# Environmental Management Plan

# For

## Obtaining CONSENT FOR ESTABLISHMENT (CFE) – Expansion

**Submitted to:**

**AP State Pollution Control Board**

**Submitted by:**

**NATCO PHARAM LIMITED - Crop Health Sciences Division**
**Technical Plant,**

**Sy. No: 56(P) & 60(P), APIIC, Industrial Park,**
**Attivaram (Village), Ozili (Mandal), SPSR Nellore (Dist.),**
**Andhra Pradesh**

**1.0 INTRODUCTION:**

**NATCO PHARMA LIMITED,** a vertically integrated and R&D focused pharmaceutical company engaged in developing, manufacturing and marketing of finished dosage formulations ("FDF") and active pharmaceutical ingredients ("APIs"). Founded in 1981, our focus is primarily on niche therapeutic areas and complex products. We market and distribute our products in over 40 countries. We sell our FDF products in the United States, India, Europe and the rest of the world ("RoW") markets. We also operate in certain key geographies through our subsidiaries.

The Company provides a congenial working environment that encourages employee empowerment and out-of-the-box initiatives. The team is provided with adequate authority-responsibility to implement novel ideas.

**Our Mission**

"Making Specialty medicines accessible to all".

**Values**

We believe, to succeed, requires highest standard of corporate governance behaviour towards everyone we work with, the communities we touch and the environment on which we have an impact. This is our road to consistent, competitive, profitable and responsible growth and creating long term value.

The Company strengthened its governance-led business commitment and corporate brand with the objective of enhancing stakeholder confidence in the management's ability to sustain growth over the long term. Increasing approvals from global regulatory authorities and large global customers bears testimony to the Company's ability in conducting business operations aligned to global best practices.

**ENVIRONMENT**:

Care for the Environment is one of our core corporate values and, as a part of this commitment; we enunciated our Environment, Health & Safety (EHS) Policy. Our EHS policy provides for the creation of a safe and healthy workplace and a clean environment for employees and the community. It aims for the highest international standards in plant

design, equipment selection, maintenance and operations. The policy is a commitment that we will manufacture products safely and in an environmentally responsible manner.

The implementation of the EHS Policy is ensured by institutionalizing a robust EHS Management System, adequately supported by a well-defined organizational structure. In our journey towards sustainability, the EHS team sets goals and benchmarks every year and works towards achieving them. Management review mechanism is in place for close monitoring of EHS policy implementation.

We are committed to environmental stewardship across the value chain. We keep wastes to the minimum and clean gases and effluents scientifically. We strive to reduce organic & inorganic waste generation in the process at the R&D stage itself. At the plant level we carry-out extensive studies for each product and at pilot plant level to understand the waste generation for treatment and for safe disposal.

## 2.0 CROP HEALTH SCIENCES DIVISION:

### Leveraging crop health sciences

We are using our expertise in organic chemistry to leverage our skillsets and expand into the agrichemical space. After carefully assessing the market potential and understanding our own strengths, we are targeting a unique set of molecules for the Indian market, which have a potential to expand to other regions.

Natco had proposed to establish a Crop Health Sciences division – Technical plant for manufacturing technical pesticides (insecticides) at Sy. No: 56(P) & 60(P), APIIC, Industrial Park, Attivaram (Village), Ozili (Mandal), SPSR Nellore (Dist.), Andhra Pradesh (state).

**Natco had obtained the Consent for Establishment (CFE) from AP State Pollution Control Board, Vijayawada, vide CFE Order No: 242/APPCB/CFE/RO-NLR/HO/2018, dated: 17.09.2018 to manufacture technical pesticide of "Chloran Tranilliprole (CTP)" with a production capacity of 4.00Tons/day with the capital cost of Rs.30crores.**

For environment protection a full pledged Effluent treatment plant with Zero liquid discharge concept to recycle the treated effluent to cooling towers makeup is proposed.

In our pursuit of sustainability, once is not enough, continuous improvement is a major ingredient. We look at the potential of continual improvement by way of process optimization, resource conservation, pollutant loads reduction, etc.

## 3.0 Revised proposal for CFE amendment:

***As a part of continual improvement, our R&D team had optimized the technical pesticide process of*** *"Chloran Tranilliprole (CTP)"* ***which is proposed at the Attivaram technical plant which in turn results in elimination of few raw materials and reduction in water consumption and effluent generation. We would like to submit the change in process to the authority.***

***Also to grab the market demand, we wish to manufacture an additional new product named*** *"Thiamethoxam",* ***a technical insecticide with a production capacity of 4.00Tons/day in the same premises.***
***With the above we here with submit the revised application for amendment of our CFE to include the new product along with the revised process of existing product.***

## Earlier process of Chlorantraniliprole (CTP)

In the earlier process, three solvents namely toluene, acetonitrile and water are involved. Toluene is used as solvent medium for acid chloride reaction, and the solvent mixture of toluene and acetonitrile is used as solvent medium for coupling of acid chloride of step-1 with 2-amino-5-chloro-3, N-dimethyl-benzamide (AC/ADB) to obtain Chlorantraniliprole. Water is used in the isolation of the final product.

After acid chloride reaction, toluene is distilled off and stripped with further toluene to obtain acid chloride as oily compound. The resulting acid chloride is again taken into fresh toluene and added to the solution of 2-amino-5-chloro-3, N-dimethyl-benzamide (AC/ADB) in acetonitrile in the presence of 3-picoline. After completion of reaction, water is added to the reaction mass and product is filtered off and washed with aq. acetonitrile. Then the resulting product is further leached with acetonitrile followed by water.

