ANNEXURE

FOR

"Proposed APIs Manufacturing Facility"

AT

Survey No: 155Pt, Plot No. C-29B, SIPCOT Industrial Complex -Cheyyar Phase-II,
Village: Mathur
Taluk: Vembakkam
District: Thiruvannamalai
State: Tamil Nadu

By

M/s. Global Pharma Healthcare Private Limited

[Project Activity termed under 5(f)-Synthetic Organic Chemicals manufacturing, Category - "B1" as Per EIA Notification, 2006 and its amendments]

June 2022

LIST OF ANNEXURES

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State Industries Promotion Corporation of Tamil Nadu Limited

(A Government of Tamil Nadu Undertaking)

CIN : U74999TN1971SGC005967

REF. NO. P-II/SICC/Global Pharma/2020 **DATE :25.08.2020**

ALLOTMENT ORDER FOR PLOTS

M/s. Global Pharma Health Care Pvt. Ltd.,
No.A-9, SIDCO Pharmaceutical Complex,
Alathur,
Tiruporur – 603 110.

// BY R.P.A.D //

PROJECT OFFICE 89 SIPCOT

Dear Sir(s),

Sub : SIPCOT Industrial Complex at Cheyyar Phase – II - Allotment of plot - Orders - Issued.

Ref : 1. Your application dated 18.06.2020
2. This office letters dt.29.06.2020
3. Your letter dated 9.7.2020, 15.07.2020 & 13.08.2020

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1. The following plot in SIPCOT Industrial Complex at Cheyyar Phase – II is allotted on lease for a period of ninety nine years for setting up an industrial unit for the manufacture of Diclofenac Sodium, Aciclofenac, Nalidixic Acid, Ciprofloxacin, Levofloxacin, Ofloxacin, Norfloxacin, Gatifloxacin, Moxifloxacin, Erythromycin Stearate

i. Plot No.	:	C-29B
ii. (a) Total extent (in acres)	:	2.50 acres
(b) Water Quantity (in KL)	:	60 KL
iii. Amount payable per acre	:	Rs.43,00,000/-
a. Towards Plot Deposit	:	Rs. 7,80,000/- Lakhs
b. Towards Development Charges	:	Rs.35,20,000/- Lakhs
c. Frontage Charges	:	Rs. --
d. Towards 50% capital cost on Water Supply System	:	Rs. --
e. Towards Lease rent as at 3(vi)	:	Rs.100/-
f. Caution Deposit*	:	Rs.5,37,500/-
iv. Total amount payable	:	Rs.112,87,600/-
Less : Initial Deposit	:	Rs. 22,350/-
Balance amount payable	:	**Rs. 12,65,250/-**

(Rupees one crore twelve lakhs sixtyfive thousand two hundred and fifty only)

**Caution Deposit shall be interest free and refunded, if the Allottee implements the project within the stipulated time period as per the Allotment Order.*

For Global Pharma Healthcare Pvt. Ltd.

Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT CHEYYAR

For Global Pharma Healthcare Pvt. Ltd.

Director

2258

2.a. The extent mentioned above is subject to such modification as may be necessary with reference to the measurements made at the time of handing over the site. The total amount payable will also stand accordingly modified.

b. The plot deposit alone will be refunded on the expiry of the period of lease and SIPCOT shall not pay any interest thereon.

c. The amount remitted towards development charges and any additional development charges incurred by SIPCOT and collected from you during the lease period will be adjusted towards the expenditure incurred and/or to be incurred for the development of Industrial Park including its infrastructural facilities.

d. On surrender of a plot by an allottee, refund equal to the amount remitted towards plot deposit, development charges and 50% capital cost on water supply system, with a deduction of 1% of the total amount remitted, proportionate to the extent surrendered shall be given. No compensation for improvement or for the building or for other structures erected in the plot will be made.

3. The allottee shall comply with the conditions stipulated in col. (2) of the table within the period prescribed in col.(3) as under :

S.No. (1)	Conditions (2)	Time Limit (3)
i.	Communicate your acceptance of this allotment order in the duplicate copy of this allotment order.	Within 30 days from the date of this order. In case it is not received by SIPCOT within 30 days from the date of this allotment order, the allotment shall stand automatically cancelled and initial deposit paid for the extent allotted and processing fee shall be forfeited.

For Global Pharma Healthcare Pvt. Ltd.

Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR.

For Global Pharma Healthcare Pvt. Ltd.

Director

ii.	Pay 100% of the amount payable as at 1(iv) less initial deposit already paid	**Within 90 days (Due Date-22.11.2020) from the date of this order failing which the allotment shall stand automatically cancelled and the initial deposit paid for the extent allotted and processing fee shall be forfeited.**
iii.	Execute the lease deed in the prescribed format with the concerned Project Officer and register the same.	Within 45 days from the date of payment of plot cost. If the Allottee fails to execute the Lease deed within the stipulated time, a penalty of 0.5% of the prevailing plot cost shall be levied for every 30 days beyond the stipulated period.
iv.	Take over the possession of the plot from the Project Officer concerned.	Within 15 days from the date of execution/registration of lease deed.
v.	Execute water supply agreement.	At the time of execution of Lease deed.
vi.	Payment of annual lease rent of Re.1 for the 98 years and Rs.2/- for the 99th year as at 1 (iii) d	Within 90 days from the date of this order failing which the allotment shall stand automatically cancelled and the initial deposit paid for the extent allotted and processing fee shall stand forfeited.
vii.	Implementation of the project / commercial production.	Within 36 months from the date of this order. Failure will entail cancellation of allotment and forfeiture of initial deposit and development charges paid towards the extent allotted.

4.a. The plot deposit and the development charges prescribed in Sl. No. 1 is only tentative. SIPCOT reserves the right to revise the amount payable for plot as fixed in Sl. No. 1, above in the event of SIPCOT having to pay enhanced compensation if awarded by the Court of law for the lands acquired or in case of escalation in development cost or for any other reason and such revised amount shall be paid by the allottee. The allottee shall also pay the cost of trees, wells, structures, existing in the allotted plot as fixed by SIPCOT in addition to the plot deposit and development charges and this amount is not refundable at any time for any reason.

For Global Pharma Healthcare Pvt. Ltd.

Director

For Global Pharma Healthcare Pvt. Ltd.

Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR

4.b. Since providing of infrastructural facilities by SIPCOT is an ongoing scheme for the overall development of the Industrial Park and expenses thereon would be incurred during various periods till its completion, the allottee shall not have any claim over the development charges paid to SIPCOT.

5. Annual maintenance charges for the common amenities and facilities like roads, street lighting, sanitation, drainage, common buildings, gardens, avenue plants, parks etc., will from time to time be apportioned among the allottees in the Industrial Park in which the above plot is situated. The allottee shall pay the same without demur within the period prescribed. Non payment on the due date will automatically attract interest at the rate of 12% per annum or such other rate as may be prescribed from time to time.

6. If, in the opinion of SIPCOT, it is found that the land allotted to the allottee is not put to use for the purpose for which it was allotted or is in excess of the allottee's actual requirements, SIPCOT shall, at any time, have the right to cancel the allotment in respect of such land or excess land, as the case may be, and resume the same under TNPPE Act. In that event, the plot cost paid by the allottee will be suitably adjusted and refund if any, will be made as per condition No.2(d). Interest, enhanced interest, if any already paid, will not be refunded. No compensation will be paid for improvement or for the buildings or other structures etc. erected on the plot. However, if the Allottee requests for extension of duration on implementation of the project, SIPCOT shall grant extension of time subject to payment of penality as per the existing policy.

7. a. Officers and staff of SIPCOT or any other person authorised by SIPCOT shall have the right to enter the land allotted to the allottee or the buildings constructed therein for the purpose of inspection with prior intimation.

7.b. The allottee shall not dump debris or any harmful or harmless waste materials within SIPCOT premises.

For Global Pharma Healthcare Pvt. Ltd.

Director

For Global Pharma Healthcare Pvt. Ltd.

Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR.

8. The plot is allotted on the specific condition that without implementing the project, the allottee shall not assign, sub-let, transfer or part with their interest in the allotted plot either in whole or in part except with the prior written consent of SIPCOT. In the event of the allottee seeking approval for change in constitution, or change in the management or control or amalgamation, with any other company or transfer of interest to any third party either in whole or in part, SIPCOT shall grant approval provided, the allottee or any person authorised by the allottee agrees to pay the cost determined by SIPCOT and the cost determined by SIPCOT shall be final and binding on the allottee or any person authorised by the allottee.

9. The allottee has to obtain No objection letter from SIPCOT to mortgage the lease hold rights of the allotted plot for availing financial assistance after getting sanction letter from Bank / Financial Institution and the same will be considered subject to conditions as applicable.

10. a) The allottee shall not sink any well / bore well / tube well within the plot leased to them. In case of short supply from SIPCOT sources the allottee can apply for permission which can be considered subject to the conditions as applicable.

10 (b) If any such open / bore well exists already in the plot allotted, it shall be under the custody of SIPCOT.

11. SIPCOT will, subject to availability, supply upto **60,000 litres** of water per day at the rate fixed by SIPCOT from time to time.

12.a. SIPCOT shall have the right to lay pipe lines, sink bore wells or put up any facilities for common use within a strip of 5 meters left open all sides within the periphery of the plot on the plot allotted to the company without payment of any compensation or rental etc., to the company.

b. The building plan and the plans for all structures shall be got approved by the Project Officer concerned for the limited purpose of ensuring that a strip of not less than 5 metres is left open to the sky within the periphery of the plot on all the sides.

For Global Pharma Healthcare Pvt. Ltd.

Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR.

For Global Pharma Healthcare Pvt. Ltd.

Director

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c. The provision of any culvert across common drains must be got approved from the Project Officer concerned / SIPCOT.

d. Water line should be designed in such a way that they should be connected to the common lines of SIPCOT which will serve the plot.

e. The allottee shall make necessary arrangements to implement rain water harvesting system and also drain the rain water from their plot into the common road drain provided by SIPCOT. The natural courses in the plot shall be realigned suitably to the satisfaction of SIPCOT at your own cost.

13. All buildings to be constructed shall be in conformity with the bye-laws of the local body and regulations in force from time to time as well as any other laws, rules and regulations in force relating to the construction and use of premises. However, as per the G.O.Ms.No.169, Industries (MIE.2) dated 12.9.96, the allottee can start construction immediately after submitting the necessary application for building plan approval to the appropriate authorities provided a certificate from a Chartered Architect or a Civil Engineer registered with the concerned local body is enclosed conforming that the plan is not violating any rules or regulations, including the zone regulations under the Town and Country Planning Act, 1971. This permission is subject to the undertaking that the portion of the building will be demolished, if it is found that the building violates any rules and regulations. The allottee should obtain clearances from Public Health Authorities, Inspectorate of Factories, Pollution Control Board and such other agencies whose clearances may be required under any law or procedure in force from time to time.

14. The company/firm shall treat all the effluents to relevant norms as prescribed by PCB and as applicable to the area/Inland waterways and commence production only after obtaining clearance from the Tamil Nadu Pollution Control Board. The company should strictly achere to the TNPCB Norms.

For Global Pharma Healthcare Pvt. Ltd.

Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR.

For Global Pharma Healthcare Pvt. Ltd.

Director

15. The allottee will have to make proper arrangements to treat the effluents solid/liquid/ to the required standards of the Tamil Nadu Pollution Control Board and to regulate dust, smoke, gas, noise, vibrations and prevent fire hazards and comply with the statutory regulations in this regard.

16. The allottee shall implements the Zero level discharge programme and shall not let out untreated / treated wastages in the form of solid, liquid, gas, etc.,

17. The allotment order is issued to the company/firm/Proprietary concern consisting of the following Directors/Partners/Proprietor:

Name of the Directors and % of Shareholding

1. **Thiru Juma Venkatesh : 99%**
2. **Thiru Rajendran : 0.5%**
3. **Thiru Kamalakannan : 0.5%**

The constitution of the Proprietary concern / Partnership firm / Board of Directors of Private Limited company shall not be changed without prior approval of SIPCOT. For a Public Limited Company, as and when the constitution of the Board of Directors (professionals) gets changed, the same shall be informed to SIPCOT and acknowledgement obtained within 90 days.

However any change of Directors causing change of ownership or management shall be made only with prior approval of SIPCOT.

18. a. Any change in the name of the company/firm shall be informed to SIPCOT and acknowledgement to be obtained.

b. Any change in the address of the Registered Office or Administrative Office of the allottee shall be intimated to SIPCOT immediately and acknowledgement obtained.

19. Failure to comply with any of the conditions of this allotment order shall result in cancellation of allotment, resumption of the plot and disconnection of water supply by SIPCOT. On such cancellation and plot deposit, development charges, additional development charges incurred and collected if any, lease rent or interest thereon already paid by the allottee shall not be refunded nor shall any compensation in whatever form be payable to the allottee.

For Global Pharma Healthcare Pvt. Ltd.

Director

For Global Pharma Healthcare Pvt. Ltd.

Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR

20. The allottee shall not draw water from their own Borewell / Tubewell sunk in private lands adjacent to SIPCOT Industrial Park through pipeline unauthorisedly trespassing into SIPCOT premises. If at anytime, such trespass is found by SIPCOT, penalty shall be levied for every such instance as per the existing policy and water supply will be disconnected besides severing the trespassed water line.

21. The allottee shall furnish the following details for the proposed project before execution of Lease Deed :

i) List of Directors and shareholders with % of shareholding as on date duly certified by a Chartered Accountant.

ii) Copy of Certificate of Incorporation.

iii) Copy of Memorandum and Articles of Association.

22. The allottee shall furnish an undertaking on Rs.100/- non-judicial Stamp Paper that they will comply the conditions stipulated in E.C. issued by MoEF, New Delhi before execution of Lease Deed.

23. The allottee shall install a sewage and waste water treatment and recycling plant and take steps to recover and recycle the waste water thereby achieve zero discharge as stipulated by TNPCB, besides adopting suitable measures for rain water harvesting.

24. The allottee shall furnish a copy of TNPCB approval and other statutory clearances / approvals for the proposed project before commencement of construction / production.

25. The allottee shall furnish the copy of Udyog Aadhaar Memorandum for the proposed project after commencement of Production.

For Global Pharma Healthcare Pvt. Ltd.

Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR

For Global Pharma Healthcare Pvt. Ltd.

Director

State Industries Promotion Corporation of Tamil Nadu Limited
(A Government of Tamil Nadu Undertaking)
CIN : U74999TN1971SGC005967

M/s. Global Pharma Healthcare P. Ltd.

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26. All payments shall be made ONLY through SIPCOT online portal and website : www.sipcot.tn.govt.in. Payments made directly into SIPCOT - Project Office/Head Office's Bank Account will not be considered as payment and will not be matched with the outstanding receivable from the allottee.

27. On expiry of the lease period of ninety nine years the lease may be renewed for a further period of ninety nine years on such terms and conditions as may be mutually agreed to.

Yours faithfully,
Sd/...
MANAGING DIRECTOR

Copy to :

The Project Officer,
SIPCOT Industrial Complex,
Cheyyar.

// Forwarded by Order //

H. Prathavathy
General Manager (P-II) i/c

Regd. Office : 19-A, Rukmani Lakshmipathy Road, Post Box No. 7223, Egmore, Chennai - 600 008.
Phone : 45261777, Fax : 45261796, Website : www.sipcot.tn.gov.in

For Global Pharma Healthcare Pvt. Ltd.
Director

For Global Pharma Healthcare Pvt. Ltd.
Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR

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FORM FOR THE HANDING OVER POSSESSION OF THE DEVELOPED PLOTS IN THE SIPCOT INDUSTRIAL COMPLEX, CHEYYAR, PHASE-II

1.	Developed Plot No	: C-29B
2.	Extent	: 2.50 Acres
3.	Boundaries	: North - 3.0mGB + 18m Road +3.0mGB (24.91m + 40.98 m = 65.89m). South - Plot No.C-29A (138.53m). East - Govt Land (Water body) (99.17m +12.22m = 111.39m). West - 3.0mGB + 18m Road + 3.0mGB (96.27m)
4.	State on ground (Give full details) of the level of the land and details of trees, structures and wells, etc, available in the plot	: Fairly level.
5.	Reference of the Managing Director in which the instructions are issued	: P-II/ SICC/ Global Pharma / 2020, dated. 25.08.2020.
6.	Date of handing over of the Plot	: 22.10.2020.
7.	By whom handed over (Name and Designation)	: Thriu S.Selvam, Assistant Engineer, SIPCOT, Cheyyar.
8.	By whom taken over (Full address and Status of the person should be furnished)	: Thiru.M.Kamalakannan, Director, M/s.Global Pharma Health Care Pvt Ltd., No.A-9, SIDCO Pharmaceutical Complex, Alathur, Tiruporur – 603 110
9.	SIPCOT Head office order No. & date in which the instructions are issued	: P-II/ SICC/ Global Pharma / 2020, dt 25.08.2020.

HANDED OVER

22/10/2020

ASSISTANT ENGINEER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR.

TAKEN OVER

For Global Pharma Healthcare Pvt. Ltd.

Director

22/10/2020

SIPCOT INDUSTRIAL COMPLEX, PHASE - II, CHEYYAR.

C-29 PLOT SKETCH

PLOT No.	: C-29	VILLAGE	: MATHUR
AREA	: 4.84 Acres	SUR. No.	: 155 Pt
SCALE	: 1:2500	TALUK	: VEMBAKKAM
NOTE	: ALL DIMENSION ARE IN METRES	DISTRICT	: THIRUVANNAMALAI

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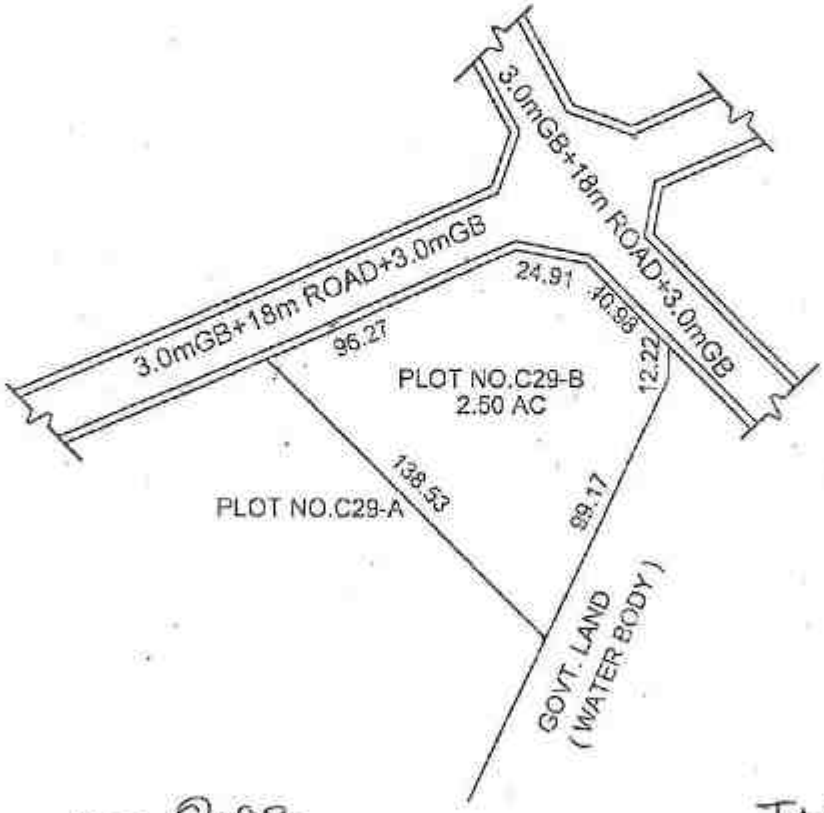

HANDED OVER

22/10/2020

ASSISTANT ENGINEER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR.

TAKEN OVER

For Global Pharma Healthcare Pvt. Ltd.

Director

22/10/2020

भारतीय गैर न्यायिक

एक सौ रुपये Rs. 100

रु. 100 ONE HUNDRED RUPEES

सत्यमेव जयते

भारत INDIA

INDIA NON JUDICIAL

தமிழ்நாடு तमिलनाडु TAMILNADU

CC 289702

Global PHARMA Healthcare PVT. LTD.

M. Sarayanan

STAMP VENDOR. L.No: 2776/E 2/
No 4/2, Padmanaban Street
Pudambakkam, Chennai 600 0

2020

21/10/2020

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LEASE DEED

MEMORANDUM OF LEASE DEED entered into at Dusi on this 22nd day of October- 2020 BETWEEN State Industries Promotion Corporation of Tamil Nadu Limited (SIPCOT), a company registered under the Companies Act, 1956 and having its Registered Office at No.19-A, Rukmani Lakshmipathy Road, Egmore, Chennai-600 008 represented by Tmt P.Maheswari W/O. Thiru B. Prabhu, Project Officer, SIPCOT Industrial Complex, Cheyyar and hereinafter referred to as the LESSOR, which term shall, unless repugnant to the context otherwise requires mean and include its representatives, administrators, successors and assigns on the one part.

LESSEE

For Global Pharma Healthcare Pvt. Ltd.

Director

For Global Pharma Healthcare Pvt. Ltd.

Director

LESSOR

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT. CHEYYAR

AND

M/s. Global Pharma Health Care Pvt Ltd., identified by Corporate Identity Number: U51102TN1986PTC013099 and PAN No. AABCG8774H a Private Limited Company having their Registered Office at No.A-9, SIDCO Pharmaceutical Complex, Alathur, Tiruporur- 603 110 represented by their Directors (1).Thiru. M.Kamalakannan (PAN No. AIOPK7689M), S/o. Thiru. Velayudam Manickam, aged about 54 years residing at 102/13, Elaiya Muthali Street, Tondiarpet, Chennai - 600 081. (2).Thiru. B.Rajendran (PAN No. ADXPR0842H), S/o. Thiru. Balakrishnan, aged about 61 years residing at L26E, Bharathidhasan Colony, Kalaignar Karunanidhi Nagar, Chennai - 600 078 hereinafter referred to as the LESSEE, which term shall, unless repugnant to the context otherwise requires, mean and include their representatives, administrators, successors and assigns on the other part witnesseth.

WHEREAS :

a) The LESSOR has been incorporated as a Limited Company with an objective to develop industrial area with basic infrastructural facilities and maintenance of such industrial area in TamilNadu.

b) The LESSOR has acquired the property more fully described in the Schedule 'A' hereunder and hereinafter referred to as the said property.

c) For the due fulfilment of its principal object, the LESSOR has laid out the said property into various plots, besides setting apart land for the purpose of laying roads, drains and for other common amenities for the benefit of the occupants of the plots so laid out and WHEREAS it also proposes to effect improvements and betterment schemes for the benefit of all the allottees of the Industrial Complex.

LESSEE

For Global Pharma Healthcare Pvt. Ltd.

Director

For Global Pharma Healthcare Pvt. Ltd.

Director

LESSOR

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR.

d) The LESSOR proposes to allot the plot on a long lease of 99 years in as much as it is felt that the characteristics and homogeneity of the Industrial Complex should not be altered with or tampered.

e) The LESSOR shall have control over the common amenities and facilities such as roads, street lighting, water supply system and sanitation, drainage, common buildings, avenue plants, parks etc., intends to make available these facilities to the LESSEE as well as other Allottees in a reasonable and equitable manner.

f) The LESSOR has decided to make available to entrepreneurs/industries, plots in the said property on terms and conditions mentioned hereunder, for the purpose of their locating any approved industry or other business or activity in the said plots under the terms of the lease deed;

g) The LESSEE made an application to the LESSOR for allotment of a plot in the Industrial Complex at Cheyyar for the purpose of putting up the project for the manufacture of Diclofenac Sodium, Aciclofenac, Nalidixic Acid, Ciprofloxacin, Levofloxacin, Ofloxacin, Norfloxacin, Gatifloxacin, Moxifloxacin, Erythromycin Stearate.

h) The LESSOR allotted the Plot No.C-29B / 2.50 Acres in the said Industrial Complex more fully described in Schedule 'B' hereunder and shown distinctly in the plan attached hereto and hereunder referred to as the allotted plot by the Order of Allotment No. P-II/ SICC/ Global Pharma/ 2020, dt. 25.08.2020 & Amendment Order No.P-I/ SIC-Cheyyar/ Global Pharma/2020, dt.14.10.2020 subject to the terms and conditions contained therein. The LESSEE has accepted the Order of Allotment.

LESSEE

For Global Pharma Healthcare Pvt. Ltd.

Director

For Global Pharma Healthcare Pvt. Ltd.

Director

LESSOR

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR.

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i) The property described in the Schedule 'A' is intended to be utilised only for the purpose of locating an Industrial unit and the restrictions and conditions stipulated in this deed are intended only to preserve the character of the said property as an Industrial Complex and for the benefit of the other plots held by the LESSOR or allotted or intended to be allotted by it to other parties similarly situated as the LESSEE.

NOW THIS LEASE DEED WITNESSETHTHAT:

1 DEFINITIONS

1.1 **"Allotment"** means allotment of plot for establishment of Industrial/Commercial/Housing/Service unit etc., as prescribed in the Allotment Order.

1.2 **"Allotment Order"** means the order issued by the LESSOR confirming the allotment of plot, with specific terms and conditions.

1.3 **"Allottee"** means an individual or person including a group of individuals under Indian Partnership Act of 1932 or a company registered under the Companies Act 1956/2013 or Limited Liability Partnership Act of 2008, or Co-operative Institution, or a body incorporated under any Act of Indian Law, established for the purpose of setting up of Industrial/Commercial/Housing/Service unit etc., to whom any plot has been allotted by the LESSOR.

1.4 **"Caution Deposit"** means the interest free deposit that shall be refunded if the Allottee implements the project within the stipulated time period as per the Allotment Order.

1.5 **"Change in Constitution"** means change in legal status of the Allottee.

LESSEE

For Global Pharma Healthcare Pvt. Ltd.

Director

For Global Pharma Healthcare Pvt. Ltd.

Director

LESSOR

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR

2020 2268

1.6 **"Change in Management"** means, (a) change in the proprietorship of the concern; (b) the change in the shareholding pattern due to induction of new partners/share-holders and where more than 50% of the shareholding is transferred to the new members resulting in total change or substantial change in ownership of the existing Allottee; (c) transfer of leasehold rights of the allotted plot, wherein the original promoters hold less than 50% shares in the transferee entity.

1.7 **"Competent Authority"** means any Department or Agency of the Government, Corporation, Board, Local Body or other authority established by the Government which are entrusted with the powers or responsibilities, inter alia, to grant or issue clearances/approvals.

1.8 **"Implementation"** means the condition where the unit has commenced commercial production/operation within the stipulated time as specified in the allotment order/lease deed or within the permitted extension time and also complying with 50% plot utilization.

1.9 **"Industrial Park/Complex/Growth Centre"** means an area developed primarily for establishment of manufacturing industries and/or service sector industries and having basic infrastructural facilities like roads, water storage and distribution infrastructure, storm water drainage, street lights and such other facilities/support services as may be required. Wherever, the word "Industrial Park" is indicated, it also means Industrial Complexes, Industrial Growth Centers, SEZs, IT Parks, Industrial Development Areas as the case may be.

LESSEE

For Global Pharma Healthcare Pvt. Ltd.

Director

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Director

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1.10 **"Participatory Infrastructure Development Programme"** means the infrastructure development programme jointly undertaken by LESSOR and Allottees/Association of Allottees for an Industrial Complex. For projects identified under this scheme, the LESSOR shall meet out the project cost upfront and 50% of the project cost shall be recovered from the Allottees/Association of Allottees of the concerned Industrial Complex.

1.11 **"Plot"** means the demarcated land parcel within the Industrial Complex provided with basic infrastructure facilities for the purpose of allotment

1.12 **"Plot Cost"** means the amount paid by the LESSEE towards the usage of land along with infrastructure facilities provided by the LESSOR.

1.13 **"Plot Utilization"** means the extent of the allotted plot covered with built-up space comprising of factory building/shed and covered utility/storage area, internal roads etc.

1.14 **"Plug and Play Facility"** means a facility where built up space is leased out for industrial activity.

1.15 **"Project Officer"** means an officer who has been designated as project officer by LESSOR, deployed at the project office of the Industrial Complex and performs tasks assigned by the LESSOR.

1.16 **"Transfer Fee"** means the amount to be paid by the LESSEE, towards Change in Management /Transfer of Leasehold rights in respect of the allotted plot.

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1.17 **"Transfer of Leasehold Rights"** means transfer of lease hold rights of the allotted plot to another legal entity or to a newly formed legal entity resulting from the change in constitution of the Allottee.

2 GRANT OF LEASE, CAUTION DEPOSIT, TERM AND CHARGES

2.1 In consideration of the allotment of plot made by the LESSOR, the LESSEE has paid a sum of Rs.1,07,50,000/- (Rupees. One Crore Seven Lakhs and Fifty Thousand only) towards plot cost.

2.2 The LESSEE has paid a sum of Rs.100/- (Rupees One hundred only) towards 100% of the annual lease rent in advance. The annual lease rent is computed at Re. One per year for 98 years and Rs.2/- for the 99th year.

2.3 The LESSEE has paid Rs.5,37,500/- (Rupees Five Lakhs Thirty Seven Thousand and Five Hundred Only) towards caution deposit which shall be interest free and refunded if the LESSEE implements the project within the stipulated time period as per the Allotment Order/Lease Deed.

2.4 The LESSOR allots the plot on lease bearing Plot No.C-29B mentioned above and more fully described in Schedule `B' to the LESSEE and the LESSEE takes the property aforesaid on lease for a period of 99 (ninety nine) years, AND the LESSEE also agrees to strictly abide by the conditions stipulated in the Lease Deed and also the terms and conditions of Allotment Order, a copy of which is enclosed with this deed.

2.5 The LESSOR shall not pay any interest to the LESEE for the amount remitted by the LESSEE.

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2.6 The LESSEE shall execute an agreement for water supply at the time of taking possession of the plot and comply with all terms and conditions of the agreement. The LESSEE shall pay water charges at the rate fixed by the LESSOR from time to time abiding by the terms of water supply agreement executed.

2.7 The LESSEE understands and agree that the Plot cost prescribed in the allotment order is only tentative. The LESSOR reserves the right to revise the amount payable for the plot as fixed in the allotment order. In the event of the LESSOR having to pay enhanced compensation for the lands acquired and/or in the event of additional development facilities being taken up and/or in case of escalation in cost of development works in future, the LESSOR shall collect the pro-rata expenses and charges as additional plot cost and the LESSEE shall pay the amount as demanded by the LESSOR.In such an event, the additional plot cost to be remitted, shall be intimated to the LESSEE as and when revised and payment for the same shall be made within ninety (90) days from the date of demand notice issued by the LESSOR.

2.8 Annual maintenance charges for the common amenities and facilities like roads, street lighting, sanitation, drainage, common buildings, avenue plants, parks etc., will from time to time be apportioned among the Allottees in the Industrial Complex as per the prevailing policy. The LESSEE shall pay the same without any demur within the period prescribed. Non-payment on due date will automatically entail an interest of **12% per annum** or such other rate as may be prescribed from time to time.

2.9 The LESSEE shall pay the charges towards the cost of trees, wells and structures, if any, in the allotted plot as prescribed by the LESSOR.

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2.10 The Participatory Infrastructure Development Programme is a scheme for upgradation of existing infrastructure and provision of support infrastructure facilities for the respective Industrial Complex at the request of the Allottees/Association of Allottees in the Industrial Complex. In the event of taking up of any such project under PIDP scheme by the LESSOR, the LESSEE shall pay proportionate amount of 50% of the project cost as per the prevailing policy.

2.11 The LESSEE shall pay all existing and future rates and taxes, charges, claims and assessments, chargeable against the LESSEE or arising out of the acts of the LESSEE in usage of the allotted plot and any building erected thereon and/or services received.

2.12 The LESSEE shall bear all expenses in connection with the drawing of power from the main lines to the plot for the supply of electricity and/or any other support infrastructure facilities.

2.13 The LESSEE understands and agrees not to raise any claim or seek refund of any of the above charges except for the caution deposit as mentioned in Clause **2.3.**

3 COVENANTS OF THE LESSEE

3.1 The LESSEE shall enter upon and take possession of the said allotted plot as it is, within 15 days from the date of execution of this lease deed, in consideration whereof the LESSEE has paid 100% of plot cost, annual lease rent and caution deposit. Failure to do so will entitle the LESSOR to cancel the allotment and execute the cancellation deed.

3.2 The LESSEE will take possession of the plot in 'as is where is' condition and no further demand for any development, such as earth filling, raising the level etc., shall be entertained. Any other

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improvement or developments inside the allotted plot is purely at the discretion of the LESSEE. Any cost incurred for such development will be borne by the LESSEE.

3.3 The LESSEE shall utilize the allotted plot only for the purpose for which it was allotted by the LESSOR and for which approvals are granted by the Competent Authorities.

3.4 The LESSEE shall, at its own cost, construct and maintain access roads leading from the Industrial Complex to the said plot in strict accordance with the specifications and details prescribed by the LESSOR.

3.5 The LESSEE shall insure all the fixed assets in the plot and renew the insurance periodically.

3.6 The LESSEE shall keep the LESSOR indemnified against any and all claims for damages which may be caused to any adjoining buildings or other premises as a consequence of the erection of the buildings and industrial installations by the LESSEE. The LESSEE shall also keep the LESSOR indemnified against all payments whatsoever which, during the progress of work, may become payable or be demanded by the Local Authority in respect of the said works, or of anything done under the authority herein contained.

3.7 **With the consent of the LESSEE**, the LESSOR shall have the right of access into and utilising any portion of the allotted plot, as required at all times, for the purpose of laying pipelines, cables, underground drainages, channels, or providing such other common facility. The LESSOR shall have further right within the area of the allotted plot including the building standing thereon as and when felt necessary by the LESSOR, to lay down, place,maintain, alter, remove

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or repair any pipes, pipe lines, conduits for service lines, posts, or other appliances or apparatus in, on, under, over, along or across the plot in such area for the purposes of providing any common amenities or services for the Industrial Complex and the same may be done either directly by any person either generally or specially authorised by the LESSOR in this behalf and the LESSEE agrees for the same.

3.8 During the period of lease the LESSEE at their expense will keep the buildings, premises and other structures clean, free from defect and in good condition.

3.9 The LESSEE shall implement and conform to the various conditions in this deed in relation to the allotted plot at all times.

3.10 Ten percent of the jobs in the Industrial units coming up in the Industrial Complex, shall be reserved to the members of the families of landowners whose lands have been acquired for the Industrial Complex, **subject to eligibility as per qualifications prescribed, mutually agreed upon by the parties, for the jobs.**

3.11 The LESSEE shall have to commence construction of buildings within six months from the date of allotment order and complete within **30 months** from the date of allotment order.

3.12 The LESSEE shall **implement the project** within 36 months from the date of allotment order. However, if the LESSEE requests for extension of duration for implementation of the project, the LESSOR shall grant extension of time subject to penalty as per the prevailing policy of the LESSOR. Failure will entail **cancellation and resumption of the allotted plot as per the Clause 12** of this deed.

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Director

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3.13 The LESSEE shall comply with the conditions applicable to it, in the Environmental Clearance/Approvals/NOC obtained from the respective Competent Authorities by the LESSOR from time to time.

4 COVENANTS OF THE LESSOR

4.1 The LESSOR reserves the right to sell, lease or otherwise deal with any plot unleased or unsold, in any manner it deems suitable **and the LESSEE shall not raise objections to the same.**

4.2 It shall be open to the LESSOR to deal with the allotted plot taken by it under the rights conferred on it as per Clause 7.2 and Clause 12.2 in any manner it likes either by retaining or by leasing it to any other person, without any let or any hindrance or claim whatsoever to the LESSEE to compensation and the LESSEE has no right to interdict the same.

4.3 The LESSOR shall have the power to grant extension of time, subject to such conditions as may be imposed to the LESSEE in **all matters** which are required to be done or completed within the prescribed time, under this deed **by imposing suitable penalties as per the prevailing policy of the LESSOR.**

4.4 The LESSOR or persons authorised by it shall have the right to enter upon and inspect the said allotted plot, during the currency of the lease at all times.

4.5 The LESSOR shall obtain the Environmental Clearances wherever applicable, DTCP approvals and other necessary statutory clearances for the Industrial Complex.

4.6 The LESSOR reserves the right to impose any further conditions and stipulations, or alterations in the regulations which are reasonable, justified and necessary at any time for the establishment of Industrial

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Complex to implement the conditions of this deed and for the benefit of the Industrial Complex as a whole by way of policy decisions and office orders/circulars which shall be published as and when imposed, which shall be binding thereon.

4.7 The LESSOR shall hold the original registered lease deed in its safe custody and a duplicate copy of the registered lease deed shall be given to the LESSEE.

5 CONSTRUCTION AND MAINTENANCE

5.1 The LESSEE shall construct all the buildings in the allotted plot, in conformity with the bye-laws of the local body and/or development and control regulations, building regulations in force from time to time, environmental laws, as well as any other laws, rules and regulations in force relating to the construction and use of premises.

5.2 All survey and other marks demarcating the boundaries of the plots, structures and installations shall be properly preserved and kept in good condition by the LESSEE, at all times. Where more than one allottee is concerned with the same boundary marks and structures the LESSOR shall allocate this obligation suitably.

5.3 No temporary or semi-permanent structure shall be built on the plot except during the period of construction or reconstruction in future.

5.4 No construction with Katcha or inflammable materials will be permitted on the site allotted.

5.5 A **setback** of not less than 5 metres shall be left open to the sky, within the periphery of the plot on all sides.

5.6 The provision of any culvert across common drains must be got approved by the LESSOR.

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5.7 Water lines should be designed in such a way that they are connected to the common lines of the LESSOR which will serve the plot.

5.8 The LESSEE should make its own arrangements to drain the rainwater from its plot into the common road drain provided by the LESSOR

5.9 The LESSEE shall not sink any well, bore well or tube well within the site allotted except with the prior permission of LESSOR, subject to the conditions as applicable. If any such well exists already in the plot it shall be closed when the LESSOR supplies water from a common source. If any bore well exists already it shall be kept under the control of the LESSOR.

5.10 LESSOR shall have the right to lay pipelines, sink bore wells or put up any facilities for common use within a strip of 5 meters left open on all sides within the periphery of the allotted plot without payment of any compensation or rental etc, to the LESSEE.

5.11 The LESSEE shall not draw water from their own Borewell/openwells/tubewells sunk in private lands adjacent to SIPCOT Industrial Complex, through pipeline unauthorizedly trespassing into SIPCOT premises. If at any time, such trespass is found by LESSOR, **penalty shall be levied as per the prevailing policy of the LESSOR** and such trespassed water line shall be severed by the LESSOR and the same shall be removed by the LESSEE.

The LESSEE shall preserve the manholes constructed if any in the 5 meter corridor and raise the same at least 45 cm above the formation level in case the natural ground level is raised by the formation at their own cost with prior intimation and approval from the LESSOR.

LESSEE LESSOR

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Director

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Director

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6 ENVIRONMENTAL COMPLIANCES

6.1 The LESSEE has to make its own arrangements to treat the effluents solid/liquid to the required standards of the Competent Authorities and to regulate emissions and prevent fire hazards and comply with all the regulations in this regard.

6.2 The LESSEE shall not dump debris or any waste harmful or harmless materials within LESSOR's premises.

6.3 The LESSEE shall not, at any time during the currency of the lease, cause or permit any nuisance in or upon the said allotted plot and in particular shall not use or permit the said allotted plot to be used for any purpose, which may be obnoxious or injurious or offensive by reason of deposits of solic matter or by harmful emissions or fire hazards or which may cause permanent damage to the allotted plot. The LESSOR shall have full right to prohibit or regulate these matters at all times.

6.4 The LESSEE shall carry out and comply with all conditions stipulated in the statutory Approvals/Clearance/NOC obtained from the Competent Authorities from time to time. In case of non-compliance of the LESSEE to such conditions, the same shall be communicated to the Competent Authorities to take remedial action.

7 BANKING, MORTGAGE AND LOAN

7.1 It shall be open to the LESSEE to ask for in writing and the LESSOR to grant a 'No Objection' certificate, with or without conditions, to enable the LESSEE to mortgage its leasehold rights at any time after taking possession for obtaining financial assistance from Financial Institutions and banks for implementing the project in the allotted plot and for the projects implemented under the same legal entity of

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the LESSEE. The LESSEE shall not offer the allotted plot as a collateral security to avail loan for other purposes/sister concern etc.

7.2 The leasehold rights of the allotted plot shall not be sold or attached and sold in satisfaction of attachment of any debt(s) by the LESSEE and if it so happens or is likely to happen without the knowledge of the LESSOR, the LESSOR shall be entitled to determine the lease and initiate proceedings under the provisions of the Tamil Nadu Public Premises (Eviction of Unauthorized Occupants) Act, 1975 or under any Statute for the time being in force for eviction against the LESSEE as well as for any other mode of recovery in force at that point of time as prescribed by law.

7.3 If the LESSEE fails to comply with any of the terms and conditions of the allotment order or of this lease deed, the NOC issued by the LESSOR in favor of the LESSEE for mortgaging the leasehold rights with the Financial Institutions/Banks shall stand cancelled and a copy of the notice mentioned in the Clause 12.1 shall be communicated to the Financial Institutions/Banks.

8 SUBLEASE AND ITS CONDITIONS

8.1 The LESSEE can sublease their built-up area for permitted industrial activity as per the prevailing office order/circular of the LESSOR, for a period of five years and renewable for every three years thereafter. The LESSEE shall pay the subleasing charges upfront annually at the rates specified in the prevailing office order/circular of the LESSOR.

8.2 The LESSEE shall communicate to the LESSOR of the sublease agreement entered into with the Sub-LESSE and the Self Declaration Form indicating the actual extent sub-leased, within 15 days from the date of the sub lease agreement. Any suppression of facts shall attract penalties as per the prevailing office order/circular of the LESSOR.

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Director

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Director

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8.3 Further, if the LESSEE has implemented the project, LESSEE shall be permitted to construct Plug & Play Facility/Warehouse in the balance unutilized area and sub-lease the same, subject to remittance of applicable sub-leasing charges as per the prevailing office order/circular of the LESSOR.

9 TRANSFER OF LEASEHOLD RIGHTS

9.1 In an event where LESSEE wishes to transfer the leasehold rights either in whole or in part, the same shall be proceeded with after obtaining prior approval from the LESSOR.

9.2 On such approval from the LESSOR, a modified lease deed shall be executed by the LESSOR with the transferee entity to the extent transferred by the LESSOR.

10 CHANGE IN CONSTITUTION AND MANAGEMENT

10.1 The change in constitution in consonance with applicable laws, shall not be made without the prior approval of the LESSOR.

10.2 The change in management of the LESSEE entity shall not be made without the prior approval of the LESSOR. In such case, the LESSEE shall pay applicable transfer fee as per the prevailing Change in Management Policy of the LESSOR and a modified lease deed shall be executed and registered to that effect.

10.3 However, if any change in the directors/partners/shareholders of the LESSEE entity does not result in change in management, such change shall be intimated within 30 days from the date of change and acknowledgement shall be obtained from the LESSOR. If there is any change in the name or the address of the registered office or administrative office of the LESSEE, the same should be intimated in writing to the LESSOR then and there along with the proof of such change.

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Director

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Director

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10.4 In the event of demise of the LESSEE, in a proprietorship concern, the legal heir or legal representatives shall intimate the same in writing to the LESSOR within 90 days from the date of such an event.

11 SURRENDER OF PLOT

11.1 The LESSEE may surrender the allotted plot or part thereof by executing/registering the surrender deed in favour of the LESSOR. In case of any existing mortgage of the allotted plot as stipulated in Clause 7.1, the LESSEE shall produce a "No Objection Certificate" or "No Due Certificate" from the concerned banks/financial institutions.

11.2 In case of any pending dues, charges, penalties to be paid by the LESSEE to any of the Competent Authorities and/or the LESSOR, the same shall be cleared by the LESSEE before executing the surrender deed.

11.3 Further, if any dues, charges or penalties are brought to the notice of the LESSOR after the execution of the surrender deed, the LESSEE shall be held responsible for clearing the same at any point of time after execution of the surrender deed.

11.4 On such a surrender, the LESSOR shall make a payment computed as per the prevailing surrender policy of the LESSOR. No compensation for improvement of building or other structures erected in the plot shall be made by the LESSOR.

12 CANCELLATION AND RESUMPTION

The LESSOR reserves the right to serve 90-days show cause notice for cancellation of the allotment and forfeiting the amount remitted for the plot allotted, if it is found that the LESSEE is in non-compliance of the terms and conditions of the allotment order or of this lease deed including non-implementation of the project and/or having unutilized extent of the allotted plot and/or non-payment of dues.

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12.1 Unless it is rectified by the LESSEE within a period of ninety (90) days from the date of show cause notice issued by the LESSOR, the LESSOR reserves the right to cancel the allotment and initiate proceedings for **resumption of the plot or part thereof** under the provisions of the Tamil Nadu Public Premises (Eviction of Unauthorised Occupants) Act, 1975 or under any Statute for the time being in force for eviction against the LESSEE as well as for any other mode of recovery in force at that point of time as prescribed by law. In such an event, the LESSEE shall not be entitled for any compensation including plot cost, annual lease rent, interest and enhanced interest, compensation for any of the structures on the allotted plot or any refund of any amount that might have been paid by the LESSEE to the LESSOR by virtue of this deed.

12.2 In such case of resumption of the **allotted plot or part thereof**, the LESSEE shall remove the factory buildings, structures and fixtures located on the same, within the stipulated period as per the Acts and Statutes mentioned in Clause 12.2, failing which the LESSOR has the right to take possession of the same without paying any compensation for any of the factory buildings, structures and fixtures on **the allotted plot or part thereof.**

13 RENEWAL

13.1 The LESSOR, at the request and cost of the LESSEE at the end of the said term of 99 years may execute a new lease of the schedule mentioned plot by way of renewal for a similar period of 99 years on such covenants and provisions as may be mutually agreed to or as per the prevailing policy.

13.2 In case the LESSEE does not opt for renewal at the expiry of 99 years lease period, the LESSEE shall peacefully quit the allotted plot and deliver vacant possession to the LESSOR after removing the

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factory building, structures and fixtures without damaging the common amenities within a stipulated time. The LESSEE shall not claim any refund of any charges whatsoever.

14 DISPUTE RESOLUTION, GOVERNING LAWS AND JURISDICTION

14.1 Any dispute or differences between the LESSOR and the LESSEE with regard to this lease deed shall be resolved amicably between the parties failing which such disputes shall be referred to a Sole Arbitrator. The Sole arbitrator shall be appointed by mutual consent of the LESSOR and the LESSEE as per the provisions of Arbitration and Conciliation Act 2016 or under any statute for the time being in force. This Lease deed shall be subject to the applicable laws of India and the courts in Chennai shall have exclusive Jurisdiction.

15 NOTICES

15.1 Unless otherwise notified in writing with acknowledgement due, the address for notice/correspondence to either of the parties hereto shall be hereunder:

The LESSOR: State Industries Promotion Corporation of Tamil Nadu Limited (SIPCOT), No.19-A, Rukmani Lakshmipathy Road, Egmore, Chennai-600 008.

The LESSEE: M/s. Global Pharma Health Care Pvt Ltd., No.A-9, SIDCO Pharmaceutical Complex, Alathur, Tiruporur- 603 110

All notices/correspondence shall be sent in writing by electronic mail or by facsimile or by post.

LESSEE

For Global Pharma Healthcare Pvt. Ltd.

Director

For Global Pharma Healthcare Pvt. Ltd.

Director

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16 AUTHORISED SIGNATORIES

16.1 The signatories to this lease deed personally covenant that they are duly authorized to execute this lease deed on behalf of the respective party whom they represent.

17 ORDERS

17.1 The LESSEE at all times shall strictly comply with prevailing office orders/circulars issued by the LESSOR which shall be published from time to time and shall be binding on the LESSEE thereon.

18 CONFIDENTIALITY

18.1 The parties agree that no announcement regarding the LESSOR/ LESSEE and /or its business or the negotiations leading to this transaction will be made by the LESSOR/LESSEE to any third parties except to Court of Law and other persons who need to be aware of the transaction for the operation of the business of the LESSOR/LESSEE.

LESSEE

For Global Pharma Healthcare Pvt. Ltd.

Director

For Global Pharma Healthcare Pvt. Ltd.

Director

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SCHEDULE – A

(Description of the Industrial Complex)

All that piece and parcel of land known as the Industrial Complex, Cheyyar at Phase-II Comprising of about 2300 Acres of land situated in (i) Mahajanampakkam, Kunnavakkam, Karanai Revenue Villages. But in compact block within the Taluk of Cheyyar and (ii) Mangal, Mathur, Ukkamperumbakkam, Alinjalpattu, Perumbulimedu, Chellaperumbulimedu and Chozavaram Revenue Villages. But in compact block within the Taluk of Vembakkam, Sub-Registration District of Dusi, Registration District of Cheyyar and Revenue District of Thiruvannamalai. The Industrial Complex is bounded.

On the South by	:	Private lands of Karanai, Kunnavakkam, Mahajanambakkam & Ukkamperumbakkam Revenue Villages.
On the North by	:	Private lands of Chozavaram, Perumbulimedu, Chellaperumbulimedu, Alinjalpattu and Mathur Revenue Villages
On the East by	:	Private lands of Mathur, Mangal & Ukkamperumbakkam Revenue Villages
On the West by	:	Private lands of Chozavaram & Karanai Revenue Villages.

LESSEE

For Global Pharma Healthcare Pvt. Ltd.

Director

For Global Pharma Healthcare Pvt. Ltd.

Director

LESSOR

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR

1 ...ந்தகம் 2020 ...ம் வருடத்திய 2268 ...ம் ஆவணம்
55 ...தான்களைக் கொண்டது
22 ...வு தமிழ் பதிவு அலுவலர்

SCHEDULE – B

(Description of the property concerned in this lease)

(Value of the property Rs. 1,07,50,000/-)

All that piece and parcel of land known as Plot No.C-29B in the SIPCOT's Industrial Complex at Cheyyar Phase-II within the village limits of Mathur, Taluk of Vembakkam, Sub-registration District of Dusi, Registration District of Cheyyar, Revenue District of Tiruvannamalai containing by admeasurement 2.50 acres or thereabouts and marked by Green Coloured boundary lines on the plan annexed hereto, bearing Survey Nos. 155pt and bounded.

On the North By: 3.0mGB +18m Road+3.0mGB

On the South By: Plot No.C-29-A

On the East By: Govt. Land(Water Body)

On the West By: 3.0mGB +18m wide Road +3.00GB

East to West on the North:	24.91 m + 40.98 m =65.89m
East to West on the South:	138.53 m
North to South on the East:	99.17m +12.22 m = 111.39m
North to South on the West:	96.27 m

For Global Pharma Healthcare Pvt. Ltd.

Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR

For Global Pharma Healthcare Pvt. Ltd.

Director

1 ...தத்தம் 2020 ...ம் வருடத்திய 2268 ...ம் ஆவணம்
55 ...தார்களைக் கொண்டது
23 ...வது தாள்

IN WITNESS WHEREOF Tmt. P. Maheswari W/o. B.Prabhu acting for and on behalf of the LESSOR and (1).Thiru. M.Kamalakannan (PAN No. AIOPK7689M), S/o. Thiru. Velayudam Manickam, Director (2).Thiru. B.Rajendran (PAN No. ADXPR0842H), S/o. Thiru. Balakrishnan, Director, acting for an on behalf of the LESSEE have hereunto set their hands on the day, month year first above written.

Signature of LESSOR

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR

WITNESS:

1. C. Jayabalan s/o. Chandrasekar, 150/2, Periyar street, Ponnambattu, Thengal.
2. M. Lakshmi (M. Gayathri w/o M. Jeeva) 2/54, Mettu street Kumananthangal.

Signature of LESSEE

Signed and delivered in the presence of:

For Global Pharma Healthcare Pvt. Ltd.

Director

WITNESS:

1. S. Siva Kumar s/o Sivasamy 1/6B Bengal amman Kovil Cinna street Ramapuram
2. C. Chandru s/o. Chitambaram Door No. 246, Kullamudaiyanur Muttur Taluk Potteneri, Salem

For Global Pharma Healthcare Pvt. Ltd.

Director

1 ...ததகம் 2020 ம் ஆண்டு ...2268 ம் ஆவணம்
55 தான்களைக் கொண்டது
24 ...

IN WITNESS WHEREOF THE Common Seal of M/s. Global Pharma Health Care Pvt Ltd., the LESSEE has hereunto been affixed on this day of 22nd October Two thousand Twenty Pursuant to the Resolution of the Board dated 21.09.2020 in the presence of (1).Thiru. V.Kamalakannan (PAN No. AIOPK7689M), S/o. Thiru. Velayudam Manickam , Director (2).Thiru. B. Rajendran (PAN No. ADXPR0842H), S/o. Thiru. Balakrishnan, Director of the company.

IN PRESENCE OF:

1. For Global Pharma Healthcare Pvt. Ltd.

Director

2. For Global Pharma Healthcare Pvt. Ltd.

Director

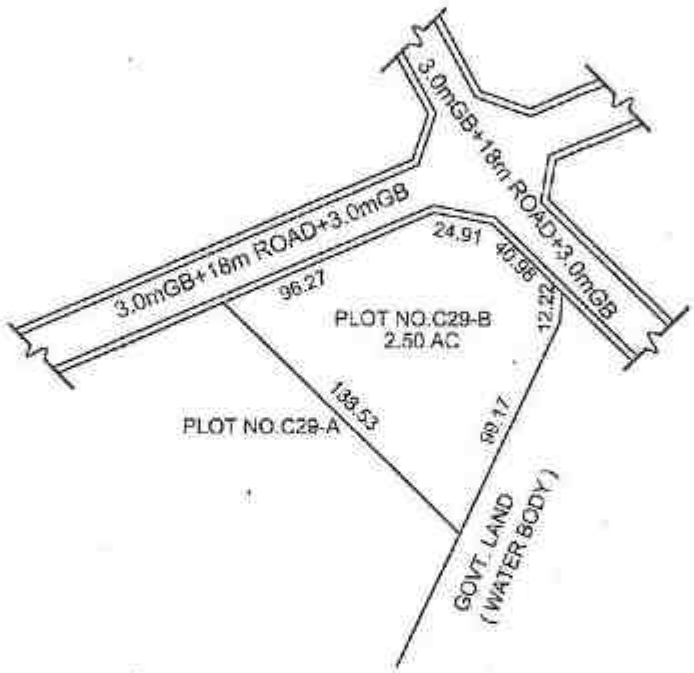
2268

SIPCOT INDUSTRIAL COMPLEX, PHASE - II, CHEYYAR.

C-29 PLOT SKETCH

PLOT No.	: C-29	VILLAGE	: MATHUR
AREA	: 4.84 Acres	SIPCOT No.	: 155 Pt
SCALE	: 1 : 2500	TALUK	: VEMBAKKAM
NOTE	: ALL DIMENSION ARE IN METRES	DISTRICT	: THIRUVANNAMALAI

N
W E
S



For Global Pharma Healthcare Pvt. Ltd.

Director

PROJECT OFFICER
SIPCOT PROJECT OFFICE
SIPCOT, CHEYYAR.

For Global Pharma Healthcare Pvt. Ltd.

Director

முதல் 2620 ம் வருடத்திய 2268 ம் ஆவணம்
55. தாள்களைக் கொண்டது
26 வது தாள்

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F.No.21-181/2014-IA-III
Government of India
Ministry of Environment, Forest and Climate Change
(IA.III Section)

Indira Paryavaran Bhawan,
Jor Bagh Road, New Delhi - 3

Dated: 30th September, 2016

To

The Managing Director,
M/s State Industries Promotion Corporation of Tamil Nadu Ltd,
19/A, Rukmani Lakshmipathy Road, Egmore,
Chennai – 600 008 (Tamil Nadu)

Sub: 'Development of SIPCOT Industrial Park' in Taluka Cheyyar, District Tiruvannamalai (Tamil Nadu) by M/s State Industries Promotion Corporation of Tamil Nadu Limited – Environmental Clearance - reg.

Sir,

This has reference to your application No.DI/EIA-Cheyyar/2016 dated 22.06.2016, submitting the above proposal to this Ministry for grant of Environmental Clearance (EC) in term of the provisions of the Environment Impact Assessment (EIA) Notification, 2006 under the Environment (Protection) Act, 1986.

2. The proposal for **'Development of SIPCOT Industrial Park'** in Taluka Cheyyar, District Tiruvannamalai (Tamil Nadu) promoted by M/s State Industries Promotion Corporation of Tamil Nadu Limited (SIPCOT), was considered by the Expert Appraisal Committee (EAC) in the Ministry for Infrastructure Development, Coastal Regulation Zone, Building/ Construction and Miscellaneous projects, in its 160th meeting held on 28-29 June, 2016.

3. The details of the project, as per the documents submitted by the project proponent, and also as informed during the above said EAC meeting, are reported to be as under:-

931.41 ha

(i) The project involves development of Industrial Park in a total area of 931.015 ha in Taluka Cheyyar, District Tiruvannamalai (Tamil Nadu) promoted by M/s State Industries Promotion Corporation of Tamil Nadu Limited. The project location is in the revenue limits of Mangal, Kunnavakkam, Mathur, karanai, Chellaperumbulimedu, Perumbulimedu, Ukkamperrumbakkam, Shozhavaram, Alinjalpattu and Mahajanambakkam villages in Cheyyar Taluk, District Thiruvannamalai (Tamil Nadu).

(ii) The geographical location is 12° 41 '36.50"N to 12° 44 '12.32"N Latitude and 79° 37' 20.20"E to 79° 41' 15.09"E Longitude.

(iii) The proposed park will house industrial units namely, metallurgical industries [item 3(a)] and Induction/Arc Furnaces/Cupola Furnaces of TPH or more [item 5(k)].

(iv) The water demand to the tune of 1 MGD will be made available through SIPCOT managed water supply systems from River Cheyyar. "Zero Waste Objectives" will be mandated to all member industries as precondition for land allotment.

(v) The member units will be mandated to establish ETPs as Zero Liquid Discharge Plants, to reclaim water for reuse/recycle in the utilities, green belt and washings.

(vi) The process solid waste, sludge from ETP/STP will be stored temporally in closed shed, having concrete floor.

(vii) The sludge will be transferred, periodically as per the plan, for pretreatment in Incinerator, if needed and final disposal into Secured land fill. Approved facility for Hazardous Solid waste Management Facility which is in operation at Gummidipoondi, to which the IP members units will transfer the Solid waste.

(viii) All member units will be mandated to develop atleast 35% of the allotted plot area as Green belt with plant and trees.

(ix) **Investment/Cost**: The cost of the project is Rs.460 crore.

(x) The project is not falling in Critically Polluted area.

(xi) **Forest land**: No forest land is involved in the project.

(xii) **Eco-sensitive area**: No specific biological diversity like National parks, wild life sanctuaries, Tiger reserve, Habituate for migratory birds, Mangrove, Wet lands and Botanical/Zoological gardens as Protected area under the Wildlife (Protection) Act, 1972, etc., are found in the project Impact area, i.e. 10 km radius of project area.

(xiii) **Employment Potential**: 5000 Nos.

(xiv) **Benefits of the project**: Environmentally compatible industrial development as Cluster for two types of industries viz., 3(a) and 5 (k).

(xv) Terms of Reference was accorded to the project vide letter No.21-181/2014-IA-III dated 19th March, 2015.

(xvi) **Public Hearing**: Public Hearing was conducted on 5th November, 2015 at Cheyyar.

4. The EAC, in its 160th meeting held on 28-29 June, 2016, has recommended the project for grant of Environmental Clearance. As per recommendations of the EAC, the Ministry of Environment, Forest and Climate Change hereby accords Environmental Clearance to the project **'Development of SIPCOT Industrial Park'** in Taluka Cheyyar, District Tiruvannamalai (Tamil Nadu) promoted by M/s State Industries Promotion Corporation of Tamil Nadu Limited, under the provisions of the EIA Notification, 2006 and amendments/circulars issued thereon, and subject to the specific and general conditions as under:-

PART A - SPECIFIC CONDITIONS

I. **Construction Phase**

(i) 'Consent to Establish' shall be obtained from State Pollution Control Board under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.

(ii) There shall be a continuous green belt along the plant premises, except at the designated entry and exit points.

(iii) The quantity of fresh water usage, water recycling and rainwater harvesting shall be measured/recorded to ensure the water balance as projected by the project proponent. The record shall be submitted to the Regional Office, MoEF&CC along with six Monthly Monitoring reports.

(iv) Special purpose vehicle shall be established for implementation monitoring and compliance of the environmental safeguards.

(v) All the recommendation of the EMP shall be complied with letter and spirit. All the mitigation measures submitted in the EIA report shall be prepared in a matrix format and the compliance for each mitigation plan shall be submitted to RO, MoEF&CC along with half yearly compliance report.

(vi) The member units shall provide storage tanks for storage of effluent for monitoring the characteristics of effluent before taking into the CETP for further treatment.

(vii) Proper meters with recording facilities shall be provided to monitor the effluent quality and quantity sent from member industries to CETP and from CETP to the final disposal/re-use on a continuous basis.

(viii) Member industries shall treat the effluent to meet the prescribed CETP inlet norms.

(ix) The project proponent shall establish an environmental monitoring cell with all the potential polluting units as members to review the environmental monitoring data and suggest for improvements.

(x) Internal Road widths within the industrial area shall be minimum 24 m ROW.

(xi) Common facilities such as repair shops, rest rooms for drivers and attendants shall be provided.

(xii) All required sanitary and hygienic measures should be in place before starting construction activities and to be maintained throughout the construction phase.

(xiii) Soil and ground water samples will be tested to ascertain that there is no threat to ground water quality by leaching of heavy metals and other toxic contaminants.

(xiv) Construction spoils, including bituminous material and other hazardous materials, must not be allowed to contaminate watercourses and the dump sites for such material must be secured so that they should not leach into the ground water.

(xv) Parking space to accommodate trucks, cars, two wheelers and bicycles shall be provided as per the norms.

(xvi) Any hazardous waste generated during development/ construction phase, should be disposed off as per applicable rules and norms with necessary approvals of the State Pollution Control Board.

(xvii) The diesel generator sets to be used during development/ construction phase should be low sulphur diesel type and should conform to Environment (Protection) Rules prescribed for air and noise emission standards.

(xviii) The diesel required for operating DG sets shall be stored in underground tanks and if required, clearance from Chief Controller of Explosives shall be taken.

(xix) Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards and should be operated only during non-peak hours.

(xx) Ambient noise levels should conform to residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during development/ construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB/SPCB.

(xxi) Fly ash should be used as building material in the construction as per the provisions of Fly Ash Notification of September, 1999 and amended as on 27th August, 2003.

(xxii) Ready mixed concrete must be used in site development and building construction.

(xxiii) Storm water control and its re-use as per CGWB and BIS standards for various applications.

(xxiv) Water demand during development/construction should be reduced by use of pre-mixed concrete, curing agents and other best practices referred.

(xxv) Permission to draw ground water shall be obtained from the competent Authority prior to construction/operation of the project.

(xxvi) Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.

(xxvii) Fixtures for showers, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor based control.

(xxviii) Use of glass may be reduced by upto 40% to reduce the electricity consumption and load on airconditioning. If necessary, use high quality low E value glass.

(xxix) Roof should meet prescriptive requirement as per Energy Conservation Building Code by using appropriate thermal insulation material to fulfill requirement.

(xxx) Opaque wall should meet prescriptive requirement as per Energy Conservation Building Code which is proposed to be mandatory for all airconditioned spaces while it is aspirational for non-airconditioned spaces by use of appropriate thermal insulation material to fulfill requirement.

(xxxi) The approval of the competent authority shall be obtained for structural safety of the buildings due to earthquake, adequacy of fire fighting equipments, etc. as per National Building Code including protection measures from lightening etc.

(xxxii) Regular supervision of the above and other measures for monitoring should be in place all through the development/ construction phase, so as to avoid disturbance to the surroundings.

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(xxxiii) Under the provisions of Environment (Protection) Act, 1986, legal actio shall be initiated against the project proponent if it was found tha construction of the project has been started without obtainin environmental clearance.

(xxxiv) The responses/commitments made to the issues raised during publi hearing shall be complied with in letter and spirit. A hard copy of th action taken shall be submitted to the Ministry.

(xxxv) 2% of the project cost shall be earmarked for Corporate Environmen Responsibility activities.

(xxxvi) Necessary provision to develop facilities for disabled people shall be mad under Corporate Environment Responsibility.

(xxxvii) Corporate Environment Responsibility:

a) The Company shall have a well laid down Environment Policy approved by the Board of Directors.
b) The Environment Policy shall prescribe for standard operating process/ procedures to bring into focus any infringements/deviation/ violation of the environmental or forest norms/ conditions.
c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished.
d) To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliances/ violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.

II. Operation Phase

(i) All the topsoil excavated during development/construction activities should be stored for use in horticulture/landscape development within the project site.

(ii) Disposal of muck during development/construction phase should not create any adverse effect on the neighbouring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.

(iii) The solid waste generated should be properly collected and segregated. Wet garbage should be composted and dry/inert solid waste should be disposed off to the approved sites for land filling after recovering recyclable material.

(iv) Diesel power generating sets proposed as source of back up power for elevators and common area illumination during operation phase should be of enclosed type and conform to rules made under the Environment (Protection) Act, 1986. The height of stack of DG sets should be equal to the height needed for the combined capacity of all proposed DG sets. The location of the DG sets may be decided with in consultation with State Pollution Control Board.

(v) Noise should be controlled to ensure that it does not exceed the prescribed standards. During night time the noise levels measured at the boundary

of the building shall be restricted to the permissible levels to comply with the prevalent regulations.

(vi) The green belt of the adequate width and density preferably with local species along the periphery of the plot shall be raised so as to provide protection against particulates and noise.

(vii) Weep holes in the compound walls shall be provided to ensure natural drainage of rain water in the catchment area during the monsoon period.

(viii) Rain water harvesting for roof run- off and surface run- off, as plan submitted should be implemented. Before recharging the surface run off, pre-treatment must be done to remove suspended matter, oil and grease. The borewell for rainwater recharging should be kept at least 4 mts. above the highest ground water table.

(ix) The ground water level and its quality should be monitored regularly in consultation with Central Ground Water Authority.

(x) Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking, loading and unloading should be fully internalized and no public space should be utilized.

(xi) A Report on the energy conservation measures confirming to energy conservation norms finalise by Bureau of Energy Efficiency should be prepared incorporating details about building materials & technology, R & U Factors etc and submit to the Ministry in three months time.

(xii) Energy conservation measures like installation of CFLs/TFLs for the lighting the areas outside the building should be integral part of the project design and should be in place before project commissioning. Use CFLs and TFLs should be properly collected and disposed off/sent for recycling as per the prevailing guidelines/rules of the regulatory authority to avoid mercury contamination. Use of solar panels may be done to the extent possible.

(xiii) The building should have adequate distance between them to allow movement of fresh air and passage of natural light, air and ventilation.

PART – B: GENERAL CONDITIONS

i) The environmental safeguards contained in the EIA Report should be implemented in letter and spirit.

ii) Provision should be made for supply of kerosene or cooking gas and pressure cooker to the labourers during construction phase.

iii) Six monthly monitoring reports should be submitted to the Ministry and it's Regional Office, Chennai.

iv) A copy of the environmental clearance letter shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industries centre and Collector's Office/ Tehsildar's office for 30 days.

v) The project proponent shall set up a separate environmental management cell for effective implementation of the stipulated environmental safeguards under the supervision of a Senior Executive.

vi) The funds earmarked for environment management plan shall be included in the budget and this shall not be diverted for any other purpose.

5. The above stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and control of Pollution) act 1981, the Environment (Protection) Act 1986, the Public Liability (Insurance) Act, 1991 and the EIA Notification, 2006.

6. Officials from the Regional Office of MoEF&CC at Chennai who would be monitoring the implementation of environmental safeguards should be given full cooperation, facilities and documents/data by the project proponents during their inspection. A complete set of all the documents submitted to MoEF&CC should be forwarded to the CCF, Regional Office of MoEF&CC at Chennai.

7. In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by this Ministry.

8. The Ministry reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environmental (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.

9. All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.

10. The project proponent should advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the Ministry of Environment, Forest and Climate Change at http://www.envfor.nic.in. The advertisement should be made within Seven days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional office of this Ministry at Chennai.

11. This clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.

12. Any appeal against the clearance lies with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

13. A copy of the clearance shall be sent by the proponent to the concerned Panchayat, Zila Parishad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.

14. The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM, SO2, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.

15. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the *Environment* (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective Regional Offices of MoEF&CC by e-mail.

