INDOFIL INDUSTRIES LIMITED

An ISO 9001 & 14001 Certified Company

Sept. 8, 2017

BY HAND DELIVERY/RPAD

To,
Mr. Gyanesh Bharati Ji
(Joint Secretary)
Ministry of Environment, Forest & Climate Change,
Government of India,
Indira Paryavarn Bhavan,
Aliganj, Jor Bagh Road,
New Delhi – 110 003

SUB:	**EC AMENDMENT FOR PROPOSED EBDC FUNGICIDES, HERBICIDES, SPECIALTY CHEMICALS, SYNTHESIS TECHNICAL PRODUCTS AND FORMULATIONS (SOLID / LIQUID) PLANT LOCATED AT PLOT NO: D-2/CH-12, GIDC INDUSTRIAL ESTATE, DAHEJ, TALUKA: VAGRA, DISTRICT: BHARUCH-392130 (GUJARAT) OF M/s. INDOFIL INDUSTRIES LTD. (DAHEJ UNIT NO. 3)**
CATEGORY:	**A-5(b) – UNIT LOCATED IN INDUSTRIAL/NOTIFIED AREA (INDUSTRIAL SECTOR PROJECT)**
REF NO.:	**EC FILE No. J-11011/265/2013-IA II (I) dated: October 28, 2016**

Dear Sir,
This has reference to the above mentioned subject matter. We would like to thank you for granting us Environmental Clearance vide Letter No. J-11011/265/2013-IA II (I) dated: 28/10/2016 for our proposed EBDC Fungicides, Herbicides, Specialty Chemicals, Synthesis Technical Products and Formulations (Solid/Liquid) located at Plot No: D-2/CH-12, GIDC Industrial Estate, Dahej, Taluka: Vagra, District: Bharuch-392 130 (Gujarat) of M/s. Indofil Industries Ltd. (Dahej Unit No. 3)

We need to amend Environmental Clearance for following points:

Sr. No.	Matter as per EC Letter	Amendment Required
1.	**Point No. 3 of EC Letter** Committee suggested PP to use Natural Gas as clean fuel	Coal required for boiler will be 100 MTPD. HSD for DG sets are 110 Ltrs./Hr. Natural gas for main plant as well as utility will be used as fuel. Estimated quantity of natural gas is 3500 SM^3/hr., which will be supplied through pipeline. We want to have dual fuel use as below: Coal – 100 MT/Day Or

Off Swami Vivekanand Road, Azad Nagar, Sandoz Baug P.O., Thane - 400 607, Maharashtra, India.
Tel. : +91 (22) 6799 9100 Fax : +91 (22) 2589 8357 e-mail : indofil@modi.com Website : www.indofilcc.com
REGISTERED OFFICE : Kalpavru Square, 4th Floor, Kondivita Road, Off Andheri Kurla Road, Andheri (E), Mumbai - 400 059. (India)