**Revised process:**

*As three solvents are involved in the earlier process and in order to minimize effluents, an improved process has been developed with a single solvent, acetonitrile. Acid chloride is prepared in acetonitrile and is added to the solution of 2-amino-5-chloro-3, N-dimethyl-benzamide (AC/ADB) in acetonitrile in the presence of 3-picoline. After completion of reaction, reaction mass is cooled and the final product is directly isolated by filtration from the reaction mass. Then the resulting product is further leached with water to improve the color of the product and to remove the water soluble impurities if any.*

## Advantageous of revised process over earlier process:

- ***Specific water consumption is drastically reduced from 10.29kg/kg of final product to 2.40kg/kg of final product (water only used for final rinsing of product).***
- ***Process time cycle has been reduced by several hours.***
- ***Consumption of toluene is eliminated and distillation of toluene step is avoided (in stage – 1), which minimizes the energy consumption by several folds.***
- ***Recovery and recycling of solvent is highly effective (single solvent instead of mixed solvent).***
- ***Single solvent is used instead of multiple solvents reduces the load in solvent recovery in the process.***
- ***Same output is achieved with reduced number of process equipments.***
- ***Yield of the product is comparatively higher in the revised process (91.0% against 82.0%).***
- ***Process is environmental friendly as total solvent volume is drastically reduced, water consumption and effluent generation is reduced.***
- ***Quality of the product is relatively improved.***

***With the addition of new product, there is no impact in terms of overall water consumption and effluent generation (due to the process optimization of existing product). Quantities of hazardous wastes will be marginally increased. There is no additional capital investment required (the same prosed equipment will be used for new product due to reduced process cycle time).***

The details of process, raw materials, material balance, water consumption, effluent generation, treatment and disposal, hazardous waste generation & disposal details are as below:

**Line of Activity:** **Organic Chemical Manufacturing (Pesticide Technical - Insectides)**

**List of Products & By-Products (as per existing CFE)**

| S.No | Status of permission | Name of the product | Capacity |
|---|---|---|---|
| 1 | Existing as per CFE | Chloran Tranilliprole (CTP) | 4.00 TPD |

| S.No | Status of permission | Name of the By-product | Capacity |
|---|---|---|---|
| 1 | Existing as per CFE | Sodium Bi sulphite/Sodium chloride | 1.68 TPD |

## Revised Proposal

**Line of Activity:** **Organic Chemical Manufacturing (Pesticide Technical - Insectides)**

**List of Products & By-Products (as per existing CFE)**

| S.No | Status of permission | Name of the product | Capacity |
|---|---|---|---|
| 1 | Existing as per CFE | Chloran Tranilliprole (CTP) | 4.00 TPD |
| 2 | New product addition | Thiamethoxam | 4.00 TPD |

**By- Products:** NIL

## LIST OF RAW MATERIALS (as per revised)

| S.No | Name of the Raw Material | Consumption (Tons/Day) |
|---|---|---|
| **A** | **Chloran Tranilliprole (CTP)** | |
| 1 | AC/BPC | 2.76 |
| 2 | AC/ADB | 1.92 |
| 3 | Thionyl Chloride | 1.00 |
| 4 | 3-Picoline | 1.00 |
| 5 | Acetonitrile | 13.00 |
| | | |
| **B.** | **Thiamethoxam** | |
| 1 | 3-methyl-N-nitro-1,3,5-oxadiazian-4-imine. | 2.43 |
| 2 | 2-chloro-5-(chloromethyl) thiazole | 2.56 |
| 3 | Dimethyl formamide (DMF) | 17.88 |
| 4 | Triethyl benzyl ammonium chloride (TEBA) | 0.05 |
| 5 | Dichloromethane(MDC) | 15.20 |
| 6 | 32% HCl | 4.00 |
| 7 | Potassium carbonate | 2.00 |

| Sl.No | Water Balance | | | | | |
|---|---|---|---|---|---|---|
| | Purpose of Use | Fresh water (KLD) | Recycled Water (KLD) | Gross water consumption (KLD) | Loss | Effluent Generation (KLD) |
| 1 | Process | **41.20** | 0 | 41.20 | (+)1.45 | **42.65** |
| 2 | Chilled water plant | 15.00 | 0 | 15.00 | 15 | 0.00 |
| 3 | Brine plant | 10.00 | 0 | 10.00 | 10 | 0.00 |
| 4 | Cooling Tower make up | 65.00 | 60 | 125.00 | 107 | 18.00 |
| 5 | Washings | 2.00 | 0 | 2.00 | 0 | 2.00 |
| 6 | Scrubbing | 3.00 | 0 | 3.00 | (+)0.4 | 3.40 |
| 7 | Green belt | 1.00 | 0 | 1.00 | 1 | 0.00 |
| | | | | | **Sub Total (Industrial Effluent)** | **66.05** |
| 8 | Domestic | 3.00 | 0 | 3.00 | 0.6 | **2.40** |
| | **TOTAL** | **140.20** | 60 | 200.20 | 133.6 | **68.45** |

Note: There is no increase in water consumption and effluent generation from the existing CFE figures.

## Details of Effluent Generation

| Sl.No | Source of Generation | HTDS (KLD) | LTDS (KLD) | Total Effluent Generation (KLD) |
|---|---|---|---|---|
| 1 | Process | 42.65 | 0.00 | 42.65 |
| 2 | Washings | 0.00 | 2.00 | 2.00 |
| 3 | Cooling Tower Blow Down | 0.00 | 18.00 | 18.00 |
| 4 | Scrubbing System | 3.40 | 0.00 | 3.40 |
| 5 | Domestic | 0.00 | 2.40 | 2.40 |
| **TOTAL** | | **46.05** | **22.40** | **68.45** |

| **Effluent Treatment & Disposal** | | | |
|---|---|---|---|
| 1 | HTDS Treatment scheme | HTDS - ETP consists of primary treatment system (50KLD for HTDS) collection sump at production block, screen chamber, equalization cum neu.tanks, flocculator, primary clarifier (lamella clarifier), and feed tank. Followed by Stripper (50KLD), MEE (60KLD) 3-Effect, and ATFD (7KLD). MEE & ATFD vapour condensate collected in an intermediate tank and fed to biological treatment along with LTDS effluent (22.40KLD). Biological treatment consists of Aeration tank, secondary clarifier (lamella clarifier), intermittent tank, Pressure sand filter & RO plant, RO permeate collection tank. Reject will be sent back to MEE feed tank for further treatment. RO permeate will be recycled to cooling towers. | RO permeate will be reused for cooling towers make up. |
| 2 | LTDS Treatment | Low TDS effluent primary treatment (30KLD) consists of equalization cum neutralization tanks, flocculator, primary clarifier (Lamella clarifier) and intermittent collection tank. Primary treated effluent pumped to Biological Treatment along with MEE& ATFD condensate. ). Biological treatment consists of Aeration tank, secondary clarifier (lamella clarifier), intermittent tank, Pressure sand filter & RO plant, RO permeate collection tank. Reject will be sent back to MEE feed tank for further treatment. RO permeate will be recycled to cooling towers. Sludge from all clarifiers will be collected in sludge tank and treated in sludge decanter. | |
| 3 | Domestic Effluent | | Septic Tank followed by Soak pit. |

Note: There is no change in the ETP treatment scheme and design capacities from the existing CFE.