30/9/2016

(S.K. Srivastava)
Scientist E

Copy to: -

1) The Secretary, Environment & Forests Department, Govt. of Tamil Nadu, Saint Geroge Port, Chennai
2) The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-32
3) The Member Secretary, Tamil Nadu State Pollution Control Board, Chennai.
4) The Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forests and Climate Change, Regional Office, 1st Floor, Handloom Export Promotion Council, 34, Cathedral Garden Road, Nungambakkam, Chennai – 34
5) Guard File
6) Monitoring File

30/9/2016

(S.K. Srivastava)
Scientist E

रजिस्ट्री सं. डी.एल.- 33004/99 REGD. No. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

सी.जी.-डी.एल.-अ.-16072021-228338
CG-DL-E-16072021-228338

असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 2653] नई दिल्ली, शुक्रवार, जुलाई 16, 2021/आषाढ़ 25, 1943
No. 2653] NEW DELHI, FRIDAY, JULY 16, 2021/ASHADHA 25, 1943

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 16 जुलाई, 2021

का.आ. 2859(अ).—केन्द्रीय सरकार ने पर्यावरण (संरक्षण) अधिनियम, 1986 की धारा 3 की उपधारा (1) और उपधारा (2) के खंड (v) के अधीन जारी की गई पर्यावरण समाघात निर्धारण अधिसूचना संख्यांक का.आ. 1533(अ), तारीख 14 सितंबर, 2006 (जिसे इसमें इसके पश्चात् उक्त अधिसूचना कहा गया है) द्वारा भूमि सुनिश्चित करने के सिवाय परियोजना प्रबंधन द्वारा भूमि के किसी संनिर्माण संकर्म या उसे तैयार करने के पूर्व उक्त अधिसूचना की अनुसूची में सूचीबद्ध नवीन परियोजनाओं या क्रियाकलापों के, यथास्थिति, विस्तारण या आधुनिकीकरण के कार्य और/या उत्पाद मिश्रण में परिवर्तन हेतु संबंधित विनियामक प्राधिकरण से पूर्व पर्यावरण अनापत्ति की अपेक्षा को बाध्यकारी बनाया था ;

और कोविड – 19 महामारी को दृष्टिगत रखते हुए तथा औषधि विनिर्माण की अपेक्षा को त्वरित करने हेतु 'उक्त अधिसूचना' का संशोधन अधिसूचना सं. का.आ. 1223(अ), तारीख 27 मार्च, 2020 द्वारा किया गया जिसमें यह अधिसूचित किया गया कि 30 सितंबर, 2020 तक प्राप्त एक्टिव फार्मास्युटिकल इन्ग्रेडिएंट्स (एपीआई) की बाबत परियोजनाओं या क्रियाकलापों के सभी प्रस्तावों को श्रेणी 'बी2' परियोजनाओं के रूप में निर्धारित किया जाएगा । तत्पश्चात् ऊपर वर्णित अवधि को अधिसूचना सं. का.आ. 3636(अ), तारीख 15 अक्टूबर, 2020 द्वारा छह मास के लिए 30 सितंबर, 2020 से 30 मार्च, 2021 तक बढ़ाया गया ;

और, कोविड-19 महामारी की दूसरी लहर फैलने को दृष्टिगत रखते हुए, केन्द्रीय सरकार को 30 मार्च, 2021 से आगे समय अवधि को और बढ़ाने के लिए अनुरोध प्राप्त हुए हैं क्योंकि औषधि विनिर्माण को त्वरित करने की निरंतर आवश्यकता है ;

और, केन्द्रीय सरकार, कोविड-19 महामारी की दूसरी लहर फैलने तथा औषधि विनिर्माण को त्वरित करने की निरंतर आवश्यकता को दृष्टिगत रखते हुए, एक और बारी प्रदान करना आवश्यक समझती है ;

अतः, अब, केन्द्रीय सरकार, पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 3 की उपधारा (1) और उपधारा (2) के खंड (v) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, उक्त अधिसूचना में निम्नलिखित और संशोधन करती है, अर्थात् :--

उक्त अधिसूचना की अनुसूची में, स्तंभ (5) में मद 5(च) के सामने, तीसरे पैरा के स्थान पर निम्नलिखित पैरा रखा जाएगा, अर्थात् :-

"16 जुलाई, 2021 से 31 दिसंबर, 2021 तक प्राप्त एक्टिव फार्मास्युटिकल इन्ग्रेडिएंट्स (एपीआई) की बाबत परियोजनाओं या क्रियाकलापों के सभी प्रस्तावों को श्रेणी 'बी2' परियोजनाओं के रूप में निर्धारित किया जाएगा, परंतु 31 दिसंबर, 2021 के पश्चात् किसी उत्पाद मिश्रण में कोई पश्चात्वर्ती संशोधन या विस्तार या परिवर्तन उस समय प्रवृत्त उपबंधों के अनुसार माना जाएगा ।"

[फा. सं. 22-25/2020-आईए-III)]

डा. सुजीत कुमार बाजपेयी, संयुक्त सचिव

टिप्पण : मूल अधिसूचना भारत के राजपत्र, असाधारण, भाग II, खंड 3, उपखंड (ii) में अधिसूचना संख्या का.आ. 1533(अ), तारीख 14 सितम्बर, 2006 द्वारा प्रकाशित की गई और उसका अंतिम संशोधन अधिसूचना संख्या का.आ. 2817(अ), तारीख 13 जुलाई, 2021 द्वारा किया गया ।

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 16th July, 2021

S.O. 2859(E).—Whereas, the Central Government, in exercise of its powers by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 has published the Environment Impact Assessment Notification, 2006 *vide* number S.O. 1533(E), dated the 14th September, 2006, (hereinafter referred to as the said notification) making the requirement of prior environmental clearance from the concerned regulatory authority mandatory for all new projects or activities listed in the Schedule to the said notification, their expansion and modernisation and/or change in product mix, as the case may be, before any construction work or preparation of land by the project management except for securing the land;

And Whereas, in view of the CoVID-19 pandemic and the requirement to expedite drug manufacturing the 'said notification' was amended *vide* notification no. S.O. 1223(E), dated 27th March, 2020 wherein it was notified that all proposals for projects or activities in respect of Active Pharmaceutical Ingredients (API), received up to 30th September, 2020, shall be appraised as Category 'B2' projects. Subsequently, the above mentioned period was extended by six months from 30th September, 2020 to 30th March, 2021 *vide* notification no. S.O. 3636(E) dated 15th October, 2020;

And Whereas, in view of the outbreak of the second wave of COVID-19 pandemic, the Central Government has received requests for further extension of the time period beyond 30th March, 2021 as there is a continued requirement to expedite drug manufacturing;

And Whereas, the Central Government deems it necessary to provide another window in view of the second wave of COVID-19 pandemic and continued requirement of expeditious drug manufacturing;

Now, Therefore, in exercise of powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government, hereby makes following further amendments in the said notification, namely:-

In the said notification, in the Schedule, against item 5(f), in column (5), for the third paragraph the following paragraph shall be substituted, namely:-

"*All proposals for projects or activities in respect of Active Pharmaceutical Ingredients (API), received from 16th July, 2021 to 31st December, 2021, shall be appraised, as Category 'B2' projects, provided that any subsequent amendment or expansion or change in product mix, after the 31st December, 2021, shall be considered as per the provisions in force at that time*."

[F. No. 22-25/2020-IA.III]

Dr. SUJIT KUMAR BAJPAYEE, Jt. Secy.

Note : The principal notification was published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) *vide* number S.O. 1533(E), dated the 14th September, 2006 and was last amended vide the notification number S.O. 2817(E), dated the 13th July, 2021.

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रजिस्ट्री सं. डी.एल.- 33004/99 REGD. No. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

सी.जी.-डी.एल.-अ.-16102020-222503
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असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 3224] नई दिल्ली, शुक्रवार, अक्तूबर 16, 2020/आश्विन 24, 1942
No. 3224] NEW DELHI, FRIDAY, OCTOBER 16, 2020/ASVINA 24, 1942

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 15 अक्तूबर, 2020

का. आ. 3636(अ).—केंद्रीय सरकार, पर्यावरण (संरक्षण) नियम, 1986 के नियम 5 के उपनियम (3) के खंड (घ) के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 3 की उपधारा (1) और उपधारा (2) के खंड (v) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, जनहित में उक्त नियमों के नियम 5 के उपनियम (4) के खंड (क) के अधीन सूचना की अपेक्षा से अभिमुक्त हो जाने के पश्चात्, भारत के राजपत्र, भाग II, खंड 3, उपखंड (ii) में प्रकाशित भारत सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय की अधिसूचना सं. का.आ. 1533(अ), तारीख 14 सितंबर, 2006 में निम्नलिखित और संशोधन करती है, अर्थात् :--

उक्त अधिसूचना की अनुसूची में, क्रम सं0 5(च) के स्तंभ (5) में, "30 सितंबर, 2020" अंकों और शब्द के स्थान पर, दोनों स्थानों पर, जहां वे आते हैं, "30 मार्च, 2021" अंक और शब्द रखे जाएंगे ।

[फा. सं. 19-21/2020-आई.ए.III]

गीता मेनन, संयुक्त सचिव

टिप्पण : मूल अधिसूचना भारत के राजपत्र, असाधारण, भाग II, खंड 3, उपखंड (ii) में अधिसूचना सं. का.आ. 1533(अ), तारीख 14 सितंबर, 2006 द्वारा प्रकाशित की गई थी और उसका अंतिम बार का.आ. 1562(अ), तारीख 21 मई, 2020 द्वारा संशोधन किया गया था ।

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 15th October, 2020

S.O. 3636(E).—In exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986), read with clause (d) of sub-rule (3) of rule 5 of the Environment Protection Rules, 1986, the Central Government after having dispensed with the requirement of notice under clause (a) of sub-section (4) of rule 5 of the said rules in the public interest, hereby makes the following further amendment in the notification of the Government of India in the Ministry of Environment and Forest, Published in the Gazette of India, Part II, Section 3, Sub-section (ii), vide number S.O 1533 (E), dated the 14th September, 2006, namely:-

In the said notification, in the Schedule, in sl. Number 5(f), in column (5), for the figures, letters and word "30th September, 2020", at both the places where they occur, the figures, letters and word " 30th March, 2021" shall be substituted.

[F.No. 19-21/2020-IA.III]

GEETA MENON, Jt. Secy.

Note : The principal notification was published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii), vide number S.O. 1533(E), dated the 14th September, 2006 and was last amended vide number S.O 1562 (E), dated the 21st May, 2020.

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असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 1087] नई दिल्ली, शुक्रवार, मार्च 27, 2020/चैत्र 7, 1942
No. 1087] NEW DELHI, FRIDAY, MARCH 27, 2020/CHAITRA 7, 1942

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 27 मार्च, 2020

का.आ.1223(अ).—केंद्रीय सरकार, पर्यावरण (संरक्षण) अधिनियम 1986 की धारा (3) की उपधारा (1) और उपधारा (2) के खंड (v) के अधीन उसको प्रदत्त शक्तियों का प्रयोग करते हुए, तत्कालीन पर्यावरण और वन मंत्रालय में परियोजनाओं के कतिपय प्रवर्गों के लिए पूर्व पर्यावरण अनापत्ति आज्ञापक बनाते हुए का. आ. 1533 (अ) तारीख 14 सितंबर, 2006 द्वारा पर्यावरणीय समाघात निर्धारण अधिसूचना, 2006 प्रकाशित किया है;

और पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, थोक औषधियों और मध्यवर्तियों के बाबत परियोजनाओं या क्रियाकलापों के लिए पूर्व पर्यावरणीय अनापत्ति में तेजी लाने के लिए आवश्यक समझता है। नोवेल कोरोना वायरस (कोविड -19) के प्रकोप को कम करने के लिए व्यापक और मजबूत प्रणाली के एक भाग के रूप में, नोवेल कोरोना वायरस (कोविड -19) के समाघात को कम करने के लिए औषधि की उपलब्धता या उत्पादन को सुनिश्चित किया जाना है। मंत्रालय ने यह आवश्यक समझा है कि नोवेल कोरोना वायरस (कोविड -19) जैसी बीमारियों का पता लगाने के लिए थोक औषधियों और मध्यवर्तियों की बाबत विनिर्मित सभी परियोजनाओं या क्रियाकलापों और इसी तरह के लक्षणों वाले रोगों को 30 सितंबर, 2020 तक की अवधि के लिए 'बी2' के रूप में वर्गीकृत किया है।

अत:, अब, केन्द्रीय सरकार, पर्यावरण (संरक्षण) नियम, 1986 के नियम 5 के उपनियम (4) के साथ पठित पर्यावरण संरक्षण अधिनियम, 1986 (1986 का 29) की धारा 3 की उपधारा (1) और उपधारा (2) के खंड (v) द्वारा उसको प्रदत्त शक्तियों का प्रयोग करते हुए, लोकहित में, नियमों के नियम 5 के उप-नियम (3) के खंड (क) के अधीन सूचना की अपेक्षा से अभिमुक्ति के पश्चात्, इस अधिसूचना के राजपत्र में प्रकाशन की तारीख से 30 सितंबर, 2020 तक की अवधि के लिए भारत के

राजपत्र, असाधारण, भाग II, खंड 3, उपखंड (ii) में सं. का. आ. 1533 (अ), तारीख 14 सितंबर, 2006 द्वारा प्रकाशित भारत सरकार के तत्कालीन पर्यावरण और वन मंत्रालय की उक्त अधिसूचना में निम्नलिखित और संशोधन करती है, अर्थात् :-

उक्त अधिसूचना की अनुसूची में, स्तंभ (5) के मद 5 (च) के सामने उससे संबंधित प्रविष्टियों के पश्चात्, निम्नलिखित प्रविष्टियां अंत:स्थापित की जाएंगी, अर्थात् :-

"30 सितंबर, 2020 तक प्राप्त एक्टिव फार्मास्युटिकल इन्ग्रेडिएंट्स (एपीआई) की बाबत परियोजनाओं या क्रियाकलापों के सभी प्रस्तावों को श्रेणी 'बी2' परियोजनाओं के रूप में निर्धारित किया जाएगा, परन्तु 30 सितंबर, 2020 के पश्चात् कोई पश्चात्वर्ती संशोधन या उत्पाद मिश्रण में विस्तार या परिवर्तन उस समय तक प्रवृत्त उपबंधों के अनुसार माना जाएगा।"

[फा. सं. 19-21/2020 – आई ए. III]

गीता मेनन, संयुक्त सचिव

टिप्पण : मूल अधिसूचना संख्या का. आ. 1533 (अ) तारीख 14 सितंबर, 2006 द्वारा भारत के राजपत्र, असाधारण, भाग II, खंड 3, उप-खंड (ii) में प्रकाशित किया गया था और अधिसूचना संख्या का. आ. 751 (अ), तारीख 17 फरवरी, 2020 द्वारा अंतिम संशोधन किया गया था।

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 27th March, 2020

S.O. 1223(E).—WHEREAS, the Central Government in the erstwhile Ministry of Environment and Forests, in exercise of its powers under sub-section (1) and clause (v) of sub-section (2) of section (3) of the Environment (Protection) Act, 1986 has published the Environment Impact Assessment Notification, 2006 *vide* number S.O.1533 (E), dated the 14th September, 2006, mandating prior environmental clearance for certain category of projects;

AND WHEREAS, the Ministry of Environment, Forest and Climate Change deems it necessary to expedite the prior Environmental Clearances to the projects or activities in respect of bulk drugs and intermediates. As a part of comprehensive and robust system to handle the Novel Corona Virus (COVID-19) outbreak, drug availability or production to reduce the impact of the Novel Corona Virus (COVID-19) are to be ensured. The Ministry deems it necessary that all projects or activities in respect of bulk drugs and intermediates manufactured for addressing ailments such as Novel Corona Virus (COVID-19) and those with similar symptoms are categorized as 'B2' for a period up to the 30th September 2020, as an interim measure.

Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986), read with sub-rule (4) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government, after having dispensed with the requirement of notice under clause (a) of sub-rule (3) of the rule 5 of the rules in public interest hereby makes the following further amendments in the said notification of the Government of India, in the erstwhile Ministry of Environment and Forests published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) vide number S.O. 1533 (E), dated the 14th September, 2006, for a period up to 30th September 2020 from the date of publication of this notification in the official Gazette, namely:-

In the said notification, in the Schedule, against the item 5(f), in the column (5), after entries relating thereto the following entries shall be inserted, namely:-

"All proposals for projects or activities in respect of Active Pharmaceutical Ingredients (API), received up to the 30th September 2020, shall be appraised, as Category 'B2' projects, provided that any subsequent amendment or expansion or change in product mix, after the 30th September 2020, shall be considered as per the provisions in force at that time.".

[F.No. 19-21/2020-IA.III]

GEETA MENON, Jt. Secy.

Note: The principal notification was published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) *vide* number S.O. 1533 (E), dated the 14th September, 2006 and was last amended *vide* the notification number S.O. 751(E), dated the 17th February, 2020.

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EMERGENCY EVACUATION & PREPARDNESS PLAN

PROPOSED APIs MANUFACTURING FACILITY

M/s. GLOBAL PHARMA HEALTHCARE PRIVATE LIMITED

AT

Plot No. C-29B, SIPCOT Industrial Complex,

Cheyyar Phase-II

Village: Mathur,

Taluk: Vembakkam,

District: Thiruvannamalai

State: Tamil Nadu

PREPARED BY

HUBERT ENVIRO CARE SYSTEMS (P) LTD, CHENNAI

DOCUMENT REVISION & AUTHORIZATION SHEET

REV.	DATE	REASON OF ISSUE	FILE NAME
A	13-05-2022	Issued as Draft Report	ERP Report – Global Pharma Healthcare Private Limited
	PREPARED BY	VERIFIED BY	AUTHORIZED BY
	Mr.Ragul Aadhitya A	Mr.C.S.Manoj Kumar	Dr. Moses

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1. INTRODUCTION

Global Pharma is a pharmaceutical company dedicated to ensuring the health and wellbeing of communities around the world. Global Pharma Healthcare Pvt Ltd has proposed to setup a new facility to Produce Active Pharma Ingredients (API) to meet the current global demand.

The proposed project will be located at Survey No: 155Pt, Plot No. C-29B (2.50 acres), SIPCOT Industrial Complex -Cheyyar Phase-II, Mathur Village, Vembakkam Taluk, Thiruvannamalai District, Tamil Nadu.

1.1 PURPOSE OF THE EMERGENCY EVACUATION & PREPARDNESS PLAN

The main aim of this report is to assist the organization regarding the various aspects of emergencies that could affect the health and safety of the people and property associated with the Global pharma manufacturing unit.

An emergency in the manufacturing facility has the potential to cause serious injuries or loss of live or extensive damage to the property and / or environment and serious disruption both inside and / or outside the works. In such cases sometimes outside agencies are required to call for help in handling the situation. The causative factors like equipment failure, human error, earthquake, sabotage etc. will normally manifest in various forms viz. Fire and Structure collapse etc.

Despite best design and layout of the facility, safe operating procedures and various preventive measures the possibility of a disaster cannot be totally ruled out. During this event timely and organized action must be taken to control the situation and to minimize the damage or loss to the facility, human beings and environment. Hence the need of a proper "Emergency Preparedness and Response Plan (EPRP)". Such plan gives the guidelines for employees, contractors, transporters and Visitors etc. The EPRP not only defines the responsibilities but also inform about prompt rescue / evacuation / co-ordination operations and some more.

1.2 SCOPE OF THE EMERGENCY EVACUATION & PREPARDNESS PLAN

The main objective of emergency evacuation and preparedness plan is to highlight the following:

- What are the hazards and risk in the facility due to natural disasters.
- Response to carried out in the event of an emergency; and
- Preventive measures for potential and unexpected incidents at the workplace.

2. POSSIBLE EMERGENCIES

An emergency is a situation, which may lead to or cause a large-scale damage or destruction to life or property or environment within or outside the manufacturing facility. Sometimes the Emergency results into uncontrollable situations and leads towards disaster. Such an unexpected severe situation may be too great for the normal workforce in the area within.

Some of the emergency situations that would result in :

- Fire.
- Electrical fire/short circuiting.
- Natural calamities.
- Structural collapse.
- Medical Emergency.
- Chemical spills

3. ACTION PLAN TO VARIOUS EMERGENCIES

3.1. FIRES

In case of any fire incident the following steps are to be followed by the building occupants:

- Be concerned about your own safety as well as that of others.
- Inform others by verbal signal: "FIRE, FIRE, FIRE".
- If the fire is controllable by nearby fire extinguishing equipment and you know firefighting, control the fire without undue personal risk.
- Shut off the electrical supply quickly.
- Use fire hydrant system point located nearer to the affected area.
- If you can't extinguish it alone, activate the fire alarm/MCP and get help.
- Inform to Safety and security team-nearest helpdesk
- Inform to manager and site controller
- Make certain you know your escape route and assembly point.
- Do not panic.
- People not involved in firefighting operation directly, should quickly move through emergency exit routes & assemble at nearest emergency assembly point.
- For any other assistance – Call emergency number.

3.2. ELECTRICAL FIRE

In case of any electrical fire occurred due to short circuiting or any other reason the following procedure needs to be followed:

- Switch off the main switch.
- Activate the fire alarm/MCP and get help.
- Before using a fire extinguisher make sure that it is not outdated, and it is of Carbon dioxide type.
- Don't use water to extinguish the fire if the main line is live.
- Inform to site controller/location manager
- Make certain you know your escape route and assembly point.
- Do not panic. Inform Utility or security person
- Make certain you know your escape route and assembly point.
- Do not panic.
- People not involved in firefighting operation directly, should quickly move through emergency exit routes & assemble at nearest emergency assembly point.
- For any other assistance call emergency number.

3.3. GAS FIRES

If a cylinder has caught on fire OR is in close proximity to a fire than the following actions shall be taken:

- Evacuate the area 100m around the fire
- Inform those within 100-300m from the fire that a gas cylinder is involved in the fire
- Call the fire brigade and inform them of the fires location and gasinvolved.
- Inform your gas supplier of the incident as the cylinder integrity will have been compromised.
- Do not attempt to fight the fires

3.4. NATURAL CALAMITIES

In case any natural disaster like earthquake the following procedure should be followed by the occupants:

a) When you are inside the building & earthquake is felt:

- Take a safe position (e.g. Under the table, concrete wooden beam, concrete column, door bracket.

- Do not use lift. Do not stand near doors, gate
- If you are driving, or on road, go to open space
- Keep away from walls, building, and electric pole/wires.
- Keep away from building, sheds, electric wires
- Keep cool & keep others cool.

b) After the earthquake:

- There can be more such jerks immediately hence go to open space.
- Close connections of LPG, Electricity, water.
- Do not smoke, ignite matchstick, or put on main switches.
- Do not touch electric wires.
- Drink clean water.
- Do not go near partially collapsed buildings.
- Keep roads clear for traffic.

c) In case of flood:

- Be ready to evacuate as directed by the Emergency Coordinator.
- Follow the recommended primary or secondary evacuation routes.
- Climb to high ground and stay there.
- Avoid walking or driving through flood water.
- Avoid walking or driving through flood water.
- For further help contact emergency.

d) In case of cyclone alert(before cyclone hits):

- Leave early before your way to high ground or shelter gets flooded
- Do not delay and run the risk of being marooned
- If your house is securely built on high ground take shelter in the safe part of the house. However, if asked to evacuate do not hesitate to leave the place.
- Board up glass windows or put storm shutters in place.
- Provide strong suitable support for outside doors.
- If you do not have wooden boards handy, paste paper strips on glasses to prevent splinters. However, this may not avoid breaking windows.
- Get extra food, which can be eaten without cooking. Store extra drinking water in suitably covered vessels.
- If you have to evacuate the house move your valuable articles to upper floors to minimize flood damage.
- Ensure that your hurricane lantern, torches or other emergency lights are in working condition and keep them handy.

- Small and loose things, which can fly in strong winds, should be stored safely in a room.
- Be sure that a window and door can be opened only on the side opposite to the one facing the wind.
- Make provision for children and adults requiring special diet.
- If the center of the cyclone is passing directly over your house there will be a lull in the wind and rain lasting for half an hour or so. During this time do not go out; because immediately after that, very strong winds will blow from the opposite direction.
- Switch off the electrical mains in your house.
- Remain calm

e) Post cyclone measures:

- You should remain in the shelter until informed that you can return to your home.
- You must get inoculated against diseases immediately.
- Strictly avoid any loose and dangling wires from lamp posts.
- If you have to drive, do drive carefully.
- Clear debris from your premises immediately.
- Report the correct losses to appropriate authorities

3.5. STRUCTURAL COLLAPSE

- Activate the emergency alarm.
- Evacuate the building immediately and assemble at Assembly Point
- Isolate & Barricade if necessary.
- Head count to be taken by the security or emergency response team.
- Rescue Operation to be carried out in case of missing personals.
- Hospitalize the victims in case of injury.

3.6. MEDICAL EMERGENCY

- Provide information to Emergency Response Team immediately.
- Move injured person to hospital
- Local legal requirement to be carried out.
- Information to be given to branch manager.

3.7. CHEMICAL SPILLS

1. Ensure all the employees involved in handling chemicals have access to Material Safety Data Sheets (SDSs) for the hazardous materials that are being used in the facility.
2. Proper care should be taken to ensure that MSDS file is updated with all the chemicals being used in the facility.
3. Understand the properties and hazards of the materials before beginning to use them.
4. Maintain a call list (daytime and after-hours) of individuals who should be notified in an emergency.
5. Emergency contact numbers should be displayed in the facility.
6. Collect and maintain spill response supplies. Sources include: safety suppliers, Biochemistry and Chemistry Stores.
7. Know the location of and how to use emergency equipment such as emergency showers and eye washes.
8. Train and practice for effective spill response.

RESPONDING TO CHEMICAL SPILLS:

Step1: Attend to personal injures

Potential health effects is the most important hazard category to consider when deciding whether or not to attempt a spill cleanup. Some chemical releases may result in health hazards such as fires or explosions. Other chemical releases may present health threats because of their ability to spread rapidly and enter the body readily. A spill is not "simple" if it presents these risks.

If the potential for fire or explosion exists, seek outside assistance from trained emergency responders. Releases of flammable chemicals (liquid or solid) can present significant fire and explosion risks when one or more of the following is present:

- Volatile vapors.
- Water reactive or air reactive chemicals.
- Ignition sources.
- Oxidizers.
- Significant quantities of combustible materials.

Toxic vapors and dust are also hazardous. Avoid direct contact with such hazards because they spread quickly, are easily absorbed through the skin, and may damage tissue.

A chemical spill is not a health risk if it has a low toxicity (especially if it is not volatile or a dust), is not highly corrosive, and is not a strong oxidizer. Such spills may be considered "simple" only if physical damage or environmental factors are absent. When a spilled chemical's toxicity is unknown, treat the spill like a potential human health hazard by avoiding exposure and seeking outside assistance.

- **Clothing on fire:** Roll person on floor to smother flame, drench with water if immediately available.
- **Splash in eyes:** Immediately rinse eyes with water continuously for 15 minutes. Forcibly hold eye open to rinse behind eyelids. Obtain medical attention.
- **Spill on body:** Remove contaminated clothing and flood exposed area with running water from faucet or safety shower for 5 minutes. Make sure spill has not accumulated in shoes.
- **For biological spills:** wash exposed area with soap and water.
- **Minor cuts and puncture wounds:** Wash vigorously with soap and water, bandage wound, seek medical help if necessary.

Step 2:Assessing the risk of spill

The next step to take when determining whether a spill is "simple" is to evaluate the quantity of material released. If a spilled chemical is not hazardous, its cleanup (without the assistance of an emergency response team) is dependent on the ability to control the spill, as well as the availability of sufficient spill control materials (e.g., an absorbent for liquids). Factors that may complicate a cleanup effort (such as the unique characteristics of a spill's surroundings or the restricted access to a spill) must be determined on a case-by-case basis.

If the spilled chemical is hazardous, the threshold quantity for a simple spill cleanup depends on the spilled chemical's physical properties and hazards. This quantity depends on situational factors such as

- The training and experience of the workers.
- The availability of spill control materials.
- The availability of personal protective equipment.

- The physical layout of the spill location.

The more toxic, corrosive, or flammable a material is, the less likely that the spill can be defined as "simple". Thresholds for flammable liquids and solids, as well as volatile toxics, should be relatively low. Spills of reactive chemicals should only be managed by trained responders (who may be in-house). In general, simple spill thresholds for liquids will be lower than the thresholds for solids. Additionally, simple spill thresholds for volatiles will be lower than the thresholds for non-volatiles

Step 3: Evaluate potential impacts

The third step to take when deciding whether a spill can be managed as a simple spill is to evaluate the potential broader impacts of the spill. A chemical spill in an area where its potential risks are magnified by specific situations (such as physical situations or the presence of a large number of people) should not be managed as a simple spill. For instance, the presence of boxes, chemicals, and other ignition sources would magnify the impact of a one-gallon release of acetone. Since acetone is highly flammable and volatile, this situation would be immediately dangerous to both human health and property, and cleanup should be handled by an emergency responder. Other factors that may magnify a spill's impact and require emergency response are

- The possibility that hazardous vapors or dusts might enter the ventilation system (and be distributed to other areas);
- The possibility that spilled liquids might flow into other areas, thus expanding the threat of harm (such as reaching ignition sources, exposing other people, damaging delicate equipment);
- The presence of incompatible chemicals;
- Spills in sinks that might be connected to other sinks through the plumbing system.

When evaluating potential impacts, a prompt response can minimize adverse consequences. On the other hand, an inappropriate response can turn a simple spill into a complex situation.

To determine whether a spill is simple or complex (which is often the hardest part of spill response), you need to know the hazards posed by the spilled chemical and the

spill's potential impact. The following information will help you determine whether you have a simple spill:

- The type of chemical(s) spilled.
- The amount of chemical spilled.
- The hazardous characteristics of the spilled chemical(s),
- The location of the spill.
- The proper method for cleaning up the spill,
- The personal protective equipment available.

Major spills

- Activate alarm, evacuate, and assemble at a safe distance
- Account for people; warn others not to enter
- Wait for and provide information to responders

PROCEDURE FOR CLEANING UP SIMPLE SPILLS

For simple spills, emergency responders do not need to be notified. However, you should contact the environmental health and safety office or other responsible person within your facility. Most importantly, before cleaning up a simple spill, be sure that you can do so safely. You must have the right personal protective equipment, including, at a minimum, appropriate eye protection, protective gloves, and a lab coat. Additional protective equipment may be required for spills that present special hazards (such as corrosive or reactive spills or spills that have a splash potential).

The following steps should be taken during spill cleanup.

1.Prevent the spread of dusts and vapors.

If the substance is volatile or can produce airborne dusts, close the doors and increase ventilation (through fume hoods, for example) to prevent the spread of dusts and vapors to other areas.

2. Neutralize acids and bases, if possible.

Spills of most liquid acids or bases, once neutralized, can be mopped up and rinsed down the drain (to the sanitary sewer). However, be careful because the

neutralization process is often vigorous, causing splashes and yielding large amounts of heat. Neutralize acids with soda ash or sodium bicarbonate. Bases can be neutralized with citric acid or ascorbic acid. Use pH paper to determine when acid or base spills have been neutralized.

3.Controlling the spread of the liquid.

Contain the spill. Make a dike around the outside edges of the spill. Use absorbent materials such as vermiculite, cat litter or spill pillows.

4.Absorbing the liquid.

Add absorbents to the spill, working from the spill's outer edges toward the center. Absorbent materials, such as cat litter or vermiculite, are relatively inexpensive and work well, although they are messy. Spill pillows are not as messy as other absorbents, but they are more expensive. Note that special absorbents are required for chemicals such as hydrofluoric and concentrated sulfuric acids.

5.Collect and contain the cleanup residues.

The neutralized spill residue or the absorbent should be scooped, swept, or otherwise placed into a plastic bucket or other container. For dry powders or liquids absorbed to dryness, double bag the residue using plastic bags. Additional packaging may be required before the wastes can be transported from your laboratory. For spills of powders or solid materials, you may need to add a dust suppressant. Be sure to place descriptive labels on each container.

6. Dispose of the wastes.

Keep cleanup materials separate from normal trash. Contact your environmental health and safety officer for guidance in packaging and labeling cleanup residues. Promptly place cleanup wastes in an appropriate hazardous waste receptacle.

7. Decontaminate the area and affected equipment.

Ventilating the spill area may be necessary. Open windows or use a fan unless the area is under negative pressure. In some instances, your environmental health and safety officer can test the air to ensure that hazardous vapors are gone. For most spills, conventional cleaning products, applied with a mop or sponge, will provide adequate

decontamination. If you have any question about the suitability of a decontaminating agent, seek expert advice.

3. EMERGENCY EVACATION LAYOUT

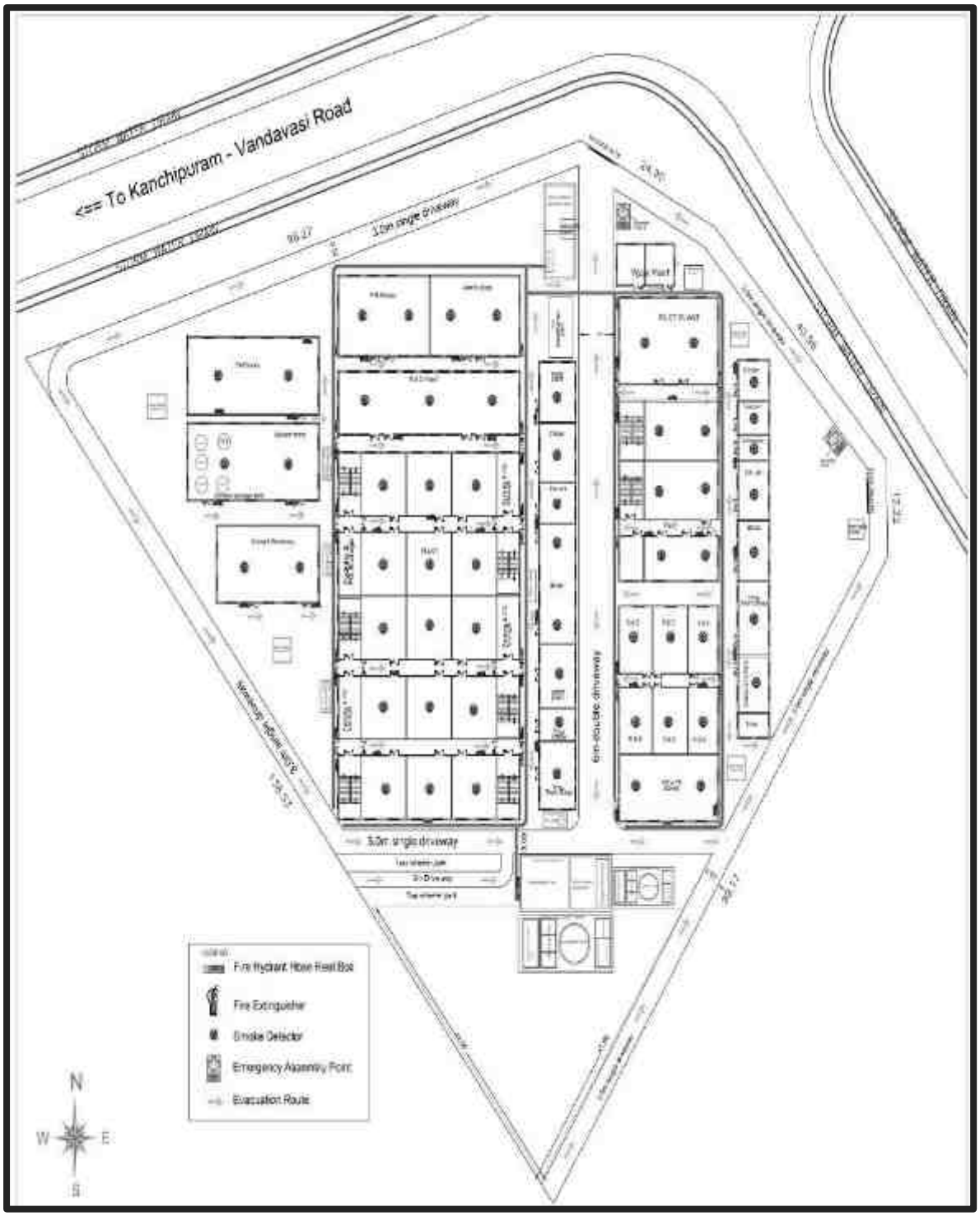


FIGURE 1: EMERGENCY EVACUATON LAYOUT

3.1. EVACUATION PROCEDURE

In case of any fire or any other emergency or if you hear the fire alarm ringing the following procedures has to be followed by the occupants inside the facility:

- Do not get panic on hearing the alarm.
- Immediately stop the work you are carrying out.
- Look for the safe evacuation route signage.
- In case of trained fire fighter, try to extinguish the fire with the help of fire extinguishers placed all over the facility.
- If not trained follow the safe exit route.
- Safe evacuation route map is also displayed inside the facility at various places.
- From the evacuation map always take the shortest possible route to reach the assembly point.
- Two emergency assembly has been defined near the entry and exit gates.
- Also follow the instructions and routes guided by the site incident controllers and security guards.
- On evacuating the building all the occupants must gather at the assembly point and shouldn't go somewhere else.
- Head count record will be taken by the security guards/site incident controllers to ensure all the occupants of the facility has been evacuation.
- In case of any mismatch with the security records then a rescue team will be sent inside the facility to rescue the persons struck inside.
- Call 101 to seek help from the nearest fire station.

3.2. PREPARDNESS MEASURES FOR EFFECTIVE EVACUATION.

- Regular training on evacuation and mock drill should be conducted at site.
- Training should be provided to all workers.
- There should be certified fire fighters and incident controllers present in the site.
- There should be certified first aider present in the facility.
- Evacuation route maps must be placed in suitable locations inside the facility.
- Emergency contacts of nearby health care centers should be displayed.

About HECS

We are India's Leading Environmental Management Company and Service Provider, serving as a catalyst to the cause of Environmental preservation for the Industrial and Domestic Sectors. We provide total Turnkey Project Supplies, Analytical Services, Operation and Maintenance Services and Consultancy Services. Over the last 25 years HECS has evolved into a large business house not just through organic growth but through acquisitions and investments in technologically advanced ventures in the fields of environmental monitoring and management

SEWAGE TREATMENT PLANT

TECHNICAL SPECIFICATION

FOR

15 KLD SEWAGE TREATMENT PLANT

Client ***M/s. GLOBAL PHARMA - CHEYYAR***	***Contractor*** ***M/s. Hubert Enviro Care Systems (P) Ltd.,*** *A21, Phase III, Thiru Vi ka Indl. Estate,* *Guindy, Chennai – 600 032*
Description	**P.O. No.**

DD-GPC-STP-TS-01 **Doc. No.**	**0** **Rev.**	**08.06.22** **Date**
MR **Prepared by**	**Dr. JRM** **Approved by**	**MR** **Checked by**

Technical Specification for 15 KLD Sewage Treatment Plant

1.0 Project & Business Objectives

M/S. Hubert Enviro Care Systems (P) Ltd seeks to provide the best technology for the Supply of 15 KLD HECS Packaged Sewage Treatment Plant.

2.0 Scope of Work

- Basic design & Concept development
- Detailed Engineering & Technical Specification
- Fabrication & Procurement of all equipments.
- Supply of all equipments.
- Installation of all equipments
- Pre commissioning, Testing & Commissioning of equipments

3.0 Flow rate logistics

Sewage Treatment Plant (STP) – 15 KLD

Plant Capacity : 15 KLD

Operating Hours : 24 hrs

Plant Flow Rate : 0.625 cum/hr

4.0 Quality logistics

S.No	Parameter	Units	STP Inlet	STP Outlet
1	pH	-	6.0 – 8.0	6.0 - 8.0
2	BOD	Mg/l	300-400	< 10
3	TSS	Mg/l	230-240	< 20
4	F.Colifom	(MPN / 100 ml)	>10000	<1000

5.0 Battery Limit

1. Inlet Water to the STP Collection Tank & STP treated water outlet is under client's scope.
2. Collection Tank, Filter feed tank & Treated Water Tank is under client's scope.

3. Incomer Electrical power – 415 Volts, 3 Phase and 50 Hz
4. Power incomer to our panel is under client's scope
5. Water & Electricity during the erection & commissioning is under Client's scope
6. Tanks, Pedestals, Enclosure for STP Plant & all necessary civil works are under Client's scope.
7. Lockable storage should be provided by the client & safety of equipments within the site is under client's scope.
8. Landscaping & gardening is under Client's scope.
9. Plant Lighting & Ventilation system is under client's scope

6.0 Process description

1. The raw sewage gets collected to the HECS Packaged STP through a separation box wherein the solid waste and liquid waste are separated.
2. The sewage from the separation box flows to the Anaerobic section of the STP where micro organism is growing up to decompose organic material contained in the domestic waste water.
3. The anaerobically treated water is then sent to the Moving bed chamber filled with Moving bed media which is provided with aeration through a small blower. The media fill in the aeration chamber is 50% of the volume.
4. After the aeration tank sewage enters into the chlorination box for the purpose of disinfection.
5. The treated water from HECS Packaged unit is stored in Filter feed Tank from where it is pumped to the Pressure Sand Filter & Activated Carbon Filter for the removal of suspended solids, colour & odour. The Filtered water is stored in the Treated water tank.
6. The Treated water can be utilized for further process.

TECHNICAL SPECIFICATIONS
FOR
ELECTROMECHANICAL WORKS

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Raw Sewage Transfer Pump		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	1 No
2	Type	Submersible Nonclog Cutter version
3	Capacity	1 cum/hr
4	Head	15 m
5	MOC	CI
6	Power Rating	2 HP
7	Model	SEG Series
8	Voltage / Frequency	415 v +/- 10% , 50 Hz +/- 10%
9	Make	Grundfos / eq.

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of 15 KLD HECS Packaged STP		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Plant data		
1	Quantity	1 No.
2	Inflow Capacity	15 cum/day
3	Average Flow	625 lph
4	Peak Flow	1562.5 lph
5	Width	2.2 m
6	Length	4.85 m
7	Height	2.28 m
8	Volume	13.81 m3
9	Tank Weight	1360 Kgs
10	Operational weight	15170 Kgs
10	Electric Consumption	0.163 kwh/day
11	Make	HECS
12	Accessories	Air blower

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of 15 KLD HECS Packaged STP		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Tank details	Sedimentation & Separation chamber, Anaerobic contact media chamber, Moving bed chamber, Sedimentation chamber, Disinfectant chamber
2	Capacity of Sedimentation & Separation chamber	3.44 cum
3	Capacity of Anaerobic chamber	3.798 cum
4	Capacity of moving bed chamber	4.452 cum
5	Capacity of Sedimentation chamber	2.006 cum
6	Capacity of Disinfectant chamber	0.115 cum

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Air blower		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai		
Sl.No	**Description**	**Specification**
Blower data		
1	Quantity	4 no
2	Blower type	Electromagnetic type
3	Capacity of Air blower	80 ltrs/min
4	Pressure	15 KPa
5	Voltage	220 V
6	Bore diameter	13 mm
7	Motor rating of each blower	51 W

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Filter Feed Pump		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	2 No (1W + 1S)
2	Type	Centrifugal Monobloc
3	Capacity	1 cum/hr
4	Head	25 m
5	MOC	CI
6	Power Rating	1 HP
7	Model	GMC 128+
8	Voltage / Frequency	415 v +/- 10% , 50 Hz +/- 10%
9	Make	Kirloskar / Eq

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Pressure Sand Filter		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Filter data		
1	Quantity	1 No
2	Type	Cylindrical vertical
3	Capacity	1 cum/hr
4	Diameter	18”
5	Height	65”
6	Pressure	2.5 ksc
7	MOC	FRP
8	Accessories	Distribution kit
9	Piping	Multiport valve with UPVC Piping
10	Make	HECS
Media data		
11	25 – 50mm	50 mm
12	12 – 25mm	50 mm
13	6 – 12mm	50 mm
14	3 – 6mm	50 mm
15	Coarse Sand	300 mm
16	Fine sand	500 mm

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Activated Carbon Filter		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Filter data		
1	Quantity	1 No
2	Type	Cylindrical vertical
3	Capacity	1 cum/hr
4	Diameter	18”
5	Height	65”
6	Pressure	2.5 ksc
7	MOC	FRP
8	Accessories	Distribution kit
9	Piping	Multiport valve with UPVC Piping
10	Make	HECS
Media data		
11	25 – 50mm	50 mm
12	12 – 25mm	50 mm
13	6 – 12mm	50 mm
14	3 – 6mm	50 mm
15	Coarse Sand	300 mm
16	Activated Carbon	500 mm

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Dosing system (Hypo)		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	1 No
2	Type	Electronic metering pump
3	Capacity	0 – 6 lph
4	Pressure	2 ksc
5	MOC	PP
6	Rating	60 W
7	Make	Edose / eq.
Dosing Tank data		
8	Quantity	1 No
9	Type	Cylindrical vertical
10	Capacity	50 ltrs
11	Diameter	410 mm
12	Height	480 mm
13	MOC	HDPE
14	Make	Edose / Sintex / Reno

SEWAGE TREATMENT PLANT – 15 KLD

Specification of Interconnecting Pipes & Valves

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Water line	
1	Quantity	1 Lot
2	MOC	UPVC SCH 40
3	Class	6 kg/cm2
4	Size	As per the requirement
5	Accessories	Elbows, Tees, Reducers, MTAs, etc.
6	Make	Finolex / Supreme/ Astral / Eq.
	Non – Return Valves	
7	Quantity	1 lot
8	Type	Flap type
9	Size	Suitable for pumps & Blowers
10	MOC	CI
11	Make	Intervalve / Marck / L&T / eq.
	Butterfly valves	
12	Quantity	1 lot
13	Type	Wafer Type
14	Size	Suitable for Pumps, Blowers & Filters
15	MOC	CI
16	Make	Intervalve / Marck / L&T/ eq.
	Ball Valves	
17	Quantity	1 lot
18	Type	Full Way Open Type
19	Size	Suitable for Pumps & Filters
20	MOC	UPVC
21	Make	Finolex / Supreme / Astral / eq.
	Pressure Gauge	
22	Quantity	2 Nos.
23	Type	4” Dial type
24	MOC	CI
25	Range	0 – 7 Kg/cm2
26	End Connection	Screwed End
27	Location	Filter Feed Pump & Air Blower
28	Make	Waaree / Baumer / H guru / eq.

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Electrical DOL Starter & Cables		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Panel data		
1	Quantity	1 LS
2	Type	DOL Starter
3	Size	As per Mfg std
4	Make of Components	L&T / eq.
5	Make of Cables	Finolex / Polycab / Orbit

TECHNICAL SPECIFICATIONS
FOR
CIVIL WORKS
(CLIENT'S SCOPE)

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Pedestal for STP Plant		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Pedestal data		
1	Quantity	1 No
2	Type	RCC
3	Length	9.75 m
4	Width	3 m
5	Pedestal height	0.55 m (RCC – 350mm, PCC – 100mm, Sand Filling – 100mm)

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Blower shed for STP Plant		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Blower Room Pedestal data		
1	Quantity	1 No
2	Type	Brick Work
3	Size	1620mm x 720mm x 700mm
4	Base raft	200 mm

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Filter Feed tank – Client's scope		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Above ground – Cylindrical Vertical
3	Capacity	3000 ltrs
4	Diameter	1.5 m
5	Total height	2.02 m
6	MOC	HDPE
7	Make	Sintex / Reno

SEWAGE TREATMENT PLANT – 15 KLD		
Specification of Treated Water tank – Client's scope		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Above ground – Cylindrical Vertical
3	Capacity	3000 ltrs
4	Diameter	1.5 m
5	Total height	2.02 m
6	MOC	HDPE
7	Make	Sintex / Reno

EFFLUENT TREATMENT PLANT WITH ZLD PLANT

TECHNICAL SPECIFICATION

FOR 20 KLD

EFFLUENT TREATMENT PLANT WITH ZLD

Client ***M/s. GLOBAL PHARMA - CHEYYAR***	**Contractor** ***M/s. Hubert Enviro Care Systems (P) Ltd.,*** *A21, Phase III, Thiru Vi ka Indl. Estate,* *Guindy, Chennai – 600 032*
Description For Consultancy	**P.O. No.**

DD-GPS-ETP-TS-01 **Doc. No.**	**1** **Rev.**	**08.05.22** **Date**
MR **Prepared by**	**Dr. JRM** **Approved by**	**MR** **Checked by**

Technical Specification for

Effluent Treatment Plant with ZLD

1.0 Project & Business Objectives

M/S. Hubert Enviro Care Systems (P) Ltd seeks to provide the best technology for Effluent Treatment Plant with ZLD of Capacity 20 KLD.

2.0 Scope of Work

- Basic design & Concept development
- Detailed Engineering & Technical Specification
- Fabrication & Procurement of all equipments.
- Supply of all equipments.
- Installation of all equipments
- Pre commissioning, Testing & Commissioning of equipments

3.0 Flow rate logistics

EFFLUENT TREATMENT PLANT WITH ZLD Plant

Fresh Effluent	: 19.4 KLD
Designed Capacity	: 20 KLD
Operating hrs	: 20 hrs
Average Flow Rate	: 1.0 cum/hr
Design Flow Rate	: 1.0 cum/hr

UF Treatment Plant

ETP Treated Water	: 20 KLD
UF Capacity	: 20 KLD
Operating hrs	: 20 hrs
Average Flow Rate	: 1.0 cum/hr
Design Flow Rate	: 1.0 cum/hr

UF feed	: 20 KLD
UF Permeate	: 20 KLD

RO Plant I

Feed Flow : 20 KLD

Recovery : 50%

Permeate Flow : 10 KLD

Rejects Flow : 10 KLD

RO Plant II

Feed Flow : 10 KLD

Recovery : 50%

Permeate Flow : 5.0 KLD

Rejects Flow : 5.0 KLD

MEE Plant Designed : 5.0 KLD

4.0 Quality logistics

S.No	**1**	**2**	**3**	**4**	**5**	**6**
Description	**pH**	**TSS**	**BOD**	**COD**	**TDS**	**Technical reason**
Unit	-	Mg/l	Mg/l	Mg/l	Mg/l	
ETP Collection Inlet	6-8	150-200	200 - 250	500 - 600	5000 - 6000	Raw Effluent
Anaerobic Tank Inlet	6.5-8	100-120	150 - 200	400-500	5000 - 6000	TSS,BOD&COD Reduction takes places followed by chemical treatment in flash mixer followed by both settling.

Aeration Tank Inlet	6.5-8	100-110	100-150	350-450	5000 - 6000	BOD&COD Reduction takes places followed by Anaerobic treatment process.
PSF Inlet	6.5-8	<75	<30	<150	5000 - 6000	BOD&COD Reduction takes places followed by Aeration treatment process.
UF Inlet	6.5-8.0	<15	15 - 20	30 - 40	5000 - 6000	BOD&COD Reduction takes places followed by Ozonator
RO Inlet	6.5-8.5	<1	<10	<30	5000-6000	TSS, BOD&COD Reduction takes places followed by UF system
RO Permeate	6.5-7.5	Nil	<3	<10	<500	TSS Reduction takes places followed by RO system
RO Rejects	6.5-8.5	<30	<25	<80	<25000	
Remarks						

Note: The inlet characteristics reduction considered as per process scheme selected in PFD. Please refer Process Flow Drawing for parameters reduction as per design

5.0 Battery Limit

- Effluent Water Inlet to Collection tank & Treated water outlet from Treated water tank is under client's scope.
- All Necessary Civil Works & its structural design are under Client's Scope. However basic civil input drawings shall be provided.
- Incomer Electrical power - 415 Volts, 3 Phase and 50 Hz
- Power incomer to our control panel is under client's scope.
- Cabling from Individual equipments to Panel is under HECS Scope.
- Water & Electricity during the erection & commissioning is under Client's scope.
- Necessary Tools, Tackles & Machineries will be provided by HECS.
- Locked Storage for the equipments at site & Safety of equipment is under HECS scope.
- Landscaping & gardening is under client's scope.

6.0 Codes & Standards

All design; fabrication, inspection, and testing of the plant will be done with respect to the latest Indian Standards. In case of non-availability of standards, good engineering practice will be adopted.

Standards to be followed:

Plain & reinforced cement concrete	– IS 456: 2000
Concrete structure for the storage of liquids	– IS 3370: 1981-88
Pressure vessels	– ASME SEC VIII
Pumps	– IS 5120
Others	– Available IS standards.

In case of non-availability of standards, good engineering practice will be adopted.

8.0 Process Description

- The Effluent from various sources gets collected in the Equalization Tank through bar screen chamber in order to remove the floating particles. The Effluent is then pumped to the oil skimmer chamber in order to remove the floating oil.
- The Effluent from the Oil Skimmer tank is then sent to Flash Mixer tank provided with agitator mechanism. Coagulant & Flocculants dosing is done in the flash mixer tank. The Overflow from the Flash Mixer is sent to the Primary settling tank.
- The Primary Clarifier tank is provided with Settler internal where the sludge gets settled at the bottom of the tank. The overflow from the Primary Clarifier tank is sent to Anaerobic digester tank.
- Anaerobic digester tank is again provided with SAFF media for the removal of BOD / COD. The overflow from the Anerobic digester tank is sent to the Aeration tank.
- Air diffusion is done in the Aeration tank through Air blower & diffuser arrangement for biological growth. The Overflow from the Aeration tank is sent to the Secondary clarisettler tank
- Secondary Clarisettler tank is provided with settler internal where the sludge gets settled at the bottom of the tank. The Overflow from the Secondary Clarisettler tank is sent to the Filter Feed tank.
- The Clear water is then pumped to the Pressure Sand Filter, Activated Carbon Filter & Ozone System in order to remove the Suspended solids, Colour, Odour& COD. The Filtered water is then stored in the Treated water tank / UF feed tank for further process.

Ultra Filtration Plant & RO Plant

- The filtered water from UF feed tank is pumped to the Ultra Filtration unit for the removal of suspended solids.

- The Permeate water is stored in the ETP/UF treated water tank & Ultra filtration unit is backwashed at regular intervals based on the pressure drop by using UF backwash pumps. The UF rejects is taken back to the ETP collection tank.
- UF cleaning will be provided at regular intervals for cleaning of membranes using UF CIP system comprising of UF cleaning tank, cleaning pump, Cleaning cartridge filter & dosing system.
- The Ultra filtered water is then used for RO feed tank
- The treated UF water is then sent to 2 stage RO System with recovery of 50% and 50% respectively and RO Permeate is used for further process. RO Rejects is sent to the MEE Plant.
- From the MEE Plant, Condensate is combined with RO Permeate and used for further process and Concentrate from MEE is sent to ATFD and result in Salt.

TECHNICAL SPECIFICATIONS
FOR
MS SKID MOUNTED PROCESS TANKS

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Oil Skimmer Tank

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Tank data	
1	Quantity	1 No
2	Type	Above Ground
4	Total Capacity	0. 525 cum
5	Length of each tank	1 m
6	Width of each tank	0.75 m
7	Liquid Depth of each tank	0.7 m
8	Total depth	1 m
9	MOC	MS Epoxy

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Flash mixer Tank		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Above Ground
4	Total Capacity	0.34 cum
5	Length of each tank	0.65 m
6	Width of each tank	0.65 m
7	Liquid depth of each tank	0.8 m
8	Total depth	1.2 m
9	MOC	MS Epoxy

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Primary Clarifier		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Above Ground
3	Capacity	4.5 cum
4	Length	1 m
5	Width	1.5 m
6	Liquid depth	3 m
7	Total Depth	3.5 m
8	MOC	MS Epoxy

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Anaerobic digester Tank

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Tank data	
1	Quantity	1 No
2	Type	Above Ground
3	Capacity	30 cum
4	Length	3.0 m
5	Width	3.0 m
6	Liquid depth	3.5 m
7	Total depth	4 m
8	MOC	MS Epoxy

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Aeration Tank		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Above Ground
3	Capacity	15 cum
4	Length	1.5 m
5	Width	3.5 m
6	Liquid depth	3.3 m
7	Total depth	4 m
8	MOC	MS Epoxy

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Secondary Clarifier		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Above Ground
3	Capacity	6.75 cum
4	Length	1.5 m
5	Width	1.5 m
6	Liquid depth	3 m
7	Total depth	3.5 m
8	MOC	MS Epoxy

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Chlorine Contact Tank		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Above Ground
3	Capacity	4.05 cum
4	Length	1.5 m
5	Width	1 m
6	Liquid depth	2.7 m
7	Total depth	3 m
8	MOC	MS Epoxy

TECHNICAL SPECIFICATIONS
FOR
HDPE STORAGE TANKS

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of UF Feed Tank		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Cylindrical Vertical
3	Capacity	5KL
4	MOC	HDPE
5	Make	Sintex / Reno

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of UF Permeate Tank		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Cylindrical Vertical
3	Capacity	5KL
4	MOC	HDPE
5	Make	Sintex / Reno

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of RO1 Reject Tank		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Cylindrical Vertical
3	Capacity	5KL
4	MOC	HDPE
5	Make	Sintex / Reno

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of RO2 Reject Tank		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Cylindrical Vertical
3	Capacity	5KL
4	MOC	HDPE
5	Make	Sintex / Reno

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Common RO Permeate Tank		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Cylindrical Vertical
3	Capacity	10KL
4	MOC	HDPE
5	Make	Sintex / Reno

TECHNICAL SPECIFICATIONS
FOR
ELECTROMECHANICAL WORKS

EFFLUENT TREATMENT PLANT WITH ZLD PLANT

Specification of Bar Screen

Client : M/s. GLOBAL PHARMA - CHEYYAR.,

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai

S. No	Description	Specification
	Bar Screen	
1	Quantity	1 No
2	Type	Coarse Screen
3	Size	500 x 500 mm
4	Thickness	5 mm
5	Spacing	6 mm
6	MOC	MSEP
7	Make	HECS

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Raw Effluent Transfer Pump

Client : M/s. GLOBAL PHARMA - CHEYYAR.,

Contractor: M/S. Hubert Enviro Care Systems (P) Ltd., Chennai

S. No	Description	Specification
	Pump data	
1	Quantity	2 Nos (1W+1S)
2	Type	Centrifugal Monobloc
3	Capacity	1.0 cum/hr
4	Head	12 m
5	MOC	CI
6	Rating	1.0 HP
7	Speed	2700 rpm
8	Seal	Mechanical
9	Power	3 Phase
10	Voltage / Frequency	415 v +/- 10% , 50 Hz +/- 10%
11	Class of insulation	F
12	Protection	IP 68
13	Suction x Delivery Size	40 x 40mm
14	Power	415V, 3 Phase, 50 Hz
15	Make	Kirloskar/CG/Eq

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Oil Skimmer unit

Client : M/s. GLOBAL PHARMA – CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

S. No	Description	Specification
	Skimmer data	
1	Quantity	1 No
2	Type drive	Motor
3	Belt Size	100mm width x 1m long
4	MOC of belt	Teflon / Polyurethane
5	MOC of Structure	MS Epoxy
6	Motor Rating	0.25 HP
7	Make	HECS
	Oil Collection tank data	
8	Quantity	1 No
9	Type	Cylindrical Vertical
10	Capacity	100 ltrs
11	MOC	HDPE
12	Make	Edose / Sintex / Reno

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Dosing System (Alum, Poly, Lime)

Client : M/s. GLOBAL PHARMA – CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

S. No	Description	Specification
	Pump data	
1	Quantity	3 No
2	Type	Electronic Diaphragm
3	Capacity	0 – 25 lph
4	Pressure	2 ksc
5	MOC	PP
6	Rating	0.18 KW
7	Make	E dose/Eq
	Dosing Tank data	
8	Quantity	3 No
9	Type	Cylindrical vertical
10	Capacity	100 ltrs
11	Diameter	500 mm
12	Height	630 mm
13	MOC	HDPE
14	Make	Sintex/Reno/Eq
	Agitator data	
15	Type	Impeller
16	Quantity	3 No
17	Drive Unit	Geared Motor
18	MOC of Geared Motor	CI
19	Rating	0.25 HP
20	Make of Motor	Greaves / Transtech
21	MOC of Impeller & Shaft	SS304
22	Make	HECS

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Flash Mixer Agitator

Client : M/s. GLOBAL PHARMA – CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

S. No	Description	Specification
	Drive data	
1	Quantity	1 No
2	Type drive	Geared Motor drive
3	Capacity	1.25 cum/hr
4	MOC of geared Motor	CI
5	Geared Motor speed	1440 rpm
6	Output Speed	90 rpm
7	Geared Motor Rating	0.5 HP
8	Geared Motor Make	Transtech / Greaves / eq.
9	Make of Flash Mixer agitator assembly	HECS
	Agitator data	
10	Quantity	1 No
11	Type	Impeller type
12	MOC of agitator	SS 304
13	Shaft diameter	30 mm
14	Make	HECS

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Primary & Secondary Clarisettler Internals

Client : M/s. GLOBAL PHARMA – CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

S. No	Description	Specification
	Internal data	
1	Type	Feed well with Splash Pad
2	Dia	300 mm
3	Height	1500 mm
4	Thickness	3 mm
5	MOC	MS EP
6	Make	HECS

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of SAFF Media – Anaerobic Tank

Client : M/s. GLOBAL PHARMA – CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

S. No	Description	Specification
	Media data	
1	Type	Flute type Media
2	Quantity	1 Lot
3	Sheet Thickness	0.3 mm
4	MOC	PVC
5	Location	Anaerobic Tank
6	Make	HECS

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Air blower & Diffuser

Client : M/s. GLOBAL PHARMA – CHEYYAR

Contractor: M/S. Hubert Enviro Care Systems (P) Ltd., Chennai

Sl.No	Description	Specification
	Blower data	
1	Quantity	2 nos (1W + 1S)
2	Capacity of Air blower	50 cum/Hr
3	Head	0.4 ksc
4	MOC	CI
5	Make of Blower	Airvak / Eq
6	Motor rating	3 HP
7	Motor Make	Kirloskar/CGL/eq
	Diffuser	
1	Quantity	8 Nos
2	Capacity	8 cum/hr
3	Type	Tubular Fine Bubble Diffuser
4	MOC	EDPM
5	Size	90 mm Dia x 1000 mm Length
6	Make	HECS

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Hypo Dosing System

Client : M/s. GLOBAL PHARMA – CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

S. No	Description	Specification
	Pump data	
1	Quantity	1 No
2	Type	Electronic Diaphragm
3	Capacity	0 – 6 lph
4	Pressure	2 ksc
5	MOC	PP
6	Rating	0.04 KW
7	Make	E dose/Eq
	Dosing Tank data	
8	Quantity	1 No
9	Type	Cylindrical vertical
10	Capacity	100 ltrs
11	Diameter	500 mm
12	Height	630 mm
13	MOC	HDPE
14	Make	Sintex/Reno/Eq

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Filter Feed Pump

Client : M/s. GLOBAL PHARMA – CHEYYAR

Contractor: M/S. Hubert Enviro Care Systems (P) Ltd., Chennai

S. No	Description	Specification
	Pump data	
1	Quantity	2 nos (1W+1S)
2	Type	Centrifugal Monobloc
3	Capacity	1.0 cum/hr
4	Head	30 m
5	MOC	CI
6	Rating	1 HP
7	Speed	2700 rpm
8	Seal	Mechanical
9	Power	3 Phase
10	Voltage / Frequency	415 v +/- 10% , 50 Hz +/- 10%
11	Class of insulation	F
12	Protection	IP 68
13	Suction & Delivery Size	40 mm x 40mm
14	Power	415V, 3 Phase, 50 Hz
15	Make	Kirloskar/Eq

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Pressure Sand Filter		
Client : M/s. GLOBAL PHARMA - CHEYYAR.,		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
S. No	**Description**	**Specification**
Vessel data		
1	Quantity	1 no
2	Type	Cylindrical Vertical
3	Capacity	1 cum/hr
4	Diameter	600 mm
5	HOS	1500 mm
6	MOC	MSEP
9	Working Pressure	2.5 Kg/cm2
10	Accessories	MS Frontal Piping
11	Make	HECS
12	Media	Pebbles / Sand
Frontal Piping details		
13	Quantity	1 Lot
14	Frontal Piping	MS B – Class – 1” diameter
15	Multiport Valves	1 No
16	Accessories	Flanges, Elbows, Tees etc.
17	Make of Frontal Pipes	Jindal / Tata / eq.
18	Make of Butterfly Valves	L&T / Intervalve / Marck / eq.
Media Details		
19	25 – 50mm Pebbles	50 mm
20	12 – 25mm Pebbles	50 mm
21	6 – 12 mm Pebbles	100 mm
22	3 – 6mm Pebbles	100 mm
23	Coarse Sand	200 mm
24	Fine Sand	300 mm

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Activated Carbon Filter		
Client : M/s. GLOBAL PHARMA – CHEYYAR		
Contractor: M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
S. No	**Description**	**Specification**
Vessel data		
1	Quantity	1 no
2	Type	Cylindrical vertical
3	Capacity	1 cum/hr
4	Diameter	600 mm
5	HOS	1500 mm
6	MOC	MSEP
9	Working Pressure	2.5 Kg/cm2
10	Media	Pebbles / Sand / Activated Carbon
11	Accessories	MS Frontal Piping
12	Make	HECS
Frontal Piping details		
13	Quantity	1 Lot
14	Frontal Piping	MS B – Class – 1 ” diameter
15	Multiport Valves	1 No
16	Accessories	Flanges, Elbows, Tees etc.
17	Make of Frontal Pipes	Jindal / Tata / eq.
18	Make of Butterfly Valves	L&T / Intervalve / Marck / eq.
Media Details		
19	25 – 50mm Pebbles	50 mm
20	12 – 25mm Pebbles	50 mm
21	6 – 12 mm Pebbles	100 mm
22	3 – 6mm Pebbles	100 mm
23	Coarse Sand	200 mm
24	Activated Carbon	300 mm

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Sludge Transfer Pump

Client : M/s. GLOBAL PHARMA – CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai

S. No	Description	Specification
	Pump data	
1	Quantity	2 no (1W + 1S)
2	Type	Centrifugal Non clog
3	Capacity	2.5 cum/hr
4	Head	10 m
5	MOC	CI
6	Rating	0.5 HP
7	Speed	2700 rpm
8	Seal	Mechanical
9	Power	3 Phase
10	Voltage / Frequency	415 v +/- 10% , 50 Hz +/- 10%
11	Class of insulation	F
12	Protection	IP 68
13	Suction & Delivery Size	40 mm x 40 mm
14	Power	415V, 3 Phase, 50 Hz
15	Make	Kirloskar/Eq

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Screw Pump

Client : M/s. GLOBAL PHARMA – CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

S. No	Description	Specification
	Pump data	
1	Quantity	1 No
2	Type	Single Stage Single Screw
3	Capacity	1 cum/hr
4	Head	50 m
5	Speed	380 rpm
6	MOC of Rotor	SS
7	MOC of Stator	Nitrile Rubber
8	Rating	1 HP
9	Seal	Gland Packing
9	Power	3 Phase
10	Voltage / Frequency	415 v +/- 10% , 50 Hz +/- 10%
11	Class of insulation	F
12	Suction & Delivery	25 mm x 25 mm
13	Protection	IP 55
14	Make	Icura / eq.

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Filter Press		
Client : M/s. GLOBAL PHARMA – CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Filter Press data		
1	Quantity	1 No
2	Type	Hydraulic Motorized
3	Capacity	1 cum/hr
8	No.of Plates / Chamber	7 Nos / 8 Nos
9	Make	Icura / Eq

ULTRA FILTRATION PLANT		
Specification of UF Feed Pump		
Client : M/s. GLOBAL PHARMA - CHEYYAR.,		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	2 No (1W + 1S)
2	Type	Centrifugal Monobloc
3	Capacity	1.1 cum/hr
4	Head	30 m
5	Speed	2760 rpm
6	MOC	CI
7	Rating	1 HP
8	Seal	Mechanical Seal
9	Power	3 Phase
10	Voltage / Frequency	415 v +/- 10% , 50 Hz +/- 10%
11	Class of insulation	F
12	Suction & Delivery	40 mm x 40 mm
13	Protection	IP 55

ULTRA FILTRATION PLANT		
Specification of UF Bag Filter		
Client : M/s. M/s. GLOBAL PHARMA - CHEYYAR.,		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	1 No
2	Type	Vertical type
3	Capacity	1.1 cum/hr
4	Micron Size	10 microns
5	MOC	SS / FRP / PVC

ULTRA FILTRATION PLANT		
Specification of UF Membrane		
Client : M/s. M/s. GLOBAL PHARMA - CHEYYAR.,		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Membrane data		
1	Quantity	1 No
2	Type	Vertical Hollow fibre
3	Capacity	1.1 cum/hr
4	Surface Area	55 m2
5	MOC	PVDF
Skid data		
6	Type	MS Structure
7	Size	As per the module requirement
8	MOC	MS Epoxy

ULTRA FILTRATION PLANT		
Specification of UF Backwash Pump		
Client : M/s. GLOBAL PHARMA – CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	2 No (1W + 1S)
2	Type	Centrifugal Monobloc
3	Capacity	3.25 cum/hr
4	Head	25 m
5	Speed	2760 rpm
6	MOC	CI
7	Rating	2 HP
8	Seal	Mechanical Seal
9	Power	3 Phase
10	Voltage / Frequency	415 v +/- 10% , 50 Hz +/- 10%
11	Class of insulation	F
12	Suction & Delivery	50 mm x 50 mm
13	Protection	IP 55

ULTRA FILTRATION PLANT		
Specification of UF CIP Pump		
Client : M/s. GLOBAL PHARMA – CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	1 No
2	Type	Centrifugal type
3	Capacity	2.5 cum/hr
4	Head	25 m
5	Speed	2760 rpm
6	MOC	SS 316 (wetted parts)
7	Rating	1 HP
8	Seal	Mechanical Seal
9	Power	3 Phase
10	Voltage / Frequency	415 v +/- 10% , 50 Hz +/- 10%
11	Class of insulation	F
12	Suction & Delivery	40 mm x 40 mm
13	Protection	IP 55

ULTRA FILTRATION PLANT		
Specification of UF CIP Tank		
Client : M/s. GLOBAL PHARMA – CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Cylindrical vertical
3	Capacity	500 ltrs
4	MOC	HDPE
5	Make	Sintex

ULTRA FILTRATION PLANT

Specification of UF dosing system

Client : M/s. GLOBAL PHARMA - CHEYYAR.,

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Pump data	
1	Quantity	3 No
2	Type	Electronic metering pump
3	Capacity	0 – 20 lph
4	Pressure	2 ksc
5	MOC	PP
6	Rating	60 W
	Dosing Tank data	
7	Quantity	3 No
8	Type	Cylindrical vertical
9	Capacity	200 ltrs
10	MOC	HDPE
11	Diameter	580 mm
12	Height	900 mm

REVERSE OSMOSIS PLANT		
Specification of RO I Feed Pump		
Client : M/s. GLOBAL PHARMA – CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	2 Nos (1W + 1S)
2	Type	Centrifugal Pump
3	Capacity	1.0 cum/hr
4	Head	25 m
5	MOC of Casing	CI
6	MOC of Impeller	CI
7	MOC of Shaft	CI
8	Power Supply	3 Phase, 415 V, 50z
9	Class of Insulation	F
10	Make	Kirloskar/Grundfos / eq.