		Natural Gas = 3500 SM^3/Hr & HSD = 110 Lts./Hr Because supply and cost of natural gas keeps on fluctuating and that disturbs our routine operations.
2.	**Point No. 3 of EC Letter** Total Water requirement will be 2711 m^3/day, out of which total fresh water requirement from River Damanganga through GIDC Vapi will be 1500 m^3/day and remaining water requirement 1311 m^3/day will be met from treated effluent/recycled water. Effluent generation will be 1323 m^3/day. Industrial wastewater will be segregated into High TDS/COD and Low TDS/COD effluent streams. High TDS/COD stream will be treated through steam stripper followed by multiple effect evaporator (MEE) and agitated thin film dryer (ATFD). Low TDS effluent stream will be treated in the effluent treatment plant (ETP) followed by reverse osmosis (RO). No effluent will be discharged outside the plant premises	Total Fresh Water requirement will be 2811 m^3/day (Industrial: 2711 m^3/day + Domestic: 100 m^3/day) from GIDC Water Supply. Effluent generation will be 1361 m^3/day (Industrial: 1311 m^3/day + Domestic: 50 m^3/day). Industrial wastewater will be segregated into High TDS/COD and Low TDS/COD effluent streams. High TDS/COD stream will be treated in multiple effect evaporator (MEE) & condensate goes to conventional ETP where it is mixed with Low TDS/COD effluent stream and ultimately the treated effluent i.e. 1361 m^3/day (Industrial: 1311 m^3/day + Domestic: 50 m^3/day) will be discharged to deep sea via GIDC's existing pipeline. Reuse of treated industrial wastewater deteriorates our utilities, reduces life of utilities and increases cost of our products. We are located in GIDC Industrial Estate of Dahej, Tal: Vagra, Dist: Bharuch and fresh water requirement is fulfilled by GIDC Water supply, Dahej and not GIDC, Vapi.
3.	**Specific Condition No. v** Total fresh water requirement from Damanganga River shall not exceed 1500 m^3/day	Total Fresh Water requirement will not exceed 2811 m^3/day (Industrial: 2711 m^3/day + Domestic: 100 m^3/day) from GIDC Water Supply.
4.	**Specific Condition No. vi** Effluent generation shall not exceed 1323 m^3/day. Industrial wastewater will be segregated into High TDS/COD and Low TDS/COD effluent streams. High TDS/COD stream will be treated through steam stripper followed by multiple effect evaporator (MEE) and agitated thin film dryer (ATFD). Low TDS effluent stream will be treated in the effluent treatment plant (ETP) followed by reverse osmosis (RO). No effluent will be discharged outside the plant premises	Effluent generation will be 1361 m^3/day (Industrial: 1311 m^3/day + Domestic: 50 m^3/day). Industrial wastewater will be segregated into High TDS/COD and Low TDS/COD effluent streams. High TDS/COD stream will be treated in multiple effect evaporator (MEE) & condensate goes to conventional ETP where it is mixed with Low TDS/COD effluent stream and ultimately the treated effluent i.e. 1361 m^3/day (Industrial: 1311 m^3/day + Domestic: 50 m^3/day) will be discharged via GIDC's existing 10 km deep sea pipeline.

We request your kind self to grant us Amendment in EC and oblige.

Thanking you.

Yours faithfully,

For **INDOFIL INDUSTRIES LTD.**

INDOFIL INDUSTRIES LTD. THANE 400 607

Dr. A. Rao
Sr. VP (Mfg.)
Encl: Copy of previous EC.

FORM-I

for

PROPOSED EBDC FUNGICIDES, HERBICIDES, SPECIALTY CHEMICALS, SYNTHESIS TECHNICAL PRODUCTS AND FORMULATIONS (SOLID / LIQUID) PLANT

(EC AMENDMENT CASE)

of

M/s. INDOFIL INDUSTRIES LTD. (DAHEJ UNIT No. 3)

Plot No: D-2/CH-12, GIDC Industrial Estate, Dahej-II,
Taluka: Vagra, District: Bharuch-392130 (Gujarat)

Prepared By:

NABL Accredited Testing Laboratory
ISO 9001:2008 Certified Company

Aqua-Air Environmental Engineers P. Ltd.