## Details of Hazardous Waste Generation & Disposal

| Sl. No | Description of Hazardous Waste | As per Existing CFE | As per Revised Proposal | Method of Disposal |
|---|---|---|---|---|
| | | Quantity (Kg/Day) | Quantity (Kg/Day) | |
| 1 | Organic Residue | 396Kg/Day | **1256 Kgs/Day** | Shall be sent to Cement Industries for coprocessing / TSDF for incineration |
| 2 | Distillation Bottom Residue | 250kg/day | **1492kg/Day** | Shall be sent to Cement Industries for coprocessing / TSDF for incineration |
| 3 | Spent Mixed Solvents (From stripper) | 500kg/day | 500kg/day | Shall be sent to Cement Industries for coprocessing / TSDF for incineration |
| 4 | Spent Carbon | 25kg/day | 25kg/day | Shall be sent to Cement Industries for coprocessing / TSDF for incineration |
| 5 | ETP Sludge | 132.50kg/day | **180kg/day** | Shall be sent to Cement Industries for coprocessing / TSDF for secured Landfill |
| 6 | Inorganic Salts (Evaporation Salt) | **2320.80kg/day** | 2208kg/day | Shall be sent to TSDF for Secured Landfill |
| 7 | Inorganic salts (Spent sodium bi sulphite/sodium chloride) | Shown as by-product (1680kg/day) | 1680kgs/day | Shall be sent to TSDF for Secured Landfill/ authorized recovery units |
| 7 | Waste oil/Used Oil | 200 Lts/Month | 200 Lts/Month | Shall be sent to Authorized reprocessors/Recyclers |
| 8 | Detoxified Containers | 500nos/Month | 500nos/Month | After Detoxification sent to outside agencies |
| 9 | Used Lead Acid Batteries | 2Nos/Annum | 2Nos/Annum | Shall be sent back to suppliers on buyback basis |
| 10 | Used PPE | Not mentioned (Missed) | 100kg/Month | Shall be sent to Cement Industries for coprocessing / TSDF for incineration |

Note: In the existing CFE, Spent sodium bi-sulphite/sodium chloride salt generated from scrubbing of gaseous emissions was proposed to sell as by-product. Currently did not find the suitable recycler for further processing to recover the sodium bi sulphite.

Hence the spent sodium bi sulphite is proposed to dispose to TSDF for secured landfill till we get a suitable recycler. Hence the same is shown as hazardous waste in the revised proposal.

Used PPE was missed in the existing CFE. Hence included in the revised proposal.

## Air Emissions:

**Boiler:** ***No boiler is proposed at site (same as existing CFE).***

Steam requirements will be met from the neighbor industry (M/s. Allegro Specialty Chemicals Private Limited or from Natco Pharma – Formulations unit) which is located beside our industry premises through pipeline. So there is no boiler make up water requirement or waste water generated for boiler blow down. M/s. Allegro Specialty Chemicals Private Limited has obtained consent order and installed (6.0 TPH boiler at M/s. Allegro and 3TPH boiler at Natco – formulations unit). As the industry is producing excess steam than their daily requirement we will be utilizing steam of approximately 2 TPH from their boiler through pipeline laid from their industry premises to our industry.

**DG Set: No additional DG set is proposed in the revised proposal.**

**DG set details as per existing CFE:**

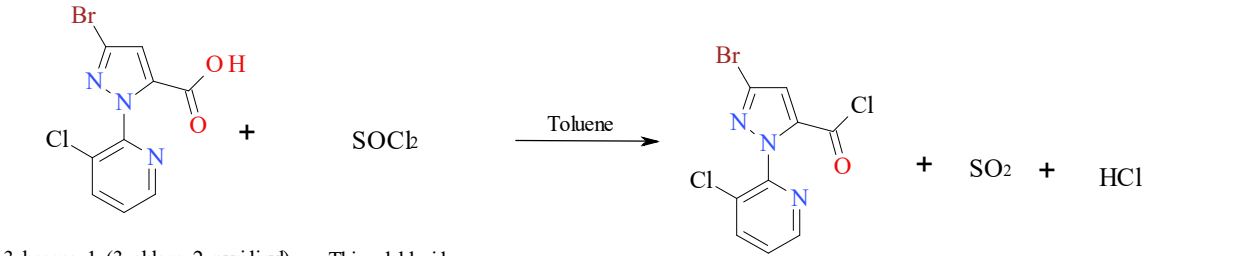
| | | |
|---|---|---|
| Capacity | = | 1010KVA |
| Fuel | = | Diesel |
| Stack height | = | 6.5mts |
| Air pollution control equipment | = | Acoustic enclosures |

**Process emissions** from reactor vents will be passed through two stage alkali scrubber with automatic pH adjustment and online pH measuring system.

## MANUFACTURING PROCESS & MATERIAL BALANCE

## Existing Product: Chlorantraniliprole (CTP)

### Stage-1




3-bromo-1-(3-chloro-2-pyridinyl) -1H-pyrazole-5-carboxylic acid
M.W: 302.5

Thionylchloride
M.W: 118.97

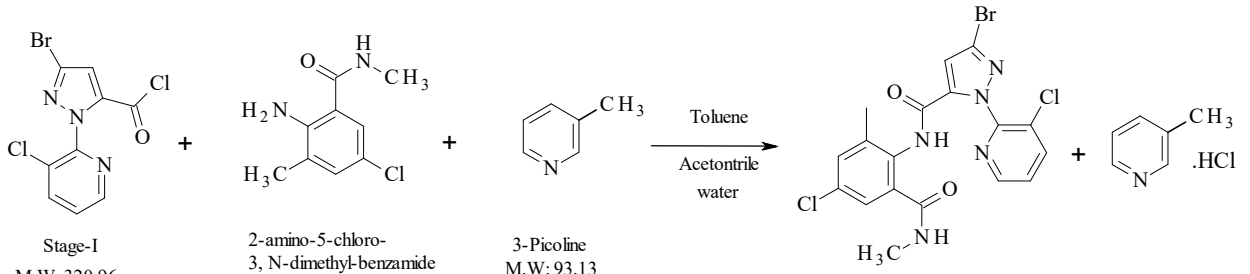
Acid chloride
M. W: 320.96

Sulphurdioxide
M.W: 64.06

Hydrochloric acid
M.W: 36.46

The Bromopyrazole carboxylic acid is converted to corresponding acid chloride using Thionyl Chloride. The Sulfur dioxide and HCl gas evoloved are scrubbed and absorbed in caustic soda solution to give Sodium bisulfite and Sodium chloride respectively.