REVERSE OSMOSIS PLANT		
Specification of RO I Dosing System		
Client : M/s. GLOBAL PHARMA – CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	3 Nos
2	Type	Electronic metering type
3	Capacity	0 – 6 lph
4	Pressure	2.5 kg/cm2
5	MOC	PP
6	Rating	0.25HP
7	Model	As per the manufacturer
8	Make	Edose/eq.
Tank data		
9	Quantity	3 Nos
10	Type	Cylindrical Vertical
11	Capacity	100 ltrs
12	MOC	HDPE
13	Make	Sintex / Reno

REVERSE OSMOSIS PLANT		
Specification of Micron Cartridge Filter I		
Client : M/s. GLOBAL PHARMA - CHEYYAR.,		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Filter data		
1	Quantity	1 Nos
2	Type	Spun Type
3	Capacity	1 cum/hr
4	Micron Size	10 micron
5	MOC	uPVC
6	Make	HECS

REVERSE OSMOSIS PLANT		
Specification of High Pressure Pump (RO I stage)		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	2 Nos (1w+1s)
2	Type	Vertical High Pressure Pump
3	Capacity	1 cum/hr
4	Head	120 m
5	MOC of Casing	CI
6	MOC of Impeller	SS 304
7	MOC of Shaft	SS 304
8	Power Supply	3 Phase, 415 V, 50z
9	Class of Insulation	F
10	Make	Grundfos / eq.

REVERSE OSMOSIS PLANT		
Specification of RO I System		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Vessel data		
1	Quantity	1 No
2	Type	Pressure vessel, Side port.
3	Capacity	1 cum/hr
4	Diameter of Vessel	4”
5	Length of Vessel	5 m
6	Pressure	400 psi
7	MOC	FRP
8	Make	Code line/ ACM / UKL / eq.
Element data		
9	Quantity	5 Nos
10	Type	Spiral Wound TFC
11	Element Size	4” x 40” long
13	Make	GE / Hydranautics / eq.
Skid data		
14	Quantity	1 set
15	MOC	MS – Epoxy
16	Support	MS Channel / Angle
17	Make	HECS

REVERSE OSMOSIS PLANT		
Specification of RO II Feed Pump		
Client : M/s. GLOBAL PHARMA - CHEYYAR.,		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	2 No (1W + 1S)
2	Type	Centrifugal monobloc
3	Capacity	0.5 cum/hr
4	Head	30 m
5	MOC of Casing	CI
6	MOC of Impeller	CI
7	MOC of Shaft	CI
8	Power Supply	3 Phase, 415 V, 50z
9	Motor	1.5 HP
9	Make	Kirloskar/Grundfos / eq.

REVERSE OSMOSIS PLANT		
Specification of RO II Dosing System		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	3 Nos
2	Type	Electronic metering type
3	Capacity	0 – 6 lph
4	Pressure	2.5 kg/cm2
5	MOC	PP
6	Rating	0.25HP
7	Model	As per the manufacturer
8	Make	E dose/eq.
Tank data		
9	Quantity	3 Nos
10	Type	Cylindrical Vertical
11	Capacity	100 ltrs
12	MOC	HDPE
13	Make	Sintex / Reno

REVERSE OSMOSIS PLANT		
Specification of Micron Cartridge Filter II		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Filter data		
1	Quantity	1 No
2	Type	Spun Type
3	Capacity	0.5 cum/hr
4	Micron Size	10 micron
5	MOC	PP
6	Make	HECS

REVERSE OSMOSIS PLANT		
Specification of High Pressure Pump (RO II stage)		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai		
Sl.No	**Description**	**Specification**
Pump data		
1	Quantity	2 Nos (1w+1s)
2	Type	Vertical High Pressure Pump
3	Capacity	0.5 cum/hr
4	Head	180 m
5	MOC of Casing	SS304
6	MOC of Impeller	SS 316
7	MOC of Shaft	SS 316
8	Power Supply	3 Phase, 415 V, 50z
9	Make	Grundfos /eq.

REVERSE OSMOSIS PLANT		
Specification of RO II System		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Vessel data		
1	Quantity	1 Nos
2	Type	Pressure vessel, Side port.
3	Capacity	0.5 cum/hr
4	Diameter of Vessel	4”
5	Length of Vessel	4 m
6	Pressure	800 psi
7	MOC	FRP
8	Make	Code line/ ACM / UKL / eq.
Element data		
9	Quantity	4 Nos
10	Type	Spiral Wound TFC
11	Element Size	4” x 40” long
13	Make	GE / Hydranautics / eq.
Skid data		
14	Quantity	1 set
15	MOC	MS – Epoxy
16	Support	MS Channel / Angle
17	Make	HECS

REVERSE OSMOSIS PLANT		
Specification of Instruments		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
pH meter		
1	Quantity	2 nos
2	Type	Online
3	Location	RO System
4	Model	PO 650
5	Make	Aster / eq.
Conductivity meter		
6	Quantity	2 nos
7	Type	Online
8	Location	RO Plant
9	Model	CT 650
10	Make	Aster / eq.
ORP meter		
11	Quantity	1 no
12	Type	Online
13	Location	RO Plant
14	Model	PO 650
15	Make	Aster / eq.
Rotometer		
16	Quantity	4 nos
17	Location	RO Permeate / RO Reject
18	Range	As per the requirement
19	Make	Aster / eq.

REVERSE OSMOSIS PLANT		
Specification of Instruments		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Pressure Switches		
20	Quantity	1 Lot
21	Type	Low / High
22	Location	RO I Feed / HPP Outlet
23	Low Pressure Switch	0 – 6 kg/cm2
24	High Pressure Switch	6 – 25 kg/cm2
25	Make	Aster / eq.
Pressure Gauges		
26	Quantity	1 Lot
27	Type	Dial type
28	Size	4”
29	Range	0 – 7 kg/cm2 / 0 – 15 kg/cm2
30	Make	Levis / eq.
Float switches		
31	Quantity	1 Lot
32	Location	RO Permeate tank / RO Reject tank
33	Make	ISI

REVERSE OSMOSIS PLANT		
Specification of Pipes & Valves		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai		
Sl.No	**Description**	**Specification**
Water line		
1	Quantity	1 lot
2	MOC	UPVC
3	Standard	ASTM D 1785
4	Size	As per the requirement
5	Accessories	Flanges, Elbows, Tees, Unions etc
6	Make	Astral / Supreme / eq.
RO Water line		
7	Quantity	1 lot
8	MOC	SS 304 / SS 316
9	Size	As per the requirement
10	Accessories	Flanges, Elbows, Tees, Unions etc
11	Make	ISI / Eq.
Air line		
12	Quantity	1 lot
13	MOC	GI
14	Class	B class
15	Size	As per the requirement
16	Accessories	Flanges, Elbows, Tees, Unions etc
17	Make	Jindal / eq.
Non – Return Valves		
18	Quantity	1 lot
19	Type	Flap type
20	Pressure	PN 10
21	Size	Suitable for pumps & Blowers
22	Make	Intervalve / KSB / eq.
Butterfly valves		
23	Quantity	1 lot
24	Type	Wafer Type
25	Pressure	PN 10
26	Size	Suitable for Pumps, Blowers & Filters
27	Make	Intervalve / KSB / eq.

REVERSE OSMOSIS PLANT		
Specification of Electrical panel & Accessories		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd., Chennai		
Sl.No	**Description**	**Specification**
Panel data		
1	Quantity	1 no
2	Type	Floor mounted Non Compartmentalized
3	Sheet thick	1.6 mm
4	Incoming main switch	4 pole MCB
5	Components	MCB / OLR / Contactor
6	Make of cables	Orbit / Finolex / Polcab
7	Ammeter	Cadel / Eq
8	Voltmeter	Cadel / Eq
9	Make of components	Havells / C&S / Siemens
10	Protection	IP 55
11	Painting	Powder coated Siemens grey
12	Cable entry	Bottom
13	Make of Panel	HECS
14	PLC	For UF alone
15	Make of PLC	Siemens / Omron / Delta / eq

MULTIPLE EFFECT EVAPORATOR		
Specification of Feed Tank MEE		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Feed Tank MEE Data		
1	Quantity	1 No
2	Type	Cylindrical Vertical
3	Main Shell	SS316L / 4 mm Thick
4	Bottom dummy	SS316 / 4 mm Thick
5	Make	Jindal / Tisco / Posco
6	Nozzle	SS316 / SCH20

MULTIPLE EFFECT EVAPORATOR

Specification of Calendria

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Calendria data	
1	Quantity	1 No
2	Type	Forced Circulation Evaporator
3	Main Shell	SS304L / 5 mm Thick
4	Tubes	SS316 Ti / 1.2 mm Thick / Seamless
5	Tube Sheet	SS316L / 20 mm Thick
6	Baffle Sheet	SS304L / 3 mm Thick
7	Tie rod	SS304L / 10 mm Thick
8	Top & Bottom Cone	SS316L / 5 mm Thick
9	Make of Shell & Tube Sheets	Jindal / Posco / Tisco
10	Nozzles Shell Side	SS304L / SCH20
11	Nozzles Tube Side	SS316L / SCH10
12	Make of Tubes	Jindal / Scoda
13	Supporting Legs	MS with Corrosion Resistant Paint

MULTIPLE EFFECT EVAPORATOR

Specification of Pre Heaters

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Pre Heaters data	
1	Quantity	1 No's
2	Type	Tubular Type
3	Main Shell	SS304L / 5 mm Thick
4	Tubes	SS316 / 1.2 mm Thick / Seamless
5	Tube Sheet	SS304 / 16 mm Thick
6	Baffle Sheet	SS304 / 3mm Thick
7	Nozzles Shell Side	SS304L / SCH 20
8	Nozzles Tube Side	SS316L / SCH10
9	Tie Rod	SS304L / 10 mm Thick
10	Top & Bottom Cone	SS304 / 5 mm Thick
11	Make of Tube sheet / Main shell	Jindal / Tisco / Posco
12	Make of Tubes	Jindal / Scoda

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of Vapour Separator

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Vapor Separator data	
1	Quantity	1 No
2	Shell	SS316L / 5 mm Thick
3	Bottom Cone	SS316L / 4 mm Thick
4	Top Dish	SS316L / 4 mm Thick
5	Vapor outlet nozzle	SS316 / SCH10
6	Pipe Lines	SS304
7	Product IN & OUT	SS316 / SCH10
8	Make of Shell	Jindal / Tisco / Posco
9	Make of Bottom cone / Top dish	Jindal / Tisco / Posco

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of Surface Condenser MEE

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Surface Condenser data	
1	Quantity	1No
2	Type	Shell & Tube
3	Main Shell	SS304L / 5 mm Thick
4	Tubes	SS304L / 1.2 mm Thick / Seamless
5	Make of Tubes	Jindal / Scoda
6	Tube Sheet	SS304L / 20 mm Thick
7	Baffle sheet	SS304L / 3 mm Thick
8	Tie Rod	SS304L / 10 mm Thick
9	Top & Bottom Cup	SS304L / 5 mm Thick
10	Nozzles Shell & Tube Side	SS304L / SCH10
11	Make of Shell / Tube Sheet / Baffle Sheet	Jindal /Posco / Tisco

MULTIPLE EFFECT EVAPORATOR WITH ATFD		
Specification of Condensate Pot - MEE		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Condensate Pot data		
1	Quantity	1 No
2	Main Shell	SS304L / 4 mm Thick
3	Bottom dummy	SS304L / 4 mm Thick
4	Top dish	SS 304L / 4mm Thick
5	Nozzle	SS 304 Sch 20
6	Make of Main Shell / Bottom Dummy / Top dish	Jindal / Tisco / Posco

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of MEE Feed Pump

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Pump data	
1	Quantity	1 no's (1W)
2	Type	Centrifugal
3	MOC of Sleeve	CF8M
4	MOC of Shaft	SS316
5	MOC of Impeller	CF8M
6	MOC of Bearing housing	CI
7	Mechanical Seal	SS316
8	Capacity	1 cum/hr
9	Head	12 m
10	Specific gravity	1.25
11	Motor Rating	1 HP
12	Make of Pump	Johnson / JEC
13	Motor Efficiency	IE2 / IP55
14	Make of Motor	Siemens / ABB

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of MEE Condensate Pump

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Pump data	
1	Quantity	1 no (1W)
2	Type	Centrifugal
3	MOC of Sleeve	CF8
4	MOC of Shaft	SS304
5	MOC of Impeller / Impeller casing	CF8M
6	MOC of Bearing housing	CI
7	Mechanical Seal	SS304
8	Capacity	1 cum/hr
9	Head	15 m
10	Specific gravity	1.05
11	Motor Rating	1 HP
12	Make of Pump	Johnson / JEC
13	Motor Efficiency	IE2 / IP55
14	Make of Motor	Siemens / ABB

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of MEE Recirculation Pump

Client : M/s. Star Industries Limited

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Pump data	
1	Quantity	1 no (1W)
2	Type	Centrifugal
3	MOC of Sleeve	CF8M
4	MOC of Shaft	SS316
5	MOC of Impeller / Impeller casing	CF8M
6	MOC of Bearing housing	CI
7	Mechanical Seal	Double cartridge mechanical seal
8	Specific gravity	1.2
9	Make of Pump	Johnson / JEC
10	Motor Efficiency	IE2 / IP55
11	Make of Motor	Siemens / ABB

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of MEE Vacuum Pump

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Vacuum Pump data	
1	Quantity	1 No's (1 W)
2	Type	Water Ring
3	Casing	CI with SS Sleeve
4	Casing Cover	CI
5	Rotor	SS 304
6	Shaft	SS 304
7	Control disc	SS 304
8	Balls	Teflon with SS support
9	Make of Pump	PPI
10	Motor Make	Siemens / ABB / Foot Mounted
11	Motor Efficiency	IE2 / IP55

MULTIPLE EFFECT EVAPORATOR WITH ATFD		
Specification of Agitated Thin Film Dryer		
Client : : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Dryer data		
1	Quantity	1No
2	Steam Shell	SS304L / 5 mm Thick
3	Product Shell	SS 316L / 8mm Thick
4	Rotary Shell	SS 316L / 8mm Thick
5	Blade	SS 316 / 10mm Thick
6	Bottom Cone	SS 316L / 4mm Thick
7	Nozzle Steam Shell	SS 304 / Sch 20
8	Nozzle Product Shell	SS 316 / Sch 20
9	Supporting Legs	MS with Corrossion Resistant
10	Make of Shells / Blades	Jindal / Tisco / Posco

MULTIPLE EFFECT EVAPORATOR		
Specification of Feed Tank ATFD		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Feed Tank ATFD Data		
1	Quantity	1 No
2	Type	Cylindrical Vertical
3	Main Shell	SS316L / 4 mm Thick
4	Bottom dummy	SS316L / 4 mm Thick
5	Make	Jindal / Tisco / Posco
6	Nozzle	SS316 / SCH20

MULTIPLE EFFECT EVAPORATOR		
Specification of Cyclone Separator		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Separator data		
1	Quantity	1 No
2	Shell	SS 316L / 5mm Thick
3	Bottom Cone	SS 316L / 4mm Thick
4	Top dish	SS316L / 4 mm Thick
5	Vapour Outlet Nozzle	SS 316 Sch 10
6	MOC of Pipelines	SS 304
7	Product In & Out	SS 316 Sch 10
8	Supporting Legs	MS with Corrossion Resistant
9	Make of Shell / Bottom cone / Top dish	Jindal / Tisco / Posco

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of Surface Condenser ATFD

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Surface Condenser data	
1	Quantity	1 No
2	Type	Shell & Tube
3	Main Shell	SS304L / 4 mm Thick
4	Tubes	SS304L / 1.2 mm Thick / Seamless
5	Make of Tubes	Jindal / Scoda
6	Tube Sheet	SS304L
7	Baffle sheet	SS304L
8	Tie Rod	SS304L
9	Top & Bottom Cup	SS304L
10	Nozzles Shell & Tube Side	SS304L / SCH10
11	Supporting Legs	MS with corrosion resistant paint
12	Make of Shell / Tube Sheet / Baffle Sheet	Jindal /Posco / Tisco

MULTIPLE EFFECT EVAPORATOR WITH ATFD		
Specification of Condensate Pot - ATFD		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Condensate Pot data		
1	Quantity	1 No
3	Main Shell	SS304L
4	Bottom dummy	SS304L
5	Top dish	SS 304L
6	Nozzle	SS 304 Sch 20
9	Make of Main Shell / Bottom Dummy / Top dish	Jindal / Tisco / Posco

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of ATFD Feed Pump

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Pump data	
1	Quantity	1 no's (1W)
2	Type	Centrifugal
3	MOC of Sleeve	SS316
4	MOC of Shaft	SS316
5	MOC of Impeller	CF8M
6	MOC of Bearing housing	CI
7	Mechanical Seal	SS316
8	Capacity	1 cum/hr
9	Head	12 m
10	Specific gravity	1.3
11	Motor Rating	1 HP
12	Make of Pump	Johnson / JEC
13	Motor Efficiency	IE2 / IP55
14	Make of Motor	Siemens / ABB

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of ATFD Condensate Pump

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Pump data	
1	Quantity	1 no's (1W)
2	Type	Centrifugal
3	MOC of Sleeve	CF8
4	MOC of Shaft	SS304
5	MOC of Impeller	CF8M
6	MOC of Bearing housing	CI
7	Mechanical Seal	SS304
8	Capacity	1 cum/hr
9	Head	10 m
10	Specific gravity	1.05
11	Motor Rating	1 HP
12	Make of Pump	Johnson / JEC
13	Motor Efficiency	IE2 / IP55
14	Make of Motor	Siemens / ABB

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of Cooling Tower

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Cooling Tower data	
1	Quantity	1 No
2	Type	Round Type with Bottom basin
3	Capacity	As required
4	Fills	ABS
5	Fan	Aluminium
6	Outer Pipeline	GI C Class
7	Inner Pipeline	PVC
8	Make	Rich / Himagri / Protek / Advance
9	Fan Motor	Siemens / Hindustan
10	Type of Motor	Flange type
11	Motor Efficiency	IE2
12	Protection	IP55
13	Drive unit for Fan	VFD
14	Make of VFD	ABB / Danfos

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of Cooling Tower Circulation Pump

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Pump data	
1	Quantity	1 no (1W)
2	Type	Centrifugal
3	Gland	Gland rope
4	Make of Pump	Johnson / JEC
5	Motor Efficiency	IE2 / IP55
6	Make of Motor	Siemens / ABB

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of Pipe Line & Fittings

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Pipe Line & Fittings data	
1	Feed line	1 lot
2	Feed line MOC	SS316 / SCH20
3	Condensate Line	1 lot
4	Condensate Line MOC	SS304 / SCH20
5	Vapour Line	1 lot
6	Non Vapor Line MOC	SS304 / SCH20
7	Non Vapor Line Qty	1 lot
8	Make of Pipeline	Jindal / eq.

MULTIPLE EFFECT EVAPORATOR WITH ATFD		
Specification of Thermo Vapour recompressor		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
data		
1	Quantity	1 No
2	MOC of shell	SS304
3	MOC of Nozzle	SS304

MULTIPLE EFFECT EVAPORATOR WITH ATFD

Specification of Electrical Panel & Accessories

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Panel data	
1	Quantity	1 No
2	Type	Floor Mounted Non Compartmentalized
3	MOC	14 / 16 G MS Sheet with Powder coated
4	Components	MCB / OLR / Contactor
5	Make of Components	Siemens / Schneider / L&T / eq.
6	Make of Cables	Polycab / Orbit / Finolex
7	Cable entry	Bottom entry
8	Panel Base	MS Epoxy
9	Mode of Operation	Manual

MULTIPLE EFFECT EVAPORATOR WITH ATFD		
Instrument List		
Client	**M/s. GLOBAL PHARMA - CHEYYAR**	
Contractor	**: M/S. Hubert Enviro Care Systems (P) Ltd, Chennai**	
Sl.No	**Description**	**Qty**
Instrument List		
1	Feed Flow Meter with Totalizer	1 No
	Location – MEE Feed	
2	Feed Flow Level Transmitter	1 No
	Location – MEE Balance Tank	
3	Level Switch	3 Nos
	Location – MEE Vapour Separator, MEE Condensate Pot, ATFD Balance Tank	
4	Condensate Solenoid Valve	2 Nos
	Location – MEE Condensate	
5	Conductivity Meter	1 No
	Location – MEE Condensate	
6	Vacuum Transmitter	2 No
	Location – MEE / ATFD	
7	Temperature Sensor	3 No
	Location - MEE	
8	Pressure Transmitter	1 No
	Location – Seal Water Pump Outlet	
9	pH Indicator	1 No
	Location – CIP Pipe line	

TECHNICAL SPECIFICATIONS
FOR
CIVIL WORKS

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Coarse Bar Screen Chamber

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

S.No	Description	Specification
	Tank data	
1	Quantity	1 No
2	Type	Below Ground
3	Capacity	0.3 cum
4	Length	1 m
5	Width	0.5 m
6	Liquid depth	0.6 m
7	Total depth	4.2 m
8	MOC	RCC
9	Wall thickness	As per structural design
10	Raft thickness	As per structural design

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Effluent Collection tank		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor : M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
S.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Below ground
3	Capacity	6.0 cum
4	Length	2.0 m
5	Width	2.0 m
6	Height	2.5 m
7	MOC	RCC
8	Others	Top covered with Manhole and its cover

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of MEE Feed Storage tank

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor: M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Tank data	
1	Quantity	1 No
2	Type	Below Ground / Above Ground
3	Capacity	10 cum
4	Length	2.0 m
5	Width	2.0 m
6	depth	2.5 m
7	Total Depth	3.0m
8	MOC	MS Epoxy

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of ATFD Feed Storage tank		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor: M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Below Ground / Above Ground
3	Capacity	5 cum
4	Length	1.5 m
5	Width	1.5 m
6	depth	2.5 m
7	Total Depth	3.0m
8	MOC	MS Epoxy

EFFLUENT TREATMENT PLANT WITH ZLD

Specification of Pedestals for Electro Mechanical Equipment's

Client : M/s. GLOBAL PHARMA - CHEYYAR

Contractor: M/S. Hubert Enviro Care Systems (P) Ltd, Chennai

Sl.No	Description	Specification
	Tank data	
1	Quantity	1 No
2	Type	Above Ground
3	Size of Pedestals	As per site Condition
4	MOC	PCC/RCC

EFFLUENT TREATMENT PLANT WITH ZLD		
Specification of Shed for UF & RO Plant		
Client : M/s. GLOBAL PHARMA - CHEYYAR		
Contractor: M/S. Hubert Enviro Care Systems (P) Ltd, Chennai		
Sl.No	**Description**	**Specification**
Tank data		
1	Quantity	1 No
2	Type	Above Ground
3	Size of Pedestals	As per site Condition
4	MOC	MS Galvalume Sheet

EFFLUENT TREATMENT PLANT – 5.0 KLD

DESIGN PHILOSOPHY

PLANT CAPACITY:

The Effluent treatment plant is designed to treat 5.0 m^3/day of Effluents.

TREATMENT SCHEME:

- **Bar Screen Chamber**
- **Effluent collection Sump**
- **Coagulant dosing system - 1**
- **Coagulant dosing system - 2**
- **Flocculent dosing system**
- **Flocculator**
- **Primary Settling Tank**
- **Bio Aeration system**
- **Secondary Settling**
- **Filter Feed Tank**
- **Multi Grade Filter**
- **Activated Carbon Filter**
- **Sludge Drying Beds**

DESIGN RAW EFFLUENT ANALYSIS

We are basing our design on the following typical Effluent characteristics;

DESCRIPTION	VALUES
Ph	6.5 -8.5
Turbidity	35 NTU
TSS	150 PPM
TDS	<1000 PPM
BOD	350 PPM
COD	1050 PPM

TREATED EFFLUENT QUALITY:

Treated Effluent quality at the outlet of the tertiary treatment plant will be as follows:

DESCRIPTION	VALUES
Ph	6.5 -8.5
Turbidity	<1 NTU
TSS	<20 PPM
TDS	<1000 PPM
BOD	<30 PPM
COD	<150 PPM

NOTE:

The Treated Effluent quality is subjected to the following conditions:

1. The raw Effluent quality being not worse than the quality indicated in the offer.
2. The plant is being operated and maintained strictly in accordance with our operational procedures.
3. Our scope does not involve in the reduction of total dissolved solids from the effluent.

TECHNICAL DATA

EFFLUENT TRANSFER PUMPS	
No. off	One
Capacity	1.0 m^3/hr
Head	10 mwc
Type	Horizontal non clog type
Motor HP	1.0 HP
MOC	Cast Iron constructions
Make	**Kirloskar /Anala/ Equivalent**
COAGULANT DOSING SYSTEM – 1	
No. Offered	One.
Type of Pump	Hydraulic diaphragm type
Capacity	0 – 12 LPH
Material of Construction	Polypropylene
Tank capacity	100 Liters
MOC of Tank	MDPE
Make of pump	**Positive Metering / Xeed/ Equivalent**
COAGULANT DOSING SYSTEM -2	
No. Offered	One.
Type of Pump	Hydraulic diaphragm type
Capacity	0 – 18 LPH
Material of Construction	Polypropylene
Tank capacity	100 Liters
MOC of Tank	MDPE
Make of pump	**Positive Metering /Xeed/ Equivalent**
FLOCCULANT DOSING SYSTEM	
No. Offered	One.
Type of Pump	Hydraulic diaphragm type
Capacity	0 – 6 LPH
Material of Construction	Polypropylene

Tank capacity	50 Liters
MOC of Tank	MDPE
Make of pump	**Positive Metering / Xeed/ Equivalent**
FLOCCULATOR WITH TANK	
No. offered	One
Size	400mm dia x 1200mm TH - MS with FRP
Mixer MOC	SS 304
Tank MOC	MS with FRP Lining
Drive	0.5 HP
PRIMARY SETTLING TANK	
No. offered	One
Size	1.2 m x 1.2 m x 2.0 m TH
MOC	MSFRP
Feed well Drum	0.3 m dia x 0.8 m TH – FRP
MSFRP TANK	
No. offered	One Set
Aeration Tank	1.2 m x 1.2 m x 3.0 m SWD + 0.3 m FB
Secondary Settling Tank	1.2 m x 1.2 m x 2.5 m SWD + 0.3 m FB
Feed well Drum	0.3 m dia x 0.8 m TH – FRP
MOC	MSFRP
PH CORRECTION DOSING SYSTEM	
No. of dosing pump offered	One
Capacity	4.0 LPH
Type of the pump	Electronic type
MOC of pump	PP
Dosing tank	50 litters MDPE
Make	**Positive Metering /Xeed/ Equivalent**

AERATION SYSTEM	
No. Air blowers	Two (1W + 1S)
Capacity	15 m^3/hr
Head	4 m wc
Type	Twin lobe type
MOC	Cast Iron
RPM	<1100 RPM
Motor HP	1.5 HP
Make	**Kay International/ Equivalent**
CHEMICAL SLUDGE TRANSFER PUMPS	
No. off	One
Capacity	0.5 m^3/hr
Head	10 mwc
Type	Horizontal Non clog type
Motor HP	0.5 HP
MOC	Cast Iron
Make	**Kirloskar /Anala/ Equivalent**
BIOLOGICAL SLUDGE TRANSFER PUMPS	
No. off	One
Capacity	0.5 m^3/hr
Head	10 mwc
Type	Horizontal Non clog type
Motor HP	0.5 HP
MOC	Cast Iron
Make	**Kirloskar /Anala/ Equivalent**
FILTER FEED PUMPS	
No. off	One
Capacity	1.0 m^3/hr
Head	30 mwc
Type	Horizontal centrifugal type
Motor HP	1.0 HP

MOC	Cast Iron
Make	**Kirloskar /Anala/ Equivalent**
MULTI GRADE FILTER	
No. off	One
Flow rate	1.0 m^3/hr
Dia	13" Dia
Height	54" HOS
MOC	FRP
Valves	Multiport valves with Frontal Piping
Medias	Filtering sand & Graded pebbles
ACTIVATED CARBON FILTER	
No. off	One
Flow rate	1.0 m^3/hr
Dia	13" Dia
Height	54" HOS
MOC	FRP
Valves	Multiport valves with Frontal Piping
Medias	Granular Activated & Graded pebbles
SINTEX TANKS	
Nos. offered	2 No's
Treated water tank	1.0 KL
Filter Feed Tank	1.0 KL

- ✓ **Interconnecting pipes in UPVC with isolation valves in PP for Treatment Plant**

Instruments:

- ► Control panel with required cabling as required
- ► Pressure gauges – 1 lot
- ► Level Switches – 1 Lot

LIST OF CIVIL WORKS

The following are the list of civil works to be carried out by the **Customer** and EHS will furnish the GA & Layout drawings at the time of contract.

Assumed invert level = -1.0m

Bar Screen Chamber

No. Required	One No
Size	0.5 M x 0.5 M x 0.5 m TH
MOC	RCC

Effluent Collection Tank

No. Required	One No
Size	1.5 M x 1.5 M x 2.5 m TH
MOC	RCC

SLUDGE DRYING BEDS

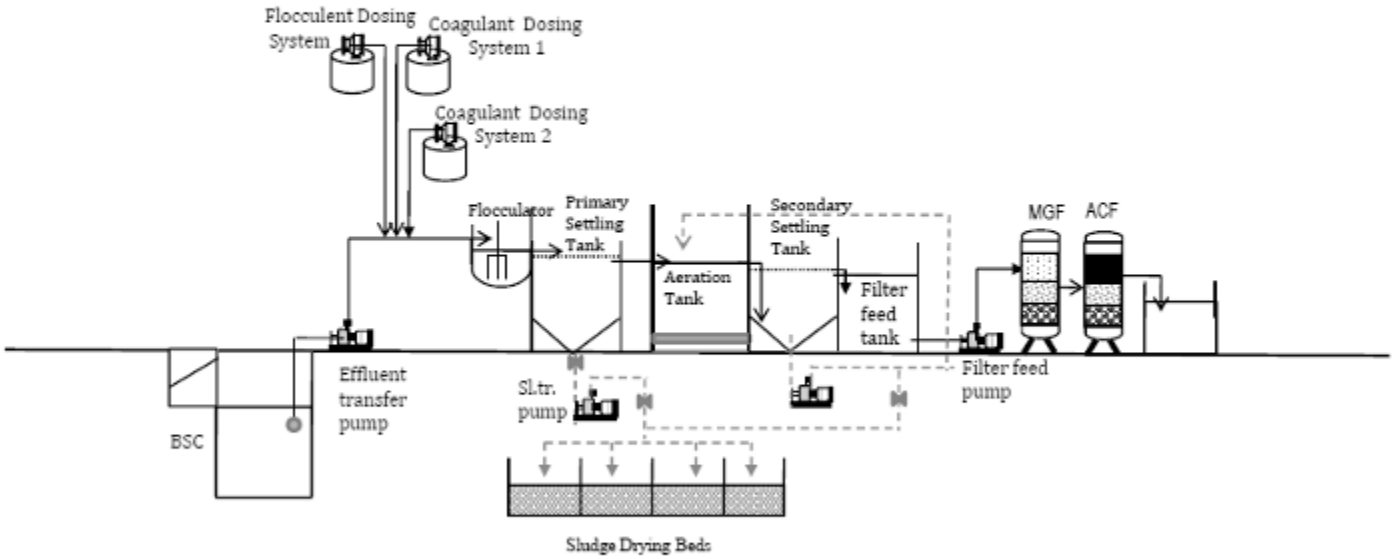
No. Required	Four No's
Size	1.0 M x 1.0 M x 1.0 m TH
MOC	RCC

PUMP ROOM

No. Required	One No.
Size	As per site condition

Foundation for all mechanical equipment 1 Lot

FLOW SCHEME FOR EFFLUENT TREATMENT PLANT – 5.0 KLD



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	GLOBAL PHARMA HEALTHCARE PVT.LTD,	
QA	ENVIRONMENTAL HEALTH SAFETY MANUAL	Effective Date:
Document No.: GPHC/EHS/001/00		Supersedes no.: New

ENVIRONMENTAL HEALTH & SAFETY MANUAL

1.0 PROTOCOL APPROVAL:

Signing of this document indicates agreement with the Environment, Health and Safety Manual. If any further changes in this document are required, document will be revised and duly approved.

Activity	Functional Areas	Name	Sign and Date
Prepared by	Quality Assurance		
Reviewed by	Engineering		
	HR and Admin		
	Production		
	Quality Control		
	Quality Assurance		
Approved by	Plant Head		
Authorized by	General Manager - QA		

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3.0 COMPANY PROFILE:

Global Pharma Healthcare Private Limited is a professionally engaged Pharmaceutical company, manufacturing BULK DRUGS and has emerged as a reputed pharmaceuticals API manufacturer. The company enjoys a rich manufacturing experience of more than 20 years. This EHS manual is related to manufacturing facility at cheyyar, tamilnadu and 70kms away from the Tambaram Railway station and 90 kms away from the Chennai Airport. The site manufacturers ofloxacin, norfloxacin, moxifloxacin and ciprofloxacin in bulk quantities. The bulk drugs are used in formulation of medicines for HUMAN USE ONLY.

Number of employees and workers to be engaged in

Department	Managers	Staff	Workmen	Total
PRODUCTION	2	10	28	40
QUALITY ASSURANCE	1	5	2	8
QUALITY CONTROL	2	15	2	19
STORES (R.M,P.M & FG)	1	3	5	9
ENGINEERING (MAINTANANCE)	1	11	3	15
PRESONAL (HR& ADMIN)	1	3	5	9

4.0 USER GUIDE:

Introduction:

During the normal working by our employees or contractor employees there are possibilities of suffering an injury. The objective of the company is to reduce the accident rates and therefore it is necessary to all concerned people to be aware of Environmental, Health and Safety procedures and regulations.

PURPOSE:

The information manual is intended to the guidelines (OSHA) on Environmental, Health and Safety matters pertaining to safe working within the company.

SCOPE:

The information manual details the various aspects of Environment, Fire, Safety and Health and also covers the principles of management.

It has covered the topics such as Prevention of Fire and accidents; work permit system, safe working method etc.,. The manual gives the guidelines about the general duties and responsibilities of employees as well as supervisors to ensure safety and fire prevention.

Identification and Distributions:

Every manual should be identified by " Document No" GPHC/EHS/001/00 For the purpose of distribution the document is available with Quality Assurance department and Engineering Department.

Amendments:

Only the head of Engineering (Head of Environment, Health and Safety department) is authorized to record changes to this manual and approves them. When changes are incorporated to any pages of this manual, the same shall be revised giving the revision status.

5.0 SAFETY ORGANISATION:

The company has a well set up of safety organization. The overall objective of the safety organization is to remove unsafe Physical Conditions and suitable safe practices in place of unsafe practices. The following are the basic elements of Safety Organization

5.1 Leadership and Employee involvement.

5.2. Assignment of Responsibility

5.3 Maintenance of Safe Working Conditions.

5.4 Establishment of Safety Training

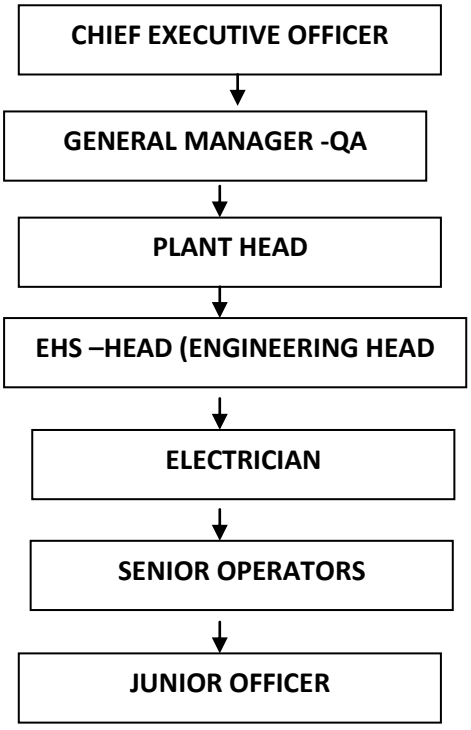
5.5 Accident Investigation system

5.6 Medical and First-aid System

5.7. Acceptance of Personal Responsibility by Employees.

Top Management approach towards accident prevention is reflected in the attitude of supervisory force. The head of Safety is responsible to provide support to Top Management in Leading and directing activities for safety management in the organization.

6.0 ORGANOGRAM OF ENVIRONMENT, HEALTH AND SAFETY



EHS POLICY:

Global Pharma Healthcare Private Limited is a responsible manufacturer of API in bulk quanity is committed to take adequate precautions related to environment, health and safety in developing, manufacturing, storing, handling and distribution of both existing and new products and in its business. It is our policy to provide a workplace free from accidents, injuries and exposure to hazardous chemicals, conserve natural resource and prevent pollution to protect the environment.

Towards this, we have set our objectives:

- We will comply with applicable Environmental, Health and Safety (EHS) legislation and statutory, regulatory and other requirements.
- We will respond to community concerns regarding EHS and address them proactively in our operations.
- We will use process safety and management techniques like safety audits, analysis \ operability studies and Documentation of safety related information to minimize EHS associated with our operations.
- We will communicate our EHS policy and other concerns to our contractors and visitors and seek their compliance.
- We will continually review objectives and set targets to improve our EHS performance..
- We will provide organizational structure support and directive to achieve these objectives.

Head –EHS **Plant-Head** **GM-QA**

8.0 BASIC SAFETY RULES AND GUIDELINES:

The company has implemented certain safety measures in the interest of employees, contractors and visitors. It is essential that all people strictly adhere to the following safety rules

- All employees are expected to wear clean uniforms while on duty.
- Smoking is not allowed inside the factory premises.
- Matchbox, cigarette, lighter, Gutka, tobacco, camera is not allowed inside the premises.Mobile phones are to be deposited at security gate. Only authorized persons are allowed to carry mobile phones inside the factory.
- Photography and use of mobile phone is strictly prohibited in hazardous area.
- In case of emergency siren, all employees and contractors are expected to assemble at designated assembly points.
- A person less than 18 years is not allowed to work inside the factory premises.
- Personal Protective Equipments (PPE)as required are issued to all employees and it is mandatory to use them as directed.
- All chemicals handled and stored in factory premises which are expensive and hazardous all must ensure that spillage is prevented.
- For any maintenance job, a work permit is necessary. Don't start any work in an operating area without obtaining proper work permit.
- For working at height, special permit must be obtained and safety belt must be used.
- For working at height, special permit must be obtained and safety belt must be used.
- Do not enter inside any Closed vessel / Tank/ Pit / any equipment or confined space without authorized vessel entry permit.
- No welding, cutting or hot work is allowed without obtaining a hot work permit.
- For doing digging job or breaking of floors an Excavation permit is required.
- Do not block access of emergency equipments like safety showers; firefighting equipments, safety equipments, emergency exists, etc.,
- Follow all safety norms. Procedures and instructions established in the factory.
- You are required to work in your area/work place. Don't leave your area without prior permission of your supervisor.
- Maintain a high standard of house-keeping/ up keeping in your area.
- Report any incident/accident/fire /unsafe act/ unsafe conditions immediately.
- Report any kind of abnormality like sound vibrations,etc., in your work area to your supervisor.
- For safe walking inside the factory premises, all persons are requested to follow road safety rules.

- Follow the vehicle speed limit of 15km/ hour inside the premises.
- In case of emergency siren, all permits will be suspended automatically. After getting all clear siren only, new permit shall be obtained to carry out the job.
- Disobey/ Disregard of any safety rules/ procedure shall lead to disciplinary action.
- Factory has well –established On Site Emergency system. Please understand it and follow it.
- Before opening valves, turning on switches or starting machinery, check the locations and safety of others in the area. Have all safety guards and covers attached.
- You should be sure that the walking surface is secured before stepping onto it. Be careful around slippery spots, loose objects or jagged edges.
- All electrical cords, ropes, hoses, etc., shall be placed to avoid hazards such as tripping or damage from grease, water or moving equipment.
- Having adequate lights on all work areas, stairways, and in basements is very important.
- When swinging sledge hammers, elevated loads,or other materials, make sure the area involved is clear. If your work causes hazardous conditions for others, place adequate barricades and/ or signs to warn of the danger e.g. manhole barricade guards.

ALL EMPLOYEES MUST FAMILARISE WITH THE FOLLOWING

1. Hazard Associated with your job.
2. Locations of fire hydrant points and fire extinguishers in and around your working area.
3. Methods of operation of different type of fire extinguishers.
4. Procedure for reporting an accident, a near miss and a fire or any mishap.
5. Your individual as well as team roll in case of emergency management.
6. Properties of the hazardous materials and necessary precautions in use, handing and transter.
7. Important telephone nos. including emergency telephone nos. ((Including intercom)
8. Details of On-site emergency plan and responsibilities.

FOR EMPLOYEES WORKING IN PLANT, WORKSHOP & LABORATORIES:

In addition to above points familiarize you with the following.

1. Location of Safety Cupboard in your working area and its key.
2. Location of first aid box
3. Location of respiratory mask.
4. Location of Safety showers cum eyes wash fountain and their use in case of contamination with chemicals.
5. Location of hydrant points & hydrant hose boxes and their use in case of fire.

6. Lower and higher explosive level of flammable material used.
7. Threshold Limit Values of the pollutants likely to be present in working area.
8. Use of personnel protective equipments.
9. Use of safety helmet and safety shoes inside the plant is mandatory.

GUIDELINES BEFORE STARTING ANY JOB:

1. Obtain proper work permit apart from routine job.
2. Ensure all preventive measures for safe working, if any doubt consult officer In charge/ HOD, Abide by all safety rules, regulations and instructions.
3. Report all unsafe conditions and or unsafe act at your superior immediately . If within your means correct it immediately.
4. Know the colour codes of all equipments and pipelines.
5. Drinking water should be taken only from potable water sources
6. Do not walk through or across any operating plant unless your duty requires to do so. If you require to enter inform the officer in-charge of the plant first.
7. Do not wear shoes having nails at sole, it may generate sparks.
8. Do not leave the table or filling cabinet drawer in open condition.
9. Smoking inside factory is strictly prohibited. Deposit lighters, cigarettes, matchboxes etc., at the security gate.
10. Do not rest under or near any vehicle.
11. Do not operate any equipment, vehicle without requisite training and authorization.
12. Park your vehicles only at authorized parking area.

GENERAL GUIDELINES:

The guidelines given here are by no means exhaustive and detail information should be obtained from superiors to maintain safe working conditions.

1. Each employee is responsible for compliance of all safety rules, safety operating procedures and practices laid down by the company.
2. Every employee should take an active part in all safety works and insist on the compliance of safety rules by fellow employee.
3. Any unsafe condition or act likely to affect the safety of company any employee or fellow employee must be promptly reported to superior and safety department.
4. All employees must follow safety regulatory signs for prevention of any incident.
5. Horseplay around operating units are prohibited at all times.
6. Do not spread any type of rumors or panicky at all time
7. Employees should eat their meals at authorized places only.

8. Do not use defective material/ equipment; report such observation to superior immediately.
9. Employees are strictly forbidden against tampering with or acting in a manner to cause damage to any part / machine / valves/ equipment/ tag/ signs/ switches etc.,,
10. Standing on pipelines or fitting orequipment's is discouraged. Do not sit on railings.
11. Use hand railing while ascending or descending through staircase.
12. Employees should beep clear of suspended loads and scaffolds and other elevation from which work is being performed.
13. Match boxes, Cigarette lighters, camera and or any equipment/ instrument may lead to spark are strictly prohibited to carry inside the factory premises.
14. Any non-spark proof equipment/ instrument required for carrying any job inside the plant shall be authorized by concerned HOD and or safety department.
15. Employees holding any equipment/ instrument in their charge should inspect their safe condition before use. Any abnormality should be reported to superior.
16. Follow evacuation route in case of Disaster Siren.
17. Avoid running inside the plant unless emergency.
18. Do not throw any materials from any height.
19. Do not use V-belt as sling for lifting any material.
20. Use of intoxicant, Narcotics, Tobacco, alcoholism is strictly prohibited inside the factory.
21. Use of cameras with flashguns and other battery-operated equipments/ can only be used under authorized permission.
22. Employees are not permitted to carry any firearms, ammunition and explosives or any other form of lethal weapons inside the factory premises.
23. Do not dry any clothing's or other combustible material on steam lines or any other hot surfaces.
24. Excavation job shall be done only after getting permit from authorized personnel.
25. Use safety belt for any overhead job more than e feet. Obtain work at height permit before commencing the job.
26. Do not remove, displace, damage or misuse of any safety/ Fire appliances.
27. Do not walk on Asbestos cement sheet(Fragile roof), Obtain work at height permit before commencing the job.
28. Do not walk in the plant with bare foots.
29. Any openings, pits pump motors or drains must be kept covered. In case the cover is removed for any work it must be barricaded for means of protection.
30. Keep all exists, isles, roadways, stairs emergency escapes free from obstacles.
31. No one is allowed to work inside any tank, vessel, reactor, pit or confined place without any authorized vessel entry permit.
32. Follow electrical lock out permit while working on electrical equipments and or machines connected to electrical power.

33. Obtain work order cum permit for all non-routine work inside the plant.

OPERATIONAL INSTRUCTIONS:

1. Do not attempt to operate any machine or equipment to which you are not assigned/
2. Employees must not touch any machine they are not operating or repairing.
3. Only plant operating personnel's are allowed to operate or changeover pumps, valves or any other critical equipment as per the SOP.
4. Before starting any job ensure proper work permit is obtained with due safety precautions as recommended in work permit system
5. Avoid contact with any chemicals or inhalation of toxic chemical vapours.
6. The personnel protective equipments and proper respiratory protective equipments ,must be used when concentration of toxic/ corrosive material is present.
7. In case of chemical contamination wash the affected area with plenty of fresh water at least 15 minutes.
8. Foodstuffs and eatables should not be stored or eaten in plant area(other than specified area).
9. Before eating or drinking always wash your hands with soap and fresh water.
10. In case of clothes contamination with oils and or any chemicals, remove the cloth immediately and wash the body part affected with plenty of fresh water/
11. Cut down regularly excess size of nails to avoid chemical contamination.\
12. Smoking inside the factory premises is totally prohibited.
13. Always carry suitable PPE's while going inside the plant. Use safety harness while working on corrosive and toxic chemicals.
14.

9.0 CAUSES OF ACCIDENTS AND PREVENTION:

An accident is an undesired event that results in physical harm to a person or damage to property. It is unusually the result of a contact with a source of energy ((i.e) kinetic, electrical, thermal, ionizing, radiation, non-ionizing radiation etc.)Above the threshold limit of the body structure.

For accident prevention, causes of accidents are to be controlled. The following are basic causes of accidents.

- Unsafe acts
- Unsafe conditions

1. UNSAFE ACTS:

These are generally classified as

- Operating without authority, failure to secure or warn
- Operating or working at unsafe speed.
- Making device in-operative
- Using unsafe equipment or hand instead of equipment.
- Unsafe loading, placing, mixing etc.
- Taking unsafe position or posture.
- Working on moving on dangerous equipment.
- Distracting, testing, abusing.
- Failure to use PPE.
- Render safety controls in effective.
- Climbing up or down a staircase without holding side rail.
- Use of Mobile phone in restricted areas.

2. UNSAFE CONDITIONS

These are generally classified as

- Unguarded equipment.
- Inadequately guarded equipment.
- Defective conditions, corroded, sharp ends, crack, etc.
- Unsafe design.
- Hazardous arrangement, process etc.,
- In adequate ventilation.
- Unsafe attire
- Unsafe method, process planning etc.
- Slipper floors.
- Tripping Hazards.

APPROACH TO ELIMINATE UNSAFE ACTS/ CONDITIONS:

UNSAFE ACTS: Unsafe acts can be eliminated by the following means.

- Personal attention and care
- Safety education and training
- Supervision
- Discipline
- Knowledge of Hazardous conditions.
- Adherence to permit system

UNSAFE CONDITIONS: Unsafe conditions can be controlled/ eliminated by the following means

- Engineering interventions.
- Modification to safe operations.
- Close Supervision.
- Regular Inspection.
- Safety Discipline.
- Audit followed by corrective actions.
- Safety built in Design.
- Work area clearance procedure post work completion.
- Training
- Good Housekeeping

10.0 FIRE PREVENTION AND CONTROL MEASURES

Fire Prevention Purpose:

Minimize Fire Hazards/ Damage.

Aims to protect employee Property.

Assure the continuity of the operations.

How can this be done

Clean up after ourselves.

Put flammable materials in safe locations.

Observe safety precautions

Fire is heat and light from rapid combination of oxygen and other materials. The flame, which gives the light is composed of glowing particles of burning material and luminous gases. For fire to exist, a combustible substance must be present, the temperature must be high enough to cause combustion, and enough oxygen must be present to sustain rapid combustion. Fire is a chemical reaction . It represents as follows.

Fuel+O_2+ Heat $\longrightarrow$ Energy+ Heat+ Soot + Smoke.

ELEMENTS OF FIRE:

The three elements –fuel, heat and oxygen –form the fire triangle. It is chain reaction. If one part of the fire triangle is removed, the fire will go out.

To have a fire, you must have fuel, heat and oxygen. When these 3 elements are together in the correct amounts, a fire starts.

FUEL: Solids, Liquids and Flammable Gases.

OXYGEN: Normal Air-21%, Unconsicousnes-18%, Flame-15%, Smolder-3%

HEAT : Sparks, Short circuits, Matches, Friction.

FIRE DECOMPOSITION STAGES:

Explosions accepted, must fires have quite humble beginnings and grow through four stages:

Incipient stage : At this stage decomposition is occurring at the surface of the fuel due to the influence of some form of heat.Products of combustion given off at this stageare invisible in the eye.

Smoldering stage : At this stage up to 10% of the decomposing products released at the surface of the fuel are visible.

Flaming stage : Vapors from the decomposing fuel have ignited and are at the stage where flames are propagating

Heat Stage : At This stage the burning has progressed to the point where the fire is still small but generating sufficient heat to warm the air immediately around the fire, sending warm products of combustion upwards by convention.

The time required for a fire to develop through the first two stages is usually quite long when compared to the last two. Depending on conditions , the time involved going through all stages may be anything from seconds to days. The principles of fire extinction consist of the eliminations or removal of one or more of the elements.

These principles are:

Cooling : The most commonly used fire-fighting medium is water. Water absorbs heat from the fire and cools the fuel to a temperature where it no longer produces flammable vapors.

Smothering : By excluding the oxygen in the surrounding atmosphere, the fire will be extinguished.

Starvation : Starvation is achieved by removal of the fuel burning in the fire. Sometimes combustible materials can be removed such as shutting off gas valves or fuel flows.

Stop Chain reaction: Stop or interrupt the chain reaction between the fuel, heat and oxygen the fire will be extinguished.

Specific methods of extinguishing fires often involve a combination of more than one of the four principles.

HOW TO OPERATE THE FIRE EXTINGUISHER?

Pull the Pin at the top of the extinguisher.

The pin releases a locking mechanism and will allow you to discharge the extinguisher.

Aim at the base of the fire, not the the flames. This is important – in order to put out the fire, you must extinguish the fuel.

Squeeze the lever slowly. This will release the extinguishing agent in the extinguisher. If the handle is released, the discharge will stop.

S weep from side to side . Using a sweeping motion, move the fire extinguisher back and forth until the fire is completely out. Operate the extinguisher from a safe distance, several foot away, and then move towards the fire once it starts to diminish. Be sure to read the instructions on your fire extinguisher-different fire extinguishers recommend operating them from different distances. Remember, Aim at the base of the fire, not at the flames!!!!

DO NOT FIGHT THE FIRE:

The fire is spreading beyond the immediate area where is started, or is already a large fire.

1. The fire could block your escape route.
2. You are unsure how to properly operate the extinguisher.
3. You don't have the proper fire extinguisher.
4. Yes don't know what is burning.
5. There is too much smoke or you are at risk of inhaling smoke.

BEFOFE DECIDING TO FIGHT A FIRE, ENSURE THAT:

1. The fire is small and not spreading.
2. You have the proper fire extinguisher for what is burning.
3. The fire won't block your wait if you can't control it.
4. You know how to use your fire extinguisher, know its limitations.
5. You know your fire extinguisher works.

HOW TO FIGHT A FIRE SAFELY:

1. Always stand with an exit at your back.
2. Stand several feet away from the fire, moving closer once the fire starts to diminish.
3. Use a sweeping motion and aim at the base of the fire.
4. Be sure to watch the area for a while to ensure it doesn't re-ignite.

COMMON CAUSE OF FIRE:

1. Heating sources are often causes of fire.
2. Electrical wiring can cause a fire if it is not large enough to carry the load being supplied.
3. Rubbish and Waste materials.
4. Combustible Materials.
5. Hazardous Materials
6. Non-standard flameproof installations.
7. Faulty connections.
8. Frayed wiring.
9. Loose cords.
10. Overloads.
11. Broken plugs.
12. Dirty equipment.
13. Bad contacts Improper equip.
14. Extension Cords.
15. Contamination
16. Smoking should not be prohibited.
17. Area identification is not done properly. No proper isolations of equipment's.
18. Static electricity
19. No proper earthling
20. Unwanted material.
21. Uncovered flammable material, Wood, Cotton, Oil spillage.

COMMON CAUSES OF FIRE AND PREVENTION:

Cause	%	Preventive measures
Electrical	23%	Proper maintenance.
Smoking	15%	Control & Education
Friction spark	10%	Preventive maintenance
Hot surface	7%	Proper Operations
Combustion Spark	5%	Well-designed equipment.
Spontaneous ignition	4%	Good ventilation & House keeping
Welding and Cutting	4%	Work permit system
Mechanical spark	2%	Keeping stock clean and Use of Non Sparking tools
Static Spark	1%	Earthling & bonding ionization
Chemical reaction	1%	Proper Safe operating procedure
Lighting	1%	Lighting arrestor, earthling

FIRE EXINTGUISHER: CARBON DIOXIDE:

It is designed for use on fires involving flammable liquids and live electrical equipment.

The discharge period depends on the size of the extinguisher CO_2 (carbon dioxide) extinguishers are for class B and C.

They do not work very well on class A. A fire because the material usually reignites.

CO_2 extinguishers have an advantage over dry chemical in that they leave behind no harmful residue.

That makes carbon dioxide a good choice for an electrical fire involving a computer or other delicate instrument.

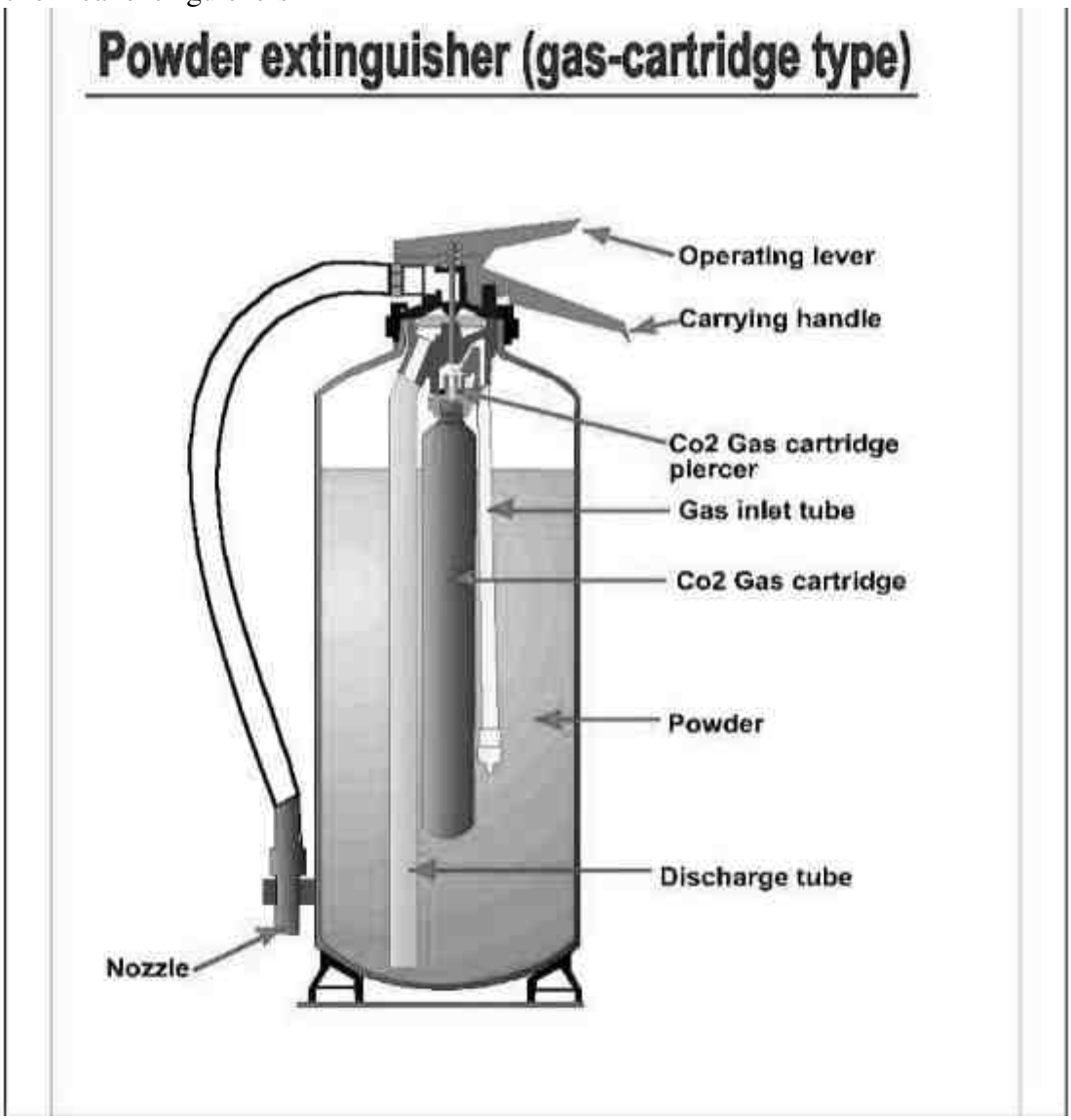
Note that: CO_2 is a bad choice for flammable metal fires such as Grignard reagents, alkyllithiums and metal because CO_2 reacts with these materials

CO2 extinguishers are not approved for Class D fires?

FIRE EXTINGUISHER: DRY CHEMICAL POWDER:

It contains a bi-carbonate based powder and is suitable for fires involving flammable liquids and live electrical equipment.

The discharge period depends on the size of the extinguisher.
Dry chemical extinguishers



FIRE EXTINGUISHER: DRY CHEMICAL POWDER:

It contains a bi-carbonate based powder and is suitable for fires involving flammable liquids and live electrical equipment.

The discharge period depends on the size of the extinguisher.

Dry chemical extinguishers are useful for class ABC fires and are your best all-around choice.

They have an advantage over CO_2 extinguishers in that they leave a blanket of non-flammable material on the extinguished material that likelihood of resignation.

There are two kinds of dry chemical extinguishers! Dry chemical extinguishers are useful for class ABC fires and are your best all-around choice.

They have an advantage over CO_2extinguishers in that they leave a blanket of non-flammable material on the extinguished material, which reduces the likelihood of resignation.

There are two kinds of dry chemical extinguishers!

A) Type BC fire extinguishers contain sodium or potassium bicarbonate.
B) Type ABC fire extinguishers contain ammonium phosphate.

1) Fire squad and fire training:

Fire squad and training employees are available in all shifts to security personals. Employees in Global Pharma Healthcare are in basic firefighting, first aid and rescue in the mock drills. Mock drills are conducted during every year to assess response time and effectiveness of the action team. On site emergency plan which has been revised from time to time.

2) Fire squad and fire training:

All the factory area are covered with well-established and maintained Fire extinguishers of foam, CO_2, water, DCP as per requirement of area made available.

FIRE DRILL:

Fire drill should be conducted on the occasion like safety day & Fire service day.

FIRE EXTINGUISHERS MAINTENANCE & RECHARGING:

Fire extinguishers should be checked every month. Some standard equipment's etc. used for firefightingis given below to help selection as per your own equipment.

Like disease fire also need to be diagnosed and treated. It is important to identify nature and class of fire to select appropriate extinguishing media and equipment.

- Fire extinguishers should only be removed from their wall brackets is an emergency. The removal of fire extinguishers in other cases without good reason will be considered as misconduct.
- Flammable materials must never be exposed to hot surfaces or direct heat sources.
- In the event of a gas leak switch off all equipment and evacuate the premises immediate.

- Contact the Emergency Services immediately.
- In the event of a fire the premises should be evacuated immediately following the information provided on the fire notices.
- Fire exists must be kept at all times.
- All employees required to familiarize themselves with the fire drill before commencing work. Exercises will be arranged at regular intervals.

PORTABLE TYPE (FIRE EXINGUISHER)

These are called first-aid firefighting appliances. According to the fire hazards, Dry Chemical powder, Carbondi-oxide and Mechanical foam type fire Extinguishers have been installed in all operating areas. Selection and Installation of fire extinguishers have been done on the basis of type of fire.

SELECTION OF FIRE EXTINGUISHERS:

S.No.	TYPE OF FIRE	MATERIALS INVOLVED IN FIRE	TYPE OF FIRE EXTINGUISHERS
1	A Class	Solid Combustible Materials (i.e.,) Wood, Paper, Grass etc.	Water Type
2.	B Class	Flammable solvents	Foam, DCP & CO_2
3.	C Class	Flammable Gases & Electrical Equipments	CO_2, DCP, Sand
S.No.	**TYPE OF FIRE**	**MATERIALS INVOLVED IN FIRE**	**TYPE OF FIRE EXTINGUISHERS**
4	D Class	Metals – Sodium, Lithium, Magnesium, Ra-Nickel etc…,	Special Dry Chemical Powder, Sand

Firefighting Equipment are well maintained in good operating condition at all times. All plant personnel are well trained in firefighting operations. We have adequate trained persons in all depts. Round the clock to meet the Emergency requirement. We conduct regular training program for our emergency squad team. Fire drills are also being conducted on regular basis for assessment of our preparedness.

11.0 ACCIDENT, INCIDENT REPORTING & ANALYSIS

The failure of people , equipment, supplies or surroundings to behave or react as expected cause most of the accidents.

Accident investigations determines how any why those failures occur.

By using the information gained through an investigation a similar or perhaps more disastrous accident may be prevented.

Conduct accident investigation with accident prevention in mind. Investigations are NOT o place blame.

If results in a fatality or in a permanent partial or temporary total (lost-time) disability, it is serious.

Similarly, property damage may be minor or serious. Investigate all accidents regardless of the extent of injury or damage.

Whenever accident took place, the concerned officer/ shift in charge prepares an Accident report containing particulars of the accident, the type of injury, causes of injury and other relevant factors.

Based on this report, the safety / personnel department provides treatment to the injured person and decides whether further treatment/ action is required i.e. sending to hospital etc.

Investigates the accident in all its details including whether accident occurred due to defects in equipment's, failure of safety devices or human failure.

The investigation report is then prepared and sent to the concerned area incharge or plant Head.This report will indicate the corrective steps to be taken to prevent recurrences.

When the investigation indicates purely human failure, the concerned employee is called and explained the necessity to abide by the safety rules.

Any injury causing total disablement for more than 48 hours is reported to factory inspectors.

ACCIDENT ANALYSIS: ALL SAFETY STATISTICS ARE AS PER IS 3786

FREQUENCY RATE:

The frequency rate shall be calculated both for Lost Time injury & Reportable Lost Time Injury as follows.

FA = Number of Lost Time Injury X1000000/ Man Hours Worked.

FB = Number of Reportable Lost Time Injuryx1000000 / Man hours worked.

Since frequency rate FB is based on the lost time injuries reportable to the statutory authorities, it may be used for official purpose only. In all other cases, frequency rate FA should be used for comparison purposes.

SEVERITY RATE:

The severity rate shall be calculated from man-days lost in time injury & reportable lost time injury as follows.

SA = Man days lost due to lost time injuryX1000000/ Man hours worked.

SB = Man days lost due to reportable lost time injuryx1000000/ Man Hours worked.

Note: Since severity rate SB is based on the lost time injuries reportable to the statutory Authorities, it should be used for official purposes only.

In all other cases severity rate SA should be used for comparison purposes.

Calculation of man days lost shall be based on the following,

Man-days lost due to temporary total disability.

Man-days lost according to schedule of charges to death & permanent disabilities. In case of multiple injuries, the sum of schedule charges shall not be taken to exceed 6000 person-days.

Day lost due to injury in previous periods that is if any accident, which occurred in previous period is still causing loss of time in the period under review.

In the case if intermittent loss of time, each period should be included in the severity rate.

For the period in which the time is lost. If any injury is treated as a lost time injury in one statistical period & subsequently times out to be a permanent disability, the man days charged to the injury shall be subtracted from the schedule charge for the injury when permanent disability becomes known.

If you are taking prescribed drug that may have a side effect, inform your supervisor before beginning the day's work.

12.0 VISITORS & CONTRACTORS:

1. All visitors and contractors must report to the main reception.
2. Before entering into the plant all visitors and contractors has to take entry permit (Visitor gate pass)from security department.
3. The Identity card given by security has to be display.
4. Before leaving the plant the entry permit (Visitor gate pass) is to be submitted to security.

5. Any contractor carrying out work at the premises may be required to provide the following details to the security in advance of the work commencing.
6. Liability insurance Cover:- The contractor should submit the paper TO Personal and Administration dept. regarding the Insurance coverage.
7. Contractors carrying out electrical, gas or hot works will be issued with a permit to work before commencing work.
8. A permit to work will also be required for persons working at height or in confined spaces
9. All contractors working for the company are required to comply with this safety policy and with all other written safety instructions.

14.0 SAFETY OF COMPORESSED GAS CYLINDERS,

Compressed gases present a unique hazard, Depending on the particular gas, there is apotentials for simultaneous exposure to both mechanical and chemical hazards, Gases may be:

- Flammable or combustible
- Explosive
- Corrosive
- Poisonous
- Inert
- Or a combination of hazards

If the gas is flammable, flash points lower than room temperature compounded by high rates of diffusion present a danger of fire or explosion. Additional hazards of reactivity and toxicity of the gas, as well as asphyxiation, can be caused by high concentrations of even harmless gased such as nitrogen. Since the gases are contained in heavy, highly pressurized metal containers, the large amount of potential energy resulting from compression of the gas make the cylinder a potential rocket or fragmentation bomb.

Care full procedures are necessary for handling the various compressed gases, the cylinders containing the compressed gases, regulators or valves used to control gas glow, and the piping used to confine gases during flow.

IDENTIFICATION:

The contents of any compressed gas cylinder must be clearly identified. Such identification should be stenciled or stamped on the cylinder or a label.

No compressed gas cylinder should be accepted for use that does not legibly identify its contents by name.

If the labeling on a cylinder becomes unclear or an attached tag is defaced to the point the contents cannot be identified, the cylinder should be marked 'content unknown' and returned directly to the manufacturer.

1. Never rely on the colour of the cylinder for identification. Colour coding is not reliable because cylinder colours may vary with the supplier. Additionally, labels on caps have little value because caps are interchangeable.
2. All gas lines leading from a compressed gas supply should be clearly labeled to identify the gas, the laboratory or area served, and the relavent emergency telephone numbers.
3. The labels should be colour coded to distinguish hazardous gases (such as flammable, toxic or corrosive substances. (e.g., a yellow background and black letters).
4. Signs should be conspicuously posted in areas where flammable compressed gases are stored, identifying the substances and appropriate precautions (e.g., HYDROGEN – FLAMMABLE GAS- NO SMOKING –NO OPEN FLAMES).