403, Centre Point, Nr. Kadiwala School, Ring Road, Surat - 395002

APPENDIX I
FORM 1

(I) Basic Information

Sr. No.	Item	Details
1.	Name of the Project/s	M/s. Indofil Industries Ltd. (Unit – III)
2.	S.No. in the Schedule	5(b)
3.	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number of wells to be drilled	**Total Proposed Capacity:** EBDC Fungicides, Herbicides, Specialty Chemicals, Synthesis Technical Products = 1,07,395 MTPA Powder/Liquid Formulations = 32,000 MTPA/10,000 MTPA Or Glyphosate Formulations = 70,000 MTPA No bore well to be drilled within the premises.
4.	New/Expansion/Modernization	New
5.	Existing capacity/area etc.	N.A.
6.	Category of project i.e. 'A' or 'B'	'A'
7.	Does it attract the general condition? If yes, please specify.	N.A.
8.	Does it attract the specific condition? If yes, please specify.	N.A.
9.	Location	
	Plot/Survey/Khasra No.	Plot No. D-2/CH-12
	Village	Dahej-II
	Tehsil	Vagra
	District	Bharuch
	State	Gujarat
10.	Nearest railway station/airport along with distance in kms.	Nearest Railway Station : Bharuch: 39 kms Nearest Airport: Baroda: 90 kms
11.	Nearest Town, city, District Headquarters along with distance in kms.	Nearest town: Bharuch : 39 kms, Nearest District Head quarter: Bharuch : 39 kms
12.	Village Panchayats, Zilla Parishad, Municipal corporation, Local body (Complete postal addresses with telephone nos. to be given)	Notofied Area Authority, Dahej, Tal: Vagra, Dist: Bharuch, Gujarat.
13.	Name of the applicant	M/s. Indofil Industries Ltd. (Unit – III)
14.	Registered address	Plot No: D-2/CH-12, GIDC Industrial Estate, Dahej-II, Taluka: Vagra, District: Bharuch-392130 (Gujarat)
15.	Address for correspondence:	
	Name	Dr. A. Rao
	Designation (Owner/Partner/CEO)	Senior Vice President (Mfg.)
	Address	Indofil Industries Limited (unit – III) Off Swami Vivekanand Road, Sandoz Baug, Azad Nagar, Thane West, Thane – 400607, Maharashtra

	Pin Code	400 607
	E-Mail	arao-icc@modi.com
	Telephone No.	022-67999100/111
	Fax No.	022-25898357
	Mobile	+919930100504
16.	Details of Alternative Sites examined, if any location of these sites should be shown on a toposheet.	No
17.	Interlinked Projects	No
18.	Whether separate application of interlinked project has been submitted?	Not Applicable
19.	If Yes, date of submission	Not Applicable
20.	If no., reason	Not Applicable
21.	Whether the proposal involves approval/clearance under: If yes, details of the same and their status to be given. (a) The Forest (Conservation) Act, 1980? (b) The Wildlife (Protection) Act, 1972? (c) The C.R.Z Notification, 1991?	Not Applicable, as the project is located in GIDC industrial estate, Dahej.
22.	Whether there is any Government order/policy relevant/relating to the site?	No
23.	Forest land involved (hectares)	No
24.	Whether there is any litigation pending against the project and/or land in which the project is propose to be set up? (a) Name of the Court (b) Case No. (c) Orders/directions of the Court, if any and its relevance with the proposed project.	No

(II) Activity

1. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

Sr. No.	Information/Checklist confirmation	Yes /No?	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	No	Proposed Project is within GIDC, Phase-II, Dahej Total Plot area: 1,01,900.75 m^2
1.2	Clearance of existing land, vegetation and buildings?	No	There will be no clearance of buildings and vegetation required for the project activity.
1.3	Creation of new land uses?	No	--
1.4	Pre-construction investigations e.g. bore houses, soil testing?	No	--
1.5	Construction works?	Yes	Layout plan is attached as **Annexure: 1.**
1.6	Demolition works?	No	--
1.7	Temporary sites used for construction workers or housing of construction workers?	No	--
1.8	Above ground buildings, structures or Earthworks including linear structures, cut and fill or excavations	Yes	Layout plan is attached as **Annexure: 1.**
1.9	Underground works including mining or tunneling?	No	--
1.10	Reclamation works?	No	--
1.11	Dredging?	No	--
1.12	Offshore structures?	No	--
1.13	Production and manufacturing	Yes	List of Products and manufacturing process attached as **Annexure: 2 & 2A.**
1.14	Facilities for storage of goods or materials?	Yes	Dedicated storage area for storage of Raw Materials and finished products, solvents, etc. shall be provided.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	Effluent Treatment Plant will be installed to treat effluent so as to achieve the GPCB norms. Details of water consumption & effluent generation with segregation of effluent streams are attached as **Annexure: 3.** Details of proposed Effluent Treatment Plant are attached as **Annexure: 4.** Details of Hazardous waste generation and disposal is attached as **Annexure: 5.**
1.16	Facilities for long term housing of operational workers?	No	--
1.17	New road, rail or sea traffic during construction or operation?	No	--