### Stage-2




Stage-I
M.W: 320.96

2-amino-5-chloro-
3, N-dimethyl-benzamide
M.W : 198.6

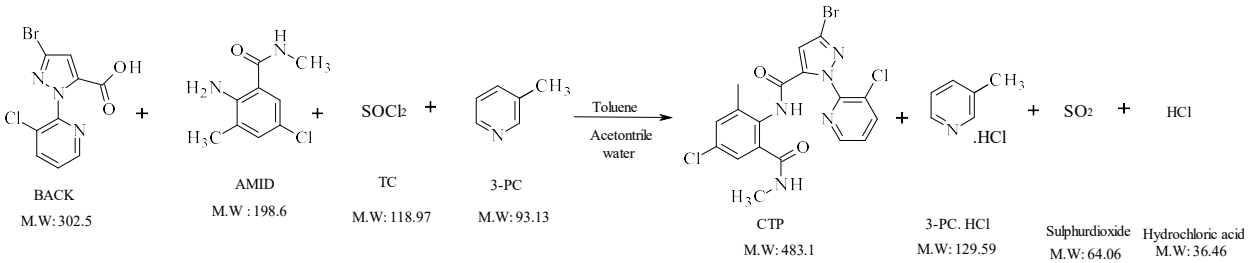
3-Picoline
M.W: 93.13

Chloranthraliniprole
M.W: 483.1

3-Picoline HCl
M.W:129.59

The acid chloride compound from Stage –I is couple with Amino – Chloro – N_ Dimethyl Benzamide to get the final technical product Chlorantranilliprole(CTP).

**Consolidated material balance for 1.0 Kg of CTP**



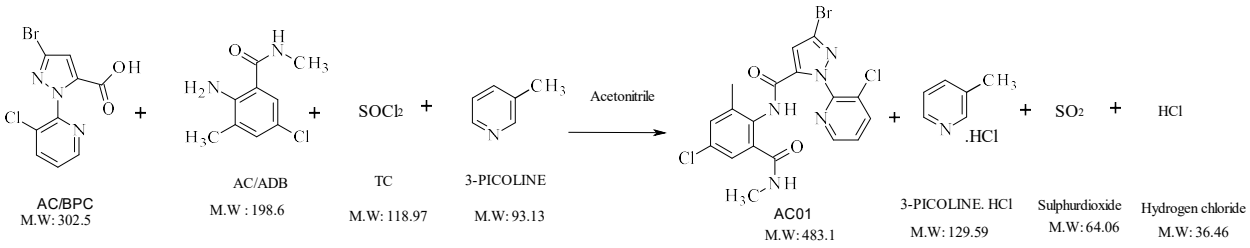

| S.No | Input | Quantity | Output | Quantity |
|---|---|---|---|---|
| 1. | BACK | 0.771 Kg | CTP | 1.0 Kg |
| 2. | AMID | 0.531 Kg | **Recovered solvent** | |
| 3. | TC | 0.364 Kg | Toluene | 10.79 Kg |
| 4. | 3-PC | 0.617 Kg | Acetonitrile | 3.493 Kg |
| 5. | Toluene | 11.36 Kg | 3-PC | 0.60 Kg |
| 6. | Acetonitrile | 4.99 Kg | **Solvent evaporation loss** | |
| 7. | Water | 10.29 Kg | Toluene | 0.57 Kg |
| 8. | | | Acetonitrile | 1.0 kg |
| 9. | | | TC | 0.06 kg |
| 10. | | | **Aqueous waste** | |
| 11. | | | Water | 10.29 Kg |
| 12. | | | 3-PC. HCl | 0.061 Kg |
| 13. | | | Acetonitrile | 0.499 kg |
| 14. | | | **Gaseous waste** | |
| 15. | | | Sulphur dioxide | 0.164 Kg |
| 16. | | | Hydrogen chloride | 0.093 kg |
| 17. | | | **Organic waste** | |
| 18. | | | | 0.303 Kg |
| | **Total** | **28.923 Kg** | **Total** | **28.923 Kg** |