HANDLING & USE:

Cylinders may be attached to a bench top, individually to the wall, placed in a holding cage or have a non-tip base attached. Chains or sturdy strips may be used to secure them. If a leaking cylinder is discovered, move it to a safe place (if it is safe to do so) and inform Environmental, Health and safety head. You should also call the vendor as soon as possible.

UNDER NO CIRCUMSTANCES SHOULD ANY ATTEMPT BE MADE TO REPAIR A CYLINDER OR VALVE

Standard cylinder-valve outlet connections have been devised by the Compressed Gas Association (CGA) to prevent mixing of incompatible gases. The outlet threads used vary in diameter, some are internal, some are external, some are right-handed, some are left-handed. In general , right-handed threads are used for non-fuel and water-pumped gases, while left-handed threads are used for fuel and oil-pump gases.

To minimize undesirable connection, only CGA standard combinations of valves and fitting should be used in compressed gas installation, the assembly of miscellaneous parts should be avoided. The threads on cylinder valves, regulators and other fittings should be examined to ensure they correspond and are undamaged.

Cylinders should be placed with the valve accessible at all times. The main cylinder valve should be closed as soon as it is no longer necessary that it to be open (i.e, it should never be left open when the equipment is unattended or not operating). This is necessary not only for safety when the

cylinder is under pressure, but also to prevent the corrosion and contamination resulting from diffusion of air and moisture into the cylinder after it has been emptied.

Cylinders are equipped with either a hand wheel or stem valve. For cylinders equipped with a stem valve, the valve spindle key should remain on the stem while the cylinder is in service. Only wrenches or tools provided by the cylinder supplier should be used to open or close a valve. At no time should pliers be used to open a cylinder valve. Some valves may require washers , this should be checked before the regulator is fitted.

Cylinder valves should be opened slowly. Oxygen cylinder valves should be opened all the vay. Open up the oxygen cylinder valve stem just a crack. Once the needle on the high pressure gauge has stopped, open up the valve all the way.

This back-sets the valve. Oxygen cylinders must have the valve opened up all the way because the high pressure in the cylinder. There is a back- seating valve on the oxygen cylinder. This prevents the high pressure gas from leaking out through the threaded stem. When opening the valve on a cylinder containing an irritating or toxic, gas , the used should position the cylinder with valve pointing away from them and warn those working nearby.

Cylinders containing flammable gases such as hydrogen or acetylene must not be stored inclose proximity to open flames, areas where electrical sparks are generated, or where other sources of ignition may be present.

An open flame shall never be used to detect Leaks of flammable gases. Hydrogen flame is invisible, so “fell” for heat. One common practice is to use a natural bristle broom to “sweep’ the air in front of you. All cylinders containing flammable gases should be stored in a well-ventilated area.

Oxygen gascylinders, full or empty, shall not be stored in the same vicinity gas flammable gases. The proper storage for oxygen cylinders requires that a minimum of 20 feet be maintained between flammable gas cylinders and oxygen cylinders or the storage area be separated, at a minimum, by a fire wall five feet high with a fire rating of 0.5 hours. Greasy and oily;materials shall never be stored around oxygen; nor should oil or grease be applied to fitting. Regulators are gas specific and not necessarily interchangeable Always make sure that the regulator and valve fittings are compatible.

If there is any question as to the suitability of a regulator for a particular gas checks with Environmental, Health & Safety Services or call your vendor for advice. Aster the regulator is attached the cylinder valve should be opened just enough to indicate pressure on the regulatory

gauge (not more than one full turn) and all the connections checked with a soap solution for leaks. Never use oil or grease on the regulator of a cylinder valve.

The following rules should always be followed in regards to piping:

- Copper piping shall not be used for acetylene.
- Plastic piping shall not be used for any portion of a high-pressure system.
- Do not use cast iron pipe for chlorine.
- Do not conceal distribution lines where a high concentration of a leaking hazardous gas can build up and cause an accident..
- Distribution lines and their outlets should be clearly labeled as to the type of gas contained.
- Piping systems should be inspected for leaks on a regular basis.
- Special attention should be given to fittings as well as possible cracks that may have developed.

A cylinder should never be emptied to a pressure lower than 172 kPa(25psi/in2) (the residual contents may become contaminated if the valve is left open). When work involving a compressed gas is completed, the cylinder must be turned off and if possible, the lines bled.

When the cylinder needs to be removed or is empty, all valves shall be close, the system bled, and the regulator removed. The valve cap shall be replace, the cylinder clearly marked as"empty," and returned to a storage area for pickup by the supplier.

Empty and full cylinder should be stored in separate areas.

Where the possibility of flow reversal exists, the cylinder discharge lines should be equipped with approved check valves to prevent in advertent contamination of cylinders connected to a closed system. "sucking back" us particularly troublesome where gases are used ass reactants in a closed system. A cylinder in such as system should be shut off and removed from the system when the pressure remaining in the cylinder is at least 172 kPa (25psi/in2). If there is a possibility that the container has been container has been contaminated, it should be so labeled and returned to the supplier.

Liquid bulk cylinders may be used in laboratories where a high volume of gas is needed. These cylinders usually have a number of valves on the top of the cylinder. All valves should be clearly marked as to their function. These cylinders will also vent their contents when a preset internal

pressure is reached, therefor, they should be stored or place in service where there is adequate ventilation.

Always use safety glasses (preferably with a face shield) when handling and using compressed gases, especially when connecting and disconnecting compressed gas regulators and lines.

All compressed gas cylinders, including lecture-size cylinders, must be returned to the supplier when empty or no longer in use.

TRANSPORTATION OF CYLINDERS.

The Cylinders that contain compressed gases are primarily shipping containers and should not be subjected to rough handling or abuse. Such misuse can seriously weaken the cylinder and render it unfit for further use or transform it into a rocket having sufficient thrust to drive it through masonry walls.

1. To protect the valve during transportation, the cover cap should be screwed on hand tight and remain on until the cylinder is in place and ready for use.
2. Cylinders should never be rolled or dragged.
3. When moving large cylinders, they should be strapped to a properly designed wheeled cart to ensure stability.
4. Only one cylinder should be handled (moved)at a time.

14.0 ELECTRICAL SAFETY

Introduction: It takes very little electric current to kill-less than one-tenth of an ampere. With good contact, 115 volts is sufficient voltage to cause death. There have been fatal electric shocks where voltage as low as 60 to 70 volts was involved.

Management must ensure that with regard to all fixed electrical installations and to all portable electrical equipment there is in place a safe system of work that ensure:-

- Compliance with relevant legislation
- All fixed installations are safe and tested
- All electrical appliances and cables are tested and maintained
- Only safe equipment is used
- This system applies to all places of work
- There are no voltage restrictions

Requirements:

1. Any installation, use and maintained of equipment must reflect specific safety requirements with regard to adverse conditions i.e. weather effects, exposure to corrosive or flammable environments. And operation in a dusty atmosphere.
2. Connection should always be suitable for the purpose for which they are being used and the use of electrical tape alone for connections is for bidden.
3. All electrical installations and equipment must have adequate means to enable them to be isolated from the electric supply in order to prevent danger.
4. All switches and fuse ways must be clearly labeled as to indicate the circuit or function controlled and all switches and distribution covers must be kept closed at al times unless being worked on by a competent authorized person.
5. Adequate working space means access and lighting must be provided at all electrical equipment on which or near which work is being carried out which may give rise to danger.
6. There should be adequate arrangements to ensure that electrical equipment has been made 'dead', while work is being carried out on or near such equipment, cannot be electrically charged if this would then present danger.
   This can be physically achieved y ensuring that a 'lock-out' system is used, the isolator controlling equipment is physically locked in the off position. Where a lock-out' system cannot be used then there should be a procedure for ensuring that fuses are removed and held by the authorized person carrying, put the work.

VISUAL CHECKS BY USERS

All persons about to use an item of electrical equipment should carry out a visual check. The should look for:

- Damage to plug
- Damage to cable
- Taped joints are poor wire connections
- Insecure cable at entry to plug
- Exposed internal insulation showing below cable sheath
- Evidence of dampness or water contamination
- Evidence of physical damage to equipment
- Missing guarding to equipment

Spliced or damaged electrical cords shall not be used until properly repaired. Electrical cords on power tools and extension cords shall have heavy-duty rubber insulation.

15.0 SAFETY IN HAND TOOLS

Hand & Power Tools

Always know how to properly use hand and power tools before starting the job by following operating instruction and using the proper accessories. If you are unfamiliar with how a tool operates or is to be use, get the advice and instruction of your supervisor or the Tool Room attendants as appropriate.

- ✓ Tools should not be used for other than their intended use.
- ✓ Keep all cutting tools sharp.
- ✓ Tools shall be kept in a safe condition without broken or damaged parts.
- ✓ Never use tools which have burred or mushroomed heads and never carry loose tools in your pockets.
- ✓ If tools or equipment are found to be faulty, report them to your supervisor and return the equipment to the Tool Room or appropriate department for repair.
- ✓ When possible, pull on a hand tool rather than push since it can slip and cause a serious cut or bruise.
- ✓ Never leave hand tools lying around loose where they may fall on someone below.
- ✓ Non-sparking, non- magnetic tools are provided for your use in the tool room. They shall be used in areas such as grain storage, sewers, steam tunnels, spray-paint booths, radar unit locations, and rooms with electromagnets.

Remember, use the right tool for the job.

Hand & Power Tool Audit

Facility_____ Area_____

Auditor _____ Date _____

Area	Satisfactory	Action Required	Corrective Action(date)
Employee knowledge			
Date Last Tool Training			
Hazards of faulty or improperly used tools			
Pre-Use Inspection			
Electrical Hazards			
Tool Adjustments			
Sharpening Procedures			
Proper Storage			
Proper Administration			
Person Assigned for tool checkout/repair			
Designated Area for tool storage			
Respirators required when cutting fluid use creates mist			
Safeguards			
Engineering safeguards			
Administrative Safeguards			
Training Safeguards			
Area Inspection			
Eye Hearing Protection Used			
Bench Grinders Adjusted			
Equipment mounted			

to floor				
Machine guards in place				
Warning signs posted in posted in shops				
Storage area neat, dry				
Tools in good condition				
Blades & cutting edges sharp				
Face shields used at grinders				
Grinding wheels dressed Rigging equipment tested.				
Operational Questions				
1	Are all tools and equipment(both company and employee owned) used by employees at their workplace in good condition?			
2	Are hand tools such as chisels and punches, which develop mushroomed heads during use reconditioned or replaced as necessary?			
3	Are broken or fractured handles on hammers, axes and similar equipment replaced promptly?			
4	Are worn or bent wrenches replaced regularly?			
5	Are appropriate handles used on files and similar tools?			
6	Are employees made aware of the hazards caused by faulty or improperly used hand tools?			
7	Are appropriate safety glasses, face shields, etc. used while using hand tools or equipment, which might produce flying materials or be subject to breakage?			
8	Are jacks checked periodically to ensure they are in good operating condition?			
9	Are tool handles wedged tightly in the head of all tools?			
10	Are tool cutting edges kept sharp so the tool will move smoothly without binding or skipping?			
11	Are tools stored in dry, secure locations where they won't be tampered with?			

12	Is eye and face protection used when driving hardened or tempered spuds or nails?
13	Are grinders, saws and similar equipment provided with appropriate safety guards?
14	Are power tools used with the correct shield, guard, or attachment recommended by the manufacturer?
15	Are Portable circular saws equipped with guards above and below the base shoe? Are circular saw guards checked to assure they are not wedged up, thus leaving the lower portion of the blade unguarded?
16	Are rotating or moving parts of equipment guarded to prevent physical contact?
17	Are all cord-connected, electrically operated tools and equipment effectively grounded or of the approved double insulated type?
18	Are effective guards in place over belts, pulleys, chains, sprockets, on equipment such as concrete mixers, and air compressors?
19	Are Portable fans provided with full guards or screens having openings1/2 inch or less?
20	Is hoisting equipment available and used for lifting heavy objects, and ar hoist ratings and characteristics
21	Are ground-fault circuit interrupters provided on all temporary electrical 15 and 20 ampere circuits, used during periods of construction?
22	Are pneumatic and hydraulic hoses on power operated tools checked regularly for deterioration or damage?
NOTES:	

16.0 MACHINERY & GUARDING

Supervisors shall allow only properly trained employees to operate power equipment or machinery and shall give proper instructions in their safe operation.

- All electrical equipment and machinery shall be properly grounded. Control switches shall be properly located at the point of operations best suited to control the equipment.
- You should never adjust, repair, clean, or oil machinery or equipment while any of its parts are in motion. Use lock out switches to prevent accidental start-ups.
- Be sure all of the components have stopeed.
- Always replace guards after repairs have been made.
- Always perform proper maintenance on all machinery and equipment to prevent premature failure or possible accident. Have all safety guards in place while testing repaired equipment.
- You should regularly inspect for cracks, stretching, etc. on cables, chains, clamps, hooks, and other equipment that are frequently placed under stress. Spreading, crimps, or cracks are warning signs of anger. If you feel the equipment is damaged or creating a possible hazard, report this to your supervisor immediately.

Tag-Out Procedure

- Before starting maintenance or repair, the equipment should be checked to make sure all energy has been released or disconnected.
- Each trade should remove its tag after the equipment is repaired and notify affected personnel.
- When more than one trade is involved in repair or maintenance of such equipment, a compound –locking device shall be used.
- A tag shall be placed on the junction box of stationary permanently-wired equipment with the energy activating device placed in the ‘off” Position.
- This lockout/tag out procedure should reduce accidents caused by the unexpected start up or release of energy.
- The equipment shall not be put back in service until after the last trade removes its lock and tag.
- Only trained personnel may use machinery provided in the workplace.
- If you have not received training then under no circumstances should you attempt to prate it.
- Prior to authorization being given to operate machinery an assessment of your competence will be carried out.
- If at any stage whilst using any item of machinery your begin to feel unwell you must stop what you are doing, isolate the plant concerned via the remote electrical supply switch and report to your supervisor.

- Never talk to another member of staff when you are operating machinery. Do not approach or distract any other employee operating machinery.

GUARDING

It is not only dangerous but also illegal to remove a guard from a machine unless you need to clean or repair it.

Only trained personnel may clean or repair items of plant, which require guarding to be removed. Equipment, which is to be cleaned, must be isolated electrically. The electrical supply should be locked out and a notice should be fixed to the switch point advising that re-connection of the supply can be hazardous.

If any part of the equipment you are using is unguarded you should stop work immediately, isolate the plant concerned, and report the matter to the safety officer without delay.

17.0 SAFETY IN MANUAL METERIAL HANDLING:

Lifting and moving loads by hand is the biggest cause of injury in the work place Lifting should be carried out in accordance with the following guidelines:

Avoid Lifting and Bending whenever you Can

Place objects up off the floor. If you can set something down on a table or other elevated surface instead of on the floor, you won't have to reach down to pick it up again.

Raise /lower shelves. The best zone for lifting is between your shoulders and your waist. Put heavier objects on shelves at waist level and lighter objects on lower or higher shelves.

Over 250,000 industrial worker, housewives, and office workers injure themselves each year through poor lifting techniques.

The Practice of stooping over from the waist to lift, accompanied with the added factors of uneven footing, poor balance, or awkward positioning is a direct invitation to eventual injury, because undue strain is thrown on the back and abdominal muscles.

The following rules should be observed for safe lifting:

1. Determine if you need help-consider the distance and the object's weight.
2. Look over the pick-up and delivery area for (1)tripping hazards, (2)slippery spots, (3)small doors, (4) sharp corners, (5) blind spots, etc.'
3. Inspect the object for sharp corners, wet surfaces, slivers, etc.

4. Place feet correctly- on foot close to the side of the object to provide stability-and one directly behind the object to provide lift or thrust.
5. Keep the object close to your body.
6. Get a correct grip or hold on the object by using a full grip-not just your fingers.
7. Keep your back straight this does not mean vertical just aligned from head to pelvis.
8. Your should tuck in your chin when lifting to insure alignment from head to pelvis.
9. Do the actual lifting with your legs only.
10. Just as important as lifting correctly is the ACT OF LOWERING CORRECTLY. You should lower objects in the same manner as you lifted them.
11. The body should never be turned or twisted while under the stress of heavy weight. Instead, you should turn your whole body if you desire to change your postion after you have made the lift.
12. When team-lifting large, heavy loads, one person should inform all other prior to lifting of the safe, correct method of lifting and transportation to be use.

18.0 SAFE STORAGE AND HANDLING OF CHEMICALS:

As the factory is handling materials, which are flammable and hazardous, these are well laid down safety system for handling storing and processing of the chemical factory layout divided into flammable and non-flammable area.

- Bulk storage, warehouse and chemical unloading are kept away from production blocks.
- Chemicals are stored based on their compatibility.
- Flammable and non-flammable liquids are stored in separate tank farm area and identified as explosive and non-explosive tank farm.
- Tankers awaiting unloading are parked away from areas of regular operations.
- Tankers without spark arrestors are not allowed to enter in tank farm area.
- Minimum inventory of hazardous chemicals is maintained.
- Low boiling (flammable) solvents are stored in insulated tanks provided with chilled water condenser, flame arrester and breather valve on vent.
- Static discharge ear thing connections are provided to connect the tanker before unloading.
- Suitable type of portable fire extinguisher, tool box and personnel protective equipment box is kept available in the tank farm.
- Use of complete PPE's is made mandatory.
- No unloading operations are carried out after sun set unless approved by location head.
- Chemicals stored in drums are kept in chemical drum storage yard with proper labels and locations.
- Special transfer facility for hazardous chemicals is provided.

19.0 SAFETY IN TANKER UNLOADING

Wear Personal protective equipments as per following:

1. Apron
2. Goggles
3. Gum boots
4. Hand gloves

1. Check the level of the tank in which the tank in which the tanker is to be unloaded.

2. Ensure that there is enough space in the tank or enough drum for storage to unload all the tanker material

3. Before starting unloading activities of LOD ensure that the pipes are fixed properly.

4. If there is any problem in the system, get it repaired through Maintenance department and then follow unloading activities.

5. Ensure that the tanker stands firmly one the ground.

6. Do not allow any maintenance work of tanker during unloading.

7. Get the tanker material sampled by Q.C department and only after their approval of sample start following activities

8.If there is leakage, either on the suction or discharge side, stop the unloading and all connecting valves immediately, report Maintenance department, and restart the unloading operation after attaining the leakage.

9. In case of emergency is declared either by raising siren or by announcing so stop the unloading and gather at assembly point if siren of evacuations raised.

10. Ensure that the tanker driver is available near the tanker at all the time while the tanker is in the premise.

11. Do not allow tanker driver to switch on the tape recorder while tanker is in the factory is in the premise.

12. Do not allow tanker driver or his assistance to move elsewhere other than the tanker unloading area without permission of unloading supervisor.

13.After unloading of the tanker, keep unloading accessory in the HDPE container.

20. SAFETY IN LABORATORIES:

Various chemicals are used in laboratories day-to-day basis, so risk is also too high. Everyone must be responsible for everyone else in lab. No horseplay is ever allowed. Lack of pre-lab preparation is the biggest problem related to lab safety.

- Safety Glasses must be worn any time you are in lab.
- Contact lenses should NOT be worn in lab.
- Long hair, bulky clothing, rings, watches, dangling jewelry are dangerous inlab.

Broken Glass:

- Stop and report it immediately.
- There may be small slivers of glass that you do no notice.
- More minor cuts occur after this type of accident than during it.
- Chemical spills are often involved with glass breakage.
- Use appropriate hand gloves to clean up area.

Chemicals Spills:

- Depending on the chemical spilled, we might just have to clean it up or we might have a more dangerous situation
- The most potentially dangerous chemicals used in our lab are corrosive acids and bses.
- You are to treat all spills as DANGEROUS.
  Each employees must take reasonable care of their own health and safety of others by:
- Taking action to avoid, eliminate or minimize hazards of which they are aware.
- Complying with all occupational health and safety instructions, policies, and procedures including departmental safety manuals;
- Making proper use of all safety devices and personal protective equipment;
- Complying with the instructiongiven by emergency response personnel such as emergency wardens and first aiders;
- Seeking information or advice where necessary before carrying out new or unfamiliar work;
- Maintaining dress standards appropriate for the work being done. Appropriate protective clothing and footwear must be worn at all times;
- Not consuming or storing food and drink in laboratory areas;
- Being familiar with emergency and evacuation procedure and the location of emergency equipment

- Reporting all incidents, hazards and near miss incidents on the companies Hazard & incident Report form

GENERAL SAFETY REQUIREMENTS

All personnel entering, working in a laboratory must:

- Maintain the minimum quantity of hazardous substances at all times:
- Consider and manage the risks to themselves and others working in the laboratory;
- Wear appropriate enclosed footwear with a non-slip sole;
- Wear appropriate protective clothing as specified by the Laboratory Manager,
- Use and maintain any other personal protective equipment as required by safe work practice(e.g. safety glasses);
- Know the emergency procedures for the facility;
- Ensure access and egress for fire exits and emergency equipment are kept free of obstruction at all times;
- Do not run in the laboratory or the corridors leading to them;
- Always exercise care when opening and closing doors;
- Food is not stored or consumed in the laboratory;
- Do not undertake unauthorized experiments;
- Maintain work areas in a clean state to reduce the risk of exposure to hazardous substances and slip and trip hazards;
- Ensure all spills are cleaned up immediately;
- Do not pipette by mouth;
- The use of mobile phones in laboratories is strictly prohibited except in circumstances where it does not pose a risk to the user or others as demonstrated by the risk assessment undertaken;

LABORATORY INSPECTIONS CHECKLIST

PLANT/LOCATION:

Any items marked 'No' are in need of attention

Fire protection(Yes/No)

- ☐ Easy extinguisher access?
- ☐ Inspection current?

Electrical (Yes/No)

- ☐ Absence of overloaded circuits?
- ☐ Elec. cords in good condition?
- ☐ Proper grounding?
- ☐ Absence of extension cords?

How many of each?

- ☐ Dry Chem,
- ☐ CO2,

Biological Safety (Yes/No)

- ☐ Absence of live animals?
- ☐ Are the workers a trained?
- ☐ Is PPE adequate?
- ☐ Are there Biosafety cabinets?

First Aid (Yes?No)

- ☐ Is the stock adequate?
- ☐ Is the stock labeled?
- ☐ Is there easy access?
- ☐ Are procedures posted?

Eye Wash Stations(Yes/No)

- ☐ Proper location? Proper Location
- ☐ Inspected/tested? Tested/sealed?
- ☐ Plumbed system? Workable?
- ☐ Labeled? Labeled?

Safety Showers(Yes/No)

- ☐
- ☐
- ☐
- ☐

Staff Summary(Yes/No)

- ☐ Safety practices
- ☐ Hazard communication

Hazard communication(Yes /No)

- ☐ Lab sign-in?
- ☐ Safety rules posted?
- ☐

☐ PPE/Spill training Emergency procedures?

☐ Chemical Hygiene Plan ☐ Containers labeled?

☐ Emergency labels on trance?

Refrigerators(Yes/No) General use (Yes/No)

☐ Absence of food storage? Absen☐f hazardous materials?

☐ "Explosion-proof? ☐Absence of Explosives?

☐ Properly installed? ☐Absence of cryogenics?

☐ Marked for flammables? ☐sence of laser hazard?

☐ Absence of domestic refrigerator? ☐sence of corrosives?

House keeping (Yes/No General use (Yes/No)

☐ Aisles Clear? Fume hoo☐Expl.Frig ☐

☐ Exits clear ☐Perc Hoods ☐Eye Wash

☐ Haz-Waste collection? C☐ Hoods Exits ☐

☐Absence of eat/drink/smoke?Biosfty ca☐ Sftyshwr ☐

☐Absence of previous spillsCylinder Do☐Flam. Cab. ☐

☐Spill kit Spill PPE

General Storage yes/No Ventilation (Yes/No)

☐Absence of leaking containersAdequa☐ventilation?

☐ Glass containers all< 4 liters? Absence☐ storage inhood?

☐ Segregation of chemicals? Fume hoo☐dequate?

☐ Absence of corroded containers? Vel☐y tested?

☐ Containers capped? Lab negative to ot☐ rooms?

☐ Glass shatter-Proof? Hazardous exhau☐abeled?

PPE (Yes/No) **Flammable (Yes/No)**

- ☐ Goggles/Shields?Adequate cabin ☐
- ☐ Gloves? Absence of excess storag ☐
- ☐ Aprons?Spill plan? ☐
- ☐ Respirators?Safety cans? ☐
- ☐ Eye protection worn?Bonded/gro ☐ led?
- ☐ Other necessary equipment?Less t ☐ 300 gallons?
- ☐ Absence of storage by exits?

Security (Yes/No) Gas cylinders(Yes/No)

- ☐ Instrusion alarms? Cylinders secured? ☐
- ☐ Security procedures? Contents identified? ☐
- ☐ Absence of past vandalism? Caps on tightly ☐
- ☐ Key control?If NFPA rating>2,2nd exit? ☐
- ☐ Absence of custodial service? Two gauges? ☐
- ☐ Dead bolt? Fewer than 3 cylinders in use? ☐
- ☐ If 2nd exit, emergency lights Fewer than 9 c ☐ ders in lab?
- ☐ Shutoffs?

Personal Protective Equipment

Type:	Material Used on:	Condition:
Cylinders		
Numbers:	**Contents:**	**Size:**

Fume Hoods

Apply checklist to each fume hood

Type of work Performed:

Location of hood in lab:

☐ If located by an exit, is there a 2 nd exit?

☐ Type of hood (check)

- Chemical
- Per chloric Acid
- Wash down?
- Canopy
- Biological
- Radioactive

Last inspection date:

Average face velocity (feet per minute):

Location of exhaust fan that serves the hood:

Hood Inspector's name:

Filters (check)

- HEPA

- Charcoal
- Scrubber
- Other

Ducts: (Yes/No)

Negative pressure?

Absence of manifold?

If answer is no, is there a duct in the shaft

21.0 WORK PERMIT SYSTEM:

Introduction

A Permit to work system is a formal safety control system designed to prevent accidents including injury to employees, contractors and third parties as well as to property. The permit sets out the work to be done and the precautions to be taken.

Global Pharma Healthcare Private limited has developed and implemented work permit system by virtue of which the risk is brought to minimum level by showing the concerned person about the hazard involved in the particular job and corrective action and precaution to be undertaken during the work.

The various permits used in the factory are.

S.No.	PERMIT NAME	Reference SOP NO.
	General Work Permit	
	Hot Work Permit	
	Height Work Permit	
	Excavation Permit	
	Confined Space work permit	

Work Permit.

Work permits the person who has adequate standard of technical knowledge and experience to be able to competently assess all the conditions for the permit purpose is authrorized to sign the permit.

Before signing any permit he person himself y personal inspection tat the site equipment plant is safe for the work. Unless and until he is satisfied on the compliance of the permit condition, no certificate should be given by him. The safety permit is also signed by Respective authorities after ensuring that the equipment is isolated from all sources of motive power, electrical supply and otherwise presents no mechanical hazards. The name of the supervisor actually supervising the job is mentioned on the permit. It is duty and the responsibility of the named supervisor to ensure that the work starts and continue only after all the precautions mentioned is fully met.

Issuing authority:

Work permit is initiated & signed by the immediate supervisor/ officer/shift in-charge of the area where work is to be carried out & the concern maintenance engineer. If any representative from safety department is available then he should check & sign.

Validity of work permit:

Work permit may be renewed for an extended period on the same day. The extended period should be authorized by the immediate in-charge/supervisor in-charge. After making sure than condition mentioned inoriginal permit have not changed & the area is safe for working.

Issue of work Permit:

Before issuing the work permit the immediate supervisor in-charge of the area should issue that area/ equipment is rendered safe for working. All manpower sources are isolated & locked out. The surrounding are clean and safe. Supervisor should be describe clearly the nature of the work, precaution to be taken. PPE to be used while working.

Regulation:

i) Hot job like welding, gas cutting are not permitted without sufficient fire extinguisher, water arrangement, etc.
ii) One or more fireman or section operator& running water hoses kept present while hot work is being carried our. Area is watched for spark for 30 min after completion.
iii) Adequate ear thing is provided to eliminate from static charge.
iv) Section supervisor In charge must comply with all stipulated condition in permit before commencement of work.
v) Person entering to confined space; the work permit must indicate the name of each employee who makes the entry in confined space.
vi) Confined space should be effectively banked of using isolation reference card system.

vii) Confined space should be emptied & flushed with water followed by purge with steam or air & air & then shouldbe tested for presence of hydrocarbon toxic gases availability of sufficient oxygen.

viii) Excavation in any part of the factory should be properly barricaded and proper signboard should be displayed

Lock out system:

The proposed of electrical lock out is to ensure that electrical or mechanical equipment under maintenance, inspection, cleaning is made safe by locking & tagging the main power thereby controlling its sources of power.

On completion of job shift in charge sign the log out tag after confirming the safety. The electrical will close the circuit by replacing fuse & removing the tag.

Protection from fall:

a) Falls prevented by proper guardrails.
b) Falls protected by fall arrest hardness with proper attachment point.
c) 3 ponts of contact at all times between worker sand ladder, ladder tied and /or footed.

Precautions:

a) Firm level ground for scaffold mobile access or ladders.
b) Overhead services and obstructions avoided or precautions taken.
c) Lifting equipment (if any) installed properly (e.g. winch, hoist etc.)
d) Barriers sand warnings placed for these below.
e) Roof boards, ladders and other permanent access in good condition.
f) Fragile areas(e.g. roof lights) identified and protected.
g) Adverse weather not expected (strong wind, lighting etc.)
h) Falling materials prevented (tools secured, toe boards, side sheeting etc.)
i) No person shall work at a height above 8 feet without the use of safety belt, having proper anchored.
j) Person suffering form dizziness due to height (Vertigo) will not be allowed.
k) Ensure that flammable/harmful gases do not escape through the roof of chimney invicinity which may affect the person working on roof.
l) The scaffolding provided is mechanically strong. The precautions were read out an explained tome in a language understood by me. I promise to above the same.

22.0 PERSONAL PROTECTIVE EQUIPMENT

Company has provided personal Protective Equipments to the workers for safe working are as follows: Hand Gloves, Gum Boots, Masks, Goggles, PVC apron.

The term personal protective equipment (PPE) covers any specialized clothing or equipment designated to create a barrier against work place hazards.

REQUIRMENT OF PPE:

(i) When elimination or substitution of hazard is not possible when engineering controls safe working practices as administrative control do not sufficiently protect employees.

(ii) As an interim measure until the installation of engineering controls

(iii) As a supplement to engineering and administrative controls.

SELECTION OF PPE:

The following criteria are used for selecting PPE

A) Nature of hazard
B) Degree of protection required
C) Acceptable exposure concentration
D) Ease of Use by employee
E) When engineering controls safe work practices or administrative controls do not sufficiently protect employees, suitable PPE should be used.

When engineering controls safe work practices or administrative controls do not sufficiently protect employees, suitable PPE should be used.

Personal protective equipment's are generally divided into two groups:

Non-Respiratory & Respiratory

General Protection

1) Non Respiratory PPE:

These are used for protection of body parts against the hazards. As per SOP No.: S4/HSA/GG/004

S.No.	Type of safety equipment	Body parts protect	Recommended use in operation
1.	Safety goggle, spectacles	EYE protection	Chipping, buffing, grinding, drilling
	Welding goggle, welding shield		Welding, cutting

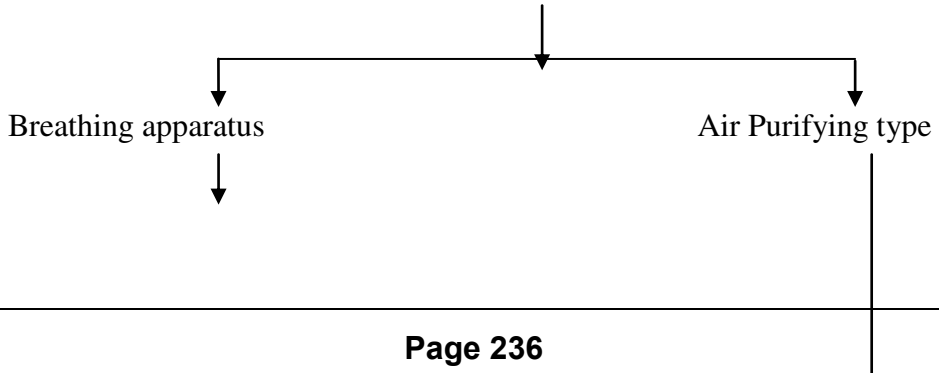
2.	Face shields	Face protection	Chemical flash
3.	Ear muff Ear plugs	Ear protection	Noise pollution area as Air compressor Power plant
4.	Safety helmet and caps	Head protection	Risk of falling object, chemical& protection from chemical dust
5.	Apron, fire suit, made from leather, rubber, plastics	Body protection	Risk of dust, spark, chemical fumes, etc
6.	Gloves Acid proof Alkali proof Shock proof Leather Asbestos	Hand protection	Operation where risk of chemical contacts, Electrical contacts, Hot surface contact, Cold burn, etc.
	Barrier cream		Used against protection from oil and solvent.
7	Safety shoes with toe protection	Foot and leg protection	Where potential hazard of foot injury due to falling objects while holding heavy material.

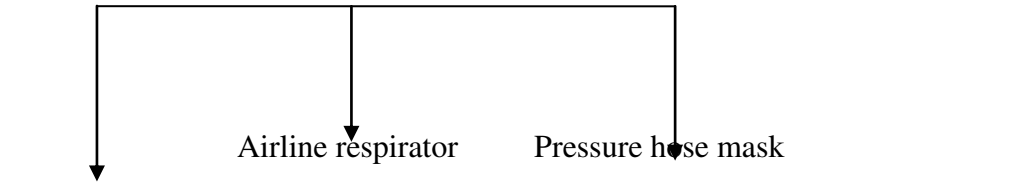
3) RESPIRATORY PROTECTION: -

The areas where contamination take place in form of dusts (Nuisance, irritant, toxics, poisonous), gases, smoke, fumes mist, etc.

Proper respiratory PPE are available and are designed to provide adequate protection

RESPIRATORY PROTECTION





GENERAL PROTECTION:

SAFETY BELT:

Safety belt with lifeline is used for working at height and confined spaces to protect the person from falling

SAFETY SHOWER and EYE WASH

It is used for washing chemicals in case of splash of Chemicals in eyes and/or on body.

DISPOSAL OF CONTAMINATED PPE's: The PPE's that are contaminated should be detoxified in the same manner as done for contaminated containers with 5% sodium hydroxide and then processed as general scrap. (Like disposable Head Gear, Nose mask, Shoe covers and any other PPE's).

23.0 SAFETY PROMOTIONAL ACTIVITIES

PROMOTIONAL ACTIVITIES:

SAFETY WEEK:

4 th March to 11th March safety Day/Week celebration will be conducted by arranging various safety competitions like Slogan, Poster, Safety quiz, etc. During prize distribution ceremony the chief guest will distribute certificates and prizes.

All winning slogan, poem and posters will be displayed in the plant. Safety has been given prime importance and included in annual employee appraisal

WORLD ENVIRONMENT DAY:

5thJune will be celebrated as a world environment day by arranging tree plantation activities & various competitions like slogan, poster, essay etc. Entries

Will be evaluated by panel of judges. Prize winners will be rewarded on the concluding function. Winning slogans, Poem & Posters will be displayed in plant.

24.0 HAZOP STUDY

H AZOP Study Method was developed by ICI in 1960s & CIA (Chemical Industries Association guide was published in 1977. This is being used by the Chemical industry to Identify the hazard & Modification of System. The Technique designed to study such Deviations from Intentions is known as HAZOP Study.

HAZOP PROCEDURE:

1) Examine the process & the Equipment on the a system by System basis.
2) Review the process parameters using a set of Guide Words Which Suggest Deviations from the normal operating intentions.
3) Assesses the consequences and the causes that might bring it about.
4) If deemed significant then addressed on the spot and a situation proposed for action.

ESSENTIAL FEATURES:

1) Systematic and detailed Series of Guide Words used for Consistency and repeatability.
2) Conducted by a team who know most about the project or facility, typically those who designed and those who operate/maintain it.
3) Concentrates on exploring conditions & Intentions.

GUIDE WORDS & MEANING FOR HAZOP STUDY:

GUIDE WORDS	MEANING	PARAMETER	DEVIATION
No	Negation of the design intent	Flow	No Flow
Less	Quantitative decrease	Temperature	Less temperature
More	Quantitative increase	Pressure	High pressure
Part off	Quantitative Decrease	Quantity	Less than intent material
As well as	Quantitative increase	One Phase	Two Phase
Reverse	Logical Opposite of the intent	Chilling	Heating instead of chilling
Other than	Complete substitution	Material	Other than intent material

JOB HAZARD ANALYSIS

It is a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools and the work environment. After identifying uncontrolled hazards, steps are taken to eliminate or reduce them to an acceptable risk level.

APPROPRIATE JOBS FOR JOB HAZARD ANALYSIS:

1) Accident frequency and Severity
2) Potential for Severe injuries or illnesses
3) Newly established Jobs
4) Modified Jobs

BASIC STEPS FOR CONDUCTING JOB HAZARD ANALYSIS

- Selecting the job to be analyzed.
- Breaking the job down into a sequence of steps.
- Identifying potential hazards.
- Determining preventive measures to overcome these hazards.

After a job has been chosen for analysis the next stage is to break the job into steps.

A job step is defined as a segment of the operation necessary to advance the work.

25.0 RISK ASSESSMENT

'Risk' is the probability of an event occurring in a given set of circumstances. The 'event' is an exposure to a hazard. The 'hazard' is the potential to cause harm. Risk Assessment is the technique of evaluating not just the likelihood of an event occurring, but also what the outcome will be in terms of injury, loss damage or harm.

RISK = PROBABILITY OF EVENT AND SEVERITY OF OUTCOME

Risk Assessment Procedure

How do you perform a risk assessment?

There are eight steps to performing a satisfactory risk assessment

1. Focus for assessment

2. Identify activities
3. Identify hazards
4. Who at risk
5. Evaluate risk
6. Review controls
7. Record Decisions
8. Review Regularly

How do you assess risk levels?

Risk level are categorized in a numbered format. Each hazard is given a rating and this is multiplied by the probability that these hazards will occur, as shown in the following equation.

Risk level= Hazard severity x Likelihood of occurrence

Step One Give each hazard a severity marking as indicated in the table below:

Risk	Effect of hazard
5	Fatal injury
4	Permanent disabling injury
3	Disabling injury
2	Injury causing time off work
1	First aid only

For example:

If slipping on the stairs(Hazard), could result in death or disablement, then it must be given a rating of 4-5.

Step Two

The next step is to consider how often each hazard is likely to occur as indicated in the table below

Risk Level	Likelihood of occurrence
5	Certain
4	Near certain
3	Very likely

2	Frequent
1	Seldom

For Example:

If slipping on the stairsa(hazard), was very likely to happen, thenit must be given a rating of 3.

Step Three

Multiply the two scores together and you will get the risk level. This figure should be entered into the risk assessment form.

For example:

- 5 hazard) multiplied by 3 (occurrence)=15

Step four

The following bullet points are guidelines to help you gauge how quickly you need to put the controls in place, so dates will vary from office to office.

- Where any hazard is given a risk ranking of 22025 then action must be taken immediately to reduce that risk.
- Where any hazard is given a risk ranking of 16-22 then the line manager must be informed before the end of that working day.
- Where any hazard is given a risk ranking of between 1 and 15 then action needs to be taken at the earliest opportunity, as soon as it is reasonably practicable to do 50 , taking into account local circumstances. Employers must ensure that risks are reduced to the lowest extent reasonably practicable. Risk assessments must be made available to all releant personnel and they must be keep up to date.

Additional Checklist for Risk assessment form

Potential hazards in the workplace.

- Portable and fixed electrical appliances
- Tools and equipment
- Storage of materials
- Handling of materials
- Trailing cables

- Stairs and stairways
- Congested walkways and corridors
- Access and egress
- Fire exits
- Seating and workstations
- Heating and ventilation
- Lighting levels
- Cleanliness and waste materials
- Sanitary conveniences
- Washing facilities
- Facilities for eating and drinking
- Chemicals cleaning substances
- Cleaning substances
- Dusts & powders
- Biological hazards(bacteria, viruses, etc.)
- Repetitive actions
- Vehicle safety
- Traveling for business
- Working alone
- Workplace violence (physical or verbal)
- Stress

  People affected by hazards
- Staff
- Visitors
- Contractors
- Maintenance staff
- Emergency staff
- People with special needs (such as people with physical or learning difficulties, young persons and pregnant women)
- General public

Other specialist areas of assessment

- Manual Handling Operations
  - Hazardous substances
  - Construction work

    Identified Hazards

The following hazards have been identified in the operation of This corporation:

Assessed Hazards

- Burns from fire
- Inhalation of smoke
- Burns from electrical/gas plant
- Burns from hot water
- Cuts from plant
- Cuts from broken glass
- Contact with chemicals
- Inhalation of chemicals
- Ingestion of Chemicals
- Falls on Slippery floors
- Falls on obstructed floors
- Falls down stairs
- Contact with electricity
- Manual handling injuries
- Collision with others
- Entanglement with equipment
- Contact with equipment
- Blood borne pathogens
- Water safety & pathogens
- Injuryfrom objects falling
- Falls from electricity
- Burns from electricity
- Escape of gas
- Airborne harm full substances
- Working in isolation
- Use of vehicles
- Handling of hazardous materials& spillage
- Use of counterbalanced trucks
- Use and handling of liquid petroleum gas

EXAMPLES OF RISK ASSESSMENT

Electrical and Gas Burns

Hazard:	Burns from electrical/gas plant
	Burns from electricity
Control	Elimination

Methods:	Guarding
	Training
	Instruction
Persons at Risk:	Delete as appropriate
	Staff
	Third Party Contractors
	Members of the Public
	Emergency Services
	3x4=12

Recommended controls:

1. Only gas and electrical appliances conforming to relevant current National Standards are to be installed in the facility.
2. Equipment must be maintained in accordance with manufactures recommendations.
3. Only trained personnel are permitted to work on gas and electrical systems.
4. A list of the current trained first aiders should be provided in a prominent position.
5. Contractors staff must only work on gas and electrical systems when they have been issued with a valid permit to work.
6. Contractors should only be permitted to work on isolated electrical supplies. Work on live systems should be strictly prohibited.

Hazard:	**Burns from hot water**
Control Methods	Elimination
Persons at Risk	Delete as appropriate
	Staff
	Third Party Contractors
	Members of the public
	Emergency Services
Risk Rating	3x5=15

Recommended Controls:

1. The Maximum water temperature at any tap should not exceed 46˚C
2. Routine checks should be made of hot water temperatures at each tap to ensure the maximum temperature is being maintained. This should include weekly checks of random taps to ensure the maximum temperature is being adhered to.

3. Any work on plant containing hot water must only be permitted with a valid permit to work. Work on such plant must only be carried out when the water system has had ample opportunity to cool to a temperature where the water is not warmer than 35˚C

GENERAL RISK ASSESSMENT FORM

Unit	**Department**	**Room/Area**
Activity		
A.HAZARDS		
B.WHO IS AT RISK?		
C.EXISTING CONTROL MESURES	RISK RATING	
	Probability Score(A)	
	➢ Severity ➢ Score (B)	
	➢ Risk Rating ➢ A x B	
D.PROPOSED ACTION		
E. Assessed By	Line Manager Date	EHS Date
F. Action taken and signed off complete. Operations Manager Date:	Health & Safety Manager Date	

RISK ASSESSMENTS LISTED AND REVIEW DATES

SITE:

Risk Assessment No	Assessor	Date Assessed	Reviewed Date	Changes Yes/No	Reviewed Date

26.0 SAFETY AUDIT & INSPECTIONS

A Professionally managed safety audit system result in

1)Strengthening of the organization Safety Standards and programmes

2)Improve the skill and performances of managers
3)Create group and self awareness
4)Provides timely information before any loss producing incident take place
5)Identifies specific deficiencies in the safety Programme
6)Provides timely information before any loss producing incident take place
7)Increase management participation n a Safety Programme

FREQUENCY:

- As a general thumb rule, audit by an external team can be carried out once in a year.
- Internal Safety Audit Checking important points can be then be conducted with a periodicity of 3/6 months.
- If no external team then depending upon the nature of operation a frequency for internal auditing can be set up.

SAFETY AUDIT CHECK LIST:

Items for Safety Audit for evaluation in operating area:

A) DOCUMENTATION

- Facility Drawings
- Installation documents
- Special tooling drawings
- Shop planning & Procedures
- Work order in progress
- Other documentation
- Check lists
- Training
- Hazards identification & analysis.
- Prior Safety requirements

B) BUILDING & AREA:

- Storage of explosive material
- Access/Walkway
- Fire Protection
- Electrical
- Water & other Utilites.
- Lighting

- Ventilation & Hood
- Heating, Cooling & Air conditioning Systems
- Escapes
- Storage/Racks/Shelves
- Waste handling & Disposal

C) MISCELLANEOS:

- Noise
- Vibration
- Fumes/Dust/Vapours
- Temperature
- Physical/Ergonomic Conditions
- Communication
- Confined space.

SAFETY INSPECTION:

Safety inspections are made at all levels to ensure a safe and healthy working environment and to demonstrate a personal commitment to safety. Safety inspections of all plant and facilities are carried out regularly. Safety coordinator makes safety inspections in their respective department.

SAFETY SURVEY LIST

Working Areas

- Adequate lighting in the work area?
- Laboratory work areas reasonably clean and tidy?
- Area kept as clean as work allows?
- Guards on fan blades that are located within 7 ft of the floor?
- Ladders and steps-stools in good condition and used in the manner for which they were designed?
- Two and four-wheeled carts and hand trucks in good condition?
- List of emergency numbers, First Aid, and CPR certified employees clearly displayed?
- No foods, beverages, tobacco,or cosmetics in laboratory?
- Eating, drinking, use of tobacco, and use of cosmetics prohibited in the laboratory?
- No chipped or broken glassware in use?

Means of Egress

- Sidewalks kept free of snow and ice?
- Stairs well lit?
- Railings provided on all open sides of exposed stairways?
- Anti-skid walking surfaces on the stairs?
- Stairs clean?
- All non-exit doors and passage which could be mistaken for an exit marked as such?
- All exits clearly designated?
- All exits Unobstructed?
- All exit signs illuminated?(They must be illuminated by general room lighting or internal lighting)
- Emergency lighting provided for fire escape routes?
- All fire doors unobstructed and free of locks and devices that could prevent free egress?
- Designated fire doors closed and operable?
- All fire doors side hinged and swing in the direction of the escap?
- Floors free from protrusions and large holes?
- Floors free from litter and obstruction?
- Floors clean and dry?
- Drainage provided for continuously wet floors?
- Mats and carpeting in good condition?
- Aisles and passageways well lit?
- No loose or protruding shelving or edging that could cause a safety problem?
- Covers or guardrails provided for open pits, vats, etc.?
- Guardrails provided for platforms greater then 4 feet above the adjacent floor?

Materials handling and storage

- Area free of the accumulation of materials that could cause tripping, fires, explosions, or pest harboring?
- Sprinklers clear of stored materials (18 inch clearance)?
- Materials stored to prevent sliding falling, or collapse?
- Storage shelving secures, in good condition, and not over-loaded or crowded?
- Storage shelving provided with a lip on forward edge?
- Hazardous chemicals not stored on floor?
- Sufficient waste containers provided?
- A closable metal container provided for oily rage 9 if necessary?
- Reagents used at the bench properly labeled to prevent accidental use of the wrong reagent or wash bottle?

- Containers labeled with the identity of contents and general hazards of contents?
- Contaniners properly capped or sealed?
- Flammable liquids in quantities greater than one liter stored in safety cans designed for flammable liquid storage?
- Flammable and combustible liquids stored in containers labeled as such?
- Flammable and combustible liquids stored in approved cabinets marked "flammable"?
- Cabinets properly ventilated?
- If flammable liquids are used in large volumes, is the mechanical ventilation adequate to remove vapos before they reach hazardous concentrations?
- Stored combustibles and flammables separated from any heat source by at least 20 feet?
- Areas where flammables are used or stored designated"NO SMOKING-NO OPEN FLAMES"?
- Metal drums used for storage and dispensing of flammable liquids properly grounded?
- Materials stored only with other compatible materials? (e.g solvents, acids, bases,reactives, oxidizers, and toxins stored separately)

Compressed Gases

- Each compressed gas cylinder marked with the identity of its contents?
- Compressed gas cylinders inspected visually for safe operating condition?
- Gas cylinders secured so they will not tip over or fall?
- Valve caps in place on all gas cylinders that are not in use
- All gas lines leading from compressed gas supplies labeled sas to identity of gas, laboratory served, and emergency telephone numbers?
- Gas where flammable compressed gases are Properly ventilated?
- Areas where flammable compressed gases are stored Posted "NO SMOKING-NO OPEN FLAMES"
- Oxygen cylinders stored a minimum of 50 feet from flammable gas cylinders or a minimum five feet high fire wall with a 0.5 hour fire rating separates them?

Electrical

- All electrical equipment properly grounded? (Double insulated tools are exempt.)
- All electrical equipment U.L. listed approved?
- All circuit breakers and fused circuits labeled to indicate whether they are in the open (off) or closed (on) position?
- Properly rated fuses used?

- All electrically live parts guarded? Electrical boxes and panels covered with face-plates to prevent exposure to live wires?
- Tool, appliance, instrument, and extension cords in good repair?
- Has permanent wiring been installed to alleviate the use of extension cords?
- Electrical cords or other lines not suspended unsupported across rooms or passageways?
- Cords not routed over metal objects?
- Cords not run through holes in walls or ceilings or through doorways or windows?
- Cords not placed under carpet, rugs, or heavy objects?
- Cords not placed in pathways or other areas where repeated abuse can cause deterioration of insulation?
- Octopus (multi-outlet) plugs not used? Approved multiple outlets with circuit breakers used instead?

General Safety Equipment

- Fire extinguishers located where flammable or combustible liquids are used?
- A fire extinguisher located between 10 feet and 25 feet of a door opening to rooms used for storage?
- Other extinguishers ready and accessible?
- Extinguishers mounted so that the top is not more than 5 feet above the floor, and not more than 3 feet if it weighs more than 40 lbs?
- Extinguishers suitable for the class of fire anticipated in each area?
- Extinguishers inspected and labeled as inspected on a yearly basis?
- Employees instructed in the proper use of fire extinguishers on an annual basis
- Eyewash and safety showers installed within 25 feet of laboratory work areas where corrosive chemicals are used?
- Safety showers and eyewash fountains easily accessible?
- Employees familiar with operation of safety showers and eyewash fountains?

- Safety showers and eyewash fountains tested at least annually?
- First aid kits available, in good condition, and plainly marked?
- Explosion-proof refrigerators not used for storage of food?
- Fume hoods in proper operating condition?
- Fuction of fume hoods periodically checked and results recorded andposted?
- Equipment properly placed in fume hoods? (i.e., nothing within 6 inches of sash and all instruments elevated a minimum of 2 inches from hood floor.)
- Fume hoods not used for storage?

Personal Pretection

- Eye protection provided and used by all personnel when in the laboratory area?
- Eye protection provided for all guests that enter the laboratory?
- Proper laboratory clothing provided and used by all personnel when in the laboratory area?
- Laboratory clothing clean and in good repair?
- Gloves provided and used when needed?
- Proper gloves provided for each different solvent type?
- Employees who are required to wear steel toe shoes comply?
- Area provided outside the laboratory for eating and drinking; lab coats and protective clothing prohibited in this area?
- Change rooms provided for each sex where it is necessary to change clothes?
- Change rooms provided with separate storage facilities for street clothes and protective clothing
- Personal hygiene facilities provided and kept in sanitary condition?

Other

- Noise levels checked and protection provided when needed?

27.0 ENVIRONMENT MANAGEMENT:

Our Company is highly committed to control & prevent Environmental pollution by adopting suitable means. We have taken proper measures for the treatment of wastes and effluents, which are being generated from the manufacturing processes. We have well

designed Effluent Treatment Plant & fully dedicated operational team. Disposal of Solid waste is also being done as per the guidelines of Pollution Control board.

EFFLUENT TREATMENT PROCESS:

The factory has installed an ETP to treat liquid effluents generated from the formulation. Wastewater is generated from the use of water for various activities in the factory such as domestic purpose, process, vessel washing floor/ Equipment wash and QC laboratory. Parameter The discharge from all sources is received in an equalization tank where effluent is received. The overflow from the final treated water shall collect in tank then pumped to V-Notch to give treated effluent of desired quality at the outlet.

PROCESS MAINTAINING

Sample 1) Final treated water of ETP.
BOD : Twice in a month
COD : Twice in a month
Oil and Grease : Once in a six month
Total Suspended Solid : Twice in a month
pH of Inlet and Outlet : Every Day

2) Final treated water of Sewage Treatment Plant.
BOD : Twice in a month
COD : Twice in a month
Oil and Grease : Once in a six month
Total Suspended Solid : Twice in a month
pH of Inlet and Outlet : Every Day

GREEN BELT COVERAGE:-

The company has taken steps to bring the available open land under green coverage in order to minimize pollution & comply with consent terms & conditions.

28.0 HOUSEKEEPING

Work Area Housekeeping: Good Housekeeping is an essential part of every job. Work areas, aisles, walkways, and equipment shall be kept clear of loose materials, tools, and scraps. Materials such as lumber and pipe shall be stored in an orderly and secure manner.
Spills such as grease, water, or oil shall be cleaned up as soon as possible; a delay could result in an accident to you or a fellow worker.
A safe access shall be maintained to work areas. Short cuts should be avoided. Never block aisles, traffic lanes, or fire exits with equipment or materials

Good housekeeping in all areas is an essential feature of safety and the prevention of accidents.

Employees working in all areas must have regard to the following:-

Ensure that loose and worn flooring is reported to your supervisor.

- Ensure all entrances, corridors, walkways and exit doors are kept clear of obstructions at all times.
- Close all cabinets, cupboards and drawers after use.
- Never overload shelving or store heavy items above head height except on load bearing purpose built racking.
- Never leave a lit cigarette unattended in the designated smoking area.
- Clear away immediately any dangerous substance or spillage. Dangerous substances are marked and are defined as toxic, harmful, irritant, flammable or oxidizing.
- Dust and fumes should not be inhaled. If dust or fumes are produced by any activity then cease the task immediately until protective measures have been put into place.
- Equipment must not be left where it can be a tripping hazard.

ON SITE EMERGENCY ORGANISATION

In spite of various preventive and precautionary measures taken in the plant, the possibility of mishap cannot be totally ruled out. Hence, the need to prepare a contingency plan for dealing with incidences which may still occur and are likely to affect LIFE and /or PROPERTY, both within the plant and in the immediate neighborhood.

Such an emergency could be the result of malfunction of the Plant & Equipment or non-observance of operating instruction .It could, at times, be the consequences of acts outside the control of plant management like severe storm, earthquake, flooding or deliberate acts of sabotage.

A major emergency in the plant is one that may cause serious injury or loss of life and damage to the property.

An On site Emergency Plan (OEP) explains the code of conduct of all personnel in the plant along with the action to be carried out in case of an emergency. This plan gives the guideline for employees, contractors, transporters, etc. It not only defines responsibilities but also informs about prompt rescue operations, evacuations, rehabilitation, coordination and communication.

OBJECTIVE OF THE PLAN:

a) To control the emergency, isolate it and if possible eliminate it.

b) To avoid confusion, panic and to handle the emergency with clear-cut actions.
c) To minimize loss of life and property in the plant as well as to the neighborhood.
d) To carry out head count and rescue operations.
e) To treat the injured persons.
f) Responsibility will be automatically delegated in the absence of concerned persons as mentioned in the Plan.

29.0 SAFETY COMMITTEE

Safety committee is most successful means of Promoting Safety at work place. it plays a vital role in accident prevention programme. The basic function of safety committee is to create and maintain an active interest of employees in safety to control unsafe act & unsafe condition at workplace to reduce accidents. The safety committee will also help us to meet the requirement of Implementation of EHS policy in the organization. Looking into the benefits & effectiveness of safety committee, we have constituted safety committees. HOD would be Chairman of the departmental safety committees and members from the department, Engineering and EHS. The details of safety committees are given below.

- Departmental Safety Committee:
  HOD will be chairman of the committee & all concerned person will be members
- Central Safety Committee:
  Location head will be Chairman of the committee & Safety Site
  Will be secretary of the committee. This committee will be constituted
  With equal No. of Management representative & staff members.
  Staff Members will be selected from the Departmental safety committee.

FUNCTION OF DEPARTMENTAL SAFETY COMMITTEE:

1) Departmental Safety Committee will meet in Every Month .It shall be chaired by the Chairman of the committee. In absence of chairman, meeting can be chaired by vice chairman.
2) The Chairman will call safety Committee meeting by giving advance information to all concerned persons. MOM of the same will be prepared & to be circulated to all concerned dept for necessary action.
3) The chairman will review compliance status in every month before starting of meeting. Pending points will be carry over till compliance.
4) Accident/Incident will be discussed in every month for the Safety Awareness of the Employees
5) All employees will discuss only safety & Environment related issue and action plan will be circulated for compliance the same.

6) The chairman of the safety committee would resolve all departmental safety related issues. If some major issues which are out of his jurisdiction then he will discuss these issues in Central Safety Committee Meeting for getting final decision of compliance.

FUNCTION OF CENTRAL SAFETY COMMITTEE:

1) Central Safety Committee will meet once in three month, the Chairman of the committee shall chair the meeting. In absence of chairman, meeting can be chaired by vice chairman.
2) The Chairman will call safety Committee meeting by giving advance information to all concerned persons. MOM of the same will be prepared by the secretary of the committee & same will be circulated to all concerned dept for necessary action.
3) The chairman will review compliance status of previous meetings before starting the CS meeting. Pending points will be carry over till compliance.
4) Accident/Incident will be discussed in meeting for the Safety Awareness among the Employees.
5) All employees will discuss only safety & Environment related issue and action plan would be circulated for compliance the same.
6) The chairman of the safety committee will resolve safety related issues and necessary advice will be given by him for necessary action for compliance of safety related issue.

30.0 SAFETY EDUCATION AND TRAINING PROGRAM:

Training is the systematic development of the attitude, knowledge & skill pattern required by all individuals to perform adequately a given task or job.

This Global Pharma Healthcare Private Limitedhas fixed there training policy as follows

a) Training to be need based i.e., relevant to their jobs.
b) Well designed training programme i.e., formulate training plans.
c) Assessment of training effectiveness

In Global Pharma Healthcare Private limited different types of training activities are going on. They are mainly conducting i.e.,

1) On- job training (Shop Floor Talk)
2) Off-job (Classroom) training
3) Induction training for new comers.
4) Fire fighting drill
5) Contractors basic safety induction
6) First Aid training.
7) Health programme (Medical checkup).

31.0 MEASURES TAKEN IN MICRO FOR SAFETY PROMOTION

Safety Promotion is essential for accident prevention. Accident prevention is our prime concern and we have taken various steps for the same in our organization. Out of the different possible approaches, viz. Engineering approach, Human Factor approach and the Participative approach is found to be most effective for achieving Safety Promotion at work place.

For safety promotion, the following activities are being done.

- Safety Education & Training
- Safety Meetings
- First-aid Training
- Safety Inspection
- Safety Audit
- Safety Committees
- Job Safety Analysis
- Hazop Study
- Process Safety Study
- Celebration of National Safety Day - 4 th March & Safety Week Programme
- Celebration of World Environment day - 5 th June
- Celebration of Energy Conservation week
- Celebration of Fire Service Day -14th April
- Participation in Celebration of Industrial Disaster day - 3 rd December
- Safety Suggestion Scheme
- Accident /Incident investigation
- Display of Safety Slogan, Posters, Cartoons, Poems.
- Display of Safety Slogan, Posters, Cartoons, Poems.

32.0 IN CONCLUSION:

In Global Pharma Healthcare Private Limited has full-fledged EHS (Environmental, Health and Safety Management System) in place to prevent accidents and to achieve our goal of zero accident company with good environment and health.

RISK ASSESSMENT (RA) STUDY REPORT

PROPOSED APIs MANUFACTURING FACILITY

M/s. GLOBAL PHARMA HEALTHCARE PRIVATE LIMITED

AT

Plot No. C-29B, SIPCOT Industrial Complex,

Cheyyar Phase-II

Village: Mathur,

Taluk: Vembakkam,

District: Thiruvannamalai

State: Tamil Nadu

PREPARED BY

HUBERT ENVIRO CARE SYSTEMS (P) LTD, CHENNAI

DOCUMENT REVISION & AUTHORIZATION SHEET

REV.	DATE	REASON OF ISSUE	FILE NAME
B	13-04-2022	Issued as Final Report	RA Report – Global Pharma Healthcare Private Limited
A	23-07-2021	Issued as Draft Report	
	PREPARED BY	VERIFIED BY	AUTHORIZED BY
	Mr.N.Sameer Ahamed	Mr.C.S.Manoj Kumar	Dr. Moses

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ABBREVIATIONS

ALARP	As Low As Reasonably Practicable
NFPA	National Fire Protection Association
DG	Diesel generator
ETP	Effluent Treatment Plant
OIECR	Offsite Industrial Emergency Control Room
BLEVE	Boiling Liquid Expanding Vapour Explosion
PSM	Process Safety Management
EPA	Environmental Protection Agency
ST	Storage Tank

1. EXECUTIVE SUMMARY

SUMMARY – WORST CASE SCENARIO

VAPOUR CLOUD DISPERSION

- For Acetonitrile, LFL Fraction received at maximum distance due to Vapour Cloud Dispersion in 45mm Large Leak scenario is 891.2m at 1.5m/s wind speed and stability classes F.

SUMMARY – JET FIRE – WORST CASE SCENARIO

- For Acetonitrile, Radiation profile (4kW/m^2) received at maximum distance due to Jet Fire in 45mm Large Leak scenario is 35.85m at 1.5m/s wind speed and stability classes D. The major receptors are employees within the facility.

SUMMARY – LATE POOL FIRE – WORST CASE SCENARIO

- For Acetonitrile, Radiation profile (4kW/m^2) received at maximum distance due to Pool Fire in Catastrophic Rupture scenario is 135.48m at 5m/s wind speed and stability classes D.

SUMMARY – FLASH FIRE – WORST CASE SCENARIO

- For Acetonitrile, LFL Fraction received at maximum distance due to Flash Fire in 45mm Large Leak scenario is 45.2m at 1.5m/s wind speed and stability classes F.

2. INTRODUCTION

Global Pharma is a pharmaceutical company dedicated to ensuring the health and wellbeing of communities around the world. Global Pharma Healthcare Pvt Ltd has proposed to setup a new facility to Produce Active Pharma Ingredients (API) to meet the current global demand.

The proposed project will be located at Survey No: 155Pt, Plot No. C-29B (2.50 acres), SIPCOT Industrial Complex – Cheyyar Phase-II, Mathur Village, Vembakkam Taluk, Thiruvannamalai District, Tamil Nadu.

2.1. PURPOSE OF THE REPORT

Risk assessment is an indispensable part of Process Safety Management (PSM). PSM must be invariably invoked when involved in handling, using, storing, moving, or manufacturing of highly hazardous chemicals. Global Pharma, proposed to setup a new facility to Produce Active Pharma Ingredients (API) which handles several solvents which pose health and flammability hazard. Thus, the risk associated with production facility was assessed and to be elaborated in this report. The Risk Assessment study has been performed as dictated by the IS15656:2006 "HAZARD IDENTIFICATION AND RISK ANALYSIS - CODE OF PRACTICE" to give crucial insights on the hazards involved in the facility line of production.

Based on the available studies & plant layout, the potential scenarios which can cause significant consequences like Dispersion of vapour cloud, fire and explosion scenarios were identified.

The purpose of the study includes the following:

- To identify those hazards that pose health and flammability risks as per NFPA rating.
- To eliminate or reduce to As Low As Reasonably Practical (ALARP) the risk to human health, risk of injury, risk of damage to plant, equipment and environment, business interruption or loss etc.
- To Suggest On-site Mitigation Measures.

2.2. SCOPE OF THE STUDY

Hazard Identification and Risk Analysis including identification, screening of scenarios, consequence analysis of the various risk scenarios, recommendation and preparation of reports and relevant drawing showing damage and risk contours.

The scope of the study mainly involves:

- Identifications of Hazards
- Consequence modelling of:
  - Dispersion of Vapour cloud
  - Flash fire
  - Pool fire
  - Jet fire
  - Explosion
- Impact limits identifications
- Contour mapping of the risk on the layouts.
- Mitigating measures for handling and storage to reduce impacts & prevent incidents.

2.3. METHODOLOGY ADOPTED

The following Risk Modeling software to aid the Risk assessment:

- PHAST software 8.1 developed by DNV.

2.4. BASIC FACILITIES DETAILS

The basic facilities available in the layout are Solvent Tank Farm, ETP, WTP and Admin building, etc., the layout is shown below.

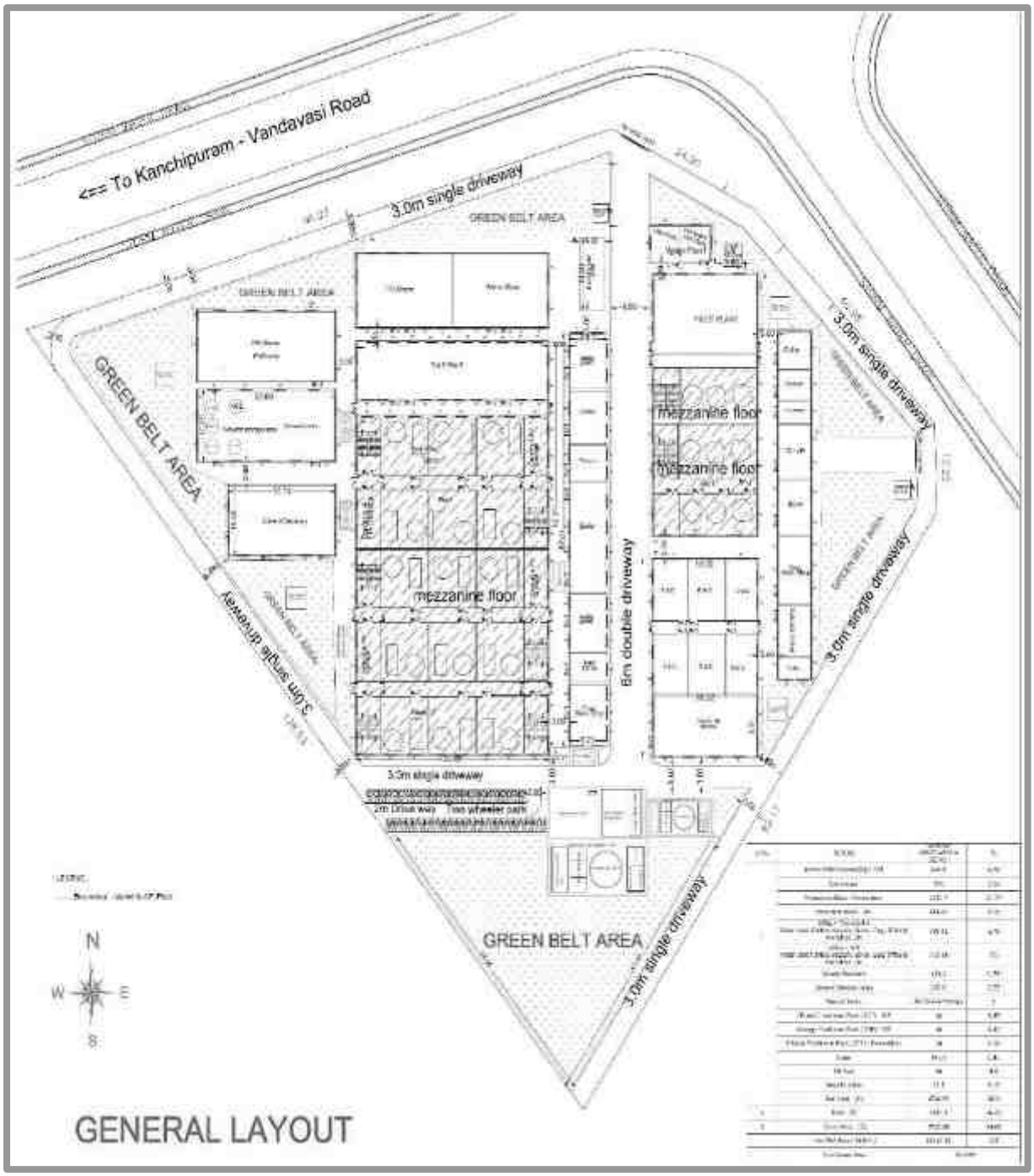


FIGURE 2-1 – GLOBAL PHARMA LAYOUT

2.5. STORAGE TANK DETAILS

The details of the storage tanks for raw materials and solvents are shown below.