## Existing product – Revised process: Chlorantraniliprole (CTP)

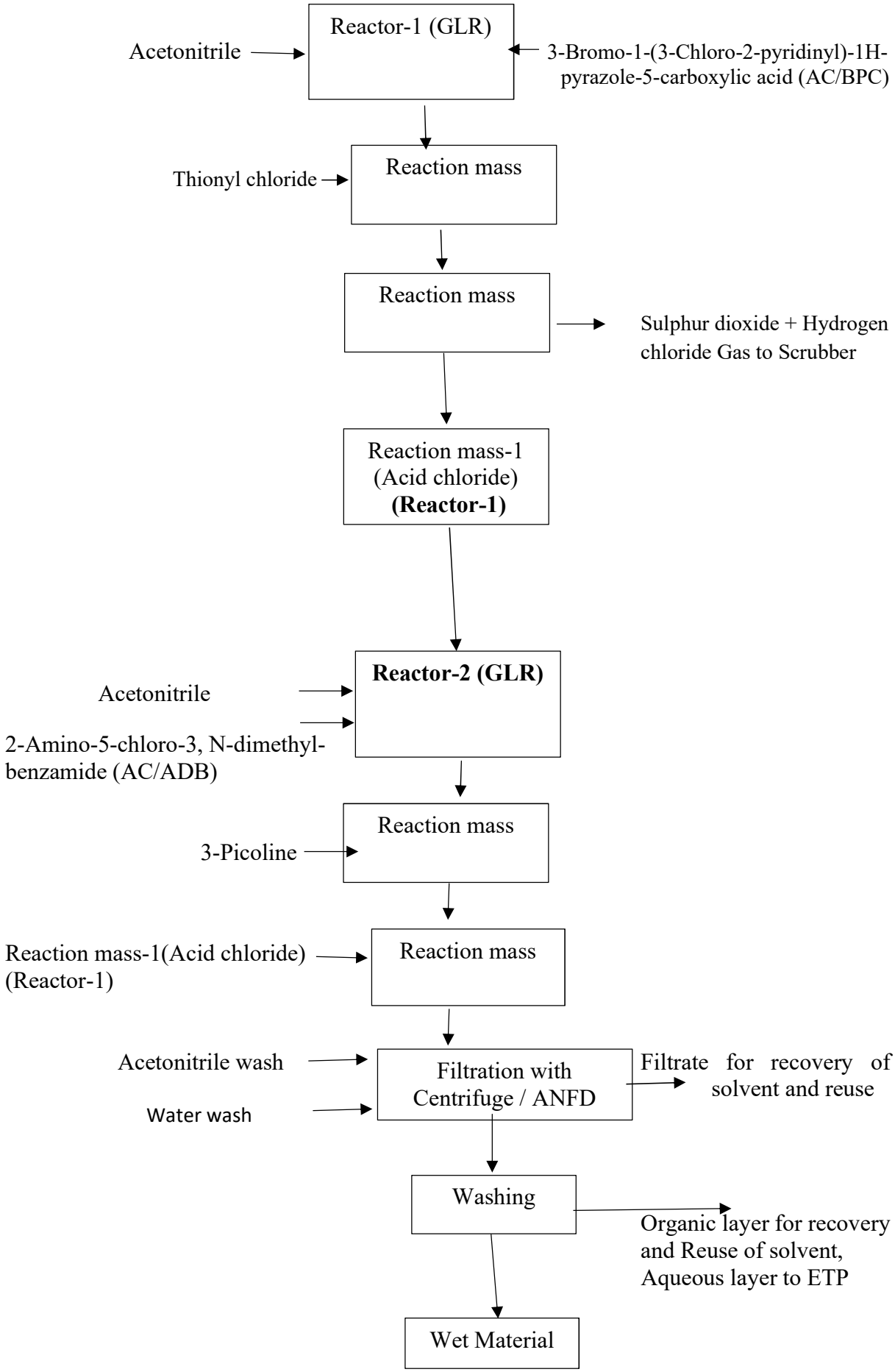
3-Bromo-1-(3-Chloro-2-pyridinyl)-1H-pyrazole-5-carboxylic acid (AC/BPC) is reacted with Thionyl chloride in acetonitrile 75-80°C to get the corresponding acid chloride intermediate (Reactor-1). The reaction mass is directly taken to next step without isolation of the intermediate. Sulphur dioxide and hydrogen chloride gasses will be liberated during the reaction and are scrubbed during reaction.

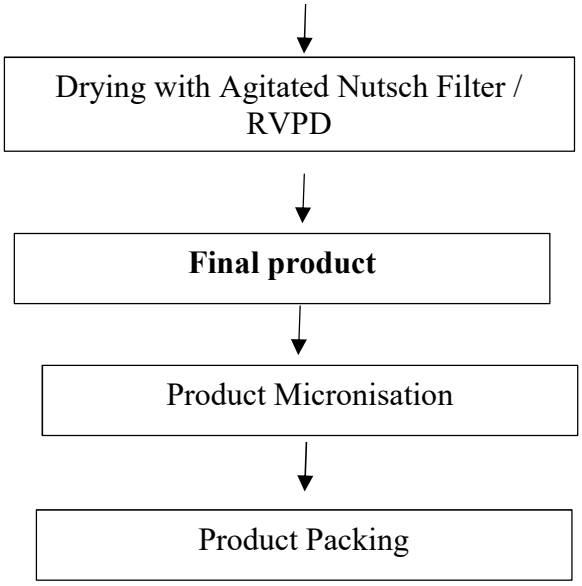
In reactor-2, 2-amino-5-chloro-3, N-dimethyl-benzamide (AC/ADB), acetonitrile and 3-picoline are charged and then reaction mass from the reactor-1 is added at 25-35°C to the above reaction mass and stirred for 3.0-3.5h at 25-35°C. Hydrogen chloride gas will be liberated during the reaction and is quenched with 3-picolne by forming 3-picoline hydrochloride. The product is filtered to separate acetonitrile organic layer. The resulting product is further purified by leaching with acetonitrile followed by water to afford pure Chlorantraniliprole (CTP). Acetonitrile & 3-picoline HCl is recovered and reused.

**Route of synthesis:**




## Process flow diagram For Chloran Thraniliprole (CTP)


Reactor-1 (GLR)
Acetonitrile
3-Bromo-1-(3-Chloro-2-pyridinyl)-1H-pyrazole-5-carboxylic acid (AC/BPC)
Thionyl chloride
Reaction mass
Reaction mass
Sulphur dioxide + Hydrogen chloride Gas to Scrubber
Reaction mass-1 (Acid chloride) (Reactor-1)
Reactor-2 (GLR)
Acetonitrile
2-Amino-5-chloro-3, N-dimethyl-benzamide (AC/ADB)
Reaction mass
3-Picoline
Reaction mass-1(Acid chloride) (Reactor-1)
Reaction mass
Acetonitrile wash
Water wash
Filtration with Centrifuge / ANFD
Filtrate for recovery of solvent and reuse
Washing
Organic layer for recovery and Reuse of solvent, Aqueous layer to ETP
Wet Material

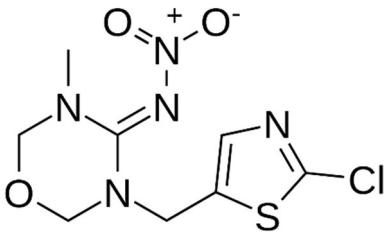



**Material balance for 1.0 Kg of Chlorantraniliprole (CTP) - REVISED**

| S.No | Input | Quantity | Output | Quantity |
|---|---|---|---|---|
| 1. | AC/BPC | 0.69 Kg | Chlorantraniliprole (CTP) | 1.0 Kg |
| 2. | AC/ADB | 0.48 Kg | **Recovered solvent** | |
| 3. | Thionyl chloride | 0.25 kg | Acetonitrile | 2.93 Kg |
| 4. | 3-Picoline | 0.25 Kg | 3- Picoline | 0.25kg |
| 5. | Acetonitrile | 3.25 Kg | **Solvent evaporation loss** | |
| 6. | Water | 2.40kg | Acetonitrile | 0.0815 Kg |
| 7. | | | **Aqueous Waste** (Effluent contains, Nacl+water:0.028) | 2.428kg |
| 8. | | | **Gaseous waste** | |
| 9. | | | Sulphur dioxide | 0.164 Kg |
| 10. | | | Hydrogen chloride | 0.093 kg |
| 11. | | | **Organic residue** (contains Thionyl chloride: 0.054 Kg, acetonitrile: | 0.373kg |

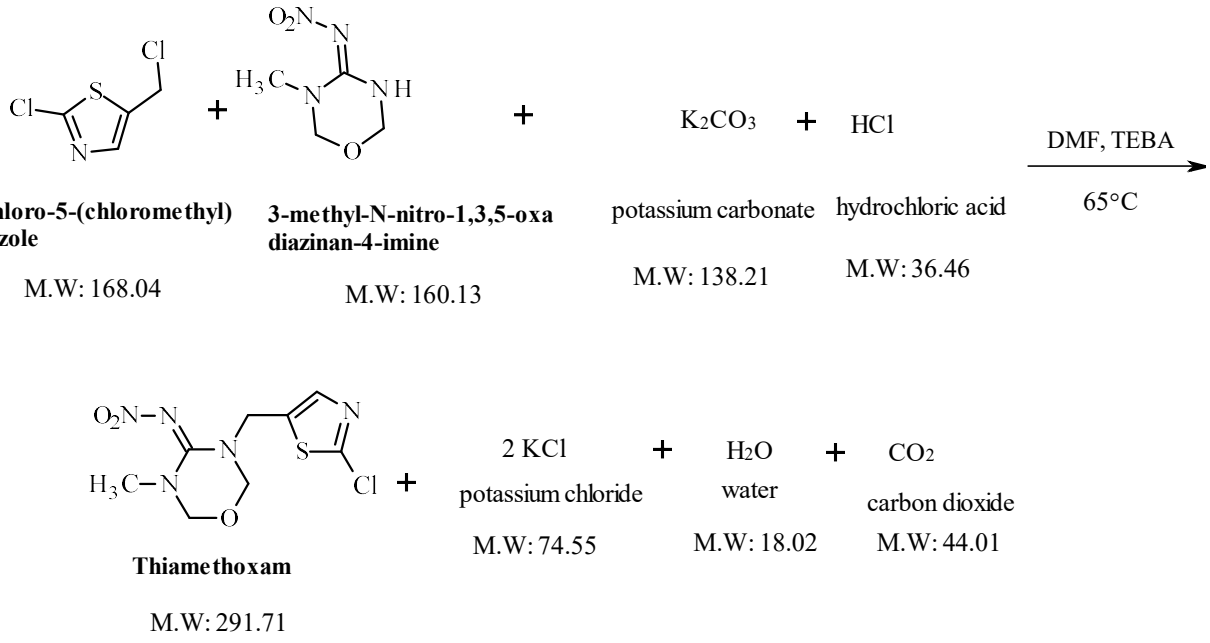
| | | | | |
|---|---|---|---|---|
| | | | 0.0815and unreacted starting materials:0.237kg) | |
| | **Total** | **7.32 Kg** | **Total** | **7.32 Kg** |

## Name of the Product: Thiamethoxam – NEW Product

| | |
|---|---|
| **Drug Name** | Thiamethoxam |
| **IUPAC Name** | 3-[(2-Chloro-1,3-thiazol-5-yl)methyl]-5-methyl-N-nitro-1,3,5-oxadiazinan-4-imine |
| **Trade Name** | Thioxam |
| **Molecular Formula** | $C_8H_{10}ClN_5O_3S$ |
| **Molecular Weight** | 291.71 |
| **Molecular Structure** |  |
| **CAS Number** | 153719-23-4 |
| **Category** | Insecticides |
| ***Melting point*** | 139.1 °C |
| **Appearance** | White to off-white Crystalline Powder |
| | |

## Reaction Scheme:

**Procedure**: preparation of Thiamethoxam from 3-methyl-N-nitro-1,3,5-oxadiazinan -4-imine and 2-chloro-5-(chloromethyl) thiazole by using DMF, TEBA, $K_2CO_3$.