Table 2-1 – Storage Details

S.No	Chemical Used/ Solvent Storage Used	Capacity	Temperature	Pressure	AG / UG
1	Hydrochloric Acid	13KL (Storage of 10.0KL)	Ambient	-	Above Ground
2	Methanol	13KL (Storage of 10.0KL)	Ambient	-	Above Ground
3	Acetonitrile	13KL (Storage of 10.0KL)	Ambient	-	Above Ground
4	Dimethylformamide	13KL (Storage of 10.0KL)	Ambient	-	Above Ground
5	N-Butanol	13KL (Storage of 10.0KL)	Ambient	-	Above Ground

3. RISK ASSESSMENT METHODOLOGY

3.1. IDENTIFICATION OF HAZARDS & RELEASE SCENARIOS

A technique commonly used to generate an incident list is to consider potential leaks and ruptures of all process pipelines and vessels/tanks. The following data were collected to envisage scenarios:

- Solvent Tank conditions (Operating temperature, pressure)
- Dimensions of the storage tank and pipelines
- Atmospheric conditions viz. Temperature, Humidity and Wind direction

3.1.1. SELECTION

The goal of selection is to limit the total number of incident outcome cases to be studied to a manageable size. The purpose of incident outcome selection is to develop a set of incident outcomes that must be studied for each incident included in the finalized incident study list. Each incident needs to be considered separately. Using the list of incident outcomes, the risk analyst needs to determine which may result from each incident. While the analyst can decide whether an incident involving the loss of a process chemical to the atmosphere needs to be examined using dispersion analysis because of potential toxic gas effects, what happens if the same material is immediately ignited on release.

3.1.2. CHARACTERIZING THE FAILURES

Accidental release of flammable or toxic vapours can result in severe consequences. Delayed ignition of flammable vapours can result in blast overpressures covering large areas. This may lead to extensive loss of life and property. Toxic clouds may cover yet larger distances due to the lower threshold values in relation to those in case of explosive clouds (the lower explosive limits). In contrast, fires have localized consequences. Fires can be put out or contained in most cases; there are few mitigating actions one can take once a vapour cloud gets released. Major accident hazards arise, therefore, consequent upon the release of flammable or toxic vapours or BLEVE in case of pressurized liquefied gases. In an industry, main hazard arises due to storage and handling of hazardous chemicals. To formulate a structured approach to identification of hazards and understanding of contributory factors is essential.

3.1.3. INVENTORY

Inventory Analysis is commonly used in understanding the relative hazards and short listing of release scenarios. Inventory plays an important role in regard to the potential hazard. A practice commonly used to generate an incident list is to consider

potential leaks and major releases from fractures of pipelines and vessels containing sizable inventories.

The potential vapour release (source strength) depends upon the quantity of liquid release, the properties of the materials and the operating conditions (pressure, temperature). If all these influencing parameters are combined into a matrix and vapour source strength computed for each release case, a ranking should become a credible exercise.

3.1.4. LOSS OF CONTAINMENT

Liquid Release may be instantaneous. Failure of a vessel leading to an instantaneous outflow assumes the sudden appearance of such a major crack that practically all of the contents above the crack shall be released in a very short time.

The more likely event is the case of liquid release from a hole in a pipe connected to the vessel. The flow rate will depend on the size of the hole as well as on the pressure head in the line, prior to the accident. Such pressure is basically dependent on the pressure in the vessel.

The vaporization of released liquid depends on the vapour pressure and weather conditions. Such consideration and others have been kept in mind both during the initial listing as well as during the short-listing procedure.

Initial listing of all significant inventories in the process plants was carried out. This ensured no omission through in advertence.

3.1.5. FACTORS CONSIDERED FOR IDENTIFICATION OF HAZARDS

In any installation, main hazard arises due to loss of containment during handling of flammable and toxic chemicals.

The Chemicals are classified according to the properties and hazard class given by National Fire Protection Association (NFPA) is responsible for 380 codes and standards that are designed to minimize the risk and effects of fire by establishing criteria for building, processing, design, service and installation.

NFPA classification (**Table 3-1**) for Health, Flammability & Reactivity of a chemical is on a scale from 0-4 least to worst. As per the NFPA Rating on the scale from 0-4 the chemicals having 3 & 4 are considered are highly hazardous and considered for analysis.

Table 3-1 – NFPA Classification

Rating	Health	Fire
0	No hazard	will not burn
1	Can cause significant irritation	must be preheated before ignition occur
2	Can cause temporary incapacitation or residual injury	must be heated or high ambient temperature to burn
3	Can cause serious or permanent injury	can be ignited under almost all ambient
4	Can be lethal	will vaporize and readily burn at normal temp

NFPA provides standard for the chemicals to reduce the risk of fire and other hazards. The chemicals handled by the facility, that pose health and fire hazards as identified by their NFPA ratings, are mentioned in **Table 3-2.**

Table 3-2 – NFPA RATINGS

S.No	Solvent	Flash Point (^{0}C)	Boiling Point (^{0}C)	NFPA Ratings		
				Health	Fire	Reactivity
1	Hydrochloric Acid	NA	50.5	3	0	0
2	Methanol	16.1	64.5	1	3	0
3	Acetonitrile	5.55	81.6	2	3	1
4	Dimethylformamide	67.2	153	1	2	0
5	N-Butanol	36.1	117.7	1	3	0

3.2. TYPES OF OUTCOME EVENTS

In this section of the report, we describe the probabilities associated with the sequence of occurrences which must take place for the incident scenarios to produce hazardous effects and the modeling of their effects.

Considering the present case, the outcomes expected are

- Jet fire
- Flash Fire
- Vapour Cloud
- Pool Fire

3.2.1. JET FIRE

Jet fire occurs when a pressurized release (of a flammable gas or vapour) is ignited by any source. They tend to be localized in effect and are mainly of concern in

establishing the potential for domino effects and employee safety zones rather than for community risks.

3.2.2. FLASH FIRE

A flash fire is the non-explosive combustion of a vapour cloud resulting from a release of flammable material into the open air, which after mixing with air, ignites. A flash fire results from the ignition of a released flammable cloud in which there is essentially no increase in combustion rate. The ignition source could be electric spark, a hot surface, and friction between moving parts of a machine or an open fire. Part of the reason for flash fires is that, flammable fuels have a vapour temperature, which is less than the ambient Temperature. Hence, as a result of a spill, they are dispersed initially by the negative buoyancy of cold vapours and subsequently by the atmospheric turbulence. After the release and dispersion of the flammable fuel the resulting vapour cloud is ignited and when the fuel vapour is not mixed with sufficient air prior to ignition, it results in diffusion fire burning. Therefore, the rate at which the fuel vapour and air are mixed together during combustion determines the rate of burning in the flash fire.

The main dangers of flash fires are radiation and direct flame contact. The size of the flammable cloud determines the area of possible direct flame contact effects. Radiation effects on a target depend on several factors including its distance from the flames, flame height, flame emissive power, local atmospheric transitivity and cloud size.

3.2.3. VAPOUR CLOUD

Vapour cloud is the result of flammable materials in the atmosphere, a subsequent dispersion phase, and after some delay an ignition of the vapour cloud. Turbulence is the governing factor in blast generation, which could intensify combustion to the level that will result in an explosion. Obstacles in the path of vapour cloud or when the cloud finds a confined area, as under the bullets, often create turbulence. Insignificant level of confinement will result in a flash fire. The vapour cloud will result in overpressures.

It may be noted that vapour cloud has been responsible for very serious accidents involving severe property damage and loss of lives.

3.2.4. POOL FIRE

This represents a situation when flammable liquid spillage forms a pool over a liquid or solid surface and gets ignited. Flammable liquids can be involved in pool fires where they are stored and transported in bulk quantities. Early pool fire was caused when the steady state is reached between the outflow of flammable material from the container and complete combustion of the flammable material when the ignition source is available.

Late pool fires are associated with the difference between the release of material and the complete combustion of the material simultaneously. Late pool fires are common when large quantity of flammable material is released within short time.

3.3. HEAT RADIATION

The effect of fire on a human being is in the form of burns. There are three categories of burn such as first degree, second degree and third degree burns. The consequences caused by exposure to heat radiation are a function of:

- The radiation energy onto the human body [kW/m^2];
- The exposure duration [sec];
- The protection of the skin tissue (clothed or naked body).

The limits for 1% of the exposed people to be killed due to heat radiation, and for second-degree burns are given in **Table 3-3**.

Table 3-3 – Damages to Human life due to heat radiation

Exposure Duration (sec)	Radiation energy (1% lethality, kW/m^2)	Radiation energy for 2nd degree burns, kW/m^2	Radiation energy for first degree burns, kW/m^2
10	21.2	16	12.5
30	9.3	7	4

Table 3-4 – Effects due to incident Radiation Intensity

Radiation Intensity (kW/m^2)	TYPE OF DAMAGE
0.7	Equivalent to Solar Radiation
1.6	No discomfort for long exposure
4	Sufficient to cause pain within 20 sec. Blistering of skin (first degree burns are likely)
9.5	Pain threshold reached after 8 sec. second degree burns after 20 sec.
12.5	Minimum energy required for piloted ignition of wood, melting plastic tubing's etc.
37.5	Heavy Damage to process equipment

3.4. TYPE OF DAMAGE

The actual results would be less severe due to the various assumptions made in the models arising out of the flame geometry, emissivity, angle of incidence, view factor

and others. The radiation output of the flame would be dependent upon the fire size, extent of mixing with air and the flame temperature. Some fraction of the radiation is absorbed by carbon dioxide and water vapour in the intervening atmosphere. Finally, the incident flux at an observer location would depend upon the radiation view factor, which is a function of the distance from the flame surface, the observer's orientation and the flame geometry.

3.5. EXPLOSION

In case of vapour cloud explosion, two physical effects may occur:

1. A flash fire over the whole length of the explosive gas cloud;
2. A blast wave, with typical peak overpressures circular around ignition source.

For the blast wave, the lethality criterion is based on:

A peak overpressure of 0.1bar will cause serious damage to 10% of the housing/structures. Falling fragments will kill one of each eight persons in the destroyed buildings.

The following damage criteria may be distinguished with respect to the peak over pressures resulting from a blast wave is shown in **Table 3-5.**

Table 3-5 – Effects of Overpressure

Peak Overpressure	Damage Type	Description
0.30 bar	Heavy Damage	Major damage to plant equipment structure
0.10 bar	Moderate Damage	Repairable damage to plant equipment & structure
0.03 bar	Significant Damage	Shattering of glass
0.01 bar	Minor Damage	Crack in glass

4. PROJECT DESCRIPTION

Global Pharma is a pharmaceutical company dedicated to ensuring the health and wellbeing of communities around the world. Global Pharma Healthcare Pvt Ltd has proposed to setup a new facility to Produce Active Pharma Ingredients (API) to meet the current global demand.

The proposed project will be located at Survey No: 155Pt, Plot No. C-29B (2.50 acres), SIPCOT Industrial Complex – Cheyyar Phase-II, Mathur Village, Vembakkam Taluk, Thiruvannamalai District, Tamil Nadu.

5. CONSEQUENCE ANALYSIS

VAPOUR CLOUD DISPERSION

Table 5-1 – Vapour Cloud Dispersion – Consequence Analysis

S.No	CHEMICALS	SCENARIO	WEATHER	VAPOUR CLOUD DISPERSION		
				UFL	LFL	LFL Fraction
1	Methanol	Catastrophic rupture	Category 1.5/F	4.4016	5.99187	9.95702
			Category 5/D	4.04512	14.3151	28.1539
			Category 1.5/D	4.05134	8.0545	15.5907
		Large Leak	Category 1.5/F	n/a	6.11759	8.43101
			Category 5/D	n/a	6.59154	7.8376
			Category 1.5/D	n/a	5.61221	8.29381
		Short pipe	Category 1.5/F	n/a	4.76993	7.02979
			Category 5/D	n/a	6.31776	7.38073
			Category 1.5/D	2.7953	4.01713	6.94237
2	Acetonitrile	Catastrophic rupture	Category 1.5/F	4.31703	15.8164	24.4243
			Category 5/D	4.07625	22.4737	34.2232
			Category 1.5/D	4.5168	19.7979	27.3803
		Small Leak	Category 1.5/F	n/a	2.5008	21.3448
			Category 5/D	n/a	n/a	4.00541
			Category 1.5/D	n/a	2.55968	3.50109
		Large Leak	Category 1.5/F	n/a	20.5351	45.2011
			Category 5/D	n/a	7.60266	21.1603
			Category 1.5/D	n/a	10.6069	38.0712
		Short pipe	Category 1.5/F	n/a	21.2278	39.8047
			Category 5/D	2.97997	6.72998	11.0079
			Category 1.5/D	3.32809	8.00889	32.9808
3	Dimethylformamide	Catastrophic rupture	Category 1.5/F	4.48158	4.4864	4.48684
			Category 5/D	4.31394	4.34725	4.35031

S.No	CHEMICALS	SCENARIO	WEATHER	VAPOUR CLOUD DISPERSION		
				UFL	LFL	LFL Fraction
			Category 1.5/D	4.45649	4.46236	4.4629
		Small Leak	Category 1.5/F	7.47759	9.60226	10.266
			Category 5/D	7.40023	8.31614	8.6003
			Category 1.5/D	6.47777	7.22507	7.47455
		Large Leak	Category 1.5/F	n/a	7.539	8.78732
			Category 5/D	4.74173	10.7661	11.6825
			Category 1.5/D	5.14581	7.31224	7.65287
		Short pipe	Category 1.5/F	4.05705	6.71946	7.3462
			Category 5/D	3.33777	10.8692	11.6415
			Category 1.5/D	5.02844	5.94985	6.16828
4	N-Butanol	Catastrophic rupture	Category 1.5/F	4.31091	4.31862	4.31917
			Category 5/D	4.29279	4.34453	4.9382
			Category 1.5/D	4.44108	4.4507	4.45139
		Small Leak	Category 1.5/F	6.60827	9.53445	10.894
			Category 5/D	7.35311	8.64975	11.2867
			Category 1.5/D	6.13027	7.19746	10.5666
		Large Leak	Category 1.5/F	n/a	6.89174	7.54107
			Category 5/D	n/a	10.1479	11.0715
			Category 1.5/D	4.50787	4.50787	4.50787
		Short pipe	Category 1.5/F	3.39409	5.09035	5.43681
			Category 5/D	3.14653	10.2545	11.0424
			Category 1.5/D	3.02048	3.02048	3.02048

JET FIRE

Table 5-2 – Jet Fire – Consequence Analysis

S.No	CHEMICALS	SCENARIO	WEATHER	JET FIRE		
				4kW/m²	12.5kW/m²	37.5kW/m²
1	Methanol	Small Leak	Category 1.5/F	13.3637	n/a	n/a
			Category 5/D	10.8114	10.0933	n/a
			Category 1.5/D	13.407	n/a	n/a
		Large Leak	Category 1.5/F	29.1731	n/a	n/a
			Category 5/D	26.658	22.2138	n/a
			Category 1.5/D	29.3149	n/a	n/a
		Short pipe	Category 1.5/F	21.757	n/a	n/a
			Category 5/D	19.3253	16.7529	n/a
			Category 1.5/D	21.9677	n/a	n/a
2	Acetonitrile	Small Leak	Category 1.5/F	15.0239	12.3383	n/a
			Category 5/D	13.1835	10.1166	9.34974
			Category 1.5/D	15.0457	12.3538	n/a
		Large Leak	Category 1.5/F	35.8092	27.1728	n/a
			Category 5/D	32.2116	24.6849	20.347
			Category 1.5/D	35.8547	27.2079	n/a
		Short pipe	Category 1.5/F	23.343	18.5192	n/a
			Category 5/D	20.8118	16.2723	14.1658
			Category 1.5/D	23.459	18.6006	n/a
3	Dimethylformamide	Small Leak	Category 1.5/F	13.0574	9.82503	n/a
			Category 5/D	12.9783	9.89722	8.29416
			Category 1.5/D	13.2717	9.9905	n/a
		Large Leak	Category 1.5/F	5.21576	3.59125	n/a
			Category 5/D	4.42206	3.10215	n/a
			Category 1.5/D	5.2355	3.60197	n/a

S.No	CHEMICALS	SCENARIO	WEATHER	JET FIRE		
				4kW/m²	12.5kW/m²	37.5kW/m²
		Short pipe	Category 1.5/F	4.1225	2.81745	n/a
			Category 5/D	3.45475	2.18117	n/a
			Category 1.5/D	4.13532	2.86439	n/a
4	N-Butanol	Small Leak	Category 1.5/F	24.5909	18.6087	n/a
			Category 5/D	25.2265	19.2897	15.4797
			Category 1.5/D	25.0726	18.9618	n/a
		Large Leak	Category 1.5/F	11.122	9.03817	n/a
			Category 5/D	10.1747	7.81207	7.14015
			Category 1.5/D	11.225	9.10893	n/a
		Short pipe	Category 1.5/F	8.34683	7.23609	n/a
			Category 5/D	7.29505	5.57771	4.51517
			Category 1.5/D	8.3855	7.26375	n/a

POOL FIRE

Table 5-3 – Pool Fire – Consequence Analysis

S.No	CHEMICALS	SCENARIO	WEATHER	LATE POOL FIRE		
				4kW/m²	12.5kW/m²	37.5kW/m²
1	Methanol	Catastrophic rupture	Category 1.5/F	67.4684	43.0449	26.6758
			Category 5/D	68.7212	47.7892	26.2422
			Category 1.5/D	67.3481	42.9271	26.56
		Small Leak	Category 1.5/F	44.806	29.1129	19.2613
			Category 5/D	43.5552	31.1506	18.304
			Category 1.5/D	44.8281	29.1395	19.2913
		Large Leak	Category 1.5/F	68.8249	45.2771	29.5591
			Category 5/D	68.915	49.166	28.8029
			Category 1.5/D	68.8298	45.2852	29.5696
		Short pipe	Category 1.5/F	67.8558	44.0382	28.1195
			Category 5/D	68.0735	48.0532	27.4181
			Category 1.5/D	67.8445	44.0291	28.1121
2	Acetonitrile	Catastrophic rupture	Category 1.5/F	133.936	83.1804	47.1006
			Category 5/D	135.485	88.1606	58.4067
			Category 1.5/D	133.809	83.0575	46.9803
		Small Leak	Category 1.5/F	85.4838	54.1164	30.5325
			Category 5/D	79.2359	52.9662	35.0642
			Category 1.5/D	85.5037	54.146	30.5683
		Large Leak	Category 1.5/F	131.887	83.5	48.9355
			Category 5/D	129.751	86.0383	58.3712
			Category 1.5/D	131.899	83.5144	48.9513
		Short pipe	Category 1.5/F	131.728	82.6153	47.586
			Category 5/D	129.818	85.349	57.2475
			Category 1.5/D	131.715	82.6056	47.5786

S.No	CHEMICALS	SCENARIO	WEATHER	LATE POOL FIRE		
				4kW/m²	12.5kW/m²	37.5kW/m²
3	Dimethylformamide	Catastrophic rupture	Category 1.5/F	61.7263	26.9986	n/a
			Category 5/D	71.8911	28.9976	n/a
			Category 1.5/D	61.5983	26.8707	n/a
		Small Leak	Category 1.5/F	66.2903	31.5611	n/a
			Category 5/D	76.8072	33.8959	n/a
			Category 1.5/D	66.2873	31.5623	n/a
		Large Leak	Category 1.5/F	65.59	30.8736	n/a
			Category 5/D	75.9671	33.1225	n/a
			Category 1.5/D	65.5955	30.8807	n/a
		Short pipe	Category 1.5/F	63.8732	29.1487	n/a
			Category 5/D	74.3164	31.4419	n/a
			Category 1.5/D	63.8671	29.1432	n/a
4	N-Butanol	Catastrophic rupture	Category 1.5/F	108.422	68.0327	38.7726
			Category 5/D	121.768	79.8203	53.4502
			Category 1.5/D	109.988	68.9716	39.3091
		Small Leak	Category 1.5/F	124.478	79.7603	47.7269
			Category 5/D	126.236	84.3564	58.0256
			Category 1.5/D	124.556	79.8137	47.7641
		Large Leak	Category 1.5/F	123.262	78.7281	46.812
			Category 5/D	124.716	83.1037	56.9268
			Category 1.5/D	123.292	78.7494	46.828
		Short pipe	Category 1.5/F	122.017	77.3795	45.3974
			Category 5/D	123.542	81.8144	55.571
			Category 1.5/D	122	77.3672	45.388

FLASH FIRE

Table 5-4 – Flash Fire – Consequence Analysis

S.No	CHEMICALS	SCENARIO	WEATHER	FLASH FIRE	
				LFL	LFL Fraction
1	Methanol	Catastrophic rupture	Category 1.5/F	5.99187	9.95702
			Category 5/D	14.3151	28.1539
			Category 1.5/D	8.0545	15.5907
		Small Leak	Category 1.5/F	n/a	n/a
			Category 5/D	n/a	n/a
			Category 1.5/D	n/a	n/a
		Large Leak	Category 1.5/F	6.11759	8.43101
			Category 5/D	6.59154	7.8376
			Category 1.5/D	5.61221	8.29381
		Short pipe	Category 1.5/F	4.76993	7.02979
			Category 5/D	6.31776	7.38073
			Category 1.5/D	4.01713	6.94237
2	Acetonitrile	Catastrophic rupture	Category 1.5/F	15.8164	24.4243
			Category 5/D	22.4737	34.2232
			Category 1.5/D	19.7979	27.3803
		Small Leak	Category 1.5/F	2.5008	21.3448
			Category 5/D	n/a	4.00541
			Category 1.5/D	2.55968	3.50109
		Large Leak	Category 1.5/F	20.5351	45.2011
			Category 5/D	7.60266	21.1603
			Category 1.5/D	10.6069	38.0712
		Short pipe	Category 1.5/F	21.2278	39.8047
			Category 5/D	6.72998	11.0079
			Category 1.5/D	8.00889	32.9808

S.No	CHEMICALS	SCENARIO	WEATHER	FLASH FIRE	
				LFL	LFL Fraction
3	Dimethylformamide	Catastrophic rupture	Category 1.5/F	4.4864	4.48684
			Category 5/D	4.34725	4.35031
			Category 1.5/D	4.46236	4.4629
		Small Leak	Category 1.5/F	9.60226	10.266
			Category 5/D	8.31614	8.6003
			Category 1.5/D	7.22507	7.47455
		Large Leak	Category 1.5/F	7.539	8.78732
			Category 5/D	10.7661	11.6825
			Category 1.5/D	7.31224	7.65287
		Short pipe	Category 1.5/F	6.71946	7.3462
			Category 5/D	10.8692	11.6415
			Category 1.5/D	5.94985	6.16828
4	N-Butanol	Catastrophic rupture	Category 1.5/F	4.31862	4.31917
			Category 5/D	4.34453	4.9382
			Category 1.5/D	4.4507	4.45139
		Small Leak	Category 1.5/F	9.53445	10.894
			Category 5/D	8.64975	11.2867
			Category 1.5/D	7.19746	10.5666
		Large Leak	Category 1.5/F	6.89174	7.54107
			Category 5/D	10.1479	11.0715
			Category 1.5/D	4.50787	4.50787
		Short pipe	Category 1.5/F	5.09035	5.43681
			Category 5/D	10.2545	11.0424
			Category 1.5/D	3.02048	3.02048

5.1. SUMMARY AND CONCLUSIONS

SUMMARY – VAPOUR CLOUD DISPERSION – WORST CASE SCENARIO

- For Acetonitrile, LFL Fraction received at maximum distance due to Vapour Cloud Dispersion in 45mm Large Leak scenario is 891.2m at 1.5m/s wind speed and stability classes F.

SUMMARY – JET FIRE – WORST CASE SCENARIO

- For Acetonitrile, Radiation profile ($4kW/m^2$) received at maximum distance due to Jet Fire in 45mm Large Leak scenario is 35.85m at 1.5m/s wind speed and stability classes D. The major receptors are employees within the facility.

SUMMARY – LATE POOL FIRE – WORST CASE SCENARIO

- For Acetonitrile, Radiation profile ($4kW/m^2$) received at maximum distance due to Pool Fire in Catastrophic Rupture scenario is 135.48m at 5m/s wind speed and stability classes D.

SUMMARY – FLASH FIRE – WORST CASE SCENARIO

- For Acetonitrile, LFL Fraction received at maximum distance due to Flash Fire in 45mm Large Leak scenario is 45.2m at 1.5m/s wind speed and stability classes F.

5.2. CONTOURS FOR WORST CASE SCENARIOS

VAPOUR CLOUD DISPERSION

Figure 5-1 – Acetonitrile – Catastrophic Rupture – Vapour Cloud Dispersion – Google Image

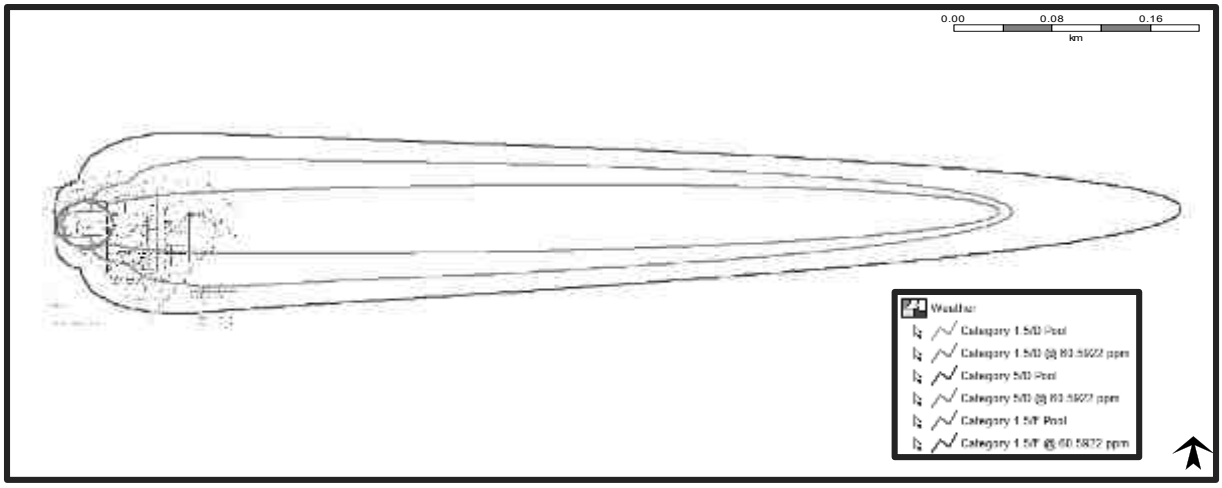


Figure 5-2 – Acetonitrile – Catastrophic Rupture – Vapour Cloud Dispersion – Layout

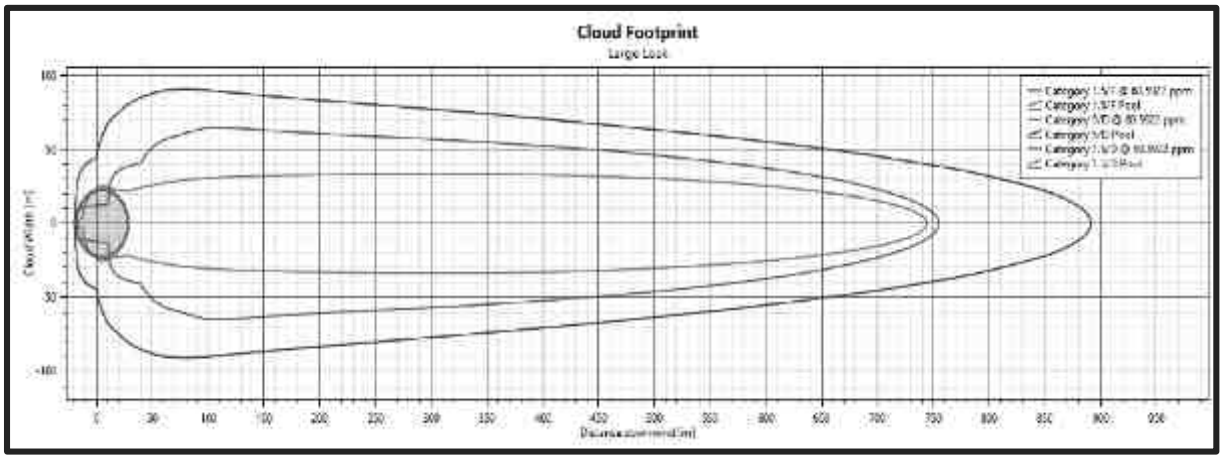


Figure 5-3 – Acetonitrile – Catastrophic Rupture – Vapour Cloud Dispersion – Graphical Representation

FLASH FIRE

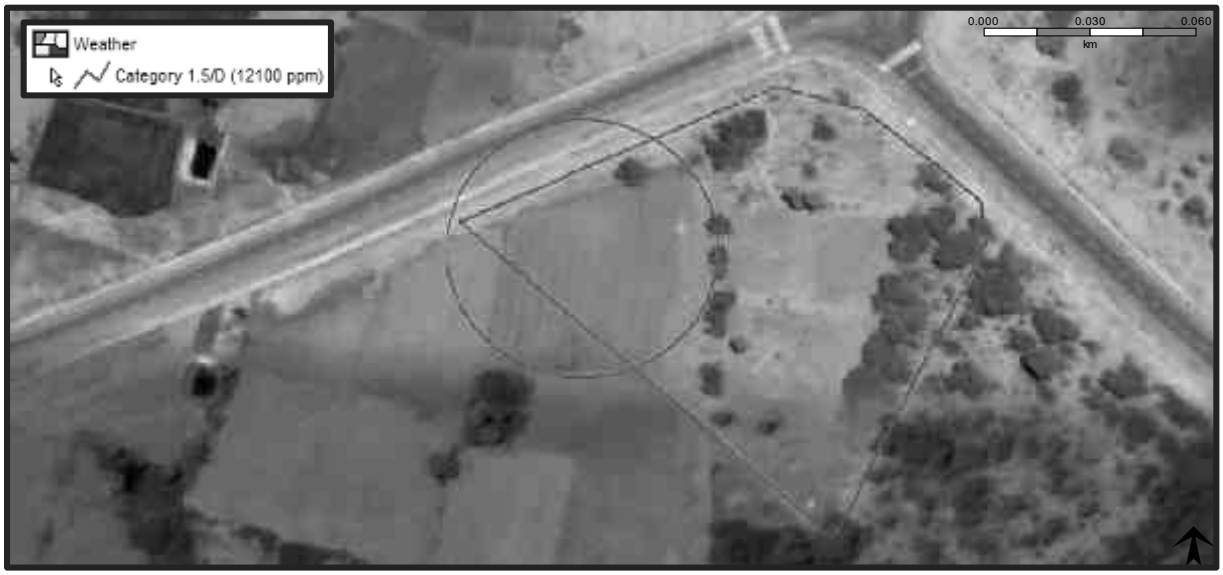


Figure 5-4 – Acetonitrile – Catastrophic Rupture – Flash Fire – Google Image

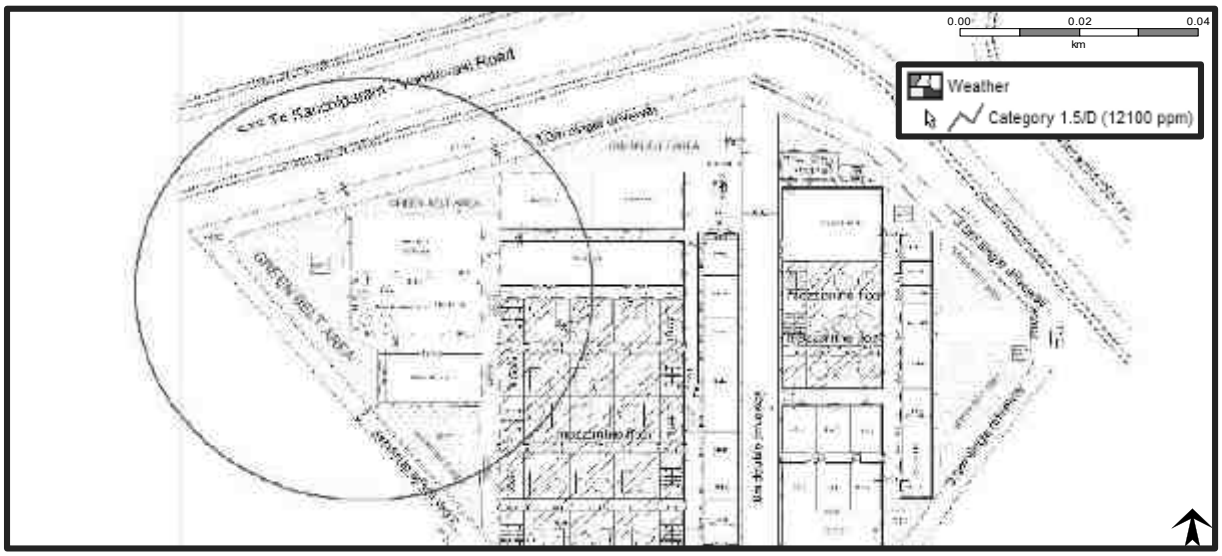


Figure 5-5 – Acetonitrile – Catastrophic Rupture - Flash Fire – Layout

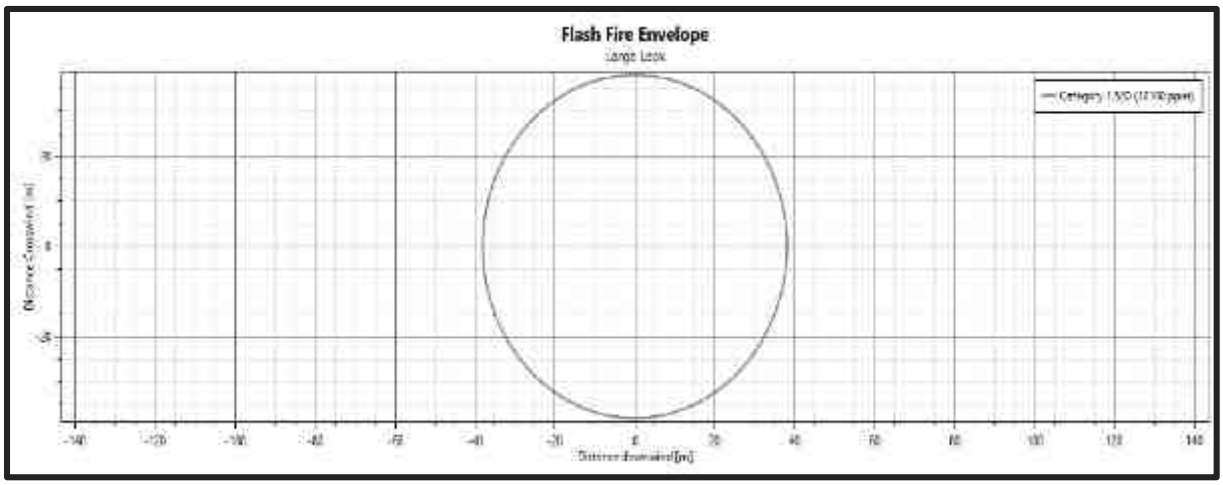


Figure 5-6 – Acetonitrile – Catastrophic Rupture – Flash Fire – Graphical Representation

LATE POOL FIRE

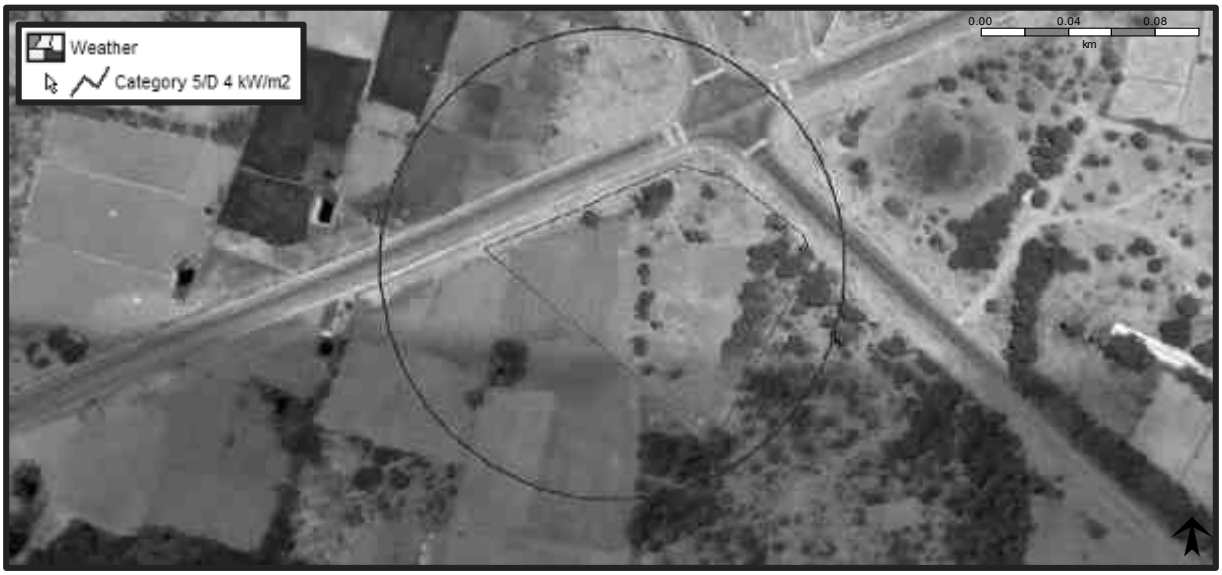


Figure 5-7 – Acetonitrile – Large Leak – Late Pool Fire – Google Image

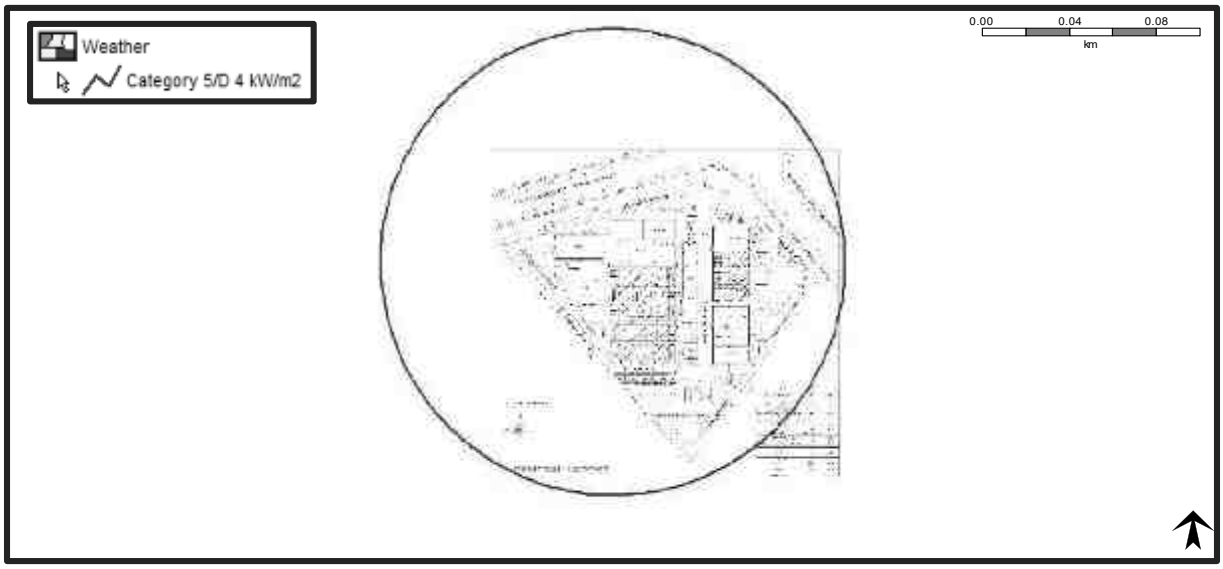


Figure 5-8 – Acetonitrile – Large Leak – Late Pool Fire – Layout

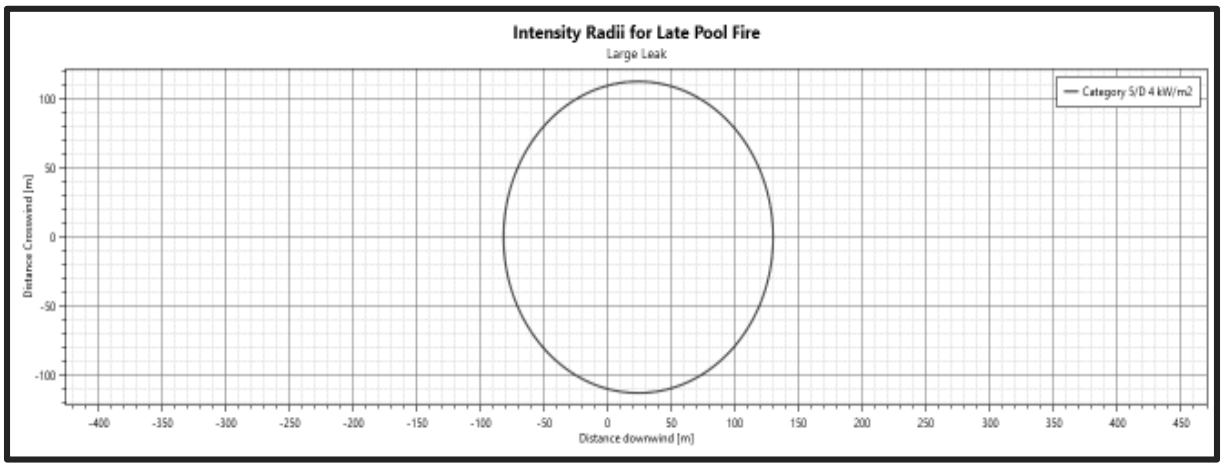


Figure 5-9 – Acetonitrile– Large Leak – Late Pool Fire – Graphical Representation

JET FIRE

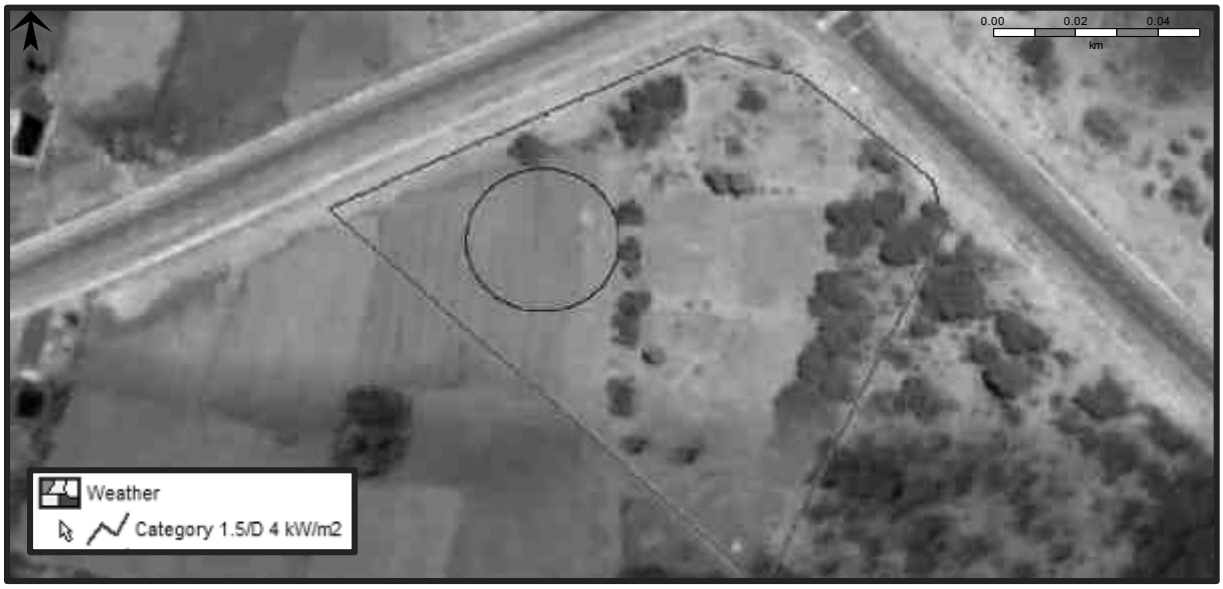


Figure 5-10 – Acetonitrile – Large Leak – Jet Fire – Google Image

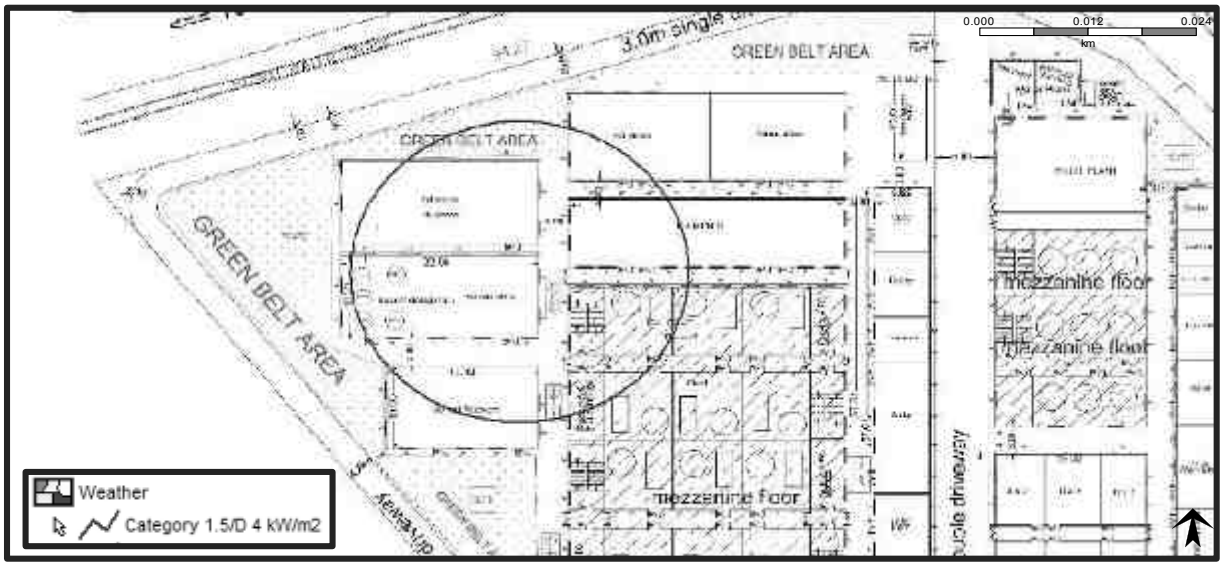


Figure 5-11 – Acetonitrile – Large Leak – Jet Fire – Layout

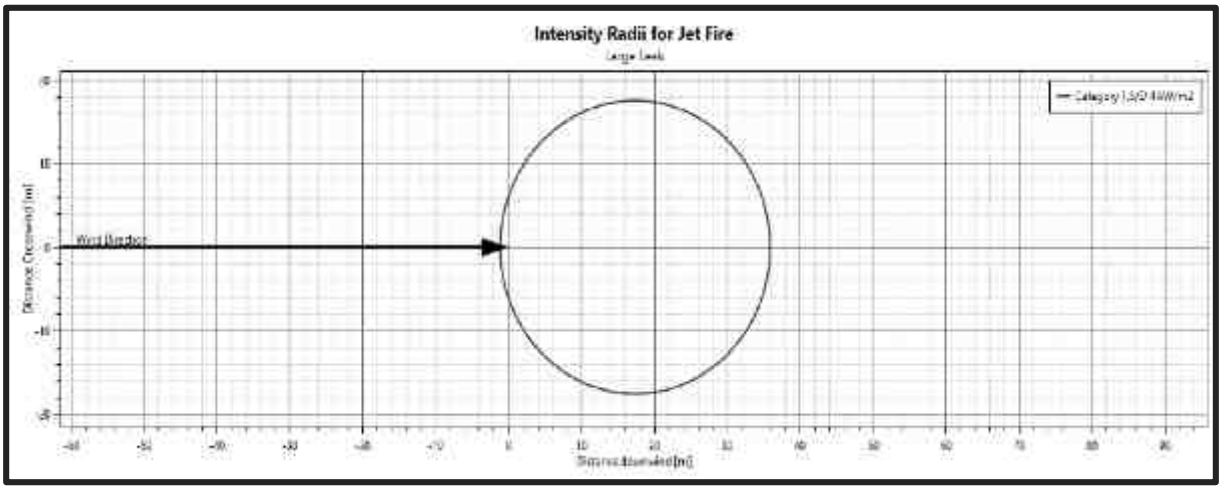


Figure 5-12 – Acetonitrile – Large Leak – Jet Fire – Graphical Representation

6. MITIGATION MEASURES

6.1. RECOMMENDATIONS FOR IMPROVING SAFETY

The following measures are considered for enhancing the safety standards at site:

- Operator training and retraining should be a continuous effort and Mock Drills should be carried out regularly on identified scenarios.
- Work Permit System should be strictly enforced and should not be allowed to be circumvented.
- Hoses should be inspected and tested every three months, for the recommended test pressure.
- Static protection and integrity of explosion proof equipment should be ensured through regular inspection. Every electrical equipment and lighting features should meet explosion proof requirement, in classified area.
- Smoking and carrying smoking accessories are to be strictly prohibited.
- Earth link may be connected to pump circuit to ensure start up only after providing tank earth – connection.
- Safety Procedures and Do's and Don'ts should be prepared and displayed in handling and storage area.
- Periodic inspection of Pipelines and painting to be done to avoid corrosion and subsequent leak.
- The Plant commissioning has an important role to ensure long term safety. Proper cleaning and flushing of the system should be ensured in storage area and fire hydrant system to avoid possible hold up of welding slag's, bolts, nuts etc., which could hamper smooth operation.
- All the solvents must be distributed across the production plants through closed pipe lines and transfer pumps that will minimize fugitive loses.
- The Environment team are trained on industrial hygiene and sampling/ testing techniques.

7. DISASTER MANAGEMENT PLAN

7.1. Objectives

- To establish a method of systematic, safe and orderly evacuation in the least possible time, to a safe area or by the nearest safe means of way out.
- Control the accidents.
- Rapid control and containment of hazardous situation.
- Rescue and treatment of casualties.
- Safeguard people (both at site and neighborhood).
- Minimize damage to property and environment.
- Identify casualties, notify their relatives and render necessary help to them.
- Proper training of the concerned person.
- Prevent recurrence.
- Be capable of dealing with largest incident that can reasonably be foreseen.
- Have sufficient flexibility with a view to handling the emergency efficiently and avoiding unnecessary calling external agencies like fire brigade services.

7.2. Basic forms of Emergency

- Fire
- Explosion
- Toxic release
- Natural disaster (earth quake, flooding, tsunami etc.)
- A combination of more than one

7.3. Types of Emergency

7.3.1. On-site Emergency

An accident/ incident that take place in a factory, with effects being confined to the factory premises, involving only the persons working in the factory and the property inside the factory is called On-site Emergency. It can further be classified as minor and major emergency based on severity of the incident

7.3.2. Minor Emergency (Evacuation is not required)

In the case of minor emergency there is no need for an evacuation siren and the respective department personnel will handle the same with assistance of Safety Squad.

7.3.3. Major Emergency (Evacuation is required)

In case of major emergency, there must be an emergency siren and situation is tackled as per the plan.

7.3.4. Off-site Emergency

If the accident is such that it affects inside the factory uncontrolled and it may spread outside the factory premises, it is called as Off-site Emergency.

Assessment reveals that an Off-site emergency is a very remote possibility in the factory. If situation dictates, local police may be availed to warn and advice the local public on mitigation in an emergency situation.

7.4. On Site Emergency Plan in Place with GLOBAL PHARMA

7.4.1. Purpose

The main purpose of preparing "On-Site Emergency plan" is to define responsibility for individuals and teams to control and mitigate emergency situation in a systematic way without affecting adjacent building, neighbouring industry and public of the surrounding vicinity.

7.4.2. Emergency Organization

The effective control of emergency situations depends upon the way in which the individual and team acting during emergency in an appropriate time. So this is very essential to identify key individual and teams for fixing specific responsibility as part of emergency organization to avoid confusion.

The following are the important key persons and team identified as part of emergency organization.

1. Emergency Identifier.
2. Incident controller
3. Chief controller.
4. Works Controller.
5. Liaison Team.
6. Fire and Safety Team.
7. First aid Team.
8. Environmental Team.
9. Internal communication Team.
10. Taskforce team.

7.4.3. Individual and Teams Roles and Responsibilities

The following are the individual and team responsibility of emergency organization. M/s Global Pharma may assign the following roles to their responsible employees as

applicable. Some suggested responsibility bearers may be Plant Manager, Head-MAINTENANCE, Head-QC, Head-E&I, Head-OPERATION, Head-HSE, etc.

Incident Identifier

The person who is noticing an incident is called "Incident Identifier". After noticing the incident he has to take the following action immediately.

1. In case of major incident, to inform the shift in charge about the incident. While informing, he has to tell his,

   Name :----------

   Location :----------

   And nature of Incidents like Fire, Solvent leakage and Gas leak, etc.

2. Shout about the Incident like "Fire! Fire" or "Leak! Leak" to gather people for help.

Shift in charge /manager

After receiving the information from Incident Identifier, the following are the action to be taken by Shift in Charge or Manager of the particular location:

1. Assess the situation and inform the Works controller.
2. Try to evacuate the people in that area including contract workers.
3. Act as the incident controller till works controller reaches the spot.
4. After handing over the charge to works controller, he should take the lead of controlling the situation with the available resource.

Note: In the absence of shift in-charge the next responsible person should act as shift in-charge.

Chief Controller

The following are the roles and responsibility of Chief controller during an emergency:

1. After receiving the communication about the emergency he should reach the emergency control centre and take the control actions to control the overall incident.
2. Keep communicating to works controller about the action to be taken to control the emergency either directly or through internal communication team.

3. Send the required team to the emergency site to attend the emergency as per the requirement of works controller.
4. Inform external agencies like fire brigade, ambulance or other vehicles through coordinator for liaison team.
5. Arranging additional protective equipment through mutual help scheme through liaison coordinator.
6. Instruct security department to close the gate and stop loading and unloading activities inside the plant and move the vehicles to safe location.
7. Keep inform higher authorities either through liaison coordinator or by himself. Keep inform to kith and kin of the affected victims through liaison coordinator.
8. Keep inform all the necessary statutory authorities through liaison coordinator.
9. Keep inform to respective hospitals for arranging treatment for victims through liaison coordinator.
10. Instruct liaison coordinator to receive press and media and keep them in conference hall.

Works controller

After receiving the communication from incident controller and ensuring the incident to be a major one, he has to report to the chief controller about the incident and ask him to declare an emergency.

1. Arrange for the evacuation of the people.
2. Instruct shift in-charge of respective plant and adjacent plant to stop the operation if needed.
3. Instruct electrical department to isolate the power.
4. Guiding the people to control and content incident.
5. Directing the team leader to take action according to the irresponsibility.
6. Communicating various actions taken to control the incident to Chief controller either directly by phone or through internal communication coordinator.
7. Informing to Chief controller about the external help as per mutual agreement.
8. Informing to Chief controller about help of external fire brigades.
9. Instruct environmental team to contain the effluent water without getting mixed with storm water gutter.
10. Instruct safety and firefighting team to use right type of extinguishers and use hydrant system for fighting fire.
11. Instruct safety and firefighting team to supply sufficient numbers of personal protective equipment to meet the emergency.

Liaison Team

Immediately after receiving the communication about emergency, he should reach the emergency control center and act as follows:

1. Carefully receive the instruction from Chief controller and act accordingly.
2. Instruct security to regularize the manpower at the assembling point.
3. Instruct security to close the gate and restrict unwanted movement.
4. Inform kith and kin of the affected victim as per the instruction of Chief controller.
5. Receive representative from Press and Media and ask them to stay in conference hall and inform to chief controller.
6. Inform all the statutory authorities as per the instruction from Chief controller.
7. Arrange additional transport including ambulance as per the instruction of Chief Controller.
8. Arranging food and other facilities for emergency team members and others.
9. Keepinformedhospitalauthoritiesfornecessaryarrangementsfortreating the victims.
10. Make way for moving ambulance.
11. Instruct security guards to move lorry/tankers to safe location.
12. Instruct security guards to evacuate contractor workers available inside the plant to assembling Point I or II depending upon the wind direction.
13. Receive statutory authorities and inform to chief controller.

Fire and Safety Team

After receiving the communication about the emergency, he should reach the Emergency control center along with Fire Squad and Fire Guards and report to the chief controller and act as follows:

1. Try to extinguish the fire using suitable type of fire extinguishers or fire hydrant system or foam (AFFF) depending upon the material involved.
2. Instruct fire guard to barricade the area.
3. Ensure supply of necessary personal protective equipment and inform works controller to get additional equipment as per the mutual scheme.
4. In case of leakage of chemicals, instruct people to contain the leakage by provide barricade using sand without mixing into storm water gutter by using necessary personal protective equipment.
5. Helping first aid team to shift the victims.
6. Instruct one of the fire squad to ensure fire water pump is running.
7. Inform different action taken to control the emergency to works controller.

8. Note: In the absence of Head safety, the person next to him will act as the coordinator.

First Aid Team

After receiving the communication about the emergency, he should reach the Emergency control center along with first aid team and report to the Chief controller and act as follows:

1. Organize the first aid team and arrange first aid treatment to the affected persons.
2. To arrange for immediate medical attention.
3. After getting head count details search for missing person.
4. Coordinate with Liaison coordinator for transporting the victims to the hospital.
5. To arrange for required medicines.

Environment Team

After receiving information about the emergency, he should reach the spot of emergency along with his team and report to chief controller and take the following action.

1. Contain the effluent generated during emergency and divert it to ETP without getting mixing up with storm water.
2. Monitor the surrounding area and inform to works controller in case of any deviation.
3. Mobilize suitable neutralizing agent through raw material stores.
4. Ensure ETP collection tank is empty.

Note: In the absence of Head environment, the person next to him will act as the coordinator.

Internal communication team

After receiving the communication about the emergency, he should reach the spot of emergency and report to Incident controller and act as follows:

1. Communicate the information given by Chief controller then and there to works controller by nearby intercom or by person and vice versa.
2. Make all the necessary arrangements for communication system in case of failure of any system Note: In the absence of Head Instrumentation, the person next to him will act as the internal communication team coordinator.

Task Force Team

After receiving the communication about the emergency, he should reach the spot of emergency and report to Incident controller and act as follows:

1. Ensure evacuation of peoples and inform to Works controller.
2. Inform chief controller about the stoppage of loading and unloading of lorry tanker and safe parking the same.
3. Helping other teams like First aid and Liaison for arranging infrastructure for shifting victims.
4. Arranging critical equipment as per the instruction of chief/works controller.
5. Use appropriate personal protective equipment and arrange for transferring of chemicals either into spare tank or suitable container.
6. Action to be taken for arranging sufficient number of barrels for transferring of chemicals. Use appropriate personal protective equipment and arrests the leak.
7. Communicating works/ chief controller about the additional facility needed for controlling either Toxic chemical leak or Gas leak.
8. Cutoff the power as per the instruction of works Controller.
9. Ensure running condition of the DG.

Note: In the absence of Head Maintenance, the person next to him will act as coordinator.

7.4.4. Emergency Communication facility

The effective communication is must to alert both people and emergency action teams to take action in controlling emergency in a stipulated time.

The following are the communication system, limited to communicating emergency situation, may be considered:

1. Siren System for common evacuation.
2. Siren system for Toxic release.
3. Public Announcement System.
4. Local alarm for fire.
5. Megaphone
6. Walkie Talkie

Siren System

The following are the two different types of siren used for communicating emergency.

- Wailing siren.

I. Wailing siren is used for declaring emergency. This is the type of siren having high and low frequency for the duration of 90seconds.

- Continuous siren.

II. This is the type of siren used for declaring all clear about the emergency. This is the continuous siren of high frequency for a period of 90 seconds.

- "Beep" sound for Toxic gas release.

Public Announcement system

The Public Announcement System via megaphone, etc., is provided for the effective communication about the Nature of emergency and its location so as to mobilize the individuals and action team to take timely action to control emergency without damaging men, property and environment.

This system is also used for communicating to the general public in the surroundings, about the emergency and various actions taken to control.

Declaration of Emergency

Both emergency siren and announcement will be operated from emergency control centre. After receiving the information about emergency, the Security who is available in emergency control centre will note down,

1. Name of the person intimated about emergency.
2. Nature of Incident.
3. Location.

After getting the instruction from chief controller, he actuates the wiling Siren for around 90Seconds followed by Announcement given by using public announcement system and inform about the Nature of emergency and location.

Declaration of All clear

After controlling an emergency, based on the environment team report, works controller will inform Chief controller to declare all clear siren to allow people to resume their jobs. Based on the report from both works controller and Head count from HR, chief controller will instruct emergency control centre operator to declare "All Clear" using both siren and public announcement.

The security guard will actuate the "All Clear" siren of continuous high frequency for 90 Seconds and then inform through public announcement system stating "Emergency is cleared! All should resume their work".

7.5. Offsite Emergency Plan

7.5.1. Preamble

An offsite emergency, arising out of chemical hazards is one which has potential to cause serious damage or loss of life beyond the plant boundary. In addition, Accidents during transportation of hazardous chemicals by road, rail, pipeline etc, can cause offsite emergencies. Emergency services such as Police, Fire, Medical etc., need to be prepared to handle such situations promptly and effectively. It is mandatory under Rule 16 of the Hazardous Chemical Rules for District authorities to prepare an off-site emergency plan in respect of clusters of hazardous chemical industries or at locations where accidents are likely to have an off-site adverse effect. In order to be in a state of preparedness to respond to the accidents and minimize their adverse impacts on the offsite population, requires an offsite emergency plan to be prepared by the District Controller for every District or Industrial Areas as applicable.

7.5.2. Objective

The objective of the present assignment is to prepare an area specific Offsite Emergency Action Plan for the district which can be practically implemented / activated at a short notice to ensure minimal impact on life and property due to emergencies arising out of Chemical Accidents or during Transportation of Hazardous Chemicals in the district.

The plan should be regularly updated when there are changes occurring in the Industrial set up, Transportation Aspects, Key Manpower and Administrative Changes etc., Regular drills, Training of key persons, increasing safety awareness etc is extremely important areas that must be looked into for sound preparedness.

7.5.3. Offsite Emergency Control

After the "Bhopal Gas Tragedy" (Methyl Isocyanides- MIC Poisonous and toxic gas release Accident at Union Carbide, 1984) the Government felt an immediate need to be more conscious about handling of Hazardous Chemicals. Central control room Centre or Offsite Industrial Emergency Control Room "OIECR" should be established by company. It should work under the Governing Council. The Governing Council should be headed under the chairmanship by District Collector & Magistrate.

The Governing Council Members are the permanent Ex. Officio Members to manage the affairs of the Emergency Control Room.

7.5.4. Emergency Instruction to the General Public

The Notification of Emergency

The emergency can be declared by following media to alert or alarm the public;

- Public address system
- Blow horns/Bells
- Sirens / Hooters
- Telephone message / Fax Messages / Hot lines/ Pager / E-mail / Mobile Phone / Satellite system.
- Sending messages through a messenger.
- Rushing personally to the Central Control Room or to the nearest Police Department or Fire Department for declaration of emergency.
- Rising of Flag for denoting the level of natural calamities.
- By any other source by which information can reach to the public in time.

Category of Alarm Systems

The following alarm system may be considered which will identify the various levels of emergency.

First Level Warning (Fire Alarm)

- For an accident / incident within the unit
- Siren – Short, intermittent

Second Level Warning

- When the District Authority receives information that a toxic or flammable gas has leaked then the siren has to be sounded in order to facilitate early evacuations from the unit.
- Siren – A wailing short and long intermittent siren notification of emergency.

Third Level Warning (All Clear)

- When the District Authority considers that the accident / incident is under control, emergency is withdrawing and it is safe for re-entry.
  Siren – A wailing, long and continues, intermittent siren

Fire Fighting System

In order to tackle great risk of fire explosion, spillage of hazardous liquid or release of toxic gases, firefighting system should be mobilized under chief fire officer. The operational response will be coordinated from the Central Control Room.

General Instruction to the Public

A major emergency may affect areas outside the worksite. The surrounding public must be alerted with public address system by Police or Government Authorities or nearby industrial concerns. The siren must blow to indicate the emergency situation aroused.

The type of emergency aroused, must be communicated via telecommunication sources (Television, Radio, etc). The public may accordingly take prompt action to protect them-selves in their then location or rush to the safe shelters, as instructed by the authority.

Public action must be to investigate the type of emergency aroused.

- Fire
- Explosion
- Gas Leakage / Release
- Collapse of Building, Bursting of Vessel etc.
- Natural Calamities.

If gas leakage emergency aroused, ascertain probability of gas whether flammable, toxic or poisonous. The following actions are suggested as per prevailing situation: Otherwise follow the instruction as issued by the authority.

Flammable Gas:

- Be calm.
- Do not light Cigarette etc.
- Shut down open flame, gas and electrical instruments or any source of ignition.
- Do not move any vehicle in the area.
- Do not go near the incident & don't allow anyone else either.
- Shut down the windows, doors etc & seal open ground or terrace.
- Follow the instruction as directed by the authority.

Toxic Poisonous Gas

- Cover your nose with wet hand kerchief/ cloth and breathe through it.

- Come out in open, check the wind direction and move away quickly in perpendicular direction of wind. (Cross wind direction).
- Immediately try to get to a higher elevation, if gas is heavier than air (like chlorine, as it settles in low lying area).
- Follow the instruction and reach safe shelter as instructed notified by Government Authority or Public authority.

General Instruction:

DON'T

1. Do not get panicky, be calm.
2. Do not approach the site of incident as a spectator.
3. Do not approach unnecessarily for information or more enquires.
4. Do not allow unnecessarily crowd nearby incident place.
5. Do not believe in rumours unnecessarily.

DO'S

1. Listen radio, TV or Public Addressing System.
2. Emergency will be communicated by public addressing system / TV / Radio or siren (Siren-code wailing sound for one minute).
3. Follow the instruction & convey to others accordingly.
4. On announcement of withdrawal of emergency or clearance Siren, start your routine work.
5. On enquiry, deposit your statement as required by authority at the time of investigating the incident
6. Co-operate, help and assist the person(s) / authority handling the emergency and rescue operation.

7.5.5. Security & Police

Security, protection of life & property and traffic control & maintenance of law and order should be taken care of by police. During an emergency duties and responsibilities of the police may be:

- Cordoning of the incident area

- Warning public about the hazards
- Traffic Control Assist fire fighting
- Services Assist first-aid medical teams
- Assist evacuation and ensure protection of property in evacuated areas.

Before the Crisis

Proper planning of manpower, transport and communication network to coordinate possible incident areas and regulation of traffic should be made for each industry in the area.

During the Crisis

The Security Commander of the area will set in motion the relevant contingency plan to control the operation.

After the Crisis

Protect property in the evacuated area.

Media

The Control Room should release up-to-date information through the media to the people.

About HECS

We are India’s Leading Environmental Management Company and Service Provider, serving as a catalyst to the cause of Environmental preservation for the Industrial and Domestic Sectors. We provide total Turnkey Project Supplies, Analytical Services, Operation and Maintenance Services and Consultancy Services. Over the last 25 years HECS has evolved into a large business house not just through organic growth but through acquisitions and investments in technologically advanced ventures in the fields of environmental monitoring and management

TAMIL NADU POLLUTION CONTROL BOARD

Category of the Industry :

ORANGE

CONSENT ORDER NO. 2101139965476 DATED: 01/09/2021.

PROCEEDINGS NO.F.1516TVM/OS/DEE/TNPCB/TVM/W/2021 DATED: 01/09/2021

SUB: TNPC Board-Consent for Establishment-M/S GLOBAL PHARMA HEALTHCARE PRIVATE LTD S.F No. PLOT NO. C-29B, CHEYYAR SIPCOT INDUSTRIAL PARK - PHASE II,, MATHUR Village, Vembakkam Taluk, Tiruvannamalai District - for the establishment or take steps to establish the industry under Section 25 of the Water (Prevention and control of Pollution)Act,1974, as amended in 1988(Central Act 6 of 1974)- Issued- Reg.

REF: 1. Unit Application No. 39965476 for CTE dated 10.08.2021/31.08.2021.
2. IR.No : F.1516TVM/OS/AE/TVM/2021 dated 31.08.2021.
3. Minutes of 224th DLCCC meeting held on 31.08.2021 (DLCCC Item No.224-08).

Consent to establish or take steps to establish is hereby granted under Section 25 of the Water (Prevention and control of Pollution) Act,1974, as amended in 1988(Central Act 6 of 1974) (hereinafter referred to as 'The Act') and the Rules and Orders made there under to

The Managing Director,
GLOBAL PHARMA HEALTHCARE PRIVATE LTD

Authorizing occupier to establish or take steps to establish the industry in the site mentioned below:

S.F. No.PLOT NO. C-29B, CHEYYAR SIPCOT INDUSTRIAL PARK - PHASE II,,
MATHUR Village,
Vembakkam Taluk,
Tiruvannamalai District.

This Consent to establish is valid upto **March 31, 2026**, or till the industry obtains consent to operate under Section 25 of the Water (Prevention and control of Pollution) Act, 1974, as amended in 1988 whichever is earlier subject to special and general conditions enclosed.

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
THIRUVANNAMALAI

To
The Managing Director,
M/s.GLOBAL PHARMA HEALTHCARE PRIVATE LTD,
No.2A, GANGA NAGAR 3RD FLOOR, FOURTH STREET, KODAMBAKKAM, CHENNAI ,
Pin: 600024

Copy to:

1.The Commissioner, ANAKKAVUR-Panchayat Union, Vembakkam Taluk, Tiruvannamalai District .
2. Copy submitted to the Member Secretary, Tamil Nadu Pollution Control Board, Chennai for favour of kind information.
3. Copy submitted to the JCEE-Monitoring, Tamil Nadu Pollution Control Board, Vellore for favour of kind information.
4. File

SPECIAL CONDITIONS

1. This consent to establish is valid for establishing the facility for the manufacture of products/ byproducts (Col. 2) at the rate (Col 3) mentioned below. Any change in the product/byproduct and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Sl. No.	Description	Quantity	Unit
	Product Details		
1.	Tablets	100000000	No's /Year
2.	Capsules	12000000	No's /Year

2. The unit shall provide Sewage Treatment Plant and /or Effluent Treatment Plant as indicated below.

a	**Sewage Treatment Plant:**		
Treatment status: Individual STP			
SL. No.	Name of the Treatment Unit	No. of Units	Dimensions in metres
1.	Sedimentation and Separation chanber	1	1.07 x 2.0 x 1.98
2.	Anaerobic Chamber	1	0.48 x 2.0 x 1.98
3.	Moving bed chamber	1	0.85 x 2.0 x 1.98
4.	Disinfection Chamber	1	0.4 x 0.5 x 0.7
5.	Sedimentation Chanber	1	1.2 x 2.0 x 1.98
b	**Effluent Treatment Plant:**		
Treatment status: Individual ETP			
SL. No.	Name of the Treatment Unit	No. of Units	Dimensions in metres
1.	Bar Screen Chamber	1	0.5 x 0.5 x 0.5
2.	Effluent collection Sump	1	1.5 x 1.5 x 2.5
3.	Coagulant dosing system 1	1	0 - 12 LPH
4.	Coagulant dosing system 2	1	0 - 18 LPH
5.	Flocculant Dosing System	1	0 - 6 LPH
6.	Flocculator with tank	1	0.4 Dia X 1.2
7.	Primary Settling Tank	1	1.2 x 1.2 x 1.2
8.	Aeration Tank	1	1.2 x 1.2 x 3.0
9.	Secondary Settling Tank	1	1.2 x 1.2 x 2.5
10.	Filter Feed Tank	1	1.2 x 1.2 x 1.0
11.	Multi Grade Filter	1	0.3 Dia x 1.3
12.	Activated Carbon Filter	1	0.3 Dia x 1.3
13.	Sludge Drying beds	4	1.0 x 1.0 x 1.0

3. This consent to establish is valid for establishing the facility with the below mentioned outlets for the discharge of sewage/trade effluent. Any change in the outlets and the quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Outlet No.	Description of Outlet	Maximum daily discharge in KLD	Point of disposal
Effluent Type : Sewage			
1.	Sewage	7.2	On land for gardening
Effluent Type : Trade Effluent			
1.	Trade Effluent	5.0	On land for gardening

4. **Additional Conditions:**

Outlet No.	Description of Outlet	Maximum daily discharge in KLD	Point of disposal
Effluent Type : Sewage			
1.	Sewage	7.2	On land for gardening
Effluent Type : Trade Effluent			
1.	Trade Effluent	5.0	On land for gardening

4. **Additional Conditions:**

1. The unit shall provide Sewage Treatment Plant as reported for the treatment of sewage to be generated so as to satisfy the standards prescribed by the Board.
2. The unit shall earmark adequate land to utilize the entire quantity of treated sewage for gardening/ irrigation purposes at the rate of 35KL/Hectare.
3. The unit shall provide the Effluent Treatment Plant as reported for the treatment of trade effluent generated from its activities so as to satisfy the standards prescribed by the Board.
4. The unit shall earmark adequate land to utilize the entire quantity of treated trade effluent for gardening/ irrigation purposes at the rate of 35KL/Hectare.
5. The unit shall ensure that no sewage/trade effluent from the unit premises gains access to any private land/well/water bodies.
6. The unit shall apply and obtain valid Hazardous Waste Authorization under Hazardous & Other Waste (M& TBM) Rules, 2016 for handling and disposal of Hazardous & Other Waste.
7. The establishment of the unit shall not evoke public complaint.
8. The unit shall provide the Rain Water Harvesting Facility within the unit's premises for recharge of Ground Water.
9. The unit shall not use "Use and throwaway plastics" such as plastic sheets used for food wrapping , spreading on dining table etc, plastic plates, plastic coated tea cups, plastic tumbler, water pouches and packets, plastic straw, plastic carry bag and plastic flags irrespective of thickness, within the industry premises. Instead unit shall encourage use of eco friendly alternative such as banana leaf, areca nut palm plate, stainless steel, glass, porcelain plates / cups, cloth bag etc.
10. In case of revision of consent fee by the Government, the unit shall remit the difference in consent fee amount within one month from the date of notification. Failing to remit the consent fee, this consent order will be withdrawn without any notice and further action will be initiated against the unit as per law.

THIRUPPATHI PALANICHAMY VISWANATHAN

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
THIRUVANNAMALAI

GENERAL CONDITIONS

1. This consent to establish cannot be construed as consent to operate and the unit shall not commence the operation without obtaining the Consent to operate.
2. The applicant shall make a request for grant of consent to operate at least thirty days, before the commissioning of trial production.
3. Any Change in the details furnished in the conditions has to be brought to the notice of the Board and got approved by the Board, before obtaining consent to operate under the said Act.
4. The unit has to comply with the provisions of Public Liability Insurance Act, 1991 to provide immediate relief in the event of any hazard to human beings, other living creatures/plants and properties while handling and storage of hazardous substances (wherever applicable).
5. Consent to operate will not be issued unless the unit complies with the conditions of consent to establish.
6. The unit shall provide adequate water sprinklers for the control of dust emission during the loading and unloading of construction material so as to minimize the dust emission.
7. The unit shall provide water sprinklers along the temporary roads inside the premises to avoid fugitive dust emission during the vehicle movements.
8. The unit shall develop green belt of adequate width around the premises.
9. In case there is any change in the management, the unit shall inform the change with relevant documents immediately.

THIRUPPATHI PALANICHAMY VISWANATHAN

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
THIRUVANNAMALAI

Annexure–10

Alternate site analysis

1.1 General

M/s. Global Pharma Healthcare Pvt Ltd proposes Active Pharmaceutical Ingredients manufacturing industry in Tamil Nadu.

The environmental compatibility of the identified land mass is the key issue for the finalization of the particular location and extent of land for the proposed Industry.

1.2 Choice of Alternative Sites

M/s. Global Pharma Healthcare Pvt Ltd considered three sites require good connectivity to the urban areas and other facilities like port, airports etc.

The alternative sites considered as per SOI Topo map were:

- SIPCOT Industrial Park at Manallur
- SIPCOT Industrial Park at Thoothukudi
- SIPCOT Industrial Complex at Cheyyar

The Industrial Park at Manallur has obtained Environmental Clearance for only 10% of the plotted area for A category industries and presently allotment is yet to be done for the industrial Park.

The Industrial Park at Thoothukudi is for Non EC category industries and the application for Environmental Clearance is under process.

For the Industrial Complex at Cheyyar, EC has been issued vide F.No. 21-181/2014- IA-III dated 30th September 2016 for A category Industries. Due to the reason the Industrial Complex has been selected for the proposed project. This Industrial Complex does not have EC for Synthetic Organic chemicals and dyes industries; the application for Environmental Clearance is being submitted.

The alternative site with reference to the proposed project location is presented in **Figure 1**.

Detailed comparison was made among these sites for the proposed Industrial Park. On the basis of these options and detailed ground truth exercise, it is recommended that the land available at Cheyyar is suitable for the project.

1.3 SITE MATRIX

The choice among the alternative sites was made by constructing a Matrix using Standard set of guidelines and set of recommendations in the Technical Guidance Manual of MoEF&CC.

The environmental and coastal compatibility of the location which is with respect to the following were studied and compared for all the three locations;

- Area
- Access
- Ecological sensitivity
- R& R Requirements

The Site Matrix evaluated for the above said deciding criteria is presented in **Table 1.**

1.4 Evaluation of Selected Sites

The importance of environmental and coastal attributes was examined for their relevance to the proposed project and arbitrary values were assigned. The assigned values of importance for evaluation of selected sites are listed in **Table 2.** The score of values of each site is listed in **Table 3.**

SIPCOT Industrial Park-Manallur

SIPCOT Industrial Park -Thoothukudi

SIPCOT Indsutrial Park, Cheyyar- Global Site

Figure -1 Alternate sites considered for the project

Table 1Environmental analysis for alternate sites for proposed project

S.No	Environmental Attributes	SIPCOT Cheyyar	SIPCOT Thoothukudi	SIPCOT Manallur
1	Location	Human Settlement adjacent to the	Human settlement within 1 Km	Human Settlement within 1 Km
2	Land availability	Land readily available for allotment as EC has been obtained for the project under A category	Allotment not yet started since EC application under progress	Allotment not yet started. EC issued under category A for only 10% of plotted area.
3	Land use classification	Unclassified	Unclassified	Unclassified
4	Access	SH-116 (Kanchipuram -Vandavasi) ≈0.74 km (E)	Adjacent to NH 38 (Vellore-Thoothukudi)	NH-5 (Chennai – Kolkata Highway)≈8.04 km (E)
5	Soil Characteristics	Black soil	Red sandy soil & black soil	Sandy with Red Gravely patches
6	Socio Economic	Farming activity being carried out at site	No Activity; Barren	No Activity; Barren
7	Eco sensitive areas	Pond is adjacent to the site towards south	Lake within 1 km form project site. Gulf of Mannar Marine National park ≈8.3 km (E)	Reserve forests & water bdoes within 1 km radius. Pulicat Bird Sanctuary ≈5.77 km (NE)
8	Air Quality	AAQ is well within the prescribed level	Site located in Critically polluted area	AAQ is well within the prescribed level
9	Water Source	Ground water	TWAD	CMWSSB
10	Noise	Within the limits prescribed by CPCB	Within the limits prescribed by CPCB	Within the limits prescribed by CPCB
11	RR Plan	Not applicable	Not applicable	Not applicable

Table -2 Arbitrary value of importance for site selection

Sl. No	Selection Criteria	Value of Importance
1	Land Availability	200
2	Road Access	200
3	Soil Conditions	100
4	Ecological Sensitivity	200
5	Change in land use	100
6	Interference with fresh water sources	100
7	R& R Requirements	100
	Net Score	**1000**

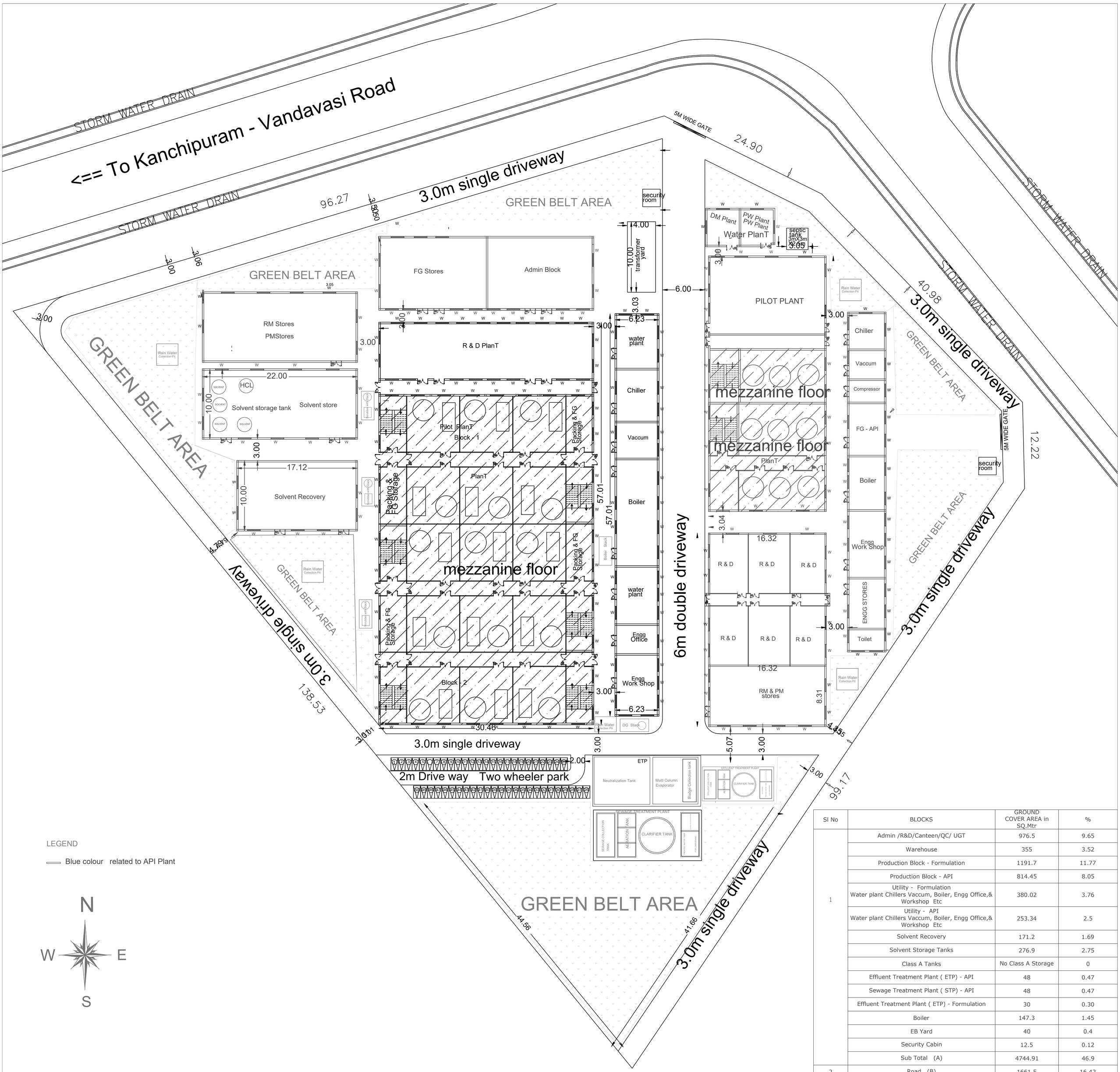
Table -3 Site selection based on arbitrary value

Sl. No	Selection Criteria	Importance Values	SIPCOT Cheyyar	SIPCOT Thoothukudi	SIPCOT Manallur & Soorapoondi
1	Land Availability	200	200	50	100
2	Road Access	200	200	200	100
3	Soil Conditions	100	50	100	50
4	Ecological Sensitivity	200	150	75	50
5	Change in land use	100	50	50	50
6	Interference with fresh water sources	100	100	0	100
7	R & R requirements	100	100	100	100
Total score		**1000**	**850**	**575**	**550**
Choice Ranking			**I**	**II**	**III**

Based on these criteria, Cheyyar SIPCOT complex was selected for development of the project.

Advantages of the selected site

- Cheyyar SIPCOT site is well connected by National Highway Road and vicinity to major metro areas for the API Markets.
- Cheyyar SIPCOT has well developed infrastructure in terms of connecting Roads, Storm Water drains, availability of Power & required water for the manufacturing.
- The site offered, is plain, has good soil conditions and the overall site layout comply with requirements of the manufacturing set up.
- Cheyyar SIPCOT lies in the industrial belt, where skilled manpower is readily available for the Proposed project.



LEGEND

Blue colour related to API Plant

N
W E
S

GENERAL LAYOUT

Sl No	BLOCKS	GROUND COVER AREA in SQ.Mtr	%
1	Admin /R&D/Canteen/QC/ UGT	976.5	9.65
	Warehouse	355	3.52
	Production Block - Formulation	1191.7	11.77
	Production Block - API	814.45	8.05
	Utility - Formulation Water plant Chillers Vaccum, Boiler, Engg Office,& Workshop Etc	380.02	3.76
	Utility - API Water plant Chillers Vaccum, Boiler, Engg Office,& Workshop Etc	253.34	2.5
	Solvent Recovery	171.2	1.69
	Solvent Storage Tanks	276.9	2.75
	Class A Tanks	No Class A Storage	0
	Effluent Treatment Plant (ETP) - API	48	0.47
	Sewage Treatment Plant (STP) - API	48	0.47
	Effluent Treatment Plant (ETP) - Formulation	30	0.30
	Boiler	147.3	1.45
	EB Yard	40	0.4
	Security Cabin	12.5	0.12
	Sub Total (A)	4744.91	46.9
2	Road (B)	1661.5	16.42
3	Green Area (C)	3710.68	36.68
	Total Plot Area (A+B+C)	10117.09	100
	% of Green Area	36.68%	

LAYOUT PLAN OF SIPCOT INDUSTRIAL COMPLEX, PH - I &II, CHEYYAR, THIRUVANNAMALAI DISTRICT.

EAR MARKING 5.00 ACRES OF LAND FOR PLUG AND PLAY FACILITY AT PHASE - II

REFERENCE	
DESCRIPTION	EXTENT IN ACRES
PROPOSED AREA EARMARKED FOR PLUG AND PLAY FACILITY AT PHASE - II (PLOT NO. A19/1)	5.00 A.C

				M/s Global Pharma					
PM 10				**Mid of January to Mid of March**					
S. No.	**Date**	**AAQ1**	**AAQ2**	**AAQ3**	**AAQ4**	**AAQ5**	**AAQ6**	**AAQ7**	**AAQ8**
	Location Name	**Project site**	**Kilakkattur**	**Bagavantapuram**	**Sodiyambakkam**	**Mattur**	**Mahajanambakkam**	**Mangal**	**Mamandur**
1	17.01.2022	61.47	58.75	63.17	58.98	57.51	65.20	60.22	64.86
2	20.01.2022	46.70	44.63	47.99	44.81	43.69	49.54	45.75	49.28
3	24.01.2022	61.90	59.17	63.61	59.39	57.91	65.66	60.65	65.32
4	27.01.2022	48.22	46.09	49.55	46.26	45.11	51.15	47.24	50.88
5	31.01.2022	49.58	47.38	50.95	47.57	46.38	52.59	48.57	52.31
6	04.02.2022	47.24	45.15	48.55	45.33	44.20	50.11	46.28	49.85
7	07.02.2022	63.10	60.31	64.84	60.54	59.03	66.93	61.82	66.58
8	10.02.2022	47.13	45.05	48.43	45.22	44.09	50.00	46.18	49.74
9	14.02.2022	48.33	46.19	49.66	46.37	45.21	51.26	47.35	51.00
10	17.02.2022	49.96	47.75	51.34	47.93	46.74	52.99	48.94	52.72
11	21.02.2022	47.62	45.52	48.94	45.69	44.55	50.52	46.66	50.25
12	24.02.2022	63.53	60.72	65.29	60.96	59.44	67.39	62.24	67.04
13	28.02.2022	48.94	46.78	50.29	46.96	45.79	51.91	47.95	51.64
14	03.03.2022	61.60	58.88	63.31	59.11	57.63	65.35	60.36	65.01
15	07.03.2022	48.87	46.71	50.22	46.89	45.72	51.84	47.88	51.57
16	10.03.2022	45.34	43.34	46.59	43.50	42.42	48.10	44.42	47.85
17	14.03.2022	63.26	60.46	65.01	60.70	59.18	67.10	61.98	66.75
18	17.03.2022	64.62	61.76	66.40	62.00	60.45	68.54	63.31	68.19
19	21.03.2022	54.44	52.04	55.94	52.24	50.94	57.74	53.34	57.44
20	24.03.2022	62.66	59.89	64.39	60.12	58.62	66.47	61.39	66.12
21	28.03.2022	47.78	45.67	49.10	45.85	44.70	50.69	46.82	50.42
22	31.03.2022	62.17	59.43	63.89	59.65	58.17	65.95	60.91	65.61
23	04.03.2022	46.70	44.63	47.99	44.81	43.69	49.54	45.75	49.28
24	07.03.2022	63.80	60.98	65.57	61.22	59.69	67.68	62.51	67.33
	N	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
	Min	45.34	43.34	46.59	43.50	42.42	48.10	44.42	47.85
	Max	64.62	61.76	66.40	62.00	60.45	68.54	63.31	68.19
	Mean	54.37	51.97	55.87	52.17	50.87	57.68	53.27	57.38
	Median	49.77	47.57	51.14	47.75	46.56	52.79	48.76	52.52
	SD	7.49	7.16	7.70	7.19	7.01	7.94	7.34	7.90
	C V %	13.77	13.77	13.77	13.77	13.77	13.77	13.77	13.77
	98 Percentile	64.24	61.40	66.02	61.64	60.10	68.15	62.94	67.79
	NAAQS	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

				M/s Global Pharma					
PM 2.5				**Mid of January to Mid of March**					
S. No.	**Date**	**AAQ1**	**AAQ2**	**AAQ3**	**AAQ4**	**AAQ5**	**AAQ6**	**AAQ7**	**AAQ8**
	Location Name	**Project site**	**Kilakkattur**	**Bagavantapuram**	**Sodiyambakkam**	**Mattur**	**Mahajanambakkam**	**Mangal**	**Mamandur**
1	17.01.2022	28.98	23.66	24.11	27.73	30.34	24.22	27.96	24.00
2	20.01.2022	22.02	17.97	18.32	21.07	23.05	18.40	21.24	18.23
3	24.01.2022	29.18	23.83	24.28	27.93	30.55	24.40	28.16	24.17
4	27.01.2022	22.73	18.56	18.91	21.76	23.80	19.00	21.93	18.83
5	31.01.2022	23.37	19.08	19.45	22.37	24.47	19.54	22.55	19.36
6	04.02.2022	22.27	18.18	18.53	21.32	23.32	18.62	21.49	18.44
7	07.02.2022	29.75	24.29	24.75	28.47	31.14	24.87	28.70	24.63
8	10.02.2022	22.22	18.14	18.49	21.27	23.26	18.58	21.44	18.40
9	14.02.2022	22.78	18.60	18.96	21.81	23.85	19.05	21.98	18.87
10	17.02.2022	23.55	19.23	19.60	22.54	24.66	19.69	22.72	19.50
11	21.02.2022	22.45	18.33	18.68	21.49	23.50	18.77	21.66	18.59
12	24.02.2022	29.95	24.45	24.92	28.67	31.36	25.04	28.90	24.80
13	28.02.2022	23.07	18.84	19.20	22.08	24.15	19.29	22.26	19.11
14	03.03.2022	29.04	23.71	24.16	27.80	30.40	24.28	28.02	24.05
15	07.03.2022	23.04	18.81	19.17	22.05	24.12	19.26	22.23	19.08
16	10.03.2022	21.38	17.45	17.79	20.46	22.38	17.87	20.62	17.70
17	14.03.2022	29.82	24.35	24.81	28.54	31.22	24.93	28.78	24.70
18	17.03.2022	30.46	24.87	25.35	29.16	31.89	25.47	29.39	25.23
19	21.03.2022	25.74	21.04	21.44	24.64	26.94	21.54	24.84	21.34
20	24.03.2022	29.54	24.12	24.58	28.27	30.93	24.70	28.50	24.46
21	28.03.2022	22.53	18.39	18.74	21.56	23.58	18.83	21.74	18.66
22	31.03.2022	29.31	23.93	24.39	28.05	30.69	24.50	28.28	24.27
23	04.03.2022	22.02	17.97	18.32	21.07	23.05	18.40	21.24	18.23
24	07.03.2022	30.08	24.56	25.03	28.79	31.49	25.15	29.02	24.91
	N	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
	Min	21.38	17.45	17.79	20.46	22.38	17.87	20.62	17.70
	Max	30.46	24.87	25.35	29.16	31.89	25.47	29.39	25.23
	Mean	25.64	20.93	21.33	24.54	26.84	21.43	24.74	21.23
	Median	23.46	19.15	19.52	22.45	24.56	19.61	22.64	19.43
	SD	3.53	2.88	2.94	3.38	3.70	2.95	3.41	2.92
	C V %	13.77	13.77	13.77	13.77	13.77	13.77	13.77	13.77
	98 Percentile	30.29	24.73	25.20	28.99	31.71	25.32	29.22	25.08
	NAAQS	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00

				M/s Global Pharma					
SO2				**Mid of January to Mid of March**					
S. No.	**Date**	**AAQ1**	**AAQ2**	**AAQ3**	**AAQ4**	**AAQ5**	**AAQ6**	**AAQ7**	**AAQ8**
	Location Name	**Project site**	**Kilakkattur**	**Bagavantapuram**	**Sodiyambakkam**	**Mattur**	**Mahajanambakkam**	**Mangal**	**Mamandur**
1	17.01.2022	13.23	9.75	11.85	11.22	12.07	9.17	12.76	14.15
2	20.01.2022	10.05	7.40	9.00	8.52	9.17	6.97	9.69	10.75
3	24.01.2022	13.33	9.82	11.94	11.30	12.15	9.23	12.85	14.25
4	27.01.2022	10.38	7.65	9.30	8.80	9.47	7.19	10.01	11.10
5	31.01.2022	10.67	7.86	9.56	9.05	9.73	7.40	10.29	11.41
6	04.02.2022	10.17	7.49	9.11	8.62	9.27	7.05	9.80	10.88
7	07.02.2022	13.58	10.00	12.17	11.52	12.39	9.41	13.10	14.53
8	10.02.2022	10.15	7.47	9.09	8.60	9.25	7.03	9.78	10.85
9	14.02.2022	10.40	7.66	9.32	8.82	9.49	7.21	10.03	11.13
10	17.02.2022	10.75	7.92	9.63	9.12	9.81	7.45	10.37	11.50
11	21.02.2022	10.25	7.55	9.18	8.69	9.35	7.10	9.88	10.96
12	24.02.2022	13.68	10.07	12.25	11.59	12.47	9.48	13.19	14.63
13	28.02.2022	10.54	7.76	9.44	8.93	9.61	7.30	10.16	11.27
14	03.03.2022	13.26	9.77	11.88	11.24	12.09	9.19	12.79	14.18
15	07.03.2022	10.52	7.75	9.42	8.92	9.59	7.29	10.14	11.25
16	10.03.2022	9.76	7.19	8.74	8.27	8.90	6.76	9.41	10.44
17	14.03.2022	13.62	10.03	12.20	11.55	12.42	9.44	13.13	14.56
18	17.03.2022	13.91	10.25	12.46	11.79	12.69	9.64	13.41	14.88
19	21.03.2022	11.83	8.75	10.61	10.05	10.80	8.24	11.41	12.64
20	24.03.2022	13.49	9.94	12.08	11.44	12.30	9.35	13.01	14.43
21	28.03.2022	10.29	7.58	9.21	8.72	9.38	7.13	9.92	11.00
22	31.03.2022	13.39	9.86	11.99	11.35	12.21	9.27	12.90	14.31
23	04.03.2022	10.05	7.40	9.00	8.52	9.17	6.97	9.69	10.75
24	07.03.2022	13.74	10.12	12.30	11.64	12.53	9.52	13.24	14.69
	N	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
	Min	9.76	7.19	8.74	8.27	8.90	6.76	9.41	10.44
	Max	13.91	10.25	12.46	11.79	12.69	9.64	13.41	14.88
	Mean	11.71	8.63	10.49	9.93	10.68	8.12	11.29	12.52
	Median	10.71	7.89	9.60	9.08	9.77	7.42	10.33	11.46
	SD	1.61	1.19	1.44	1.37	1.47	1.12	1.55	1.72
	C V %	13.77	13.77	13.77	13.77	13.77	13.77	13.77	13.77
	98 Percentile	13.83	10.19	12.39	11.72	12.61	9.58	13.33	14.79
	NAAQS	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00

				M/s Global Pharma					
NO2				**Mid of January to Mid of March**					
S. No.	**Date**	**AAQ1**	**AAQ2**	**AAQ3**	**AAQ4**	**AAQ5**	**AAQ6**	**AAQ7**	**AAQ8**
	Location Name	**Project site**	**Kilakkattur**	**Bagavantapuram**	**Sodiyambakkam**	**Mattur**	**Mahajanambakkam**	**Mangal**	**Mamandur**
1	17.01.2022	27.51	19.81	24.79	22.75	29.21	20.49	25.47	22.19
2	20.01.2022	20.90	15.05	18.83	17.29	22.19	15.57	19.35	16.86
3	24.01.2022	27.70	19.95	24.97	22.91	29.41	20.63	25.65	22.34
4	27.01.2022	21.58	15.54	19.45	17.85	22.91	16.07	19.98	17.40
5	31.01.2022	22.19	15.98	19.99	18.35	23.56	16.53	20.54	17.89
6	04.02.2022	21.14	15.23	19.05	17.49	22.45	15.75	19.58	17.05
7	07.02.2022	28.24	20.34	25.45	23.36	29.98	21.03	26.15	22.78
8	10.02.2022	21.09	15.19	19.01	17.45	22.39	15.71	19.53	17.01
9	14.02.2022	21.63	15.58	19.49	17.89	22.96	16.11	20.03	17.44
10	17.02.2022	22.36	16.10	20.15	18.49	23.74	16.65	20.70	18.03
11	21.02.2022	21.31	15.35	19.21	17.63	22.63	15.87	19.73	17.19
12	24.02.2022	28.43	20.48	25.62	23.52	30.19	21.18	26.33	22.93
13	28.02.2022	21.90	15.77	19.74	18.12	23.25	16.31	20.28	17.67
14	03.03.2022	27.57	19.85	24.85	22.80	29.27	20.53	25.53	22.24
15	07.03.2022	21.87	15.75	19.71	18.09	23.22	16.29	20.25	17.64
16	10.03.2022	20.29	14.61	18.29	16.78	21.54	15.11	18.79	16.37
17	14.03.2022	28.31	20.39	25.51	23.42	30.06	21.09	26.21	22.83
18	17.03.2022	28.92	20.83	26.06	23.92	30.70	21.54	26.78	23.32
19	21.03.2022	24.44	17.64	22.04	20.24	25.94	18.24	22.64	19.74
20	24.03.2022	28.04	20.20	25.27	23.20	29.77	20.89	25.97	22.62
21	28.03.2022	21.38	15.40	19.27	17.69	22.70	15.93	19.80	17.25
22	31.03.2022	27.82	20.04	25.08	23.01	29.54	20.72	25.76	22.44
23	04.03.2022	20.90	15.05	18.83	17.29	22.19	15.57	19.35	16.86
24	07.03.2022	28.55	20.56	25.73	23.62	30.32	21.27	26.44	23.03
	N	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
	Min	20.29	14.61	18.29	16.78	21.54	15.11	18.79	16.37
	Max	28.92	20.83	26.06	23.92	30.70	21.54	26.78	23.32
	Mean	24.34	17.53	21.93	20.13	25.84	18.13	22.53	19.63
	Median	22.27	16.04	20.07	18.42	23.65	16.59	20.62	17.96
	SD	3.35	2.41	3.02	2.77	3.56	2.50	3.10	2.70
	C V %	13.77	13.77	13.77	13.77	13.77	13.77	13.77	13.77
	98 Percentile	28.75	20.70	25.91	23.78	30.52	21.41	26.62	23.19
	NAAQS	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00

WILDLIFE CONSERVATION PLAN

For

"Proposed APIs Manufacturing Facility"

AT

Survey No. 32/2 (Pt), Plot No. A-8/3, SIPCOT Industrial Park,

Survey No: 155Pt, Plot No. C-29B, SIPCOT Industrial Complex -Cheyyar Phase-II,
Village: Mathur
Taluk: Vembakkam
District: Thiruvannamalai
State: Tamil Nadu

By

M/s. Global Pharma Healthcare Private Limited

[Project Activity termed under 5(f)-Synthetic Organic Chemicals manufacturing, Category - "B" as Per EIA Notification, 2006 and its amendments]

May 2022

1. PROJECT BACKGROUND

M/s. Global Pharma Healthcare Pvt Ltd is located in the heart of the exclusive government-promoted pharmaceutical industrial area in Alathur, Chennai. It has been meticulously designed for the manufacturing of tablets, capsules, ointments, liquid orals, sterile eye drops, small volume parenterals, sachets, and food supplements. It has been audited by the Ministries of Health of over 12 countries, and also possesses the following certifications: WHO-GMP, ISO 9001:2008, ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007, ISO 22000:2005, ISO 17025:2005.

The Greenfield APIs manufacturing facility proposed by M/s. Global Pharma Healthcare Private Limitedis located at Survey No: 155Pt, Plot No. C-29B (2.50 acres), SIPCOT Industrial Complex - Cheyyar Phase-II, Mathur Village, Vembakkam Taluk, Thiruvannamalai District, Tamil Nadu State.

2. NATURAL RESOURCES

2.1. Flora & Fauna

The Thervoy Kandigai village is covered with dry and evergreen species of vegetation typical in tropical regions. Main trees grown in this region are those which are a good supply of firewood. Eucalyptus is one example of this kind. You will find rows of tamarind tree along the roadside. Just like flora; ThervoyKandigai Village in Thiruvallur district is equally rich in fauna as well. There are Reserve Forests which are considered as wildlife refuges in this district with a great variety of birds. The ponds and streams house many species.

Thiruvannamalai district has thick forest areas in Chengam and Polur taluks. The district has 79677.7 hectares of forest area which is about 14.8% to the total area of the entire district. The hilly areas of this district are “dry” deciduous type. In the low land, the ordinary vegetation like Tamarind trees, Teak wood, Sandal wood, Ven teak, Casurina, Bamboo etc. are the important trees in the district. Number of rare plant species is spread over the Tiruvannamalai hill. Of these, more than 50% of the species are used by the local people for various medicinal uses.

Regarding fauna, some wild animals are found in the mountainous tracts. Bisons are seen in small numbers in Jawadhu Hill ranges and Tigers are occasionally seen. Leopards, Black Bears, Hyena, Samburs, Spotted Deer, Jungle Sheep, Barking Deer, Antelopes, and Varieties of snakes including Cobras are spread over at different regions. The reserved forests in the district found with sandalwood, bamboos, herbal plants, tamarind trees, teakwood, Ven teak and casurina.

2.2. Biological Environment

A habitat or an area comprises of different kinds of plants and animals within its boundary. The distribution of flora and fauna in the given area represents the biological elements present in the study

area, its value, description of community uniqueness, the dominant species, its response to impacts and mitigation measures to overcome any negative impacts. The detailed ecological assessment of the study area has been assessed with secondary data sources. There are some major waterbodies which support the flora and fauna in the region.

Palar and Cheyyar are the main rivers of the district. Cheyyar River which originates from Jawadhu Hills, flows in a southern direction at first, and turns south-east near Chengam after flowing through Polur, Vandavasi and Cheyyar taluks. Palar raising near Nandidurg in Mysore enters Vellore district passing through Gudiyatham, Walajah and Arakonam taluks before entering into Cheyyar taluk of Tiruvannamalai district and

there after enters into Kancheepuram district. Pennaiyar and South Pennaiyar originate from Nandidurg of Karnataka. They pass through Dharmapuri district and enter southern part of Chengam taluk before entering in to Viluppuram district. Finally, the river enters into the Bay of Bengal at Cuddalore. The river is dry for the most part of the year

3. Objectives of the Study

a) Carryout ecological observation of the study area with respect to Schedule-I fauna and flora through secondary data source.

b) To evaluate the impacts of project activities on Schedule-I fauna, flora and wildlife in the region and predict the potential impacts in future.

c) To suggest any mitigation measures in order to minimize the impact of project activities on surrounding environment especially on Schedule-I fauna, flora and wildlife there in.

4. General Ecological Assessment

The observations and assessment of overall ecological scenario involves details such as classification of Biogeographic zone, eco-region, habitattypes and land cover, distances from natural habitats, vegetation/forest types, sensitive ecological habitats such as Wetlands sites, Important Bird Areas, migration corridors of important wildlife etc. present in the study area. We identified ecologically important habitats through literature survey and consulting experts etc. These important ecological habitats and features were then identified on landuse map that is prepared for the study area. Land use map of 10 km radius of the proposed project site is prepared by EIA agency is used for the present study. Prominent landuse features such as, roads, rivers/waterbody/drainages, agriculture, sea, sandy beach, mangrove, mudflats, industrial and built up areas, forest area, scrubland etc. were digitized using open source software such as QGIS and their areas were calculated.

5. Potential Impacts

There are species of Schedule-I reported from the study area. None from core area and most of these species are reported from the buffer area of the project site as per the literature survey.The information collected on status of flora and fauna and, their spatiotemporal distributions hotspots, and potential impacts of proposed project development were logically analyzed and conclusions were extracted for preparation of conservation plan for the project proponent to implement.

6. Preparation of Wildlife Conservation Plan

After identification of key impacts of the project, on flora, fauna or any key habitats of any important species or their corridors, a comprehensive wildlife conservation action plan was prepared for 10 years with monitoring mechanism and financial projections.

Table 1 Faunal species of high conservation significance in study area

Sl.No	Family	Common name	Scientific name		IUCN Status	Legal Status
1	Phasianidae	Indian Peafowl	*Pavo cristatus*	R	LC	Sch-I
2	Elapidae	Cobra	*Naja naja*	R	NT	Sch-III

R-Resident
NT-Near Threatened

S-I- Schedule I; S-III- Schedule III.

Source: List of schedule species : http://wiienvis.nic.in/Database/ Schedule species database

6.1. Fauna Species of High Conservation Significance

Based on extensive literature survey, and consultation local people, we found 2 faunal species of high conservation significance as they belong to Schedule-I and II of Indian Wildlife Protection Act 1972. These species include species of reptiles, species of birds and species of reptiles. Many of the species are reported from the buffer area of the proposed project site.

6.2. Impacts On Wildlfe

Any development activities are bound to have marginal impacts on surrounding environment. However, often of the adverse impacts of development are amenable to technological control by providing necessary preventive and control measures and finally through effective environmental management of the operating industries.

Though, the impacts of proposed project activities may be on several faunal taxa, but for the present study we focused mainly on vertebrate classes i.e. avifauna, (birds) and reptiles for identification of impacts and future monitoring purpose. Therefore, in the present study we identified impacts on the birds particularly on important and Schedule-I species of the landscape

6.3. Conservation Plan for Schedule-I Fauna

Based on our field observations and literature survey we found important avifauna species which are threatened and or Schedule-I wildlife species in the study area (Table-1). We reported one species of Reptiles and species of birds in the study area i.e. 15 km buffer area.

6.4. Reptile- Naja naja

Status: During our study this species of reptile was recorded form the small village in the study area. The species is resident and breeding in the buffer areas. The cobra (Naja naja) is a terrestrial species widespread and common in the this region. They are listed as Schedule-I species under Wildlife Protection Act 1972 and as Least Concerned as per IUCN threat categories.

Impacts: Since this species is living along the waterbodies, it may be subjected to impacts related to water pollution and hydrological impacts arising due to project activities. These may include degradation of water sources, soil characteristics, choking of drainages etc. This species is otherwise not hunted or eaten by the people. Therefore, changes of degradation of overall aquatic habitat qualities in the buffer area are likely to affect these species and their distribution.

Recommendations: Since there will be no discharge of treated/ untreated wastewater from the project, no hydrological impacts are envisaged on this species by the project activities. Project proponent has proposed pollution control measures in place so that surrounding area ecological conditions are not affected

6.5. Birds/ Indian Peafowl

Status: The Indian Peafowl (*Pavocristatus*) is a resident breeder in the Indian subcontinent. The bird was justifiably declared as the national bird of India in year 1963 due to its "flagship" value founded on its glorious position in mythology and its widespread distribution in the country. The species is found in dry semi-desert grasslands, scrub and deciduous forests. It forages and nests on the ground but roosts on top of trees. It eats seeds, insects, fruits, small mammals and reptiles. The Indian Peafowl is a ground nesting bird and it lays a clutch of 4-8 eggs which take 28 days to hatch. The eggs are light brown and are laid every other day usually in the afternoon. The male does not assist with the rearing, and is polygamous. Poaching of peacocks for their feathers and poisoning by feeding on pesticide treated seeds are being noticed in this region.

6.5.1. Impacts:

The literature observation show presence of Indian Peafowl in the buffer areas of project site. The species was observed in the buffer area of 15 km radius particularly near human habitations, villages and

agriculture fields. Since the study reported presence of Indian Peafowl in the buffer area, its possibility of nesting in buffer area could not be ruled out. Since Indian Peafowl is a ground nester, several project activitie can have adverse impacts on their nesting grounds such as pollution, degredation of soil and vegetation from surrounding ara and in the forest areas. Direct disturbance by presence of people, vehicle, their noise, vibrations, lights etc. Can potentially disturb most of the bird species.

6.5.2. Recommendations:

Following actions for the conservation and protection are suggested in wildlife conservation action plan to reduce impacts of project related activities on the species. Based on our field observation on the distribution, behavioral ecology, conservation need, and envisaged impacts of proposed project, we identified several species specific actions that would help reduce the impacts of project activities on Indian Peafowl as under.

- A rapid survey for the breeding population of Indian Peafowl during their nesting season shall be carried out in pre-monsoon season by wildlife experts so as to ensure that no nesting of the species is present in and around project or corea area.
- Since Indian Peafowl is a ground nesting bird, if found in project area, construction activities could disturb their nesting activities. Therefore if nesting of peafowl is found, in close proximity of the construction area, it should not be carried out in that particular block.
- Avoid vehicle movement in the area where nesting is found. The movement of vehicles or humans shoul be prohibited in vicinity of the nesting area.
- Electric lines shall be designed to minimize the potential for electrocution of indian peafowl and other such large birds inside the projec area.
- Lightings of within the project area could potentially deter the species presence. Therefore, project proponent shall ensure that minimum illumination comes out from the project area. This can be done by adjusting the angles of the light sources and using low intensity focused bulbs inside the project area.
- Habitat improvement programme can be undertaken through plantation of suitable tree species in the surrounding villages for shelter and roosting of peacocks. While selecting the tree/ shrub species care shall be provided for beery plants which attract these birds. Some local species such as *Phyllanthus emblica, Hardwickia binate, Terminalia arjuna, Acacia niotica, ficus sp., Albizia sp., Dalbergia latifolia, Peltophorumpterocarpum, Chloroxylon swietenia, Dalbergia sissoo, Syzygiumcumini, Melia dubia* etc. will be planted. Planting of tree groves in school compounds in the villages of buffers area will be planted as per the plantation programme.

- During summer period, will be encouraged to use the old earthen pots to fill with water for drinking these birds. Summer is the time when these birds are facing shortage of feeds, there by supplying the feed like cereals with good population of Indian peafowls will suffix the problem of food shortage.
- Staff involved in construction activities shall be trained staff and madeaware of Indian Peafowl‟s status as National Bird of India, and Schedule-I species protected under Indian Wildlife Protection Act 1972. This is important because if there any casualties of the species are found then they should report to the project authorities and the local forest department to carryout further necessary actions.

7. General Mitigation/Conservation Measures

- Strict control of fugitive dust emission during operation,vehicle movements etc. using various methods and technologies shall becarried out.
- During operation phase ambient air quality standards (emission ofpollutants like Particulate Matter) must be maintained as per PCB norms in and around the project site.
- Ambient noise pollution and vibrations during operation phases of should be within limits of the standards mentioned.
- Plantation of thick green belt on periphery of the project site shall becreated using local and hardy species.
- Ensure no movement of vehicles or people through Forest Areas locatednearby in the project area.

8. Financial Allocation for Wildlife Conservation Activities

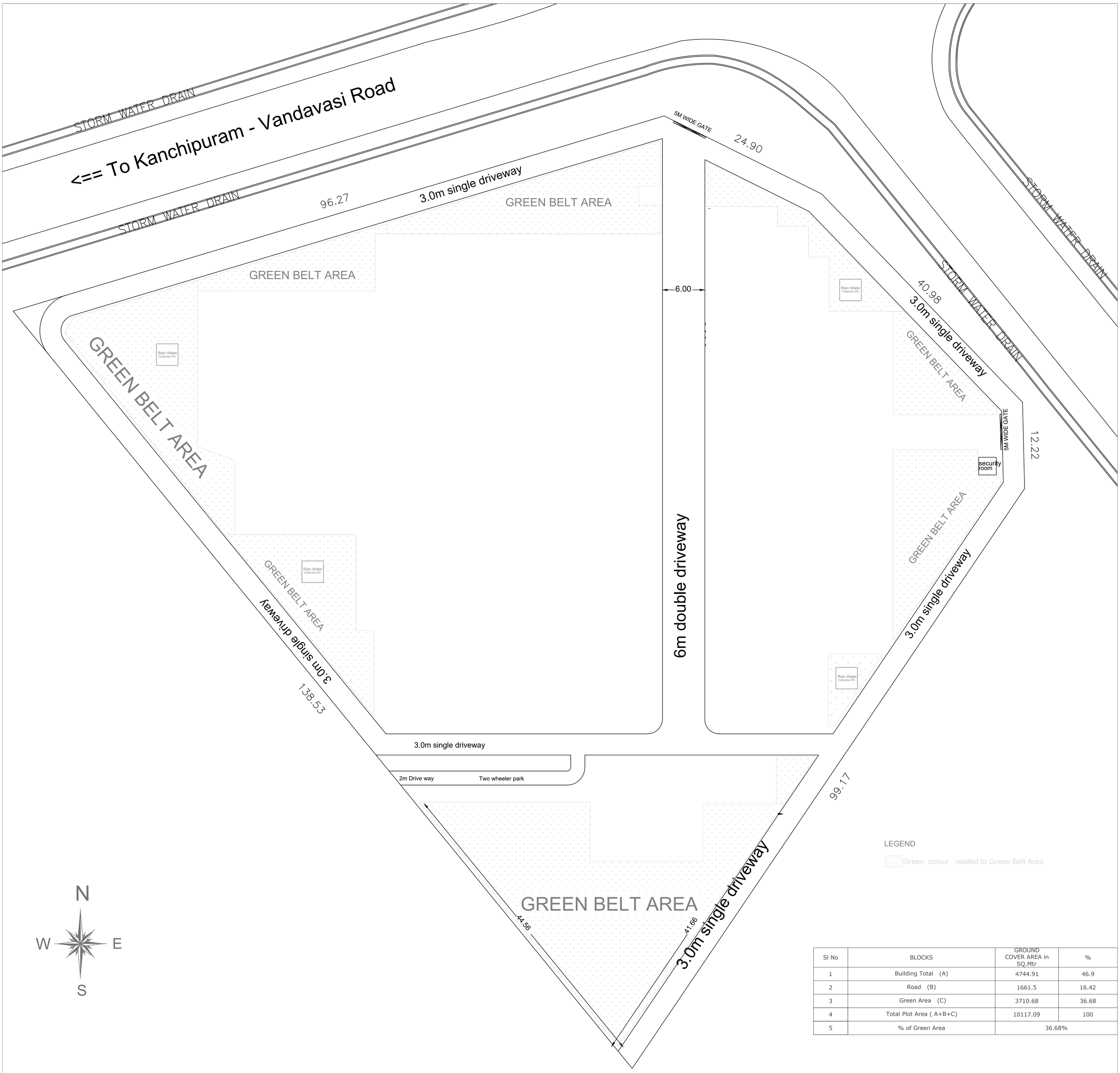
Professional judgements are made based on our experience used often for predicting impacts. We tried to bring information as much as possible from all sources; however, there may be some lack of information in the study which we could not be gathered. The general impacts of proposed project activities are air, water, noise pollution and the anthropogenic activities, direct disturbance, illumination, safety of animals and humans.

Following is the proposed budget allocation for approval from all statutory bodies permitting the protection plan (**Table 2**).

Table-2 Proposed financial allocation for mitigation and conservation measures.

Sl.No	Activity	Agency	Duration (Years)	Total Amount (Lakh)
1	Habitat improvement (Plantation) for Schedule-I species	Forest Department	Cont. till target is achieved	1.0
2	Support Wildlife awareness camps activity by Forest	Forest Department	One Time	1.0

	Department.			
Total Amount				**2.0**

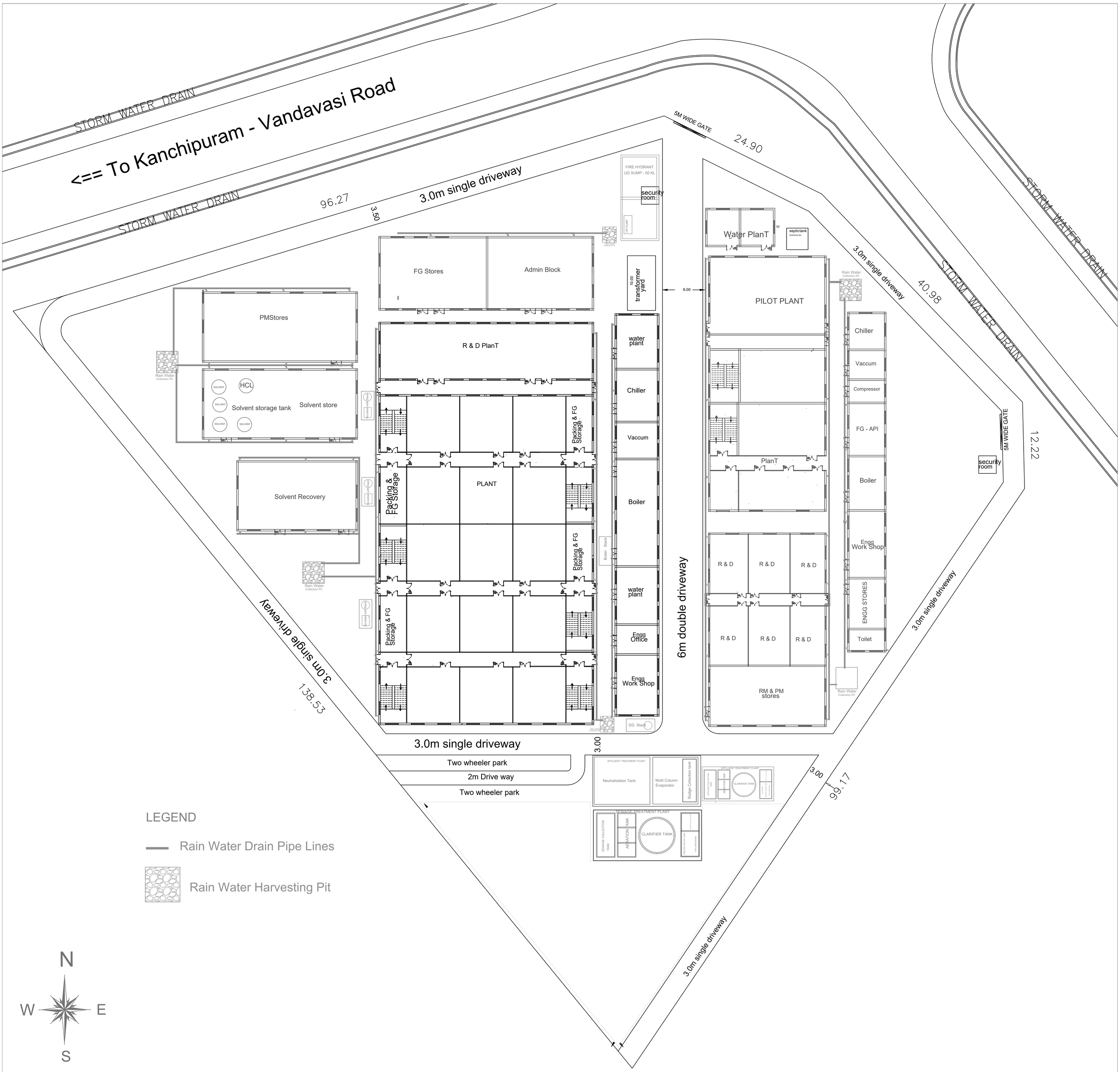


LEGEND

Green colour related to Green Belt Area

Sl No	BLOCKS	GROUND COVER AREA in SQ.Mtr	%
1	Building Total (A)	4744.91	46.9
2	Road (B)	1661.5	16.42
3	Green Area (C)	3710.68	36.68
4	Total Plot Area (A+B+C)	10117.09	100
5	% of Green Area	36.68%	

GREEN BELT AREA LAYOUT



RAIN WATER HARVESTING LAYOUT

None identified

Other hazards

DMSO readily penetrates skin and may carry other dissolved chemicals into the body.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Dimethyl sulfoxide	67-68-5	>95

4. First-aid measures

General Advice If symptoms persist, call a physician. Show this safety data sheet to the doctor in attendance.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Move to fresh air. Get medical attention immediately if symptoms occur. If not breathing, give artificial respiration.

Ingestion Do not induce vomiting. Obtain medical attention.

Most important symptoms and effects Breathing difficulties. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media No information available

Flash Point 87 °C / 188.6 °F

Method - No information available

Autoignition Temperature 301 °C / 573.8 °F

Explosion Limits

Upper 42 vol %

Lower 2.6 vol %

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Combustible material. Containers may explode when heated. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO_2) Sulfur oxides Sulfides Formaldehyde

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2 *	2	1	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Remove all sources of ignition. Take precautionary measures against static discharges. Ensure adequate ventilation.

Environmental Precautions Should not be released into the environment. Do not flush into surface water or sanitary sewer system. See Section 12 for additional ecological information.

Methods for Containment and Clean Up Remove all sources of ignition. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment. Ensure adequate ventilation. Keep away from open flames, hot surfaces and sources of ignition. Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	18.4 °C / 65.1 °F
Boiling Point/Range	189 °C / 372.2 °F
Flash Point	87 °C / 188.6 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	42 vol %

Lower	2.6 vol %
Vapor Pressure	0.55 mbar @ 20°C
Vapor Density	2.7
Specific Gravity	1.100
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	301 °C / 573.8 °F
Decomposition Temperature	> 190°C
Viscosity	1.98 mPa.s @ 25°C
Molecular Formula	C2 H6 O S
Molecular Weight	78.13

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Hygroscopic.

Conditions to Avoid Incompatible products. Excess heat. Exposure to moist air or water. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Strong acids, Strong bases, Alkali metals

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Sulfur oxides, Sulfides, Formaldehyde

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions Thermal decomposition can take place above 189°C / 372°F.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Dimethyl sulfoxide	LD50 = 28300 mg/kg (Rat) LD50 = 14500 mg/kg (Rat)	LD50 = 40 g/kg (Rat)	LC50 > 5.33 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Dimethyl sulfoxide	67-68-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants. Do not empty into drains. .

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Dimethyl sulfoxide	EC50 96h 12350 - 25500 mg/L	40 g/L LC50 96 h 33-37 g/L LC50 96 h	= 16000 mg/L EC50 Pseudomonas putida 16 h = 32 g/L EC50 Tetrahymena pyriformis 24 h = 77 mg/L EC50 Photobacterium phosphoreum 5 min	EC50 24h 7000 mg/L

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Dimethyl sulfoxide	-2.03

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Dimethyl sulfoxide	X	X	-	200-664-3	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Dimethyl sulfoxide	-	X	-	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Slight risk, Grade 1

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 23-Jan-2009
Revision Date 17-Jan-2018
Print Date 17-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other

materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 22-Oct-2010 **Revision Date** 14-Dec-2020 **Revision Number** 6

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Description:	**Bromoethane**
Cat No. :	**154210000; 154210010; 154215000**
Synonyms	Ethyl bromide
CAS-No	74-96-4
EC-No.	200-825-8
Molecular Formula	C2 H5 Br
Reach Registration Number	01-2119965776-18

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use	Laboratory chemicals.
Uses advised against	No Information available

1.3. Details of the supplier of the safety data sheet

Company

UK entity/business name
Fisher Scientific UK
Bishop Meadow Road, Loughborough,
Leicestershire LE11 5RG, United Kingdom

EU entity/business name
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Flammable liquids — Category 2 (H225)

Health hazards

Acute oral toxicity	Category 4 (H302)
Acute Inhalation Toxicity - Vapors	Category 4 (H332)
Carcinogenicity	Category 2 (H351)

Environmental hazards

Full text of Hazard Statements: see section 16

2.2. Label elements

Signal Word **Danger**

Hazard Statements

H225 - Highly flammable liquid and vapor
H351 - Suspected of causing cancer
H420 - Harms public health and the environment by destroying ozone in the upper atmosphere
H302 + H332 - Harmful if swallowed or if inhaled

Precautionary Statements

P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P312 - Call a POISON CENTER or doctor/physician if you feel unwell
P264 - Wash face, hands and any exposed skin thoroughly after handling
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P502 - Refer to manufacturer/supplier for information on recovery/recycling
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

2.3. Other hazards

No information available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008
Ethyl bromide	74-96-4	EEC No. 200-825-8	>95	Flam. Liq. 2 (H225) Acute Tox. 4 (H302) Acute Tox. 4 (H332) Carc. 2 (H351) Ozone 1 (H420)

Reach Registration Number	01-2119965776-18

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Self-Protection of the First Aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

4.2. Most important symptoms and effects, both acute and delayed

None reasonably foreseeable. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically. Symptoms may be delayed.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.

Extinguishing media which must not be used for safety reasons
No information available.

5.2. Special hazards arising from the substance or mixture

Flammable. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

Hazardous Combustion Products
Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen halides.

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.

6.2. Environmental precautions

Should not be released into the environment.

6.3. Methods and material for containment and cleaning up

Keep in suitable, closed containers for disposal. Soak up with inert absorbent material. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

7.2. Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat, sparks and flame. Flammables area.

Technical Rules for Hazardous Substances (TRGS) 510 Storage Class (LGK) (Germany) Class 3

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
List source(s): **IRE -** 2018 Code of Practice for the Chemical Agents Regulations, Schedule 1. Published by the Health and Safety Authority

Component	The United Kingdom	European Union	Ireland
Ethyl bromide			TWA: 5 ppm 8 hr. TWA: 22 mg/m^3 8 hr. STEL: 15 ppm 15 min STEL: 66 mg/m^3 15 min Skin

Biological limit values
This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
MDHS70 General methods for sampling airborne gases and vapours
MDHS 88 Volatile organic compounds in air. Laboratory method using diffusive samplers, solvent desorption and gas chromatography
MDHS 96 Volatile organic compounds in air - Laboratory method using pumped solid sorbent tubes, solvent desorption and gas chromatography

Derived No Effect Level (DNEL) No information available

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral				
Dermal				
Inhalation				

Predicted No Effect Concentration (PNEC) No information available.

8.2. Exposure controls

Engineering Measures
Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment.
Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection Goggles (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Viton (R)	See manufacturers recommendations	-	EN 374	(minimum requirement)

Skin and body protection Long sleeved clothing

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

Large scale/emergency use Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

Recommended Filter type: low boiling organic solvent Type AX Brown conforming to EN371

Small scale/Laboratory use Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Recommended half mask:- Valve filtering: EN405; or; Half mask: EN140; plus filter, EN 141
When RPE is used a face piece Fit Test should be conducted

Environmental exposure controls No information available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Liquid	
Appearance	Light yellow	
Odor	Petroleum distillates	
Odor Threshold	No data available	
Melting Point/Range	-119 °C / -182.2 °F	
Softening Point	No data available	
Boiling Point/Range	37 - 40 °C / 98.6 - 104 °F	
Flammability (liquid)	Highly flammable	On basis of test data
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	**Lower** 6.7 **Upper** 11.3	
Flash Point	-23 °C / -9.4 °F	**Method -** No information available
Autoignition Temperature	510 °C / 950 °F	
Decomposition Temperature	No data available	
pH	No information available	
Viscosity	0.38 cP at 20 °C	
Water Solubility	9 g/L (20°C)	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Component	**log Pow**	
Ethyl bromide	1.7	
Vapor Pressure	400 mmHg @ 20 °C	
Density / Specific Gravity	1.460	
Bulk Density	Not applicable	Liquid
Vapor Density	3.76	(Air = 1.0)
Particle characteristics	Not applicable (liquid)	

9.2. Other information

Molecular Formula	C2 H5 Br
Molecular Weight	108.97
Explosive Properties	Vapors may form explosive mixtures with air

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization Hazardous polymerization does not occur.
Hazardous Reactions None under normal processing.

10.4. Conditions to avoid

Keep away from open flames, hot surfaces and sources of ignition. Incompatible products.

10.5. Incompatible materials

Strong oxidizing agents. Strong bases. Metals.

10.6. Hazardous decomposition products

Carbon monoxide (CO). Carbon dioxide (CO_2). Hydrogen halides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information

(a) acute toxicity;
Oral Category 4
Dermal No data available
Inhalation Category 4

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ethyl bromide	LD50 = 1350 mg/kg (Rat)	-	LC50 = 20.9 mg/L (Rat) 4 h

(b) skin corrosion/irritation; No data available

(c) serious eye damage/irritation; No data available

(d) respiratory or skin sensitization;
Respiratory No data available
Skin No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; Category 2

The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	EU	UK	Germany	IARC
Ethyl bromide			Cat. 2	

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs No information available.

(j) aspiration hazard; No data available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

11.2. Information on other hazards

Endocrine Disrupting Properties Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity
Ecotoxicity effects .

12.2. Persistence and degradability Readily biodegradable
Persistence Persistence is unlikely, based on information available.

12.3. Bioaccumulative potential Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
Ethyl bromide	1.7	No data available

12.4. Mobility in soil The product contains volatile organic compounds (VOC) which will evaporate easily from all surfaces Will likely be mobile in the environment due to its volatility. Disperses rapidly in air

12.5. Results of PBT and vPvB assessment No data available for assessment.

12.6. Endocrine disrupting properties
Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors

12.7. Other adverse effects
Persistent Organic Pollutant This product does not contain any known or suspected substance
Ozone Depletion Potential This product does not contain any known or suspected substance

Component	Persistent Organic Pollutant	Ozone Depletion Potential
Ethyl bromide		Annex II Part B substance : ODP = 0.1 - 0.2

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues/Unused Products Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

Contaminated Packaging Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.

European Waste Catalogue (EWC)	According to the European Waste Catalog, Waste Codes are not product specific, but application specific.
Other Information	Waste codes should be assigned by the user based on the application for which the product was used. Do not flush to sewer. Can be landfilled or incinerated, when in compliance with local regulations.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

14.1. UN number	UN1891
14.2. UN proper shipping name	ETHYL BROMIDE
14.3. Transport hazard class(es)	6.1
14.4. Packing group	II

ADR

14.1. UN number	UN1891
14.2. UN proper shipping name	ETHYL BROMIDE
14.3. Transport hazard class(es)	6.1
14.4. Packing group	II

IATA

14.1. UN number	UN1891
14.2. UN proper shipping name	ETHYL BROMIDE
14.3. Transport hazard class(es)	6.1
14.4. Packing group	II

14.5. Environmental hazards	No hazards identified
14.6. Special precautions for user	No special precautions required
14.7. Maritime transport in bulk according to IMO instruments	Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories
X = listed, Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), China (IECSC), Japan (ENCS), Australia (AICS), Korea (ECL).

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL
Ethyl bromide	200-825-8	-		X	X	-	X	X	X	X	KE-03666

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals
Not applicable

National Regulations

WGK Classification See table for values

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Ethyl bromide	WGK1	Krebserzeugende Stoffe - Class III : 1 mg/m³ (Massenkonzentration)

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has not been conducted

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3

H302 - Harmful if swallowed
H332 - Harmful if inhaled
H351 - Suspected of causing cancer
H420 - Harms public health and the environment by destroying ozone in the upper atmosphere
H225 - Highly flammable liquid and vapor

Legend

CAS - Chemical Abstracts Service
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic
TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
Predicted No Effect Concentration (PNEC)
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor
ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC (volatile organic compound)

Key literature references and sources for data

https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.
Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.
First aid for chemical exposure, including the use of eye wash and safety showers.
Chemical incident response training.

Creation Date	22-Oct-2010
Revision Date	14-Dec-2020
Revision Summary	Update to CLP Format.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006 COMMISSION REGULATION (EU) 2020/878 amending Annex II to Regulation (EC) No 1907/2006

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet

Hydrochloric Acid MSDS

Effective Date: December 03, 2012
24 Hour Emergency Contact:
ChemTel: (800)255-3924
www.pioneerforensics.com

1. PRODUCT AND COMPANY IDENTIFICATION

Product:	**Hydrochloric Acid**
Product Number(s):	PF021, PF022
CAS#:	7647-01-0
Synonyms:	Muriatic acid; Hydrogen chloride, aqueous; Chlorohydric acid
Manufacturer:	Pioneer Forensics, LLC 804 E. Eisenhauer Blvd. Loveland, CO 80537 Ph: (970) 292-8487
Emergency Number:	(800) 255-3924 (CHEM-TEL)
Customer Service:	(970) 292-8487

2. HAZARDS IDENTIFICATION

Emergency Overview: DANGER! Corrosive. Causes severe skin, eye, and digestive tract burns. Harmful if swallowed. Mist or vapor extremely irritating to eyes and respiratory tract.

Safety Ratings:		
	Health: 3, Severe	Reactivity: 1, Slight
	Flammability: 0, None	Contact: 4, Extreme

OSHA Regulatory Status: This product is considered a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Acute Health Effects:

Routes of Exposure: Inhalation, ingestion, skin contact, eye contact

Inhalation: Corrosive. May cause damage to mucous membranes in nose, throat, lungs and bronchial system.

Ingestion: Corrosive. Harmful if swallowed. May produce burns to the lips, oral cavity, upper airway, esophagus and digestive tract.

Skin Contact: Corrosive. Causes severe burns.

Eye Contact: Corrosive. Causes severe burns. Vapor or spray may cause eye damage, impaired sight or blindness.

Target Organs: Skin, respiratory system, eyes, lungs

Chronic Health Effects: Corrosive. Prolonged contact causes serious tissue damage.

Aggravation of:
Medical Conditions: Repeated or prolonged exposure to the substance can produce target organs damage. Persons with pre-existing skin disorders or eye problems may be more susceptible to the effects of the substance.

Potential Environmental Effects: May affect the acidity (pH) in water with risk of harmful effects to aquatic organisms.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Components	CAS#	Chemical Formula	Formula Weight	Hazardous	% by Weight
Hydrochloric Acid	7647-01-0	HCl	36.46	Yes	36.5 - 38.0
Water	7732-18-5	H_2O	18.02	No	62.0 - 63.5

4. FIRST AID MEASURES

First Aid Procedures:

Inhalation: Remove to fresh air. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Get medical attention immediately.

Ingestion: Do not induce vomiting. If vomiting occurs, keep head low so that vomit does not enter lungs. Never give anything by mouth to an unconscious person. GET MEDICAL ATTENTION IMMEDIATELY.

Skin Contact: Flush affected area with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention immediately.

Eye Contact: Check for and remove contact lenses. Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

General Advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

Notes to Physician: Treat symptomatically. Keep victim under observation.

5. FIRE FIGHTING MEASURES

NFPA Ratings: Health: 3 Flammability: 0 Reactivity: 1

Flammable Properties: The material is not flammable.

Flash Point: Not applicable

Auto-ignition Temp: Not applicable

Flammable Limits in Air (% by volume): Not applicable

Suitable Extinguishing Media: Water, dry powder, foam, carbon dioxide

Unsuitable Extinguishing Media: No information found

Hazardous Combustion Products:	Hydrogen chloride. Chlorine. May decompose upon heating to produce corrosive and/or toxic fumes.
Specific Hazards:	Fire may produce irritating, corrosive, and/or toxic gases.
Special Protective Equipment For Firefighters:	As in any fire, wear MSHA/NIOSH approved (or equivalent) self-contained positive pressure or pressure-demand breathing apparatus and full protective gear.
Specific Methods:	Use water spray to cool unopened containers. Cool containers exposed to flames with flooding quantities of water until well after the fire is out. In the event of fire and/or explosion do not breathe fumes.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:	Ventilate area of leak or spill. Isolate hazard area and keep unnecessary and unprotected personnel away from the area of the leak or spill. Keep upwind. Keep out of low areas. Wear appropriate personal protective equipment as specified in the Exposure Control and Personal Protection Section 8. Avoid contact with eyes, skin, and clothing.
Environmental Precautions:	Prevent further leakage or spillage if safe to do so. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground. In case of large spill, dike if needed.
Methods for Containment:	Stop the flow of material, if this is without risk. Prevent entry into waterways, sewer, basements or confined areas. Dike the spilled material, where this is possible.
Methods for Cleaning Up:	Absorb spill with an inert material (e.g. vermiculite, dry sand, earth, cloth, fleece), and place in a suitable non-combustible container for reclamation or disposal. Do not use combustible materials, such as sawdust. Clean contaminated surface thoroughly. Neutralize spill area and washings with soda ash or lime. Never return spills in original containers for re-use. Clean up in accordance with all applicable regulations.

7. HANDLING AND STORAGE

Handling:	Wear personal protective equipment (see section 8). Use only in well-ventilated areas. Provide sufficient air exchange and/or exhaust in work rooms. Avoid contact with skin, eyes and clothing. Do not breathe vapors or spray mist. Do not ingest. When using, do not eat, smoke, or drink. Keep away from incompatible materials. Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly after handling. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquids). Observe all warnings and precautions listed for the product Use caution when combining with water. DO NOT add water to acid. ALWAYS add acid to water while stirring to prevent release of heat, steam, and fumes.
Storage:	Store in a cool, dry, ventilated area away from incompatible materials. Store in original container. Keep containers tightly closed and upright. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

8. EXPOSURE CONTROL AND PERSONAL PROTECTION

Exposure Limits:	ACGIH:	Ceiling: 2 ppm
	OSHA:	Ceiling: 5 ppm 7 mg/m^3
Engineering Controls:	Ensure adequate ventilation. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls	

to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Explosion proof exhaust ventilation should be used.