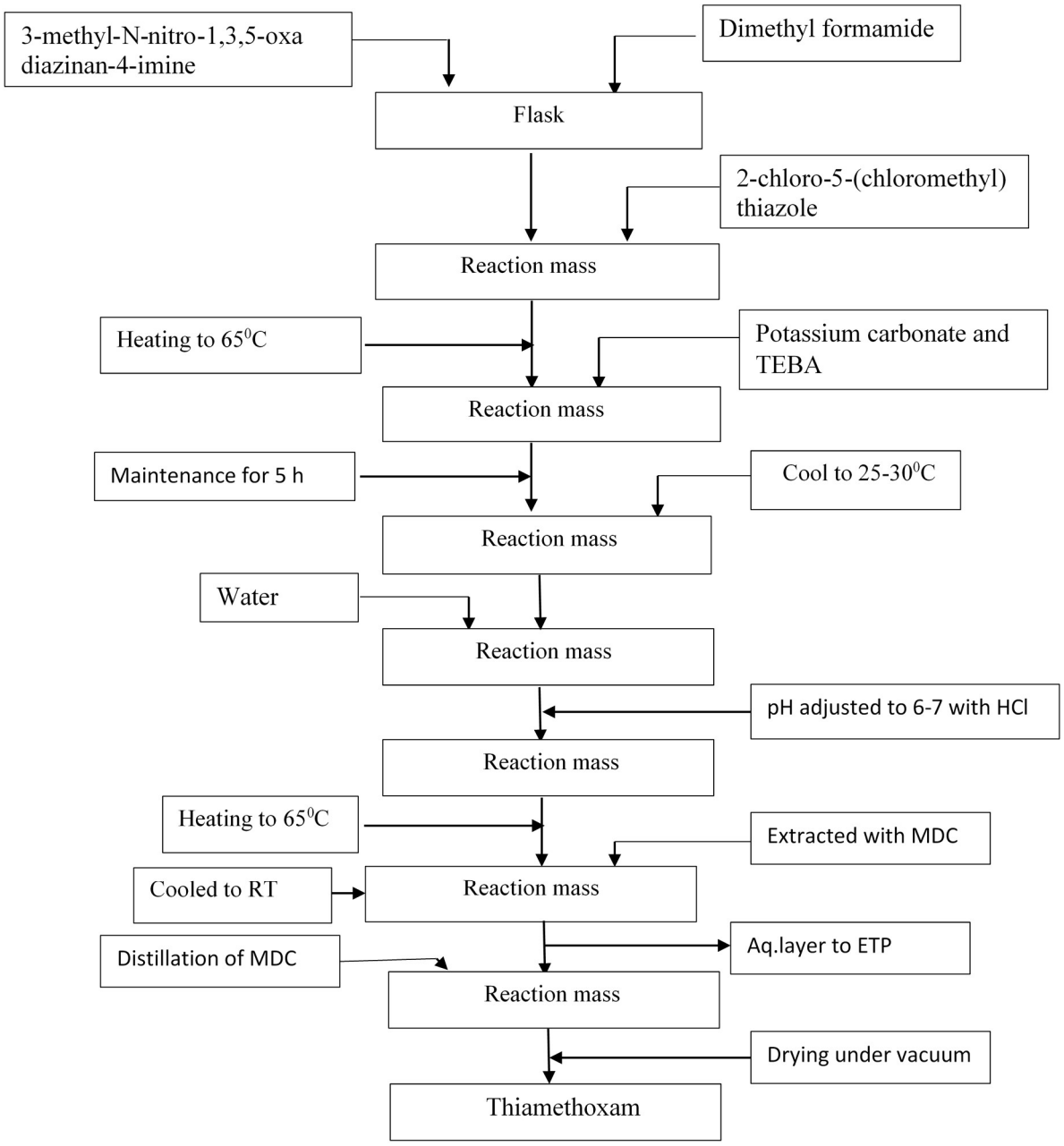




**Thiamethoxam**

M.W: 291.71

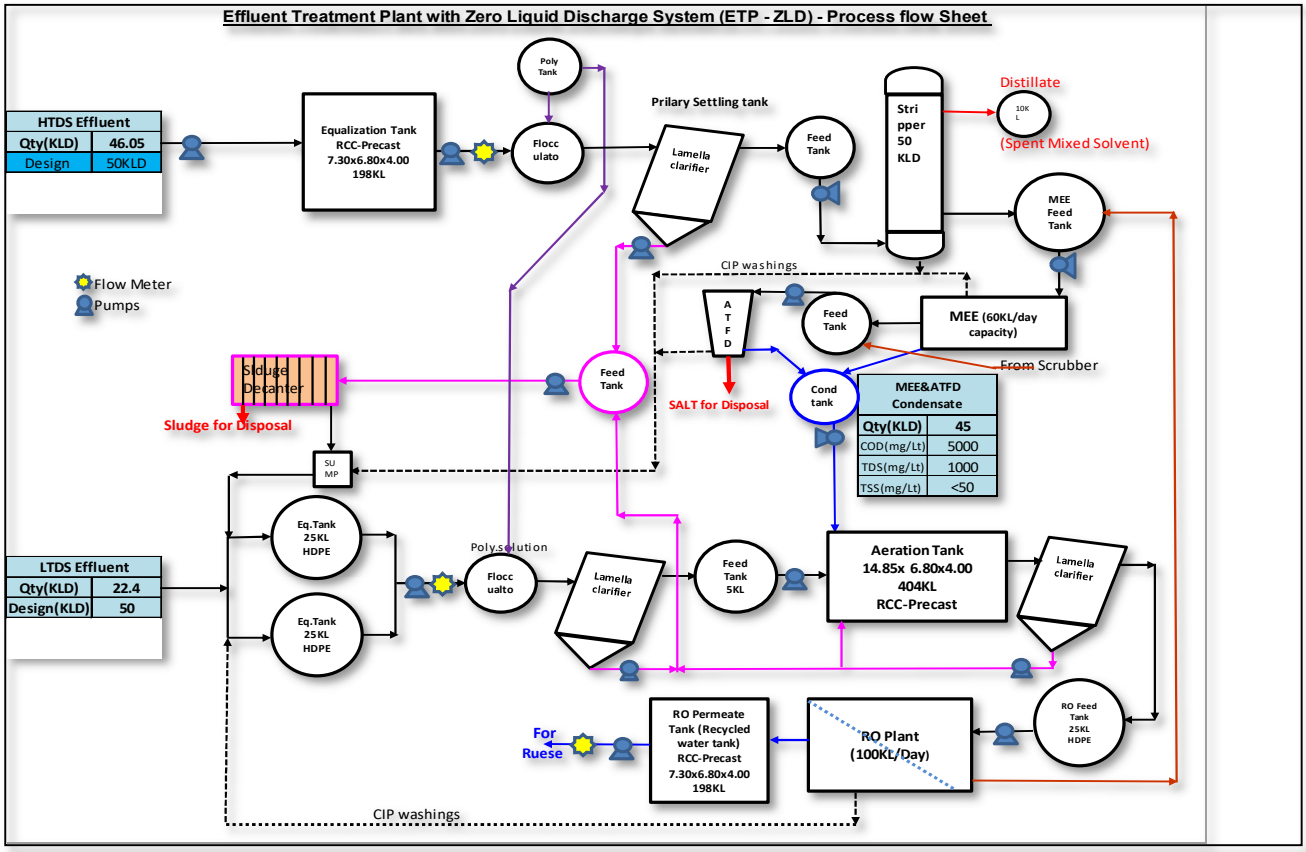
## Process Flow Chart of Thiamethoxam:




## Thiamethoxam Material balance:

| S.No | Input | Quantity | Output | Quantity |
|---|---|---|---|---|
| 1. | 3-methyl-N-nitro-1,3,5-oxa diazinan-4-imine | 0.607 kg | **Thiamethoxam** | 1.0 Kg |
| 2. | 2-chloro-5-(chloromethyl) thiazole | 0.64 kg | **Recovered solvent** | |
| 3. | Dimethyl formamide (DMF) | 4.47 kg | Dichloromethane | 3.42 kg |
| 4. | Triethyl benzyl ammonium chloride (TEBA) | 0.013 kg | Dimethyl formamide (DMF) | 3.576 |
| 5. | Water | 7.90 kg | **Solvent evaporation loss** | |
| 6. | Dichloromethane | 3.8 kg | Dichloromethane | 0.19 kg |
| 7. | 32% HCl | 1.0 kg | **Gaseous waste** | |
| 8. | Potassium carbonate | 0.50 kg | Carbon dioxide | 0.749 kg |
| 9. | | | **Aq. Waste** | |
| 10. | | | Water | 8.235kg |
| 11. | | | Potassium chloride | 0.539 kg |
| 12. | | | Triethyl benzyl ammonium chloride (TEBA) | 0.013 kg |
| 13. | | | Dimethyl formamide (DMF) | 0.894kg |
| 14. | | | **Organic waste** | |
| 15. | | | Contains unreacted starting materials & MDC | 0.314 kg |
| | **Total** | **18.93 kg** | **Total** | **18.93Kg** |

# Effluent Treatment Plant with Zero Liquid Discharge System (ETP - ZLD) - Process flow Sheet



| Effluent Treatment Plant (ETP – ZLD) - Capacities of treatment units | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sl.no** | **Description of Unit** | **No of Units** | **Length (mts)** | **Width (mts)** | **Depth/ Height (mts)** | **Liquid Volume ($M^3$)** | **MOC** |
| A | HTDS: | | | | | | |
| 1 | Equalization cum neutralization Tanks | 1 | 7.30 | 6.80 | 4.00 | 198.00 | RCC above ground tank |
| 2 | Flash mixer & Flocculator | 1 | 1.2mt dia | | 1.00 | 0.78 | HDPE spiral /MSFRP |
| 3 | Primary Settling Tank | 1 | Lamella Clarifier | | | | MSFRP/MSRL |
| 4 | Stripper Feed Tank | 1 | 5.00KL capacity ready made tank | | | | HDPE tank |
| 5 | Stripper system | 1 | 50kl/day capacity | | | | SS 304 above ground |
| 6 | MEE Feed Tank | 1 | 5.00KL capacity ready made tank | | | | SS 304 above ground |
| 7 | MEE System | 1 | 60KL/day | | | | SS 304 above ground |
| 8 | ATFD Feed Tank | 1 | 2.00KL capacity ready made tank | | | | SS 304 above ground |
| 9 | ATFD | 1 | 350kg/hr capacity (7kl/day) | | | | SS 304 above ground |
| 10 | Stripper distillate tank | 1 | 10KL capacity SS tank | | | | SS 304 above ground |
| **B** | **LTDS:** | | | | | | |
| 11 | Equalization cum neutralization Tanks | 2 | 3.00mt dia | | 3.50 | 25.00 | HDPE spiral /MSFRP - above ground |
| 12 | Flash mixer & Flocculator | 1 | 1.2mt dia | | 1.00 | 0.78 | HDPE spiral /MSFRP |
| 13 | Primary Settling Tank | 1 | Lamella Clarifier | | | | MSFRP/MSRL |
| 14 | AT Feed tank | 1 | 5KL capacity HDPE spiral tank | | | | |
| 15 | Aeration Tank | 1 | 14.85 | 6.80 | 4.00 | 404.00 | RCC above ground tank |
| 16 | Secondary Clarifier (Lamella Clarifier) | 1 | Lamella Clarifier | | | | MSRL/MSFRP |
| 17 | Treated Effluent storage tank | 1 | 25KL capacity HDPE spiral tank | | | | HDPE spiral - above ground |
| 18 | RO Plant | 1 | 100KL/day at 85% Recovery | | | | |
| 19 | RO Permeate Tank (For Reuse to cooling towers) | 1 | 7.30 | 6.80 | 4.00 | 198.00 | RCC above ground tank |
| 20 | Sludge Collection Tank | 1 | 5.00KL capacity ready made tank | | | | HDPE/PPFRP/MSFRP Tank |
| 21 | Sludge Decanter | 1 | 03.00KL/hr capacity | | | | |

**SITE PARTICULARS:**

| | |
|---|---|
| Project | **M/s. Natco Pharma Limited,**<br>Crop Health Sciences Division - Technical Plant. |
| Location | Sy. No:56 P & 60 P, Plot No : 29, APIIC Industrial Park, Attivaram Village, Ozili Mandal, Nellore District, Andhra Pradesh. |
| Latitude/Longitude | 13° 56'28.5"N 79° 47'04.2"E |
| Topo Sheet Number | 57 O 13 |
| Climate conditions | Annual Max Temp. $43^0$C |
| | Annual Min Temp. $24^0$C |
| | Annual Rainfall 700- 1000 mm |
| Land acquired for the Plant | Total land – 2.346 Acres or 9494 Sq.m<br>Built Up Area – 1.23 Acres or 5000 Sq.m<br>Green Belt – 0.70 Acres or 2848 Sq.m<br>Open Space – 0.40 Acres or 1646 Sq.m |
| Total Project Cost | 30 Crores or 3000 Lakhs |
| Nearest habitation | Attivaram Village at 3.0 Km<br>Karoor Village: 0.50km |
| Nearest water bodies | Pulicat Lake at 45.92Km |
| NH5 | Guntur – Chennai highway at 12.45 Km |
| Present use of land for proposed plant | Industrial Land |

**<u>EMPLOYMENT DETAILS</u> (same as existing): No increase of manpower in the revised proposal.**

| | EMPLOYMENT | | |
|---|---|---|---|
| **S.NO.** | **INDIRECT** | **DIRECT** | **TOTAL** |
| 1 | 20 | 30 | 50 |

**<u>PROJECT COST</u>:**

**<u>Total Project Cost - Rs. 3000 Lakhs</u>**

- Plant and Machinery – Rs. 2200 Lakhs
- Land Cost – Rs. 200 Lakhs
- Building Cost – Rs. 600Lakhs