Personal Protective Equipment:

Eye/Face Protection: Wear safety glasses with side shields or goggles and a face shield.

Skin Protection: Wear appropriate chemical resistant clothing (with long sleeves) and appropriate chemical resistant gloves.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: Chemical respirator with acid gas cartridge. Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

General Hygiene Considerations: Avoid contact with skin, eyes and clothing. When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Provide eyewash station and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Appearance:	Transparent
Color:	Colorless
Odor:	Pungent, irritating
Molecular Formula:	HCl
Molecular Weight:	36.46
pH:	0.1 (1.0 N Solution)
Specific Gravity:	1.18
Freezing/Melting Point:	-25 °C (-13 °F)
Boiling Point:	50.5 °C (123 °F)
Flash Point:	Not applicable
Auto Ignition Temperature:	Not applicable
Flammable Limits in Air (% by Volume):	
Upper:	Not applicable
Lower:	
Solubility:	Miscible with water
Vapor Pressure:	25 kPa at 25°C (estimate)
Vapor Density:	1.3 (estimate)
Odor threshold (ppm):	0.25-10 ppm
Evaporation Rate:	No information found
Partition Coefficient (n-octanol/water):	No information found

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions.

Conditions to Avoid: Incompatibles

Incompatible Materials: Bases, metals, oxidizing agents, acids, amines, reducing agents, organic materials

Hazardous Decomposition Products:	Hydrogen chloride, chlorine. May decompose upon heating to product corrosive and/or toxic fumes.
Possibility of Hazardous Reactions:	Can react vigorously, violently or explosively with incompatible materials listed above.
Hazardous Polymerization:	Will not occur.

11. TOXICOLOGICAL INFORMATION

Toxicological Data:	Oral Rat LD50:	240 mg/kg (estimate)
	Oral Rabbit LD50:	900 mg/kg
	Inhalation Rat LC50:	3124 mg/L 1 H
Acute Effects:	Strongly corrosive. May cause deep tissue damage. Harmful if swallowed.	
Local Effects:	Causes severe burns. Mist or vapor extremely irritating to eyes and respiratory tract.	
Sensitization:	Not a skin sensitizer.	
Chronic Effects:	Corrosive. Prolonged or repeated skin contact causes serious tissue damage.	
Carcinogenic Effects:	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.	
	ACGIH:	A4 – Not classifiable as a human carcinogen
	IARC:	3 – Not classifiable as to carcinogenicity of humans
Skin Corrosion/Irritation:	Corrosive to skin and eyes.	
Epidemiology:	No epidemiological data is available for this product.	
Mutagenicity:	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.	
Neurological Effects:	No information found.	
Reproductive Effects:	Contains no ingredient listed as toxic to reproduction.	
Teratogenic Effects:	No data available to indicate product or any components present at greater than 0.1% may cause birth defects.	
Target Organs and Symptoms:	Corrosive effects. Mucus membranes, skin, eyes, kidneys, liver, respiratory tract	

12. ECOLOGICAL INFORMATION

Ecotoxicological Data:	LC50 Western mosquitofish (Gambusia affinis):	282 mg/L 96 H
Ecotoxicity:	This product may affect the acidity (pH) in water with risk of harmful effects to aquatic organisms.	
Environmental Effects:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.	
Persistence and Degradability:	Expected to be readily biodegradable.	

Partition Coefficient (n-octanol/water): No information found.

13. DISPOSAL INFORMATION

Disposal Instructions: Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. All wastes must be handled in accordance with local, state and federal regulations.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied. Offer rinsed packaging material to local recycling facilities.

Waste Codes: D002: Waste corrosive material (pH ≤ 2 or pH ≥12.5, or corrosive to steel)

14. TRANSPORT INFORMATION

DOT:

UN Number: UN1789

Proper Shipping Name: Hydrochloric Acid

Hazard Class: 8

Packaging Group: II

ERG Number: 157

15. REGULATORY INFORMATION

U.S. Federal Regulations:

OSHA: This product is considered a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Inventory: Hydrochloric Acid; Water

U.S. EPCRA (SARA Title III):

Sections 311/312:

Hazard Categories	List (Yes/No)
Section 311 – Hazardous Chemical	Yes
Immediate Hazard	Yes
Delayed Hazard	No
Fire Hazard	No
Pressure Hazard	No
Reactivity Hazard	No

Section 302:

Extremely Hazardous Substance:	Hydrochloric Acid
Reportable Quantity:	5000 lbs
Threshold Planning Quantity:	500 lbs

Section 313: Toxic chemical or category: Hydrochloric Acid

	De minimis concentration:	1.0%
CERCLA:	Hydrochloric Acid:	5000 lbs

International Inventories:

Country(s) or Region	Inventory Name	On Inventory (Yes/No)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes

*A "Yes" indicates that the listed component(s) of this product comply with the inventory requirements administered by the governing country(s)

16. OTHER INFORMATION

Product Use: Laboratory and/or field reagent

Disclaimer: Pioneer Forensics LLC provides the information in this Material Safety Data Sheet in the belief that it is reliable but assumes no responsibility for its completeness or accuracy. The physical properties reported in this MSDS are obtained from the literature and do not constitute product specifications. Pioneer Forensics LLC makes and gives no representations or warranties with respect to the information contained herein or the product to which it refers, whether express, implied, or statutory, including without limitation, warranties of accuracy, completeness, merchantability, non-infringement, performance, safety, suitability, stability, and fitness for a particular purpose. No warranty against infringement of any patent, copyright or trademark is made or implied. This MSDS is intended only as a guide to the appropriate handling of the material by a properly trained person. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. Accordingly, Pioneer Forensics LLC assumes no liability whatsoever for the use of or reliance upon this information including results obtained, incidental or consequential damages, or lost profits.

Issue Date: 12/03/2012

Reason for Revision: Not applicable

Date of Preparation: 20 JAN 2003 Review Date: 10 SEP 2010

Conforms to: O.S.H.A HCS - W.H.M.I.S MSDS No. 110

1. Product and Company Identification

Manufacturer/Supplier:

AluChem, Inc. Telephone: 513-733-8519
1 Landy Lane Fax: 513-733-3123
Reading, OH 45215 USA Emergency: 800-336-8519

AluChem of Jackson, Inc. Telephone: 740-286-2455
14782 Beaver Pike Fax: 740-286-2004
Jackson, OH 45640 USA Emergency: 800-336-8519

Product Name: MAGNESIUM HYDROXIDE

Other Designations:
All ACMH-95 designations.

2. Composition / Information on Ingredients

CAS No.	Chemical or Component	% by weight
1309-42-8	Magnesium Hydroxide	95-100

Hazard Symbols: None listed. **Risk Phrases:** None listed.

3. Hazards Identification

Emergency Overview:
White to off white powder or slurry with no odor. Inhalation of high concentrations of dusts of this substance may cause eye and upper respiratory tract irritation. This material is not flammable and does not support combustion. Primary routes of entry are inhalation, skin contact and eye contact.

Ingestion: May cause mild irritation.
Inhalation: May cause upper respiratory tract irritation.
Eye Contact: May cause mild irritation.
Skin Contact: May cause mild irritation.

Hazard Description
Medical conditions generally aggravated by exposure :
Asthma, chronic lung conditions or diseases and skin rashes.

Toxicological Data: See item 11.

Carcinogenicity: Not listed by IARC or NTP as a carcinogen.

MATERIAL SAFETY DATA SHEET
Magnesium Hydroxide

Date of Preparation: 20 JAN 2003 MSDS No. 110 Review Date: 10 SEP 2010

4. First Aid Measures

Ingestion:
Do not induce vomiting. If swallowed, dilute by drinking large amounts of water. Consult a physician or other qualified medical personnel for further information and/or treatment.

Inhalation:
Remove to fresh air. Check for clear airway, breathing and presence of pulse. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician or other qualified medical personnel.

Eye Contact:
Flush eyes with ample amounts of water for at least 15 minutes. Consult a physician or other qualified medical personnel.

Skin Contact:
Wash with soap and water for at least 15 minutes. Consult a physician or qualified medical personnel if the condition persists.

5. Fire Fighting Measures

Fire / Explosion Hazards:
This product does not present fire or explosion hazards as supplied.

Extinguishing Media:
As deemed suitable by the environment.

Fire Fighting Equipment:
Respiratory and eye protection required for fire fighting personnel. Full protective equipment (Bunker Gear) and self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires.

6. Accidental Release Measures

Person-related Safety Precautions:
Avoid contact with skin and eyes.

Cleaning and Collecting Spills:
Vacuum or sweep material and place in a disposal container. Avoid dusting. Ensure adequate ventilation.

7. Handling and Storage

Handling:
Ensure good ventilation in all work areas.
Minimize dusting and dust accumulation.

Storage:
Store in dry, protected storage or in case of slurry product, then in closed and sealed containers.

8. Exposure Controls and Personal Information

Exposure Guidelines:
1309-42-8 Magnesium Hydroxide

OSHA PEL 15mg/m^3 (total dust) 5 mg/m^3 (respirable fraction)

Respiratory Protection:
Use NIOSH approved respiratory protection in case of insufficient ventilation and where exposure guidelines may be exceeded.

Skin Protection:
Wear suitable gloves and long sleeve shirts to avoid skin irritation or injury.

Eye Protection:
Use of safety glasses with full side shields is always recommended. Where air turbulence may be present, goggles are also recommended.

9. Physical and Chemical Properties

Appearance:
White to off white, granular to fine powder or slurry

Molecular Formula: $Mg(OH)_2$
Molecular Weight: 58.32

Physical State:	Solid	**Odor:**	None
Melting Point:	Decomposes 340°C (650°F)	**Vapor Pressure:**	Not applicable.
Boiling Point:	Not Determined.	**Vapor Density:**	Not applicable.
Flash Point:	Not Applicable.	**Evaporation Rate:**	Not applicable.
Solubility in Water:	Negligible (less than 0.1%)	**Oxidizing Properties:**	Not applicable.
Density:	2.3 g/cm^3	**Lower Flammable Limit:**	None.
Bulk Density:	775 kg/m^3 (48 lb/ft^3)	**Upper Flammable Limit:**	None.
pH - 20°C:	Not determined	**Odor Threshold:**	Not determined.
Autoignition:	Product is not self igniting.	**Partition Coefficient:**	Not applicable.
Danger of Explosion:	None present.		

MATERIAL SAFETY DATA SHEET
Magnesium Hydroxide

Date of Preparation: 20 JAN 2003 MSDS No. 110 Review Date: 10 SEP 2010

10. Stability and Reactivity

Stability: Product is stable when used in accordance with specifications.

Conditions to Avoid: Incompatible materials.

Incompatibilities with Other Materials: Strong acids and anhydrides; heat.

Hazardous Decomposition Products: Steam.

Hazardous Polymerization: Will not occur.

11. Toxicological Information

Acute Toxicity –
Primary Irritant Effect:
On the skin: Irritant to skin and mucous membranes.
On the eyes: Irritating effect.
Sensitization: No sensitizing effects known.

Additional Toxicological Information:

RTECS No.: OM3570000 – Magnesium Hydroxide

12. Ecological Information

General Notes:
Generally, no adverse conditions are anticipated, but may require compliance with governmental restrictions and permitting requirements prior to release.

13. Disposal Considerations

Product -
Recommendation: Collect in containers or covered dumpsters. If reuse or recycling is not possible, material may be disposed of at an industrial landfill, subject to local regulations and restrictions.

Uncleaned packaging -
Recommendation: Disposal must be made according to official regulations.

RCRA Status:
If discarded in its purchased form, this product would not be a hazardous waste either by listing or characteristic nor is it federally (USA) regulated. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal whether a material containing the product or derived from the product should be classified as a hazardous waste (40 CFR 261.20-24 or state equivalent in the USA).

MATERIAL SAFETY DATA SHEET
Magnesium Hydroxide

Date of Preparation: 20 JAN 2003 MSDS No. 110 Review Date: 10 SEP 2010

14. Transport Information

U.S. Department of Transportation (DOT):	Not regulated
U.S. Department of Transportation (DOT)	
Coast Guard Bulk Hazardous Material:	Listed (Magnesium Hydroxide slurry only)
Canadian TDGR Hazard Class and PIN:	Not regulated
Land Transport ADR/RID (cross-boarder):	Not regulated
Maritime Transport IMDG:	Not regulated
Marine Pollutant:	Not listed
Air transport ICAO-TI and IATA-DGR:	Not regulated
Placards:	Not applicable

15. Regulations

U.S. Federal Regulations:
TSCA Chemical Inventory Status: All components of this product are listed.
CERCLA Reportable Quantity:None.
SARA Title III:
Section 302 Extremely Hazardous Substances: None.
Section 304 Emergency Release Reporting: None.
Section 311/312 Hazardous Categories: None.
Section 313 Toxic Categories: None.
Clean Air Act of 1990 – Title VI: This material does not contain nor was it manufactured using ozone depleting chemicals.

Canadian Regulations:
WHMIS Classification: Not a controlled product.
DSL (Domestic Substance List): All components of this product are listed on the DSL.
NPRI (National Pollutant Release Inventory): Not subject to mandatory reporting requirements.
IDL (Ingredient Disclosure List): All components of this product are listed on the IDL.
Note: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (Canada) and this MSDS contains all the information required by the Controlled Products Regulations (Canada).

European Union Classification: (EINECS 215-170-3)
Warning Symbol: None.
Warning Word: None.
Risk Phrases: None.
Safety Phrases: None.
This product is not subject to identification regulations under EU Directives and the Ordinance on Hazardous Materials (GefStoffV).

USA State Regulations:
California Proposition 65: Not listed.

MATERIAL SAFETY DATA SHEET
Magnesium Hydroxide

Date of Preparation: 20 JAN 2003 MSDS No. 110 Review Date: 10 SEP 2010

16. Other Information

Hazard Ratings -
NFPA® Ratings: Health: **0** Flammability: **0** Reactivity: **0** Special: **0**
HMIS® III Codes : Health: **0** Flammability: **0** Physical Hazard: **0** PPE: *

*Note: PPE (Personal Protective Equipment) designation to be supplied by user depending upon use in their specific situation. HMIS guidelines do not permit this designation to be specified by the manufacturer/supplier – only by the end user.

Department Issuing MSDS:
Technical Services
AluChem, Inc.
1 Landy Lane
Reading, OH 45215 USA
Revision #1 Date: 20 JAN 2003 Supersedes 01 JAN 2002
All sections revised.

Information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. It is the user's responsibility to determine for themselves the suitability of any material for a specific purpose, whether alone or in combination with any other products, and to adopt such safety precautions as may be necessary. This shall in no way establish a legally valid contractual relationship.

ABBREVIATIONS:

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
CAS	Chemical Abstract Service
CEPA	Canadian Environmental Protection Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	United States Code of Federal Regulations
CPR	Cardio-pulmonary Resuscitation
DOT	United States Department of Transportation
DSL	Canadian Domestic Substances List
EINECS	European Inventory of Existing Commercial Chemical Substances
EPA	United States Environmental Protection Agency
IDL	Canadian Ingredient Disclosure List
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IATA-DRG	International Air Transport Association – Dangerous Goods Regulations
ICAO	International Civil Aviation Organization
ICAO-TI	International Civil Aviation Organization – Technical Instructions on the Safe Transport of Dangerous Goods by Air
IMDG	International Maritime Dangerous Goods Code
IMO	International Maritime Organization
NDSL	Canadian Non-domestic Substances List
NIOSH	National Institute for Occupational Safety and Health (USA)
NTP	National Toxicology Program (USA)
OEL	Occupational Exposure Limit
OSHA	United States Occupational Health and Safety Administration
PIN	Product Identification Number
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act (USA)
RID	European Agreement Concerning the International Carriage of Dangerous Goods by Rail
RTECS	The Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments and Reauthorization Act (USA)
TDGR	Transportation of Dangerous Goods Regulations
TLV	Threshold Limit Values
TSCA	Toxic Substances Control Act (USA)
TWA	Time Weighted Average

cm = centimeter, ft = feet, g = gram, in = inch, kg = kilogram, lb = pound, ml = milliliter,
> = greater than

MSDS for (D-Alaninol)

****** MATERIAL SAFETY DATA SHEET ******

Section 1 - Chemical Product and Company Identification

MSDS Name	D-Alaninol
Catalog Numbers	153144
Synonyms	
Company Identification	J&K SCIENTIFIC LTD. 18AEF, Building-D, Majestic Garden 6 Bei-Si-Huan-Zhong Road Beijing China 100029
For information, call	North America: (435)-753-1901 China: (86 10) 82848833
For emergencies, call	North America: (800) 424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	%	EINECS#
35320-23-1	D-Alaninol	98%	unlisted

Haz Symbols C

Risk Phrases 34

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Causes burns.

POTENTIAL HEALTH EFFECTS

Eye	Causes severe eye burns.
Skin	May be harmful if absorbed through skin. Causes skin burns.
Ingestion	Harmful if swallowed. Causes burns.
Inhalation	May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Chronic	

MSDS for (D-Alaninol)

****** MATERIAL SAFETY DATA SHEET ******

Section 4 - First aid Measures

Eyes	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
Skin	Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.
Ingestion	Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water.Consult a physician.
Inhalation	If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.
Notes to Physician	

Section 5 - Fire Fighting Measures

General Information	Wear self contained breathing apparatus for fire fighting if necessary.
Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Section 6 - Accidental Release Measures

General Information	Use proper personal protective equipment as indicated in section 8.
Spills/Leaks	Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

Section 7 - Handling and Storage

Handling	Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.
Storage	Store in a cool, dry place. Store in a tightly closed container. Store under nitrogen. Air sensitive.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls	Not available.

PERSONAL PROTECTIVE EQUIPMENT

****** MATERIAL SAFETY DATA SHEET ******

Eyes	Chemical safety goggles.
Skin	Skin and body protection: Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Clothing	Wear appropriate protective clothing to prevent skin exposure.
Respirators	Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Section 9 - Physical and Chemical Properties

Physical State	Liquid
Color	Colorless
Odor	Not available
pH	Not available
Vapor Pressure	Not available
Viscosity	Not available
Freezing/Melting Point	Not available
Boiling Point	166-168℃/760.0mmHg
Autoignition Temperature	Not available
Flash Point	83℃
Explosion Limits, lower	Not available
Explosion Limits, upper	Not available
Decomposition Temperature	Not available
Solubility in water	Not available
Specific Gravity/Density	0.963
Molecular Formula	C3H9NO
Molecular Weight	75.11

Section 10 - Stability and Reactivity

Chemical Stability	Stable under recommended storage conditions.
Conditions to Avoid	Incompatible materials.
Incompatibilities with Other Materials	Strong acids, Strong oxidizing agents.
Hazardous Decomposition Products	Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (Nox).
Hazardous Polymerization	Will not occur.

MSDS for (D-Alaninol)

****** MATERIAL SAFETY DATA SHEET ******

Section 11 - Toxicological Information

RTECS#	CAS#35320-23-1: None listed.
LD50/LC50	Not available.
Carcinogenicity	D-Alaninol- Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.
Other	

Section 12 - Ecological Information

Not available.

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

	IATA	IMO	RID/ADR
Shipping Name	AMINES, LIQUID, CORROSIVE, N.O.S. (®-(-)-2-Amino-1-propanol)	AMINES, LIQUID, CORROSIVE, N.O.S. (®-(-)-2-Amino-1-propanol)	AMINES, LIQUID, CORROSIVE, N.O.S. (®-(-)-2-Amino-1-propanol)
Hazard Class	8	8	8
UN Number	2735	2735	2735
Packing Group	II	II	II

Section 15 - Regulatory Information

European/International Regulations

Hazard Symbols C

Risk Phrases

R 34:Causes burns.

Safety Phrases

S 26:In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36/37/39:Wear suitable protective clothing, gloves and eye/face protection.
S 45:In case of accident or if you feel unwell, seek medical advice immediately (show the lable where possible).

WGK (Water Danger/Protection)

CAS#35320-23-1:3.

MSDS for (D-Alaninol)

****** MATERIAL SAFETY DATA SHEET ******

Section 16 - Additional Information

MSDS Creation Date 2009-11-4

Revision #1 Date Original

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006
Revision Date 21.05.2020 Version 1.5

SECTION 1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Catalogue No.	103034
Product name	N,N-Dimethylformamide EMPARTA®
REACH Registration Number	A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	68-12-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Reagent for analysis, Chemical production For additional information on uses please refer to the Merck Chemicals portal (www.merckgroup.com).

1.3 Details of the supplier of the safety data sheet

Company	Merck Life Science Private Limited * 8th Floor, Godrej One, Pirojshanagar, Eastern Express HighwayVikhroli (E),Mumbai – 400079 India * Tel: 0091 22 6210 9000
Responsible Department	Quality Assurance * Merck Life Science Private Limited * e-mail: quality.chemicals@merckgroup.com * Tel : +91-2267863131-6

1.4 Emergency telephone number

Please contact the regional company representation in your country.

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Flammable liquid, Category 3, H226
Acute toxicity, Category 4, Inhalation, H332
Acute toxicity, Category 4, Dermal, H312
Eye irritation, Category 2, H319
Reproductive toxicity, Category 1B, H360D

For the full text of the H-Statements mentioned in this Section, see Section 16.

The life science business of Merck operates as MilliporeSigma in the US and Canada

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms

Signal word
Danger

Hazard statements
H360D May damage the unborn child.
H226 Flammable liquid and vapour.
H312 + H332 Harmful in contact with skin or if inhaled.
H319 Causes serious eye irritation.

Precautionary statements
Prevention
P201 Obtain special instructions before use.
P210 Keep away from heat.
Response
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

Restricted to professional users.

Reduced labelling (≤125 ml)

Hazard pictograms

Signal word
Danger

Hazard statements
H360D May damage the unborn child.

Precautionary statements
P201 Obtain special instructions before use.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

CAS-No. 68-12-2

2.3 Other hazards

None known.

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SECTION 3. Composition/information on ingredients

3.1 Substance

Formula	$HCON(CH_3)_2$	C_3H_7NO (Hill)
EC-No.	200-679-5	
Molar mass	73.09 g/mol	

Hazardous components (REGULATION (EC) No 1272/2008)

Chemical name (Concentration)

CAS-No.	Registration number	Classification
N,N-dimethylformamide (<= 100 %)		
Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.		
68-12-2	*)	Flammable liquid, Category 3, H226 Acute toxicity, Category 4, H332 Acute toxicity, Category 4, H312 Eye irritation, Category 2, H319 Reproductive toxicity, Category 1B, H360D

*) A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

For the full text of the H-Statements mentioned in this Section, see Section 16.

3.2 Mixture

Not applicable

SECTION 4. First aid measures

4.1 Description of first aid measures

General advice

First aider needs to protect himself.

After inhalation: fresh air. Call in physician.

If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

Gastrointestinal disturbance, Vomiting, Nausea, Headache, Dizziness, Drowsiness irritant effects

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4.3 Indication of any immediate medical attention and special treatment needed
No information available.

SECTION 5. Firefighting measures

5.1 Extinguishing media
Suitable extinguishing media
Foam, Carbon dioxide (CO2), Dry powder, Water

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Combustible.
Vapours are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.
Fire may cause evolution of:
nitrogen oxides

5.3 Advice for firefighters
Special protective equipment for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information
Remove container from danger zone and cool with water. Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

6.2 Environmental precautions
Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
Indications about waste treatment see section 13.

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SECTION 7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Observe label precautions.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorised persons.

Recommended storage temperature see product label.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Engineering measures
Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

Individual protection measures
Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye/face protection
Safety glasses

Hand protection
full contact:

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	Glove material:	butyl-rubber
	Glove thickness:	0.70 mm
	Break through time:	> 480 min
splash contact:		
	Glove material:	Viton (R)
	Glove thickness:	0.70 mm
	Break through time:	> 240 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 898 Butoject® (full contact), KCL 890 Vitoject® (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment
Flame retardant antistatic protective clothing.

Respiratory protection
required when vapours/aerosols are generated.
Recommended Filter type: Filter A-(P2)
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.
These measures have to be properly documented.

Environmental exposure controls
Do not let product enter drains.
Risk of explosion.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form	liquid
Colour	colourless
Odour	amine-like
Odour Threshold	0.329 ppm
pH	7 at 200 g/l 20 °C
Melting point	-61 °C (External MSDS)

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Boiling point/boiling range	153 °C at 1,013 hPa Method: DIN 53171
Flash point	57.5 °C at 1,013 hPa Method: DIN 51755 Part 2
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	2.2 %(V)
Upper explosion limit	16 %(V)
Vapour pressure	3.77 hPa at 20 °C
Relative vapour density	2.51
Density	0.94 g/cm3 at 20 °C
Relative density	No information available.
Water solubility	1,000 g/l at 20 °C
Partition coefficient: n-octanol/water	log Pow: -0.85 (25 °C) OECD Test Guideline 107 Bioaccumulation is not expected.
Auto-ignition temperature	435 °C at 1,013 hPa Method: DIN 51794
Decomposition temperature	> 350 °C
Viscosity, dynamic	0.86 mPa.s at 20 °C
Explosive properties	Not classified as explosive.
Oxidizing properties	none

9.2 Other data

Ignition temperature	410 °C Method: DIN 51794

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SECTION 10. Stability and reactivity

10.1 Reactivity

Vapour/air-mixtures are explosive at intense warming.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:

Alkali metals, halogens, halides, Reducing agents, triethylaluminium, nitrates, metallic oxides, nonmetallic oxides, Halogenated hydrocarbon, Isocyanates, sodium, Sodium borohydride, hydrides, Oxidizing agents, Oxides of phosphorus

A risk of explosion and/or of toxic gas formation exists with the following substances:

azides, Bromine, Chlorine, chromium(VI) oxide, potassium permanganate, triethylaluminium, chlorates

Halogenated hydrocarbon, with, Iron

10.4 Conditions to avoid

Heating.

10.5 Incompatible materials

various plastics, Copper, Copper alloys, Tin

10.6 Hazardous decomposition products

in the event of fire: See section 5.

SECTION 11. Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity
LD50 Rat: 3,010 mg/kg
OECD Test Guideline 401

Symptoms: Gastrointestinal disturbance, Nausea, Vomiting

Acute inhalation toxicity

Symptoms: Possible damages:, mucosal irritations

Acute dermal toxicity
LD50 Rabbit: 1,500 mg/kg
(IUCLID)

Skin irritation
Rabbit
Result: No irritation

(IUCLID)

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Eye irritation
Rabbit
Result: Eye irritation

(IUCLID)
Causes serious eye irritation.

Sensitisation
Sensitisation test: Guinea pig
Result: negative

(Lit.)
Sensitisation test: Mouse
Result: negative
Method: OECD Test Guideline 406

Germ cell mutagenicity
Genotoxicity in vivo
Micronucleus test
Mouse
male
Intraperitoneal injection
Bone marrow
Result: negative

(ECHA)

Genotoxicity in vitro
Ames test
Salmonella typhimurium
Result: negative

(ECHA)

Carcinogenicity

Did not show carcinogenic effects in animal experiments. (Lit.)

Reproductive toxicity
This information is not available.

Teratogenicity
This information is not available.

CMR effects
Teratogenicity:
May damage the unborn child.

Specific target organ toxicity - single exposure
This information is not available.

Specific target organ toxicity - repeated exposure
This information is not available.

Repeated dose toxicity
Rat
male and female

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Oral
28 d
daily
NOAEL: 238 mg/kg
LOAEL: 475 mg/kg
OECD Test Guideline 407
Subacute toxicity

Aspiration hazard
This information is not available.

11.2 Further information
After absorption:
Headache, Dizziness, Drowsiness
Damage to:
Kidney, Liver
Other dangerous properties can not be excluded.
This substance should be handled with particular care.

SECTION 12. Ecological information

12.1 Toxicity
Toxicity to fish
flow-through test LC50 Lepomis macrochirus (Bluegill sunfish): 7,100 mg/l; 96 h
Analytical monitoring: yes
US-EPA

Toxicity to daphnia and other aquatic invertebrates
static test EC50 Daphnia magna (Water flea): 13,100 mg/l; 48 h
OECD Test Guideline 202

Toxicity to algae
static test EC50 Desmodesmus subspicatus (green algae): > 1,000 mg/l; 72 h
DIN 38412

Toxicity to bacteria
static test EC50 Vibrio fischeri: 12,300 - 17,500 mg/l; 5 min
(External MSDS)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
semi-static test NOEC Daphnia magna (Water flea): 1,500 mg/l; 21 d
(External MSDS)

12.2 Persistence and degradability
Biodegradability
100 %; 21 d; aerobic
OECD Test Guideline 301E
Readily biodegradable

Biochemical Oxygen Demand (BOD)
900 mg/g (5 d)

(Lit.)

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Theoretical oxygen demand (ThOD)
1,863 mg/g

(Lit.)

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water
log Pow: -0.85 (25 °C)
OECD Test Guideline 107

Bioaccumulation is not expected.

Bioaccumulation
Bioconcentration factor (BCF): 0.3 - 1.2
Cyprinus carpio (Carp); 56 d
OECD Test Guideline 305C
Does not significantly accumulate in organisms.

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

12.6 Other adverse effects

Stability in water
ca.50 d
reaction with hydroxyl radicals (calculated) (Lit.)

Discharge into the environment must be avoided.

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SECTION 13. Disposal considerations

Waste treatment methods
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14. Transport information

Land transport (ADR/RID)

14.1 UN number	UN 2265
14.2 Proper shipping name	N,N-DIMETHYLFORMAMIDE
14.3 Class	3
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
Tunnel restriction code	D/E

Inland waterway transport (ADN)

Not relevant

Air transport (IATA)

14.1 UN number	UN 2265
14.2 Proper shipping name	N,N-DIMETHYLFORMAMIDE
14.3 Class	3
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	no

Sea transport (IMDG)

14.1 UN number	UN 2265
14.2 Proper shipping name	N,N-DIMETHYLFORMAMIDE
14.3 Class	3
14.4 Packing group	III

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14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
EmS	F-E S-D

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not relevant

SECTION 15. Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

National legislation
Storage class 3

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

SECTION 16. Other information

Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapour.
H312	Harmful in contact with skin.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H360D	May damage the unborn child.

Training advice
Provide adequate information, instruction and training for operators.

Labelling
Hazard pictograms

Signal word
Danger

Hazard statements
H226 Flammable liquid and vapour.
H312 + H332 Harmful in contact with skin or if inhaled.
H319 Causes serious eye irritation.
H360 May damage fertility or the unborn child.

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Precautionary statements
Prevention
P201 Obtain special instructions before use.
P210 Keep away from heat.
Response
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

Further information

Restricted to professional users.

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

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ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 12-May-2011 **Revision Date** 18-Sep-2018 **Revision Number** 5

1. Identification

Product Name **Potassium Carbonate Anhydrous (Certified ACS)**

Cat No. : **P208-3; P208-250LB; P208-500**

CAS-No 584-08-7
Synonyms Potash; Pearl ash; Dipotassium salt of carbonic acid

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Warning

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Potassium carbonate	584-08-7	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention if symptoms occur.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if symptoms occur.

Inhalation Move to fresh air. If symptoms arise, call a physician. If not breathing, give artificial respiration.

Ingestion Do not induce vomiting. Get medical attention if symptoms occur.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature Not applicable
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

Hazardous Combustion Products
Potassium oxides Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	1	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes and clothing.
Environmental Precautions Avoid release to the environment. See Section 12 for additional ecological information.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin and eyes. Do not breathe dust. Do not ingest.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard

EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	11.5-12 50 g/l aq.sol
Melting Point/Range	891 °C / 1635.8 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	1120 g/L water (20°C)
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C K2 O3
Molecular Weight	138.21

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under recommended storage conditions. Hygroscopic.

Conditions to Avoid Avoid dust formation. Incompatible products. Exposure to moisture.

Incompatible Materials Acids, Strong oxidizing agents, Halogens

Hazardous Decomposition Products Potassium oxides, Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Potassium carbonate	> 2000 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Potassium carbonate	584-08-7	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Not mutagenic in AMES Test

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains. .

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Potassium carbonate	Not listed	LC50 <510 mg/L/96h (Pimephales promelas)	Not listed	LC50: = 630 mg/L, 48h (Ceriodaphnia dubia)

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Potassium carbonate	584-08-7	X	ACTIVE	-

Legend:

TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Potassium carbonate	584-08-7	X	-	209-529-3	X	X	X	X	KE-29083

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations Not applicable

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 12-May-2011
Revision Date 18-Sep-2018
Print Date 18-Sep-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Material Safety Data Sheet
Toluene (MSDS)

Section 1: Chemical Product and Company Identification

Product Name: Toluene

CAS#: 108-88-3

Synonym: Synonyms: Methacide; Methylbenzene; Phenylmethane; Antisal la; Benzene, methyl-; Methane, phenyl-; Methylbenzol; Tolu-Sol; Toluеen; Toluen; Toluene; Toluenо; Toluol; Toluolo.

Chemical Formula: $C_6H_5CH_3$

Contact Information:

Research and Production Enterprise "Zarya", Ltd.
Zavodskaya Street, 1g/36, Rubezhnoye,
Lugansk reg., Ukraine, 93001
Phone: +380 (6453) 95085, 95026, 95035
Fax: +380 (6453) 95042, 95026, 95035
www.zaryachem.com

Section 2: Composition and Information on Ingredients

Composition:

Name	% by Weight	
Toluene	**wt, % min**	**99,2**
Benzene	**wt, % max**	**0,02**
Sulphur	**wt, %**	**0,25**

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.
Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.
Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.
Auto-Ignition Temperature: 552°C
Flammable Limits: LOWER: 1.17% UPPER: 7.1%
Flash Points: 4.4°C
Products of Combustion: These products are carbon oxides (CO, CO2).
Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.
Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.
Special Remarks on Fire Hazards: Not available.
Special Remarks on Explosion Hazards:
Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N2O4; AgClO4; BrF3; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m3) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical State: Liquid
Appearance: colorless
Odor: sweetish odor - pleasant odor - benzene-like
Molecular Weight: 92.14 g/mol
Boiling Point: 110.62 °C
Freezing/Melting Point:-94,99 °C
Vapor Pressure: 36.7 mm Hg @ 30 deg C
Vapor Density: 3.1 (Air=1)
Density (20 ºC): 0,8669 g/cm3
Volatility: Moderate
Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.69
Solubility: Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide.

Section 10: Stability and Reactivity Data

Stability: The product is stable.
Instability Temperature: Not available.
Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials
Incompatibility with various substances: Reactive with oxidizing agents.
Corrosivity: Non-corrosive in presence of glass.
Special Remarks on Reactivity:
Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.
Special Remarks on Corrosivity: Not available.
Polymerization: Will not occur

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.
Toxicity to Animals:
Acute oral toxicity (LD50): 7530 mg/kg [Rat]. Acute dermal toxicity (LD50): 12400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].
Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.
May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).
Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).
Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min
Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal.
May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)
Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Causes mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abraisons. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss,

insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophostatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Information

References: Not available.
Other Special Considerations: Not available.
Created: 15/08/2011 11:00 AM
Last Updated: 14/07/2012 12:00 PM

Futher Information: The information contained in this Material Safety Data Sheet is based upon available data and believed to be correct; however, as such has been obtained from various sources, including the manufacturer and independent laboratories, it is given without warranty or representation that it is complete, accurate, and can be relied upon. *Research and Production Enterpise "Zarya", Ltd.* has not attempted to conceal in any manner the deleterious aspects of the product listed herein, but makes no warranty as to such. Further, *Research and Production Enterpise "Zarya", Ltd.* cannot anticipate nor control the many situations in which the product or this information may be used; there is no guarantee that the health and safety precautions suggested will be proper under all conditions. It is the sole responsibility of each user of the product to determine and comply with the requirements of all applicable laws and regulations regarding its use. This information is given solely for the purposes of safety to persons and property. Any other use of this information is expressly prohibited.

Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: (4aS,7aS)-Octahydro-1H-pyrrolo[3,4-b]pyridine
Catalog Number: 10160
CAS Number: 151213-40-0
FOR R&D use only

Supplier: AChemBlock(Advanced ChemBlocks Inc), 849 Mitten Road, Suite 101 Burlingame, CA 94010, USA. Tel: (650) 692 2368

2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquid (Category 4)
Serious eye damage (Category 1)

GHS Label elements, including precautionary Statements

Pictogram:

Signal word: Corrosive

Hazard statement(s):

H227	Combustible liquid
H318	Causes serious eye damage

Precautionary Statement(s):

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P305+351+338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/physician.
P370+378	In case of fire:
P403+235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/container to ...

3. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient name: (4aS,7aS)-Octahydro-1H-pyrrolo[3,4-b]pyridine
CAS number: 151213-40-0

Molecular Formula: C7H14N2
Molecular Weight: 126.2

4. FIRST AID MEASURES

In case of eye contact:
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If inhaled:
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin Contact:
Wash off with soap and plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician.

If swallowed:
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Suitable extinguishing media:
Use carbon dioxide, dry chemical powder, alcohol-resistant or polymer foam.

Special protective equipment for firefighters:
Wear self-contained breathing apparatus for fire-fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions:
Do not let product enter drains.

Methods and Materials for containment and cleaning up
Absorb spills on sand or vermiculite and place in closed container for disposal.

7. HANDLING AND STORAGE

Precautions for safe handing:
Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Wash thoroughly after handling.

Conditions for safe storage:
Keep container tightly closed in a cool, dry, well-ventilated place.

Recommended storage temperature:
Store at 0-8 Â°C

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Engineering Controls:
Use only in a chemical fume hood.

Personal Protective equipment:
Wear chemical-resistant gloves, safety googles.

General Hygiene measures:
Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly after handling. Wash contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	
Odor:	not available
Boiling point:	not available
Melting point:	not available
Flash Point:	not available
Density:	not available

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under recommended storage conditions.
Materials to avoid:	No data availale
Conditions to avoid:	strong oxidizer; strong acid
Possible hazardous combustion products:	carbon oxides; nitrogen oxides;

11. Toxicological information

No Data.

12. ECOLOGICAL INFORMATION

No Data.

13. DISPOSAL CONSIDERAIONS

Arrange disposal as special waste, by licensed disposal company, in consultation with local waste disposal authority, in accordance with national and regional regulations.

14. Transportation information

Non-hazardous for air and ground transportation. Or not available.

15. Regulatory Information

Indication of danger:	No data
Risk Statement:	No data
Safety Statement:	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable gloves and eye/face protection.

16. Other information

Revision:	2
Revision Date:	Update: 2021-1

The above information is believed to be correct at the date of its publication but does not supposed to be all-inclusive and shall be used only as a guide.

Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.

AChemBlock(Advanced ChemBlocks Inc) should not be held liable for any damage resulting from handling or from contact with the above product.

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 21-Jan-2009 **Revision Date** 08-May-2019 **Revision Number** 5

1. Identification

Product Name **1-Butanol (Spectranalyzed)**

Cat No. : **A400; A400-4**

CAS-No 71-36-3
Synonyms n-Butanol; n-Butyl alcohol, Butan-1-ol

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 3
Acute oral toxicity	Category 4
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3

Target Organs - Respiratory system, Central nervous system (CNS).

Label Elements

Signal Word
Danger

Hazard Statements
Flammable liquid and vapor
Harmful if swallowed
Causes skin irritation
Causes serious eye damage
May cause respiratory irritation

May cause drowsiness or dizziness

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Response
Get medical attention/advice if you feel unwell
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
n-Butyl alcohol	71-36-3	99

4. First-aid measures

General Advice	If symptoms persist, call a physician.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Move to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water.
Most important symptoms and effects	Breathing difficulties. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable Extinguishing Media	No information available
Flash Point	35 °C / 95 °F
Method -	Closed cup
Autoignition Temperature	340 °C / 644 °F
Explosion Limits	
Upper	11.2 vol %
Lower	1.4 vol %
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	3	0	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment. Ensure adequate ventilation.
Environmental Precautions	Should not be released into the environment.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Flammables area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
n-Butyl alcohol	TWA: 20 ppm	Skin (Vacated) Ceiling: 50 ppm (Vacated) Ceiling: 150 mg/m³ TWA: 100 ppm TWA: 300 mg/m³	IDLH: 1400 ppm Ceiling: 50 ppm Ceiling: 150 mg/m³	TWA: 20 ppm

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Long sleeved clothing.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Alcohol-like
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-89 °C / -128.2 °F
Boiling Point/Range	117.6 °C / 243.7 °F
Flash Point	35 °C / 95 °F
Method -	Closed cup
Evaporation Rate	0.46
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	11.2 vol %
Lower	1.4 vol %
Vapor Pressure	6.7 mbar @ 20 °C
Vapor Density	2.6
Specific Gravity	0.810
Solubility	Slightly soluble in water
Partition coefficient; n-octanol/water	No data available

Autoignition Temperature	340 °C / 644 °F
Decomposition Temperature	No information available
Viscosity	2.95 mPa.s (20 °C)
Molecular Formula	C4 H10 O
Molecular Weight	74.12
Refractive index	1.390 - 1.400

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition. Incompatible products.

Incompatible Materials Strong oxidizing agents, Reducing agents, Acid chlorides, copper, Copper alloys, Acid anhydrides

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
n-Butyl alcohol	LD50 = 700 mg/kg (Rat) LD50 = 790 mg/kg (Rat)	LD50 = 3402 mg/kg (Rabbit) LD50 = 3400 mg/kg (Rabbit)	LC50 > 8000 ppm (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Severe eye irritant; Irritating to respiratory system and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
n-Butyl alcohol	71-36-3	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system Central nervous system (CNS)

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not flush into surface water or sanitary sewer system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
n-Butyl alcohol	EC50: 225 mg/L, 96h (Pseudokirchneriella subcapitata) OECD Guideline 201 EC50: > 500 mg/L, 72h (Desmodesmus subspicatus) EC50: > 500 mg/L, 96h (Desmodesmus subspicatus)	LC50: 1376 mg/L, 96h (Pimephales promelas) OECD Guideline 203 : 100000 - 500000 µg/L, 96h static (Lepomis macrochirus) LC50: = 1740 mg/L, 96h flow-through (Pimephales promelas) LC50: = 1910000 µg/L, 96h static (Pimephales promelas) LC50: 1730 - 1910 mg/L, 96h static (Pimephales promelas)	EC50 = 2041.4 mg/L 5 min EC50 = 2186 mg/L 30 min EC50 = 3980 mg/L 24 h EC50 = 4400 mg/L 17 h	EC50: 1328 mg/L, 48h (Daphnia magna) OECD Guideline 202 EC50: 1897 - 2072 mg/L, 48h Static (Daphnia magna) EC50: = 1983 mg/L, 48h (Daphnia magna)

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
n-Butyl alcohol	0.785

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
n-Butyl alcohol - 71-36-3	U031	-

14. Transport information

DOT

UN-No UN1120
Proper Shipping Name BUTANOLS
Hazard Class 3
Packing Group III

TDG

UN-No UN1120
Proper Shipping Name BUTANOLS
Hazard Class 3
Packing Group III

IATA

UN-No UN1120
Proper Shipping Name BUTANOLS
Hazard Class 3
Packing Group III

IMDG/IMO

UN-No UN1120

Proper Shipping Name	BUTANOLS
Hazard Class	3
Packing Group	III

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
n-Butyl alcohol	71-36-3	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
n-Butyl alcohol	71-36-3	X	-	200-751-6	X	X	X	X	KE-03867

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
n-Butyl alcohol	71-36-3	99	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
n-Butyl alcohol	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
n-Butyl alcohol	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland This product does not contain any DHS chemicals.

Security

Other International Regulations

Mexico - Grade Serious risk, Grade 3

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 21-Jan-2009
Revision Date 08-May-2019
Print Date 08-May-2019
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Revision Date 15-Apr-2019 **Revision Number** 4

1. Identification

Product Name **1-Methylpiperazine**

Cat No. : **AC156910000; AC156910025; AC156910050; AC156911000; AC156915000**

CAS-No 109-01-3
Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 3
Acute oral toxicity	Category 4
Acute dermal toxicity	Category 4
Acute Inhalation Toxicity - Vapors	Category 4
Skin Corrosion/Irritation	Category 1
Serious Eye Damage/Eye Irritation	Category 1
Skin Sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
Flammable liquid and vapor
Causes severe skin burns and eye damage
May cause respiratory irritation
May cause an allergic skin reaction
Harmful if swallowed, in contact with skin or if inhaled

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Contaminated work clothing should not be allowed out of the workplace
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
Wash contaminated clothing before reuse
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
Rinse mouth
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
1-Methyl piperazine	109-01-3	99

4. First-aid measures

Eye Contact Immediate medical attention is required. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Immediate medical attention is required.

Inhalation Remove from exposure, lie down. Remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Immediate medical attention is required.

Ingestion Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Drink plenty of water. Call a physician immediately. If possible drink milk afterwards.

Most important symptoms and effects Difficulty in breathing. Causes burns by all exposure routes. . May cause allergic skin reaction. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Carbon dioxide (CO_2). Dry chemical. Chemical foam. Water mist may be used to cool closed containers.

Unsuitable Extinguishing Media No information available

Flash Point 42 °C / 107.6 °F

Method - No information available

Autoignition Temperature 320 °C / 608 °F

Explosion Limits

Upper	9.9%
Lower	1.2%
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Flammable. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

Hazardous Combustion Products
Nitrogen oxides (NOx). Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	2	1	N/A

6. Accidental release measures

Personal Precautions Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Do not let this chemical enter the environment.

7. Handling and storage

Handling Do not breathe mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not ingest. If swallowed then seek immediate medical assistance. Handle product only in closed system or provide appropriate exhaust ventilation. Use spark-proof tools and explosion-proof equipment. Use only non-sparking tools. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges.

Storage Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed. Keep away from heat, sparks and flame. Flammables area. Keep container tightly closed in a dry and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Ammonia-like
Odor Threshold	No information available
pH	11-12 5% aq. sol
Melting Point/Range	-6 °C / 21.2 °F
Boiling Point/Range	138 °C / 280.4 °F @ 760 mmHg
Flash Point	42 °C / 107.6 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	

Upper	9.9%
Lower	1.2%
Vapor Pressure	0.9 kPa @ 20 °C
Vapor Density	No information available
Specific Gravity	0.903
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	320 °C / 608 °F
Decomposition Temperature	No information available
Viscosity	4 mPa.s at 20 °C
Molecular Formula	C5 H12 N2
Molecular Weight	100.16

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Hygroscopic.

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition. Incompatible products. Exposure to moist air or water.

Incompatible Materials Acids, Strong oxidizing agents, Acid anhydrides, Acid chlorides

Hazardous Decomposition Products Nitrogen oxides (NOx), Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization No information available.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
1-Methyl piperazine	LD50 = 2830 µL/kg (Rat)	LD50 = 1.49 mL/kg (Rabbit)	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
1-Methyl piperazine	109-01-3	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Not mutagenic in AMES Test

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
1-Methyl piperazine	Not listed	LC50: 2070 - 2550 mg/L, 96h flow-through (Pimephales promelas)	Not listed	Not listed

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN2734
Proper Shipping Name	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.
Technical Name	1-Methyl piperazine
Hazard Class	8
Subsidiary Hazard Class	3
Packing Group	II

TDG

UN-No	UN2734
Proper Shipping Name	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.
Hazard Class	8
Subsidiary Hazard Class	3
Packing Group	II

IATA

UN-No	UN2734
Proper Shipping Name	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.
Hazard Class	8
Subsidiary Hazard Class	3
Packing Group	II

IMDG/IMO

UN-No	UN2734
Proper Shipping Name	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.
Hazard Class	8

Subsidiary Hazard Class 3
Packing Group II

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
1-Methyl piperazine	109-01-3	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
1-Methyl piperazine	109-01-3	X	-	203-639-5	X	X	X	X	KE-24854

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
1-Methyl piperazine	X	X	X	-	-

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Revision Date	15-Apr-2019
Print Date	15-Apr-2019
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

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End of SDS

Material Safety Data Sheet
2,3,5,6-Tetrafluorobenzyl alcohol

ACC# 02657

Section 1 - Chemical Product and Company Identification

MSDS Name: 2,3,5,6-Tetrafluorobenzyl alcohol
Catalog Numbers: AC347490000, AC347490010, AC347490050
Synonyms:
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
Not available	2,3,5,6-Tetrafluorobenzyl alcohol		unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available.
Target Organs: Respiratory system, eyes, skin.

Potential Health Effects
Eye: Causes eye irritation.
Skin: Causes skin irritation. May be harmful if absorbed through the skin.
Ingestion: May cause irritation of the digestive tract. May be harmful if swallowed.
Inhalation: Causes respiratory tract irritation. May be harmful if inhaled.
Chronic: Not available.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Get medical aid. Wash mouth out with water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: DO NOT USE WATER! Use dry powder or carbon dioxide.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container.

Section 7 - Handling and Storage

Handling: Avoid breathing dust, mist, or vapor. Avoid contact with skin and eyes.
Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
2,3,5,6-Tetrafluorobenzyl alcohol	none listed	none listed	none listed

OSHA Vacated PELs: 2,3,5,6-Tetrafluorobenzyl alcohol: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Not available.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: Not available.
Odor: Not available.
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Solubility: Not available.
Specific Gravity/Density: Not available.
Molecular Formula:C7H4F4O
Molecular Weight:180.021

Section 10 - Stability and Reactivity

Chemical Stability: Not available.
Conditions to Avoid: Incompatible materials, excess heat.
Incompatibilities with Other Materials: Oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported

Section 11 - Toxicological Information

RTECS#:
No CAS#s in product.
LD50/LC50:

Carcinogenicity:

Epidemiology: No data available.
Teratogenicity: No data available.

Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: No information available.
Physical: No information available.
Other: Avoid entering into waters or underground water. Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
2,3,5,6-Tetrafluorobenzyl alcohol is not listed on the TSCA inventory. It is for research and development use only.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XI
Risk Phrases:
R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 37/39 Wear suitable gloves and eye/face protection.

WGK (Water Danger/Protection)
Canada - DSL/NDSL
None of the chemicals in this product are listed on the DSL or NDSL list.
Canada - WHMIS
WHMIS: Not available.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 4/26/2000
Revision #3 Date: 3/28/2008

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

SAFETY DATA SHEET
Ciprofloxacin (hydrochloride)

Annexure–17

Revision: 10/15/2018
Supersedes Revision: 01/14/2014

according to Regulation (EC) No. 1907/2006 as amended by (EC) No. 2015/830 and US OSHA HCS 2015

Section 1. Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product Code: 14286

Product Name: Ciprofloxacin (hydrochloride)

Synonyms: 1-cyclopropyl-6-fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)-3-quinolinecarboxylic acid, monohydrochloride; BAY-o 9867; NSC 620634;

1.2 Relevant identified uses of the substance or mixture and uses advised against:

Relevant identified uses: For research use only, not for human or veterinary use.

1.3 Details of the Supplier of the Safety Data Sheet:

Company Name: Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Web site address: www.caymanchem.com

Information: Cayman Chemical Company +1 (734)971-3335

1.4 Emergency telephone number:

Emergency Contact: CHEMTREC Within USA and Canada: +1 (800)424-9300
CHEMTREC Outside USA and Canada: +1 (703)527-3887

Section 2. Hazards Identification

2.1 Classification of the Substance or Mixture:

Respiratory Sensitization, Category 1

Skin Sensitization, Category 1

Aquatic Toxicity (Acute), Category 1

Aquatic Toxicity (Chronic), Category 1

2.2 Label Elements:

GHS Signal Word: **Danger**

GHS Hazard Phrases:

H317: May cause an allergic skin reaction.

H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H400: Very toxic to aquatic life.

H410: Very toxic to aquatic life with long lasting effects.

GHS Precaution Phrases:

P261: Avoid breathing {dust/fume/gas/mist/vapours/spray}.

P272: Contaminated work clothing should not be allowed out of the workplace.

P273: Avoid release to the environment.

P280: Wear {protective gloves/protective clothing/eye protection/face protection}.

P285: In case of inadequate ventilation wear respiratory protection.

GHS Response Phrases:

P302+352: IF ON SKIN: Wash with plenty of soap and water.

P304+340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P333+313: If skin irritation or rash occurs, seek medical advice/attention.

P342+311: If experiencing respiratory symptoms call a POISON CENTER or doctor/physician.

P362+364: Take off contaminated clothing and wash it before reuse.

P391: Collect spillage.

GHS Storage and Disposal Phrases:

Please refer to Section 7 for Storage and Section 13 for Disposal information.

2.3 Adverse Human Health Effects and Symptoms: Material may be irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause an allergic skin reaction.
May cause eye, skin, or respiratory system irritation.
Very toxic to aquatic life with long lasting effects
To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

Section 3. Composition/Information on Ingredients

CAS # / RTECS #	Hazardous Components (Chemical Name)/ REACH Registration No.	Concentration	EC No./ EC Index No.	GHS Classification
93107-08-5 VB1994000	Ciprofloxacin (hydrochloride)	100.0 %	642-985-5 NA	Skin Sens. 1: H317 Resp. Sens. 1: H334 Aquatic (A) 1: H400 Aquatic (C) 1: H410

Section 4. First Aid Measures

4.1 Description of First Aid Measures:

In Case of Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

In Case of Skin Contact: Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

In Case of Eye Contact: Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Have eyes examined and tested by medical personnel.

In Case of Ingestion: Wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.

Section 5. Fire Fighting Measures

5.1 Suitable Extinguishing Media: Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray.
Use water spray to cool fire-exposed containers.

Unsuitable Extinguishing Media: A solid water stream may be inefficient.

5.2 Flammable Properties and Hazards: No data available.

No data available.

Flash Pt: No data.

Explosive Limits: LEL: No data. UEL: No data.

Autoignition Pt: No data.

5.3 Fire Fighting Instructions: As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.

Section 6. Accidental Release Measures

6.1	**Protective Precautions, Protective Equipment and Emergency Procedures:**	Avoid raising and breathing dust, and provide adequate ventilation. As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).
6.2	**Environmental Precautions:**	Take steps to avoid release into the environment, if safe to do so.
6.3	**Methods and Material For Containment and Cleaning Up:**	Contain spill and collect, as appropriate. Transfer to a chemical waste container for disposal in accordance with local regulations.

Section 7. Handling and Storage

7.1	**Precautions To Be Taken in Handling:**	Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid prolonged or repeated exposure.
7.2	**Precautions To Be Taken in Storing:**	Keep container tightly closed. Store in accordance with information listed on the product insert.

Section 8. Exposure Controls/Personal Protection

8.1 Exposure Parameters:

8.2 Exposure Controls:

8.2.1	**Engineering Controls (Ventilation etc.):**	Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
8.2.2	**Personal protection equipment:**	
	Eye Protection:	Safety glasses
	Protective Gloves:	Compatible chemical-resistant gloves
	Other Protective Clothing:	Lab coat
	Respiratory Equipment (Specify Type):	NIOSH approved respirator, as conditions warrant.
	Work/Hygienic/Maintenance Practices:	Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower. Wash thoroughly after handling.
		No data available.

Section 9. Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Physical States:	[ ] Gas [ ] Liquid [X] Solid	
Appearance and Odor:	A crystalline solid	
pH:	No data.	
Melting Point:	No data.	
Boiling Point:	No data.	
Flash Pt:	No data.	
Evaporation Rate:	No data.	
Flammability (solid, gas):	No data available.	
Explosive Limits:	LEL: No data.	UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.	
Vapor Density (vs. Air = 1):	No data.	

	Specific Gravity (Water = 1):	No data.
	Solubility in Water:	No data.
	Octanol/Water Partition Coefficient:	No data.
	Autoignition Pt:	No data.
	Decomposition Temperature:	No data.
	Viscosity:	No data.
9.2	**Other Information**	
	Percent Volatile:	No data.
	Molecular Formula & Weight:	C17H18FN3O3 • HCl 367.8

Section 10. Stability and Reactivity

10.1	**Reactivity:**	No data available.
10.2	**Stability:**	Unstable [ ] Stable [X]
10.3	**Stability Note(s):**	Stable if stored in accordance with information listed on the product insert.
	Polymerization:	Will occur [ ] Will not occur [X]
10.4	**Conditions To Avoid:**	No data available.
10.5	**Incompatibility - Materials To Avoid:**	strong oxidizing agents
10.6	**Hazardous Decomposition or Byproducts:**	carbon dioxide carbon monoxide hydrogen fluoride nitrogen oxides phosgene

Section 11. Toxicological Information

11.1	**Information on Toxicological Effects:**	The toxicological effects of this product have not been thoroughly studied. Ciprofloxacin (hydrochloride) - Toxicity Data: Oral LD50 (rat): > 5 g/kg; Oral LD50 (mouse): > 5 g/kg;
	Chronic Toxicological Effects:	Ciprofloxacin (hydrochloride) - Investigated as a drug. Only select Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here. See actual entry in RTECS for complete information. Ciprofloxacin (hydrochloride) RTECS Number: VB1994000

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
93107-08-5	Ciprofloxacin (hydrochloride)	n.a.	n.a.	n.a.	n.a.

Section 12. Ecological Information

12.1	**Toxicity:**	Avoid release into the environment. Runoff from fire control or dilution water may cause pollution.
12.2	**Persistence and Degradability:**	No data available.
12.3	**Bioaccumulative Potential:**	No data available.
12.4	**Mobility in Soil:**	No data available.
12.5	**Results of PBT and vPvB assessment:**	No data available.
12.6	**Other adverse effects:**	No data available.

Section 13. Disposal Considerations

13.1 Waste Disposal Method: Dispose in accordance with local, state, and federal regulations.

Section 14. Transport Information

14.1 LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Not dangerous goods.

DOT Hazard Class:

UN/NA Number:

14.1 LAND TRANSPORT (European ADR/RID):

ADR/RID Shipping Name: Not dangerous goods.

UN Number:

Hazard Class:

14.3 AIR TRANSPORT (ICAO/IATA):

ICAO/IATA Shipping Name: Not dangerous goods.

Additional Transport Information: Transport in accordance with local, state, and federal regulations.

Section 15. Regulatory Information

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
93107-08-5	Ciprofloxacin (hydrochloride)	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
93107-08-5	Ciprofloxacin (hydrochloride)	CAA HAP,ODC: No; CWA NPDES: No; TSCA: No; CA PROP.65: No

Regulatory Information Statement: This SDS was prepared in accordance with 29 CFR 1910.1200 and Regulation (EC) No.1272/2008.

Section 16. Other Information

Revision Date: 10/15/2018

Additional Information About This Product: No data available.

Company Policy or Disclaimer: DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

SAFETY DATA SHEET
Moxifloxacin (hydrochloride)

Revision: 06/28/2018
Supersedes Revision: 03/17/2014

according to Regulation (EC) No. 1907/2006 as amended by (EC) No. 1272/2008

Section 1. Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product Code: 14830

Product Name: Moxifloxacin (hydrochloride)

Synonyms: 1-cyclopropyl-6-fluoro-1,4-dihydro-8-methoxy-7-[(4aS,7aS)-octahydro-6H-pyrrolo[3,4-b]pyridin-6-yl]-4-oxo-3-quinolinecarboxylic acid, monohydrochloride; BAY 12-8039;

1.2 Relevant identified uses of the substance or mixture and uses advised against:

Relevant identified uses: For research use only, not for human or veterinary use.

1.3 Details of the Supplier of the Safety Data Sheet:

Company Name: Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Web site address: www.caymanchem.com

Information: Cayman Chemical Company +1 (734)971-3335

1.4 Emergency telephone number:

Emergency Contact: CHEMTREC Within USA and Canada: +1 (800)424-9300
CHEMTREC Outside USA and Canada: +1 (703)527-3887

Section 2. Hazards Identification

2.1 Classification of the Substance or Mixture:

Acute Toxicity: Oral, Category 4

Serious Eye Damage/Eye Irritation, Category 2A

Aquatic Toxicity (Chronic), Category 3

2.2 Label Elements:

GHS Signal Word: **Warning**

GHS Hazard Phrases:

H302: Harmful if swallowed.

H319: Causes serious eye irritation.

H412: Harmful to aquatic life with long lasting effects.

GHS Precaution Phrases:

P264: Wash {hands} thoroughly after handling.

P280: Wear {protective gloves/protective clothing/eye protection/face protection}.

P273: Avoid release to the environment.

GHS Response Phrases:

P301+312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

P330: Rinse mouth.

P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337+313: If eye irritation persists, get medical advice/attention.

GHS Storage and Disposal Phrases:

Please refer to Section 7 for Storage and Section 13 for Disposal information.

2.3 Adverse Human Health Effects and Symptoms:

Causes serious eye irritation.
Harmful if swallowed.
Harmful to aquatic life with long lasting effects.
Material may be irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation or skin absorption.
May cause skin, or respiratory system irritation.
To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

Section 3. Composition/Information on Ingredients

CAS # / RTECS #	Hazardous Components (Chemical Name)/ REACH Registration No.	Concentration	EC No./ EC Index No.	GHS Classification
186826-86-8 VB1983750	Moxifloxacin hydrochloride	100.0 %	641-756-7 NA	Acute Tox.(O) 4: H302 Eye Damage 2A: H319 Aquatic (C) 3: H412

Section 4. First Aid Measures

4.1 Description of First Aid Measures:

In Case of Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

In Case of Skin Contact: Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

In Case of Eye Contact: Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Have eyes examined and tested by medical personnel.

In Case of Ingestion: Wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.

Section 5. Fire Fighting Measures

5.1 Suitable Extinguishing Media: Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray.
Use water spray to cool fire-exposed containers.

Unsuitable Extinguishing Media: A solid water stream may be inefficient.

5.2 Flammable Properties and Hazards: No data available.

No data available.

Flash Pt: No data.

Explosive Limits: LEL: No data. UEL: No data.

Autoignition Pt: No data.

5.3 Fire Fighting Instructions: As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.

Section 6. Accidental Release Measures

6.1 Protective Precautions, Protective Equipment and Emergency Procedures: Avoid raising and breathing dust, and provide adequate ventilation. As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).

6.2 Environmental Precautions: Take steps to avoid release into the environment, if safe to do so.

6.3 Methods and Material For Containment and Cleaning Up: Contain spill and collect, as appropriate. Transfer to a chemical waste container for disposal in accordance with local regulations.

Section 7. Handling and Storage

7.1 Precautions To Be Taken in Handling: Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid prolonged or repeated exposure.

7.2 Precautions To Be Taken in Storing: Keep container tightly closed. Store in accordance with information listed on the product insert.

Section 8. Exposure Controls/Personal Protection

8.1 Exposure Parameters:

8.2 Exposure Controls:

8.2.1 Engineering Controls (Ventilation etc.): Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

8.2.2 Personal protection equipment:

Eye Protection: Safety glasses

Protective Gloves: Compatible chemical-resistant gloves

Other Protective Clothing: Lab coat

Respiratory Equipment (Specify Type): NIOSH approved respirator, as conditions warrant.

Work/Hygienic/Maintenance Practices: Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower. Wash thoroughly after handling.

No data available.

Section 9. Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Physical States:	[ ] Gas [ ] Liquid [X] Solid
Appearance and Odor:	A crystalline solid
pH:	No data.
Melting Point:	No data.
Boiling Point:	No data.
Flash Pt:	No data.
Evaporation Rate:	No data.
Flammability (solid, gas):	No data available.
Explosive Limits:	LEL: No data. UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.
Vapor Density (vs. Air = 1):	No data.

	Specific Gravity (Water = 1):	No data.
	Solubility in Water:	No data.
	Solubility Notes:	~0.2 mg/ml in PBS (pH 7.2); ~10 mg/ml in DMSO; ~3.33 mg/ml in DMF;
	Octanol/Water Partition Coefficient:	No data.
	Autoignition Pt:	No data.
	Decomposition Temperature:	No data.
	Viscosity:	No data.
9.2	**Other Information**	
	Percent Volatile:	No data.
	Molecular Formula & Weight:	C21H24FN3O4 • HCl 437.9

Section 10. Stability and Reactivity

10.1	**Reactivity:**	No data available.
10.2	**Stability:**	Unstable [ ] Stable [X]
10.3	**Stability Note(s):**	Stable if stored in accordance with information listed on the product insert.
	Polymerization:	Will occur [ ] Will not occur [X]
10.4	**Conditions To Avoid:**	No data available.
10.5	**Incompatibility - Materials To Avoid:**	strong oxidizing agents
10.6	**Hazardous Decomposition or Byproducts:**	carbon dioxide carbon monoxide hydrogen chloride gas hydrogen fluoride nitrogen oxides

Section 11. Toxicological Information

11.1	**Information on Toxicological Effects:**	The toxicological effects of this product have not been thoroughly studied. Moxifloxacin (hydrochloride) - Toxicity Data: Oral TDLO (human): 22.8 mg/kg/4D (intermittent);
	Chronic Toxicological Effects:	Moxifloxacin (hydrochloride) - Investigated as a drug and mutagen. Only select Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here. See actual entry in RTECS for complete information. Moxifloxacin (hydrochloride) RTECS Number: VB1983750

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
186826-86-8	Moxifloxacin hydrochloride	n.a.	n.a.	n.a.	n.a.

Section 12. Ecological Information

12.1	**Toxicity:**	Avoid release into the environment. Runoff from fire control or dilution water may cause pollution.
12.2	**Persistence and Degradability:**	No data available.
12.3	**Bioaccumulative Potential:**	No data available.
12.4	**Mobility in Soil:**	No data available.
12.5	**Results of PBT and vPvB assessment:**	No data available.
12.6	**Other adverse effects:**	No data available.

Section 13. Disposal Considerations

13.1 Waste Disposal Method: Dispose in accordance with local, state, and federal regulations.

Section 14. Transport Information

14.1 LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Not dangerous goods.

DOT Hazard Class:

UN/NA Number:

14.1 LAND TRANSPORT (European ADR/RID):

ADR/RID Shipping Name: Not dangerous goods.

UN Number:

Hazard Class:

14.3 AIR TRANSPORT (ICAO/IATA):

ICAO/IATA Shipping Name: Not dangerous goods.

Additional Transport Information: Transport in accordance with local, state, and federal regulations.

Section 15. Regulatory Information

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
186826-86-8	Moxifloxacin hydrochloride	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
186826-86-8	Moxifloxacin hydrochloride	CAA HAP,ODC: No; CWA NPDES: No; TSCA: No; CA PROP.65: No

Regulatory Information Statement: This SDS was prepared in accordance with 29 CFR 1910.1200 and Regulation (EC) No.1272/2008.

Section 16. Other Information

Revision Date: 06/28/2018

Additional Information About This Product: No data available.

Company Policy or Disclaimer: DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 13-Mar-2014 **Revision Date** 23-Jan-2018 **Revision Number** 5

1. Identification

Product Name **Ofloxacin**

Cat No. : **AC455670000; AC455670010; AC455670050; AC455670250**

CAS-No 82419-36-1
Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements
None required

Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %

9-Fluoro-2,3-dihydro-3-methyl-10-(4-methylpiperazinyl)-7-oxo-7H-pyrido[1,2,3-de]-1,4-benzoxazine-6-carboxylic acid	82419-36-1	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms and effects None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
None known.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Store in freezer. Protect from direct sunlight.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	No information available
Odor	No information available
Odor Threshold	No information available
pH	No information available 4444
Melting Point/Range	270 - 275 °C / 518 - 527 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C18 H20 F N3 O4
Molecular Weight	361.37

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions. Sensitivity to light.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation. Exposure to light.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products None under normal use conditions

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
9-Fluoro-2,3-dihydro-3-methyl-10-(4-methylpiperazinyl)-7-oxo-7H-pyrido[1,2,3-de]-1,4-benzoxazine-6-carboxylic acid	LD50 = 3590 mg/kg (Rat)	Not listed	-

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
9-Fluoro-2,3-dihydro-3-methyl-10-(4-methylpiperazinyl)-7-oxo-7H-pyrido[1,2,3-de]-1,4-benzoxazine-6-carboxylic acid	82419-36-1	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Persistence and Degradability May persist based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
9-Fluoro-2,3-dihydro-3-methyl-10-(4-methylpiperazinyl)-7-oxo-7H-pyrido[1,2,3-de]-1,4-benzoxazine-6-carboxylic acid	82419-36-1	-	-	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
9-Fluoro-2,3-dihydro-3-methyl-10-(4-methylpiperazinyl)-7-oxo-7H-pyrido[1,2,3-de]-1,4-benzoxazine-6-carboxylic acid	82419-36-1	-	-	-	-	-	-	-	KE-17021

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA	Not applicable
California Proposition 65	This product does not contain any Proposition 65 chemicals.
U.S. State Right-to-Know Regulations	Not applicable

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security	This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade	No information available

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Creation Date	13-Mar-2014
Revision Date	23-Jan-2018
Print Date	23-Jan-2018
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

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End of SDS

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 26-Jul-2011 **Revision Date** 23-Jan-2018 **Revision Number** 3

1. Identification

Product Name **Norfloxacin**

Cat No. : **AC445260000; AC445260050**

CAS-No 70458-96-7
Synonyms 1-Ethyl-6-fluoro-1,4-dihydro-4-oxo-7-piperazino-3-quinolinecarboxylic aicd

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements
None required

Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %

Norfloxacin	70458-96-7	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms and effects None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
1	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep refrigerated.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures None under normal use conditions.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	No information available
Odor	No information available
Odor Threshold	No information available
pH	No information available
Melting Point/Range	218 - 216 °C / 424.4 - 420.8 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C16 H18 F N3 O3
Molecular Weight	319.33

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information
Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Norfloxacin	LD50 > 4 g/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Norfloxacin	70458-96-7	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Norfloxacin	70458-96-7	-	-	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Norfloxacin	70458-96-7	X	-	274-614-4	X	-	-	X	KE-13708

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations Not applicable

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 26-Jul-2011
Revision Date 23-Jan-2018
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FIRE HYDRANT, EXTINGUISHER, SMOKE DETECTOR LAYOUT

Annexure 19 Cumulative Impact Assessment (CIA) Study

1. Ground Level Concentration Increment

1.1. Air Environment

Base line data reveals that ambient air quality in the study area for the Parameters PM_{10}, SO_2 & NO_x, are well within the permissible Limits as prescribed by the National Ambient Air Quality Standards (NAAQS) for Industrial Area, Residential, Rural & Other areas.

The major air pollutant from the proposed activity is PM_{10}, SO2 and NO_x emissions.

1.2. Meteorological Data

The meteorological data for a month, i.e. from 15/01/2022 to 15/04/2022 was considered for the study. Data included for AERMET were daily wind speed, wind direction, temperature, relative humidity, air pressure, precipitation, and solar radiation recorded during the period. AERMET reformats meteorological data so that it can be used as input for AERMOD model. Meteorology considered for modelling is shown below.

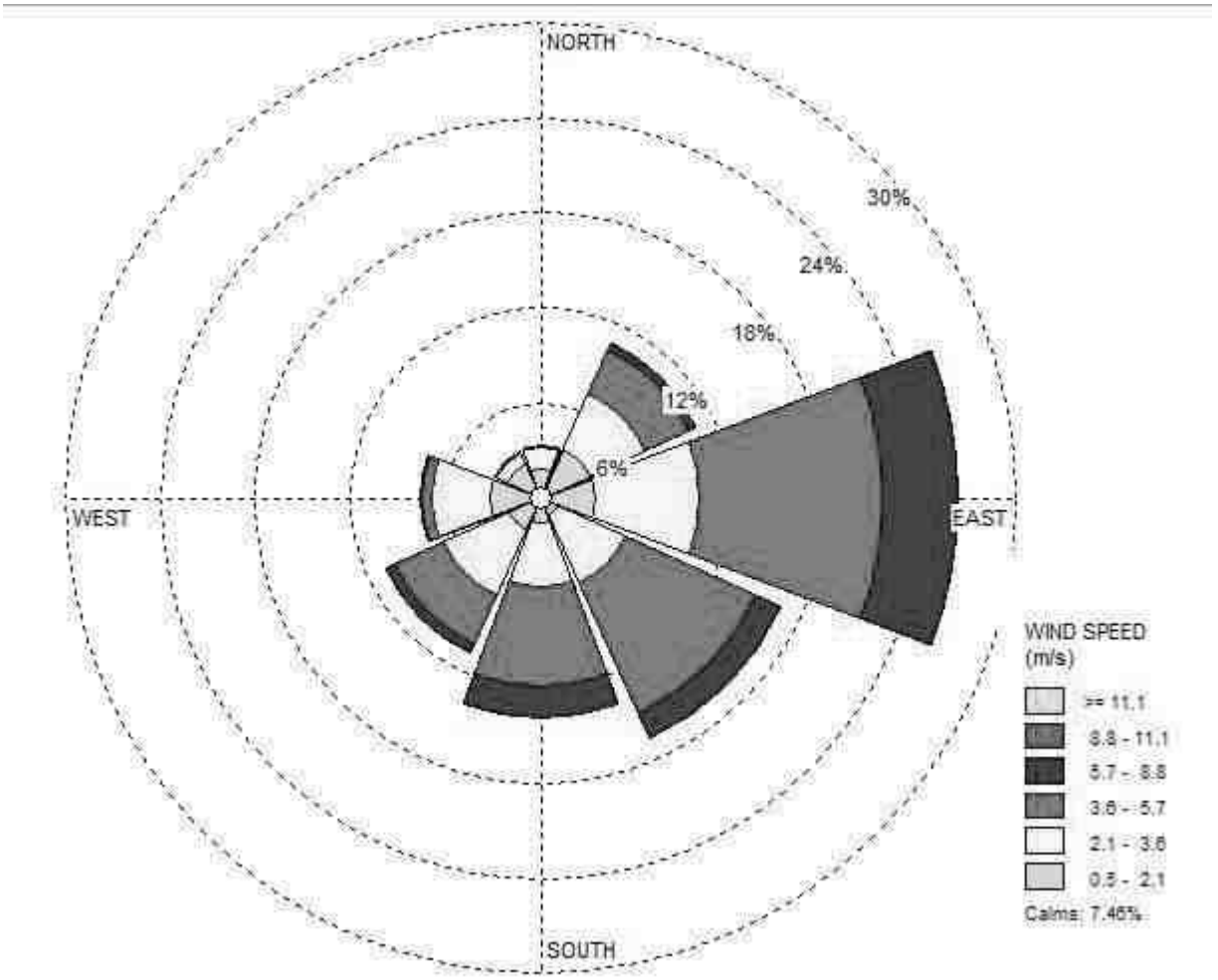


Figure 1: Wind rose Diagram of meteorology considered for Modelling

1.1. AERMET Process

For the 3 phase AERMET processing of the meteorological data, specifications of the land use in the area are required to determine the terrain roughness for modelling. The land use was characterized for in and around the site. The surface characteristics for the site and surroundings were selected and used to calculate the Albedo, Bowen ratio and surface roughness parameters.

1.2. AERMOD Process

AERMOD Software Version 8.0.5 was used for air dispersion modelling and is applicable to a wide range of buoyant or neutrally buoyant emissions up to a range of 50 km. In addition to more straight forward cases, AERMOD is also suitable for complex terrain and urban dispersion scenarios.

AERMOD is a steady-state plume model. In the stable boundary layer (SBL), it assumes the concentration distribution to be Gaussian in both the vertical and horizontal. In the convective boundary layer (CBL), the horizontal distribution is also assumed to be Gaussian, but the vertical distribution is described with a bi-Gaussian probability density function (pdf). This behavior of the concentration distributions in the CBL was demonstrated by Willis and Deardorff (1981) and Briggs (1993). Additionally, in the CBL, AERMOD treats "plume lofting," whereby a portion of plume mass, released from a buoyant source, rises to and remains near the top of the boundary layer before becoming mixed into the CBL. AERMOD also tracks any plume mass that penetrates into the elevated stable layer, and then allows it to re-enter the boundary layer when and if appropriate. For sources in both the CBL and the SBL AERMOD treats the enhancement of lateral dispersion resulting from plume meander. The emissions from proposed stacks are estimated and used for the air dispersion modeling as shown in **Table 1.1** controlled emissions, respectively**.** Maximum incremental values for PM, SO_2 and NO_x have been represented as pictorial concentration contours and as tabular concentration values in following sections.

Table 1 Proposed Stack Emission details (Global Pharma)

S.no	Source	Fuel Type	Fuel Quantity	Stack Details					Emission(g/s)			
				No.of stacks	Height(m)	Dia(m)	Temp(°C)	Exit velocity(m/s)	PM	SO2	Nox	CO
1	350 kva(DG)	HSD	200 TPD	1	19	0.15	300	12.8	0.0043	0.0040	0.0609	0.0132
2	125 kva(DG)	HSD	80 TPD	1	17	0.15	280	11	0.0015	0.0014	0.0218	0.0047
3	3 TPH - Boiler	Bio Briquettes	12 TPD	1	30	0.35	260	15	0.1346	0.0083	0.0050	0.8264
4	Boiler 0.2 TPH	LPG	5 TPD	1	30	0.35	240	13	0.0095	0.0204	0.1770	0.1021
5	Coater			1	19	0.15	37.6	10.4	0.0001			
Total(g/s)									**0.1500**	**0.0342**	**0.2647**	**0.9464**

Table 2 Industries within 3km

S. No	Industries	Distance	Direction	Source	Fuel type	Stack Details				Emission(g/s)			
						height (m)	Dia(m)	Temp	Exit Velocity(m/s)	PM	SO2	NOX	CO
1	Mahindra Research Valley	2.19 km	SW	Mahindra Research Valley DG 320 KVA	HSD	4	0.2	191	8.3	0.0039	0.0036	0.0557	0.0120
				DG 320 KVA	HSD	4	0.2	191	8.3	0.0039	0.0036	0.0557	0.0120
				DG 180 KVA	HSD	4	0.15	189	8	0.0022	0.0021	0.0313	0.0068
2	Lloyd Insulations Ltd	2.51 km	WSW	Lloyd Insulations Ltd DG 500 KVA	HSD	21	0.23	193	9	0.0061	0.0057	0.0870	0.0188

				DG 500 KVA	HSD	21	0.23	193	9	0.0061	0.0057	0.0870	0.0188
				DG 62.5 KVA	HSD	21	0.01	170	7	0.0008	0.0007	0.0109	0.0024
3	Ashley Alteams India Ltd	2.72 km	WSW	Ashley Alteams India Ltd LPG FIRED MELTING FURNACE 1.5 T/HR	LPG	18	0.35	220	11	0.0078	0.0167	0.1451	0.0837
				LPG FIRED MELTING FURNACE 1.5 T/HR	LPG	18	0.35	220	11	0.0078	0.0167	0.1451	0.0837
				LPG FIRED MELTING FURNACE 1.5 T/HR	LPG	18	0.35	220	11	0.0078	0.0167	0.1451	0.0837
				DG 750 KVA I	HSD	12	0.3	210	12	0.0092	0.0085	0.1306	0.0282
				DG 750 KVA II	HSD	12	0.3	210	12	0.0092	0.0085	0.1306	0.0282
				DG 750 KVA III	HSD	12	0.3	210	12	0.0092	0.0085	0.1306	0.0282
4	Forech India Pvt Ltd	2.12 km	WSW	Forech India Pvt Ltd Boiler 4.9 T/HR	Coal	30	0.34	230	10	0.1792	2.2287	1.0286	0.0686
				DG 500 KVA	HSD	12	0.23	193	9	0.0061	0.0057	0.0870	0.0188
				DG 500 KVA	HSD	12	0.23	193	9	0.0061	0.0057	0.0870	0.0188
				DG 500 KVA	HSD	12	0.23	193	9	0.0061	0.0057	0.0870	0.0188
				DG 500 KVA	HSD	12	0.23	193	9	0.0061	0.0057	0.0870	0.0188
5	Rockman Industries Ltd	2.54 km	WSW	Rockman Industries Ltd DG 500 KVA	HSD	5	0.23	193	9	0.0061	0.0057	0.0870	0.0188
				DG 500 KVA	HSD	5	0.23	193	9	0.0061	0.0057	0.0870	0.0188
				DG 125 KVA	HSD	5	0.1	181	7.89	0.0015	0.0014	0.0218	0.0047

				Oil fired furnaces -4(nos) (300 kg each)	FO	30	0.32	215	11.4	0.0917	1.4242	0.1218	0.0130
Total(g/s)										**0.3831**	**3.7858**	**2.8492**	**0.6056**

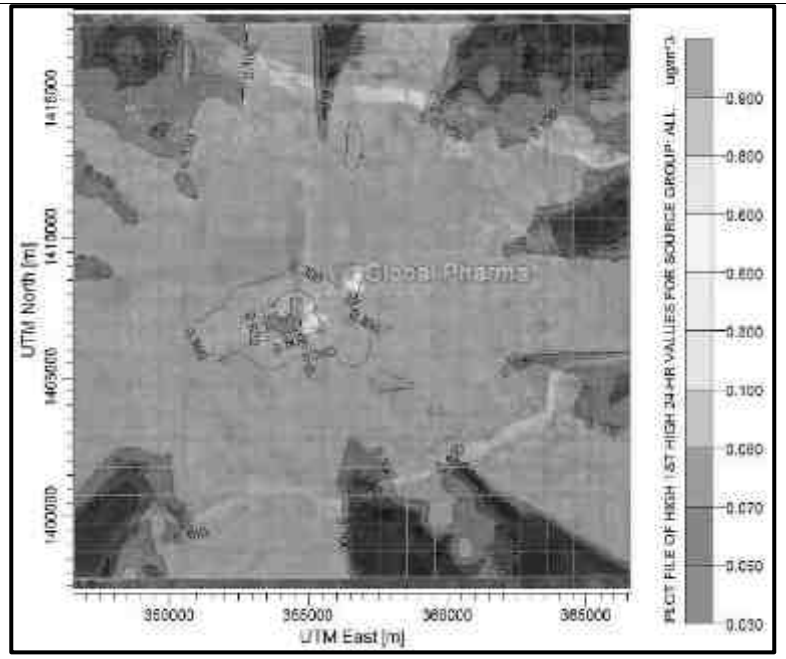
Note: (Existing Industries)

1. The stack details and capacity for other industries has been taken from the respective consent orders.

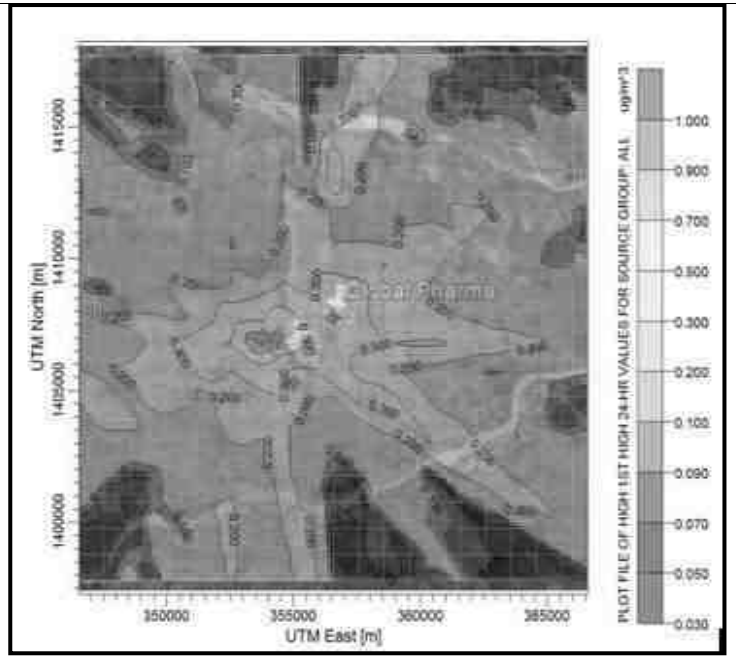
2. Emission Calculations:

i) DG Emission calculation is based on the DG Capacity.

ii) Boiler Emission calculation is based on the Fuel Quantity.



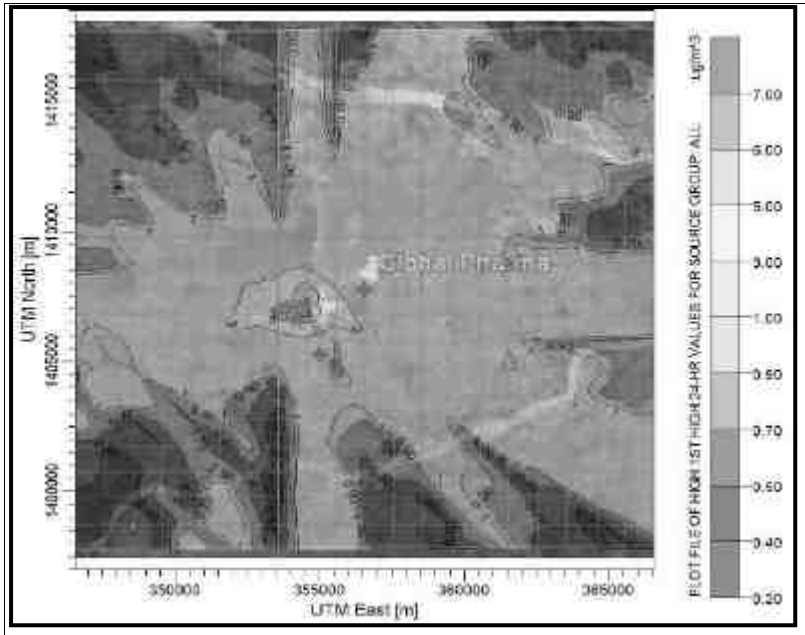
Predicted Top 10 Highest concentrations of PM due to similar type industries without Global Pharma



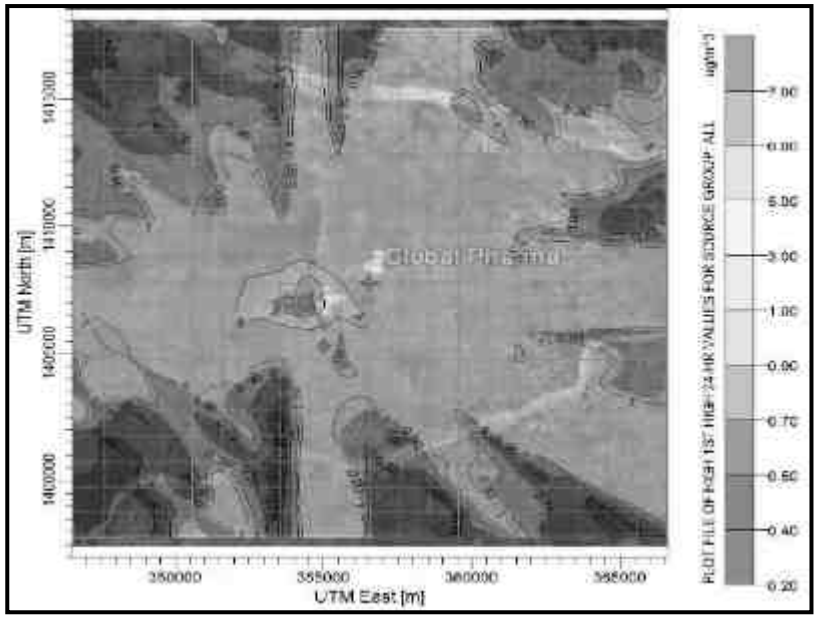
Predicted Top 10 Highest concentrations of PM due to similar type industries with Global Pharma

S. No	Coordinates(m)		Conc. (ug/m3)	Distance (km	Direction
	Latitude	Longitude			
1.	353566	1406768	0.82817	3.16	WSW
2.	354566	1407768	0.65554	2	W
3.	354566	1406768	0.62642	2.24	WSW
4.	355566	1406768	0.50154	1.41	SW
5.	352566	1406768	0.49857	4.12	WSW
6.	353566	1407768	0.45326	3	W
7.	351566	1406768	0.44132	5.10	WSW
8.	355566	1407768	0.42768	1	W
9.	353566	1405768	0.41682	3.60	WSW
10	352566	1407768	0.41334	4	W

S. No	Coordinates(m)		Conc. (ug/m3)	Distance (km	Direction
	Latitude	Longitude			
1.	353566	1406768	0.90077	3.16	WSW
2.	354566	1407768	0.65696	2	W
3.	354566	1406768	0.62752	2.24	WSW
4.	352566	1406768	0.51547	4.12	WSW
5.	355566	1406768	0.50304	1.41	SW
6.	351566	1406768	0.47156	5.10	WSW
7.	353566	1407768	0.4538	3	W
8.	353566	1405768	0.43718	3.60	WSW
9.	355566	1407768	0.43195	1	W
10.	352566	1407768	0.41996	4	W



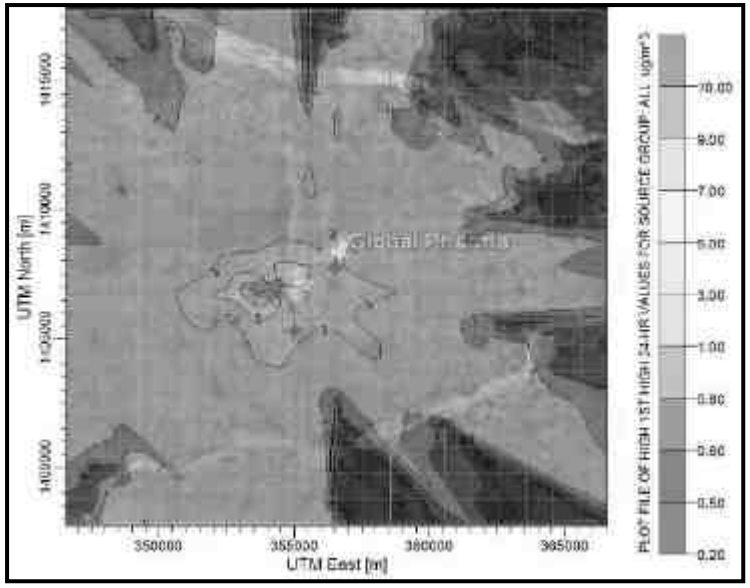
Predicted Top 10 Highest concentrations of SO2 due to similar type industries without Global Pharma



Predicted Top 10 Highest concentrations of SO2 due to similar type industries with Global Pharma

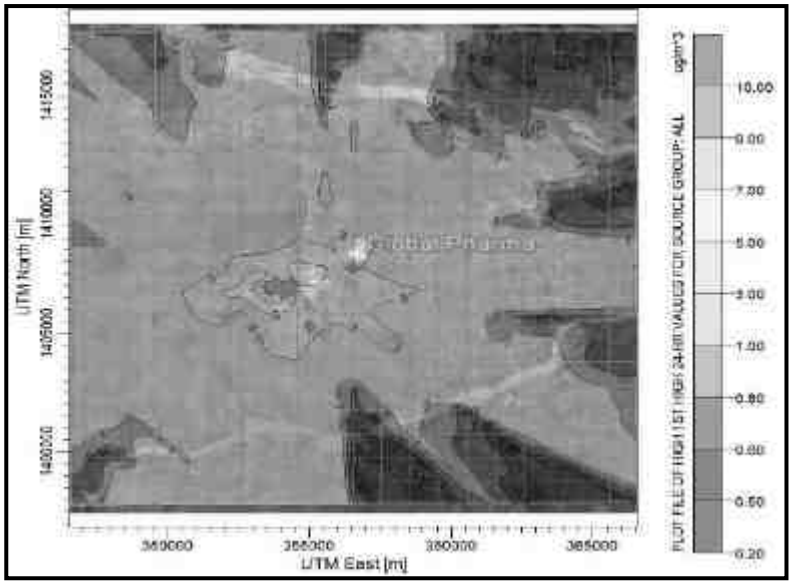
S. No	Coordinates(m)		Conc. (ug/m3)	Distance (km	Direction
	Latitude	Longitude			
1.	354566	1406768	6.34644	2.24	WSW
2.	354566	1407768	5.94627	2	W
3.	353566	1406768	5.59782	3.16	WSW
4.	352566	1406768	3.70603	4.12	WSW
5.	355566	1406768	3.66745	1.41	SW
6.	353566	1407768	3.64113	3	W
7.	352566	1407768	3.28342	4	W
8.	355566	1407768	3.06296	1	W
9.	356566	1413768	2.99866	6	N
10	356566	1405768	2.99171	2	S

S. No	Coordinates(m)		Conc. (ug/m3)	Distance (km	Direction
	Latitude	Longitude			
1.	354566	1406768	6.34673	2.24	WSW
2.	354566	1407768	5.94664	2	W
3.	353566	1406768	5.59902	3.16	WSW
4.	352566	1406768	3.71559	4.12	WSW
5.	355566	1406768	3.66797	1.41	SW
6.	353566	1407768	3.64131	3	W
7.	352566	1407768	3.28505	4	W
8.	355566	1407768	3.06408	1	W
9.	356566	1413768	2.99882	6	N
10.	356566	1405768	2.9976	2	S



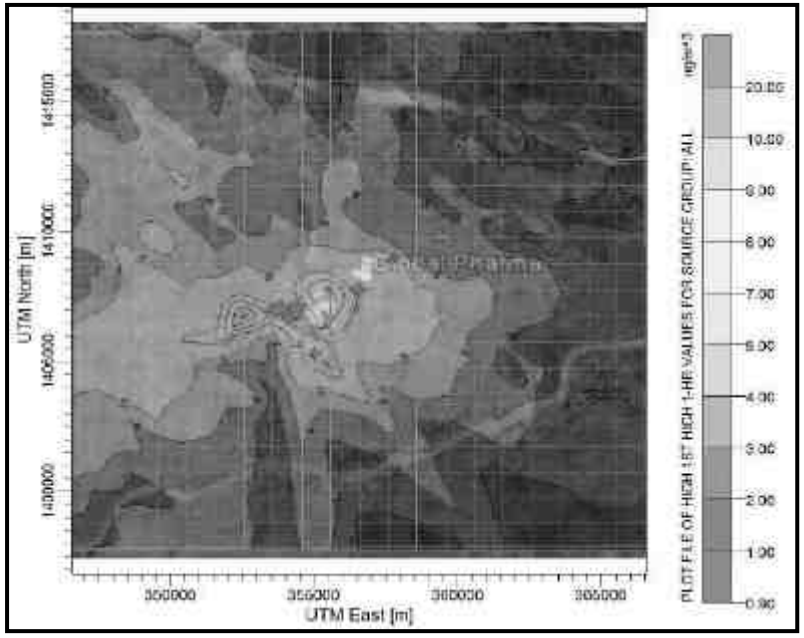
Predicted concentrations of NOx due to similar type industries without Global Pharma

S. No	Coordinates(m)		Conc. (ug/m3)	Distance(km)	Direction
	Latitude	Longitude			
1	353566	1406768	9.42073	3.16	WSW
2	354566	1407768	5.63607	2	W
3	352566	1406768	5.44849	4.12	WSW
4	355566	1407768	5.05175	1	W
5	353566	1405768	4.9353	3.60	WSW
6	355566	1406768	4.84032	1.41	SW
7	351566	1406768	4.80624	5.10	WSW
8	354566	1406768	4.75338	2.24	WSW
9	354566	1405768	4.16543	2.82	SW
10	353566	1407768	4.04588	3	W

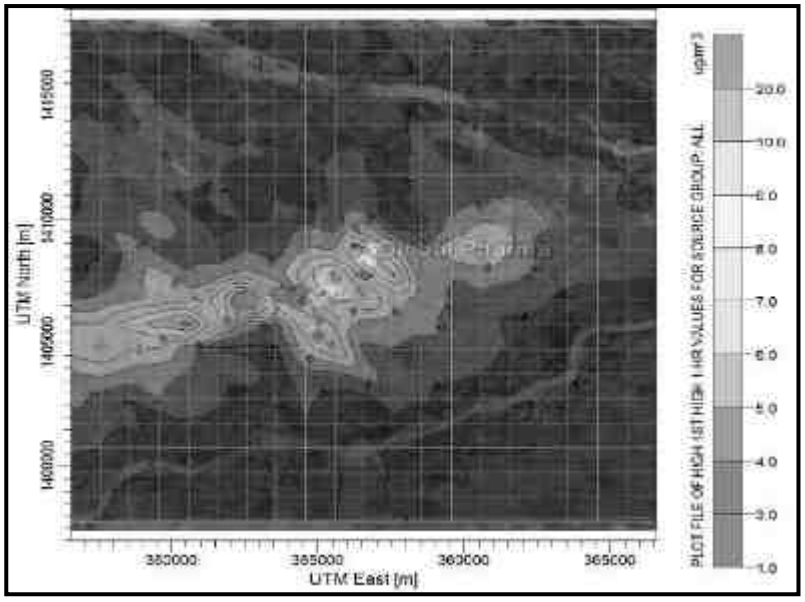


Predicted concentrations of NOx due to similar type industries with Global Pharma

S. No	Coordinates(m)		Conc. (ug/m3)	Distance(km)	Direction
	Latitude	Longitude			
1.	353566	1406768	9.56428	3.16	WSW
2.	354566	1407768	5.63935	2	W
3.	352566	1406768	5.49194	4.12	WSW
4.	355566	1407768	5.05926	1	W
5.	353566	1405768	4.97226	3.60	WSW
6.	351566	1406768	4.91014	5.10	WSW
7.	355566	1406768	4.84599	1.41	SW
8.	354566	1406768	4.78149	2.24	WSW
9.	354566	1405768	4.16695	2.82	SW
10.	353566	1407768	4.04802	3	W



Predicted Top 10 Highest concentrations of CO due to similar type industries without Global Pharma



Predicted Top 10 Highest concentrations of CO due to similar type industries with Global Pharma

S. No	Coordinates(m)		Conc. (ug/m3)	Distance (km	Direction
	Latitude	Longitude			
1.	352566	1406768	10.38133	4.12	WSW
2.	355566	1407768	9.25854	1	W
3.	355566	1406768	8.32747	1.41	SW
4.	355566	1404768	8.12797	3.16	SSW
5.	353566	1406768	7.9429	3.16	WSW
6.	354566	1407768	7.75371	2	W
7.	354566	1405768	7.70096	2.82	SW
8.	351566	1405768	7.22682	5.38	WSW
9.	350566	1405768	7.09019	6.37	WSW
10	357566	1407768	6.85346	1	E

S. No	Coordinates(m)		Conc. (ug/m3)	Distance (km	Direction
	Latitude	Longitude			
1.	352566	1406768	12.03724	4.12	WSW
2.	350566	1405768	10.43542	6.37	WSW
3.	349566	1405768	9.51388	7.36	WSW
4.	356566	1408768	9.33633	1	N
5.	355566	1407768	9.26011	1	W
6.	357566	1407768	9.17128	1	E
7.	351566	1406768	8.50452	5.10	WSW
8.	348566	1405768	8.46134	8.25	WSW
9	355566	1406768	8.32912	1.41	SW
10.	355566	1404768	8.12994	3.16	SSW

Summary:

Cumulative impact assessment study was carried out for industries similar to **Global Pharma** using AERMOD model to predict maximum concentration due to existing industries and proposed **Global Pharma** industry 3km industry. In this view two scenario were generated. Scenario one is the contribution by existing industries without the **Global Pharma** Industry, the contribution of PM, SO_2, NO_X and CO are **0.82 µg/m^3, 6.34644 µg/m^3, 9.42 µg/m^3** and **10.38 µg/m^3** scenario two with all industries, including the **Global Pharma** Industry, the contribution of PM, SO_2, NO_X and CO are **0.90 µg/m^3, 6.346763 µg/m^3, 9.56 µg/m^3** and 12.03 **µg/m^3** .

Pollutant	Estimated Incremental Conc. (µg/m^3) (Without Global Pharma)	Estimated Incremental Conc. (µg/m^3) (With Global Pharma)
PM	0.828	0.90
SO_2	6.34644	6.34673
NO_x	9.42	9.56
CO	10.38	12.03

TMT. P. RAJESWARI, I.F.S.,
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY – TAMIL NADU
3rd Floor, Panagal Maaligai,
No.1 Jeenis Road, Saidapet,
Chennai-15.
Phone No.044-24359973
Fax No. 044-24359975

Letter No.SEIAA-TN/F.No. 8698/2021 dated:29.04.2022

To

The Director
M/s.Global Pharma health Care Private Limited
A-9, SIDCO Pharmaceutical Complex,
Alathur Taluk
Thiruporur Taluk
Kanchipuram District-603110

Sir,

Sub: SEIAA-TN – Proposal seeking Environmental Clearance for the Proposed API Manufacturing facility at S.F.No: 155Pt, Plot No C-29B, SIPCOT Industrial Complex, Cheyyar Phase-II of Mathur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu by M/s.Global Pharma Health Care Private Limited- Minutes communicated– Regarding

Ref: 1. Online Proposal No: SIA/TN/IND2/223559/2021 dated: 06.08.2021
2. Your application for Environmental Clearance dated: 02.08.2021
3. Minutes of the 254th meeting of SEAC held on 17.03.2022
4. Minutes of the 498th meeting of SEIAA held on 08.04.2022

I invite kind attention to the references 1st & 2nd cited wherein you have submitted the application seeking Environmental Clearance for the Proposed API Manufacturing facility at S.F.No: 155Pt, Plot No C-29B, SIPCOT Industrial Complex, Cheyyar Phase-II of Mathur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu.

The proposal was placed in 254th SEAC meeting held on 17.03.2022. The details of the project furnished by the proponent are given in the website (parivesh.nic.in).

The SEAC noted the following:

1. The Project Proponent, M/s.Global Pharma Health Care Private Limited has applied

for Environmental Clearance for the proposed API Manufacturing facility at S.F.No: 155Pt, Plot No C-29B, SIPCOT Industrial Complex, Cheyyar Phase-II of Mathur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu.

2. The project/activity is covered under Category "B2" of Item 5(f) "synthetic organic chemicals" of the Schedule to the EIA Notification, 2006.
3. As per S.O.2859(E) dated 16.07.2021, " *All proposals for projects or activities in respect of Active Pharmaceutical Ingredients(API), received from 16th July, 2021 to 31st December, 2021, shall be appraised, as Category 'B2' projects, provided that any subsequent amendment or expansion or change in product mix, after the 31st December, 2021, shall be considered as per the provisions in force at that time.*"
4. The proponent has applied for EC application dated 06.08.21; hence SEAC has taken up the project for appraisal.

Based on the presentation and document furnished by the project proponent SEAC noted that,

i. **Proposed industry falls under "Red category"**

ii. **The administrative Sanction order for expansion of Cheyyar industrial complex by SIPCOT (931.41 ha) was issued vide G.O.Ms.No.281 Dt: 05.12.2007. Further, the Environmental Clearance was issued by MoEF & CC Dt: 30.09.2016 for the development of SIPCOT Industrial Park over an area 931.015 ha for in-housing following industry categories only such as item No. 3 (a) - Metallurgical industries (ferrous & non-ferrous) & item No.5(k) - Induction/Arc/Cupola Furnace of TPH or more. The present proposal of the is for industry category item No. 5 (f) - "synthetic organic chemicals" at the above said SIPCOT, Cheyyar which was not covered under Environmental Clearance issued to SIPCOT, Cheyyar Dt: 30.09.2016.**

iii. **Further according to para 3 (xxxiv) of the Environmental Clearance issued by MoEF & CC Dt: 30.09.2016, of EC given to SIPCOT, "the responses/commitments made to the issues raised during public hearing shall be complied with in letter and spirit." It is seen from the records that SIPCOT has given a commitment that "individual industries has to conduct public hearing separately if they do not fall within the scope of ToR issued by EAC for the Park"**

Considering the above points and after detailed deliberations, SEAC decided that, the project proponent **shall conduct public consultation** and shall submit a fresh EIA study report including the following details,

prediction of quality parameters through modeling the surface water bodies & ground water quality data, ambient/stack air quality data in regard to point/fugitive sources emission & VOCs, ambient noise level and Traffic within 5 km radius of the proposed project site.

2. The proponent shall furnish all possible types of hazardous waste generated in the process.
3. The proponent shall furnish details of spent solvent, spent organic waste along with qualitative details.
4. The proponent shall furnish each product stage wise description, flow chart, stoichiometric equation, material balance (input& output table), pollution load generated per batch.
5. Details on solvent management including loss accounting.
6. Cumulative assessment of the impacts from the industries within the 3 km radius and the EMP needs to be worked out based on the findings.
7. The proponent shall carry out cumulative impact assessment study for air pollution, water pollution, and noise pollution in the proposed site needs to be carried out considering nearby water bodies and habitations, and EMP needs to be worked out mitigation measures for the same based on the findings of the study.
8. The project proponent shall furnish emergency evacuation & preparedness plan, safety planning study for the worst-case scenario (untoward accidents) considering storage, management (Manufacturing practices) & handling/maintenance of based on MSDS of solvents, products, raw materials, hazardous waste etc & spill over management.
9. Details of sequence of process diagram of each process.
10. Details of stoichiometric analysis, reaction and mass balance of all the products, and the assessment of air pollutants along with its quantity per batch.
11. The project proponent shall submit the expected characteristics of the effluent generated during the processes and the design of the Effluent treatment plant based on those characteristics. The proponent shall furnish the design details of Effluent Treatment Plant (ETP) with the detailed process descriptions.
12. The proponent shall submit the proposal for treatment of sewage and design of the STP.
13. Detailed plan on the protection for the existing water bodies within the premise needs to be worked out and included in the EIA/EMP report.
14. The details about occupational health & safety measures as per OSHA guidelines.
15. The proponent shall furnish details of safety measures proposed for all the process area and fuel/solvent/hazardous waste storage areas.

16. The proponent may assess the risk based on the guidelines of MoEF&CC for Pharma Industry.

On receipt of the above documents along with public hearing report and EIA study report, the committee would further deliberate on this project and decide the further course of action.

The subject was placed in the 498th Authority meeting held on 08.04.2022. After detailed deliberation, the Authority decided to communicate the decision of the 254th meeting of SEAC held on 17.03.2022 to the project proponent.

The receipt of the letter may be acknowledged.

For MEMBER SECRETARY
SEIAA-TN

5(f): STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR SYNTHETIC ORGANIC CHEMICALS INDUSTRY (DYES & DYE INTERMEDIATES; BULK DRUGS AND INTERMEDIATES EXCLUDING DRUG FORMULATIONS; SYNTHETIC RUBBERS; BASIC ORGANIC CHEMICALS, OTHER SYNTHETIC ORGANIC CHEMICALS AND CHEMICAL INTERMEDIATES) AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

A. STANDARD TERMS OF REFERENCE

1) Executive Summary

2) Introduction

   i. Details of the EIA Consultant including NABET accreditation

   ii. Information about the project proponent

   iii. Importance and benefits of the project

3) Project Description

   i. Cost of project and time of completion.

   ii. Products with capacities for the proposed project.

   iii. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.

   iv. List of raw materials required and their source along with mode of transportation.

   v. Other chemicals and materials required with quantities and storage capacities

   vi. Details of Emission, effluents, hazardous waste generation and their management.

   vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)

   viii. Process description along with major equipments and machineries, process flow sheet (quantative) from raw material to products to be provided

   ix. Hazard identification and details of proposed safety systems.

   x. Expansion/modernization proposals:

      c. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In

addition, status of compliance of Consent to Operate for the ongoing /existing operation of the project from SPCB shall be attached with the EIA-EMP report.

d. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.

4) Site Details

i. Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.

ii. A toposheet of the study area of radius of 10km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)

iii. Details w.r.t. option analysis for selection of site

iv. Co-ordinates (lat-long) of all four corners of the site.

v. Google map-Earth downloaded of the project site.

vi. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.

vii. Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.

viii. Landuse break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)

ix. A list of major industries with name and type within study area (10km radius) shall be incorporated. Land use details of the study area

x. Geological features and Geo-hydrological status of the study area shall be included.

xi. Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)

xii. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.

xiii. R&R details in respect of land in line with state Government policy.

5) Forest and wildlife related issues (if applicable):

i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable)

ii. Landuse map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha)

iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.

iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.

v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.

vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife.

6) Environmental Status

i. Determination of atmospheric inversion level at the project site and site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.

ii. AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.

iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.

iv. Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.

v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC, if yes give details.

vi. Ground water monitoring at minimum at 8 locations shall be included.

vii. Noise levels monitoring at 8 locations within the study area.

viii. Soil Characteristic as per CPCB guidelines.

ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.

x. Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.

xi. Socio economic status of the study area.

7) Impact and Environment Management Plan

i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be assessed. Details of the model used and the input data used for modelling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.

ii. Water Quality modelling - in case of discharge in water body

iii. Impact of the transport of the raw materials and end products on the surrounding environment hall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined.

iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) Rules.

v. Details of stack emission and action plan for control of emissions to meet standards.

vi. Measures for fugitive emission control

vii. Details of hazardous waste generation and their storage, utilization and management. Copies of MOU regarding utilization of solid and hazardous waste in cement plant shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.

viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.

ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.

x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to

use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.

xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.

xii. Action plan for post-project environmental monitoring shall be submitted.

xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.

8) Occupational health

i. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers

ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays. Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of above mentioned parameters as per age, sex, duration of exposure and department wise.

iii. Details of existing Occupational & Safety Hazards. What are the exposure levels of hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved,

iv. Annual report of heath status of workers with special reference to Occupational Health and Safety.

9) Corporate Environment Policy

i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.

ii. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.

iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.

iv. Does the company have system of reporting of non compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report

10) Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.

11) Enterprise Social Commitment (ESC)

i. Adequate funds (at least 2.5 % of the project cost) shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon.

12) Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.

13) A tabular chart with index for point wise compliance of above TOR.

B. SPECIFIC TERMS OF REFERENCE FOR EIA STUDIES FOR SYNTHETIC ORGANIC CHEMICALS INDUSTRY (DYES & DYE INTERMEDIATES; BULK DRUGS AND INTERMEDIATES EXCLUDING DRUG FORMULATIONS; SYNTHETIC RUBBERS; BASIC ORGANIC CHEMICALS, OTHER SYNTHETIC ORGANIC CHEMICALS AND CHEMICAL INTERMEDIATES)

1. Detailsonsolvents to be used,measuresfor solventrecovery and for emissions control.
2. Details of process emissions from the proposed unit and its arrangement to control.
3. Ambient air quality data should include VOC, otherprocess-specificpollutants* like NH3*, chlorine*, HCl*, HBr*, H2S*, HF*,etc.,(*-asapplicable)
4. Work zone monitoring arrangements for hazardous chemicals.
5. Detailed effluent treatment scheme including ssegregation of effluent streams for units adopting 'Zero' liquid discharge.
6. Action plan for odour control to be submitted.
7. A copy of the Memorandum of Understanding signed with cement manufacturers indicating clearly that they co-process organic solid/hazardous waste generated.
8. Authorization/Membership for the disposal of liquid effluent in CETP and solid/hazardous waste in TSDF, if any.
9. Action plan for utilization of MEE/dryers salts.
10. Material Safety Data Sheet for all the Chemicals are being used/will be used.
11. Authorization/Membership for the disposal of solid/hazardous waste in TSDF.

EXECUTIVE SUMMARY

FOR

"Proposed APIs Manufacturing Facility"

AT

Survey No: 155Pt, Plot No. C-29B, SIPCOT Industrial Complex -Cheyyar Phase-II,
Village: Mathur
Taluk: Vembakkam
District: Thiruvannamalai
State: Tamil Nadu

By

M/s. Global Pharma Healthcare Private Limited

GLOBAL PHARMA HEALTHCARE

[Project Activity termed under 5(f)-Synthetic Organic Chemicals manufacturing, Category - "B1" as Per EIA Notification, 2006 and its amendments]

REPORT PREPARED BY

M/s. Hubert Enviro Care Systems (P) Ltd., Chennai

NABET Certificate No. NABET/EIA/1922/RA 0172 Valid till 13/10/2022

June 2022

1. Project background

M/s. Global Pharma Healthcare PVt Ltd proposed greenfield APIs manufacturing facility at Survey No: 155Pt, Plot No. C-29B (2.50 acres), SIPCOT Industrial Complex -Cheyyar Phase-II, Mathur Village, Vembakkam Taluk, Thiruvannamalai District, Tamil Nadu State. The required land area is 2.50 Acres. The project falls in SOI Topo Sheet No. 57P/9, P/10, P/13 & P/14 lies between 12°43'52.01"N & 79°40'43.63"E (Centre Coordinates)

The project scope involves in the production capacity of 750 TPA and the proposed project falls under **Schedule 5 (f)** Synthetic Organic Chemicals industry, Category B1.

2. Project location

The site is located at Survey No: 155Pt, Plot No. C-29B (2.50 acres), SIPCOT Industrial Complex -Cheyyar Phase-II, Mathur Village, Vembakkam Taluk, Thiruvannamalai District, Tamil Nadu State. The site is located about ≈0.51 km (W) km away from SH-116 (Kanchipuram -Vandavasi) and nearest City: City - Kanchipuram ≈8.25 km (N) from project site. The nearest railway station is Kanchipuram East Railway station ≈12.47 km (NNE). The site elevation is ~85-88 m.

2.1 Site Salient features

Table 1 Salient features of the project site and surrounding features

S. No.	Particulars	Details
1	Plant site Latitude	12°43'52.01"N (Centre Co-ordinates)
2	Plant site Longitude	79°40'43.63"E (Centre Co-ordinates)
3	Elevation of Project site	~85-88 m Above MSL
4	Present land use	Industrial Zone
5	Nearest Highway	NH 48 (Delhi-Kanchipuram-Chennai) in ≈15.61 Km (NNW) SH 116 (Kanchipuram -Vandavasi) in ≈0.51 Km (W)

<table>
<tr><th>S. No.</th><th>Particulars</th><th>Details</th></tr>
<tr><td>6</td><td>Nearest railway Station</td><td>Kanchipuram East Railway station ≈12.47 km (NNE)</td></tr>
<tr><td>7</td><td>Nearest Airport</td><td>Chennai International Airport ≈ 57.2 km (NE)</td></tr>
<tr><td>8</td><td>Nearest habitation</td><td><table><tr><th>Vilage</th><th>~ Distance</th><th>Direction</th><th>Population as per 2011 Census</th></tr><tr><td>Mangal</td><td>0.40 km</td><td>W</td><td>767</td></tr></table></td></tr>
<tr><td>9</td><td>Nearest Town</td><td>Kanchipuram ≈8.25km (N)</td></tr>
<tr><td>10</td><td>Water bodies</td><td><table><tr><th>Waterbodies</th><th>~Distance</th><th>Direction</th></tr><tr><td>Lake near Mattur</td><td>0.10km</td><td>SSW</td></tr><tr><td>Sodiyambakkam Lake</td><td>0.79km</td><td>E</td></tr><tr><td>Mamandur Tank</td><td>1.73km</td><td>WNW</td></tr><tr><td>Lake near Eruppatti</td><td>2.70km</td><td>SSE</td></tr><tr><td>Odai near Nattapettai</td><td>3.52km</td><td>N</td></tr><tr><td>Cheyyar R</td><td>6.45km</td><td>SSE</td></tr><tr><td>Palar R</td><td>7.06km</td><td>N</td></tr><tr><td>Canal near Anumantandalam</td><td>7.13km</td><td>SSE</td></tr><tr><td>Lake near Sanarpandai</td><td>7.63km</td><td>W</td></tr><tr><td>Lake near Sevilmedu</td><td>8.44km</td><td>N</td></tr><tr><td>Tandarai Canal</td><td>8.72km</td><td>W</td></tr><tr><td>Odai near Adavapakkam</td><td>9.59km</td><td>ESE</td></tr><tr><td>Vegavati R</td><td>10.09km</td><td>NNE</td></tr><tr><td>Uttiramerur Tank</td><td>10.93km</td><td>SSE</td></tr><tr><td>Lake near Pudupettai</td><td>13.18km</td><td>NE</td></tr></table></td></tr>
<tr><td>11</td><td>Reserve Forests and Protected Forests</td><td>Marudam RF ~12.07 km (ESE)</td></tr>
<tr><td>13</td><td>Notified Wildlife Sanctuary/ Ecologically sensitive areas</td><td>Nil within 15 km radius</td></tr>
</table>

2.2 Magnitude of operation

In view of fulfilling market requirement, we are proposing new manufacturing unit with capacity of 750 MT/annum and its 2.90 Acres of land allotted at Plot No. C-29B, Survey No. 155Pt, SIPCOT Industrial Complex-Cheyyar Phase-II, Mathur village, Vembakkam Taluk, Thiruvannamalai District, Tamil Nadu -, India.

Table 2 List of Proposed Products (EC Products)

S. No	Products	CAS No	Total (TPA)	Drug Usage
1	Ofloxacin	82419-36-1	250	To treat Bacterial infections of the skin, lungs, prostate, or urinary tract (bladder and kidneys) and pelvic inflammatory disease and Chlamydia and/or gonorrhea
2	Ciprofloxacin Hydrochloride	86393-32-0	200	To treat or prevent certain infections caused by bacteria such as pneumonia; gonorrhea (a sexually transmitted disease) and typhoid fever
3	Moxifloxacin	354812-41-2	100	To treat pneumonia, and skin, and abdominal (stomach area) infections
4	Norfloxacin	70458-96-7	200	Quinolone antibiotics
Total			**750**	--

List of Non EC Products (As per latest CTE issued Vide No:2101139965476 dated: 01.09.2021)

Sl.No	Items	Quantity (Nos/Year)
Tablets		
1	Paracetamol	Total quantity as an average is 100000000
2	Ibuprofen	
3	Ciprofloxacin	
4	Ceterizine	
5	Prednisolane	
6	Dewloratidline	
7	Amlodipine	
8	Atenelol	
9	Furosimide	
10	Enalapril	
11	Diclofenac Sodium	
12	Folic Acid	
13	Erythromycin	
14	Azithromycin	
15	Roxithromycin	
16	CPM	

17	Phenylephrine	
18	Norflocxacin	
19	Tinidazole	
20	Aceclofenac	
21	Chlorzoxazone	
22	Ketocanazole	
23	Flucanazole	
24	Metroniodazole	
25	Simvastatin	
26	Trimethoprim	
27	Sulphamethazole	
28	Albendazole	
29	Isoniazid	
30	Rifampicin	
31	Metformin	
32	Glimipride	
33	Repaglanide	
34	Dexamathazone	
35	Glibenclamide	
36	Ranitidine	
37	Domperidone	
38	Terbinafine	
39	Ondansetron	
Capsules :		
1	Omeprazole (as enteric coated pellets)	Total quantity as an average is 12000000
2	Lansoprazole (as enteric coated pellets)	
3	Domperidone	

Land Requirement

The required land area is **2.90** Acres (10117.10Sq.m). The land allotted from SIPCOT to the proponent for this proposed project. The area breakup detail is given in **Table 3.**

Table 3 Land Area Break up Details

S. no	Blocks	Ground cover area In square meters	%
1	Admin/R&D/CANTEEN/QC	976.5	9.65
	Ware house	355	3.52
	Production block- formulation*	1191.7	11.77
	Production block-API	814.45	8.05
	Utility-water plant, vacuum, engg,work shop, boiler- formulation*	380.02	3.76
	Utility-water plant, vacuum, engg,work shop, -API	253.34	2.5
	Solvent recovery	171.2	1.69
	Solvent storage, tank	276.9	2.75

	Class -A solvents	No class A Solvent storage	--
	ETP-API	48	0.47
	Sewage*	48	0.47
	ETP- formulation*	30	0.30
	Boiler	147.3	1.45
	E.B yard	40	0.4
	Security cabin	12.5	0.12
	Total (A)	**4744.91**	**46.9**
2.	**Road (B)**	**1661.5**	**16.42**
3	**Green area (C)**	**3710.68**	**36.68**
Total (A+B+C)		**10117.09**	**100**

***Note**: It is not mentioned in ToR application and added later due to detailed engineering and redesign.

2.3 Raw materials

All the raw materials required in manufacturing are procured from local markets. The raw materials and finished products are transported by road. All chemicals used in the process were stored in a designated area with proper labels in the warehouse. Solvents used for the production process are stored in tanks and drums and safety measures are followed.

2.4 Water requirement

Construction Phase: 10 KLD (Source- SIPCOT).

Operation Phase: The total requirement of raw water for the proposed unit is 75.3 KLD (EC-49.3 & Non EC-26.0). Fresh water requirement is 40.4 KLD (EC-26.4& Non EC-14) will be sourced from SIPCOT. Details of water requirement for the proposed project are given in **Table 4**

Table 4 Water Requirement for the project

Water requirement	For Non –EC products (As per CTE-2021)			For EC products			Total		
	Fresh (KLD)	Recycle (KLD)	Total (KLD)	Fresh (KLD)	Recycle (KLD)	Total (KLD)	Fresh (KLD)	Recycle (KLD)	Total (KLD)
Boiler	0	2	2	0	14.5	14.5	0	16.5	16.5
Purified Water DM Water Generation for: • Process And Equipment Cleaning • Qc & R&D • Pilot Plant Use	5.0* (in which 10 KLD is Reject, 4.0 KLD for Process equipment cleaning)	0	5.0	15.0* (in which 5 KLD is Reject, 5.0 KLD for process, 2.0 KLD for QC and 3.0 KLD for pilot plant)	0	15.0	20	0	20
Pilot Plant Use	0	0	0	2	0	2	2	0	2
Cooling Tower	0	2	2	0	3	3	0	5	4
Scrubber	0	0.8	0.8	2	0	2	2	0.8	2.8
Domestic	9	0	9	6	0	6	15	0	15
Green Belt	0	7.2	7.2	1.4	5.4	6.8	1.4	12.6	14
Total	**14**	**12.0**	**26**	**26.4**	**22.9**	**49.3**	**40.4**	**34.9**	**75.3**

2.5 Power and fuel requirement

Power requirement will be met from TANGEDCO. One DG set will be installed as back-up power requirement during power failure. The power and energy requirement details are provided in **Table 5.**

Table 5 Power and Energy Requirement

Details	Quantity	Source
For EC products:		
Power Requirement	300 kVA	TANGEDCO
Back-up-DG Set	1* 350 kVA	Fuel-HSD
Boiler	1x3.0 Ton/Hr	Bio Briquette
Bio Briquette	2.2 TPD	Local Supply
HSD Requirement	80 Liters / hr	Local Supply
For Non-EC product manufacturing (CTE):		
Back-up-DG Set	1* 125 kVA	Fuel-HSD
Boiler	5 TPD	Gas

2.6 Manpower requirement

Stage	Permanent (No)	Temporary(No)	Total(No)
Construction	5	30	**35**
Operation			
EC Process	30	70	**100**
Non EC process	100	100	**200**

2.7 Project Cost

Estimated project cost is INR. 900.05 Lakhs.

2.8 Municipal Solid Waste generation and Management

Municipal Solid waste generation and management for the proposed project is detailed in **Table 6.**

Table 6 Municipal Solid Waste generation and Management

Sl. No.	Description	Quantity (Kg/d)- EC	Quantity (Kg/d)- Non EC (CTE)	Total (Kg/d)	Method of Collection	Method of Disposal
1	Organic Waste	54	27	91	In drums	Local panchayat bin through

						SIPCOT
2	Inorganic waste	36	18	54		Authorised TNPCB Recyclers.
For Construction Phase Quantity- 5.0 kg/day (disposed through bins)						

2.9 Hazardous waste generation and management

Hazardous waste generation details for the project are given in **Table 7.**

Table 7 Hazardous waste Generation and Management

Heading as per HWM rules	**Sub heading**	**Quantity (TPA)**		**Mode of Disposal**
		(For Non-EC)	**(For EC)**	
5. Industrial operation using minerals/synthetic oil as lubricants	5.1 used oil/spent oil	5.0 litres	100 liters	Collection and storage disposal to TNPCB Authorized Recyclers
5. Industrial operations using Minerals/synthetic oil as lubricant	5.2 wastages/residue containing oil	-	10 liters	Collection and storage disposal for co-processing
20. production/industrial use of solvents	20.3 distillation residues	-	10000 liters	
28. production/ formulation of drugs/pharmaceuticals and health care products	28.2 Spent catalyst 28.3 spent carbon	None	None 0.76 MT	Collection , storage , Transport Disposal to authorized recycler
	Spent Organic waste	-	1.08 MT	Collection , storage , Transport Disposal through TWML, Gummidipoondi
28.Production/ formulation of drugs/pharmaceuticals and health care products	28.5 date expired 28.4 off specification drug 28.6 Spent solvents	200 kg 200 kg -	500 kg 829.5 MT	Collection , storage , Transport Disposal to authorized recycler
35. purification and treatment of exhaust air, water, waste water from the processes in this schedule and common industrial	35.3 chemical sludge from waste water 35.3 MEE salts	50 kg 100 kg	1000 kg 20000 kg	Collection , storage , Transport Disposal to authorized recycler/ Collection , storage , Transport

effluent treatment				Disposal through TWML, Gummidipoondi
33. Diposal of barrels, containers used for handling of hazardous wastage chemicals Empty Container	33.1 Discarded containers/barrels liners contaminated with hazardous wastes/chemicals	Barrels 500 nos 500 kg	Barrels 1000 nos 500 kg	TNPCB Authorized Recyclers
Empty bags		1000 Nos	3200 Nos	Empty bags will be taken back by suppliers

3. Environmental Baseline Data

Baseline data was generated for the same project during 15th January, 2022–15th April, 2022.

3.1 Micrometeorology

Details are given in **Table 8.**

Table 8 Micrometeorological data during study period

S. No	Parameter	Observation
1.	Temperature	Max Temperature : 38 ^{0}C Min Temperature : 22 ^{0}C Avg Temperature :28.57 ^{0}C
2.	Average Relative Humidity	77.99%
3.	Average Wind Speed	3.15 m/s
4.	Predominant Wind Direction	East South East

3.2 Ambient Air Quality

The ambient air quality was monitored at 8 locations for 12 parameters as per CPCB guidelines within the study area from 15th January, 2022–15th April, 2022. The baseline levels were

- PM_{10} ranged from 42.42 µg/m³ to 68.54 µg/m³,
- $PM_{2.5}$ ranged from 17.45 µg/m³ to 31.89 µg/m³,
- SO_2 ranged from 6.76 µg/m³ to 14.88 µg/m³,
- NO_2 ranged from 14.61 µg/m³ to 30.7 µg/m³,

All the parameters are well within the National Ambient Air Quality Standards for Industrial, Commercial and Residential areas at all monitoring locations during the study period.

3.3 Ambient noise Quality

Noise levels were monitored at 8 locations within the study area.

In the Industrial area day time noise levels was about 57.9 dB(A) and 53.2 dB(A) during night time, which is within prescribed limit by CPCB (75 dB(A) Day time & 70 dB(A) Night time).

In residential areas day time noise levels varied from 50.7 dB(A) to 53.1 dB(A) and night time noise levels varied from 40.2 dB(A) to 43.3 dB(A) across the sampling stations. The field observations during the study period indicate that the ambient noise level is within the prescribed limit by CPCB (55 dB(A) Day time & 45 dB(A) Night time).

3.4 Surface water Quality

Surface water quality was monitored at 8 locations within the study area.

- pH in the collected surface water samples varies between 6.82 to 7.89 where all the samples are within the limit of IS 2296:1992. .
- The Total Dissolved Solids (TDS) value of collected surface water sample ranges from 1307 mg/l to 2064 mg/l.
- The Total hardness value of the collected surface water sample ranges between 214.9 mg/l to 760.8 mg/l .
- BOD value of the collected surface water sample ranges from 1.2 mg/l to 6.7 mg/l.
- COD value of collected surface water varies from 10.6 to 31.6 mg/l.
- The concentration of heavy metals are within the limits of IS 2296:1992.

3.5 Ground water Quality

Ground water quality was monitored at 8 locations during study period

- The groundwater results of the study area indicate that the pH range varies between 6.8 and 7.86. It is observed that the pH range is within the permissible limit of IS 10500:2012.
- The Total Dissolved Solids range of the collected ground water sample is varied between 714 mg/l – 1251 mg/l. All the samples are within the permissible limit of IS 10500: 2012.
- The acceptable limit of the chloride content is 250mg/l and the permissible limit is 1000 mg/l. The chloride content in the collected ground water samples in the study area ranges between 198.90 mg/l – 379.40 mg/l. It is observed that all the samples are within the permissible limit of IS 10500:2012.
- The acceptable limit of the sulphate content is 200mg/l and the permissible limit is 400mg/l. the sulphate content in the collected ground water samples in the study area is varied between 46.3 mg/l –157.8 mg/l. It is observed that all the samples are meeting the acceptable limit of the IS 10500: 2012.
- The Total hardness range is between 272 mg/l – 478 mg/l for ground water samples. It is observed that all the samples are within the permissible limit of the IS 10500: 2012.
- It is observed that all ground water samples collected within the study area are meeting the drinking water standards IS 10500:2012.

3.6 Soil quality

- The pH of the soil samples ranged from 6.8 to 7.83.
- Conductivity of the soil samples ranged from 167 to 344 µmhos/cm.
- Nitrogen content in the collected soil samples ranged from 94.3 mg/kg to 182.3 mg/kg.
- Phosphorus content ranged from 29.4 mg/kg to 86.4 mg/kg.
- Potassium content ranges from 158 mg/kg to 228.7 mg/kg.

3.7 Ecology

A survey was conducted to study the flora & fauna in 10 km radius. Some of the information was gathered from the local habitants. All the collected data were

classified to interpret the impact of pollution on the flora and fauna of that region. Survey of the wild plants as well as cultivated crop plants was made and all the available information was recorded.

Livestock like cattle, buffalo, goat, poultry, duck and pig are reared for dairy products, meat, egg for agriculture purpose. Majority of cattle and buffalo are of local variety. Backyard poultry farms are mostly common in this area.

Schedule species Pavo cristatus(schedule I) and Naja naja (schedule III) are present within the study area. Conservation plan is attached as an **Annexure-13**

3.8 Socio-economic environment

Socio -economic indicators of study area are given in Table 9 below.

Table 9 Socio- economic indicators of study area

S.No	Particulars	Study Area	Unit
0-5km			
1.	Number of villages and Town in the Study Area	24	Nos.
2.	Total Households	9192	Nos.
3.	Total Population	37619	Persons
4.	Children Population (0-6 Years Old)	4018	Persons
5.	SC Population	10588	Persons
6.	ST Population	658	Persons
7.	Total Working Population	19746	Persons
8.	Main Workers	14869	Persons
9.	Marginal Workers	4877	Persons
10.	Cultivators	4789	Persons
11.	Agricultural Labourers	8131	Persons
12.	Household Industries	353	Persons
13.	Other Workers	6473	Persons
14.	Literates population	24940	Persons
15.	Illiterates population	12679	Persons
5-10 km			
16.	Number of villages and Town in the Study Area	83	Nos.
17.	Total Households	25824	Nos.
18.	Total Population	103919	Persons
19.	Children Population (0-6 Years Old)	10941	Persons
20.	SC Population	30839	Persons

21.	ST Population	2061	Persons
22.	Total Working Population	54055	Persons
23.	Main Workers	39165	Persons
24.	Marginal Workers	14890	Persons
25.	Cultivators	9733	Persons
26.	Agricultural Labourers	23772	Persons
27.	Household Industries	3161	Persons
28.	Other Workers	17389	Persons
29.	Literates population	68493	Persons
30.	Illiterates population	35426	Persons

4. Impact on Air environment

Air quality modelling was done using AERMOD software to identify the ground level concentration due to operation of proposed industries. The details on the type of fuel proposed, emissions are given in **Table 4-2** of the EIA report. Based on the modelling done, the total ground level concentrations form point source and line source are given in **Table 10** and **Table 11** respectively.

Table 10 Total concentration from point source

Pollutant	Max. Baseline Conc. ($\mu g/m^3$)	Estimated Incremental Conc. ($\mu g/m^3$)	Total Conc. ($\mu g/m^3$)	NAAQ standards ($\mu g/m^3$)	% increase
PM10	68.54	0.25	68.79	100	0.36
SO_2	14.88	0.06	14.94	80	0.40
NO_x	30.7	0.59	31.29	80	1.92
CO	610	9.31	619.31	4000	1.53
HCL*	-	0.01	-	-	-
HF*	-	0.02	-	-	-

*Note: There is no NAAQ Standard for HCL & HF.

Table 11 Total concentration from Line Source

Pollutant	Max. Baseline Conc. ($\mu g/m^3$)	Estimated Incremental Conc. ($\mu g/m^3$)	Total Conc. ($\mu g/m^3$)	NAAQ standard ($\mu g/m^3$)	% increase
PM_{10}	68.54	0.23	68.77	100	0.34
NO_x	30.7	2.62	33.32	80	8.53
CO	610	128.19	738.19	4000	21.01

From the above table, it is evident that from the proposed project, the Total Concentration for PM_{10}, $PM_{2.5}$, SO_2, CO and NO_x are well within the NAAQ Standards.

Following mitigation measures are proposed

- 1x 350 & 1x125 kVA DGs are provided with individual stack heights of 19 & 17 m AGL.
- 200 & 1000 kg/hr boiler (cyclone duct collector) will be provided with a stack of 30 m AGL.
- All the reactors will be connected to a double stage scrubber with stack of 19 m height.

5. Alternate site consideration

Global Pharma considered 3 Sites for the project namely:

- SIPCOT Industrial Park at Manallur
- SIPCOT Industrial Park at Thoothukudi
- SIPCOT Industrial Park at Cheyyar.

Of the three sites, SIPCOT Industrial Park at Cheyyar has been selected for the project.

6. Environmental Monitoring Programme

A monitoring schedule with respect to Ambient Air Quality, Water Quality, Soil and Noise as per CPCB/ MoEF & CC will be adopted during construction phase and after establishment of the project.

7. Public Hearing

The Draft EIA report is being submitted to TNPCB for conducting Public hearing.

8. Rehabilitation and Resettlement

R&R is not applicable; since site is located within SIPCOT industrial area

9. Environmental Management Plan

9.1 Air Environment

- 1x 350 & 1x125 kVA DGs are provided with individual stack heights of 19 & 17 m AGL.
- 200 & 1000 kg/hr boiler (cyclone duct collector) will be provided with a stack of 30 m AGL.

- All the reactors will be connected to a double stage scrubber with stack of 19 m height.
- Adequate greenbelt will be provided to reduce the air emission.

9.2 Water Environment

Total waste water is separated into sewage and Trade effluent.

Table 12 Liquid waste management

Wastewater	Generated Quantity (KLD)		Disposal Methods
	For Non Ec CTE)*	For EC Products	
Sewage	7.2	5.4	For Non Ec & Ec Products: Sewage Will Be Treated Through Sewage Treatment Plant (15 KLD). Treated Sewage Will Be Reused For Greenbelt Within The Plant.
Effluent (From Process, Boiler & Cooling Tower Blowdown & DM Plant Reject)	5.0	19.4	**For Non Ec Products (As Per CTE):** Effluent From Boiler, CT And Washing Will Be Treated Through 5 KLD ETP/RO And Treated Effluent Will Be Reused For Utilities. **For Ec Products:** Effluent From Boiler, Equipment Washing, Process, CT, Pilot Plant, Scrubber, DMP Rejects And R&D/Qc/Ad Will Be Treated Through ETP (20kld) Followed By UF And Ro. Ro Permeate Will Be Used For CT And Boiler Makeup. Ro Reject Will Be Treated Through MEE And ATFD. Permeate Will Be Reused And Salt From ATFD Will Be Disposed Through TSDF.

There will be no discharge of wastewater outside and Zero Liquid Discharge (ZLD) concepts will be implemented in toto.

9.3 Noise Environment

- All the noise generating equipment will be operated to ensure that noise level does not exceed 75-70 dB (A) at plant boundary as per the requirement of Central / State Pollution Control Board.
- Acoustic enclosures are available for compressors and DG sets The same measures will be followed for proposed expansion also

- Green belt of 0.92Acres (36.68% of land area) will act as a noise barrier.
- Training will be imparted to personnel to generate awareness about effects of noise and importance of using PPEs.

9.4 Land Environment

- STP is proposed for treating the sewage generated and treated sewage will be used for green belt development within the industry.
- ETP with ZLD scheme is proposed to treat the effluent. Hence there will be no discharge of treated/ untreated wastewater outside the project premises.
- Municipal solid wastes will be segregated and organic waste will be disposed to local panchayat bins. Inorganic wastes will be sent to TNPCB authorized recyclers
- Hazardous wastes generated will be disposed as per Hazardous waste (Management, Handling and Transboundary movement) amendment Rules 2016.

9.5 Green belt development

Total green belt area of 3710.68 Sq.m which is 36.68 % will be proposed for the project.

Table 13 Budget breakup with timeline:

Work or activity	Species	2022-23	2023-24
Saplings	Poovarsam	70	70
	Pungam	70	70
	Neem Tree	70	70
	Mahagony	70	70
Sub Total- (INR)		**2,50,000/-**	**2,50,000/-**

9.6 Budgetary provisions for EMP

Capital cost of INR 142.00 Lakhs has been allocated for Environmental Management measures. Details are given in **Table14.**

Table 14 Budget for Environmental Management Plan

S. No	Description	Capital Cost (INR. Lacs)	Recurring Cost/Annum (INR. Lacs.)
1	Air Pollution Control	20.00	16.0

2	Water Pollution Control (STP, ETP & MEE)	80.00	
3	Hazardous Waste Management	5.00	
4	Noise Pollution	5.00	
5	Environmental Monitoring	20.00	
6	Occupational Health & Training	2.00	
7	Green Belt	5.00	
8	Statutory Compliance	5.00	
	Total	**142.00**	

9.7 Proposed CER activities

As per CER Notification, the 2.0% of project Cost (INR 9.0 Crore) i.e., INR 18 lakhs need to spend for CER activities. As per the Latest OM F.No. 22-65/2017-IA.III dated: 30.09.2020, it will be spent as per SEAC recommendation and our proposal as follows: The details are given in **Table15**.

Table 15 Budget for CER activities

S. No.	Activities under CER (Tentative)	2023-2024	2024-2025	2025-2026
1	Government Higher Secondary School, Sodiyambakkam • Construction of Hand washing system • Sanitation facility & Drinking water plant. • Library& Solar lighting • Avenue Plantation along the School Boundary	8	2	-
2	Government School, Mamandur • Construction of Hand washing system • Sanitation facility & Drinking water plant. • Library& Solar lighting • Avenue Plantation along the School Boundary	-	6	2
	Total	**18.0 Lakhs**		

10. Project Benefits

- Local people will get direct financial benefit by way of employment.
- Local people will get some contracts of supply and services to get indirect income.
- Company will contribute to improving education in nearby areas.
- There will be a positive impact on social conditions in and around the site due to the proposed project.
- There will be an increase in market and business establishment facilities.
- This project is quite important for the state and the country considering the contribution by way of taxes and duties.
- The project will contribute to space programs of the Government of India.