1.18	New road, rail, air waterborne or other airports etc?	No	--
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	--
1.20	New or diverted transmission lines or pipelines?	No	--
1.21	Impoundment, damming, converting, realignment or other changes to the hydrology of watercourses or aquifers?	No	--
1.22	Stream crossings?	No	--
1.23	Abstraction or transfers or the water form ground or surface waters?	No	No ground water shall be used. The requirement of raw water shall be met through GIDC Water Supply.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	No	--
1.25	Transport of personnel or materials for construction, operation or decommissioning?	No	--
1.26	Long-term dismantling or decommissioning or restoration works?	No	There is no dismantling of any sort. Not applicable.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	No Impact on the Environment
1.28	Influx of people to an area in either temporarily or permanently?	Yes	350 nos. (Staff + Contractor) Locally employed manpower shall be utilized.
1.29	Introduction of alien species?	No	
1.30	Loss of native species of genetic diversity?	No	
1.31	Any other actions?	No	

2. Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

Sr. No	Information/checklist confirmation	Yes/ No?	Details there of (with approximate quantities/rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agriculture land (ha)	No	
2.2	Water (expected source & competing users) unit: KLD	Yes	Water requirement will be met through the GIDC Water Supply. Source: GIDC Water Supply For detail water balance is refer as **Annexure – 3.**
2.3	Minerals (MT)	No	Not Applicable
2.4	Construction material -stone, aggregates, sand / soil (expected source MT)	Yes	Construction material shall be procured from nearby area (mostly within Gujarat state).

2.5	Forests and timber (source - MT)	No	No wood shall be used as construction material or as a fuel.
2.6	Energy including electricity and fuels source, competing users Unit: fuel (MT), energy (MW)	Yes	**Power Requirement:** Electricity: 7500 KVA Source of power supply: Torrent Energy Limited Backup power: D G sets (3 nos., Capacity = 1500 KVA each) **Fuel Requirement:** Coal: 100 MT/Day Or N.G: 3,500 SM^3/Hr. & HSD for DG Sets: 3 Nos.: 110 LIT./Hr.
2.7	Any other natural resources (use appropriates standard units)	No	--

3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

Sr. No.	Information / Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities / rates wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	Yes	Please refer **Annexure : 7.**
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	Not applicable as site is located in GIDC, Phase II, Dahej.
3.3	Affect the welfare of people e.g. by changing living conditions?	No	Not applicable as site is located in GIDC Phase II, Dahej
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,	No	Not applicable as site is located in GIDC Phase II, Dahej
3.5	Any other causes	No	

4. Production of solid wastes during construction or operation or decommissioning MT/month)

Sr. No.	Information/Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	No	--
4.2	Municipal waste (domestic and or commercial wastes)	Yes	Domestic effluent will be treated in adequate size of STP. STP sludge will be used as manure

			within project site for greenbelt development.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	Please refer **Annexure: 5**
4.4	Other industrial process wastes	Yes	Please refer **Annexure: 5**
4.5	Surplus product	No	--
4.6	Sewage sludge or other sludge from effluent treatment	Yes	Please refer **Annexure: 5**
4.7	Construction or demolition wastes	Yes	The construction debris shall be used for back filling and site leveling with in premises. The steel and other scrap generated during construction shall be given to scrap dealers.
4.8	Redundant machinery or equipment	No	--
4.9	Contaminated soils or other materials	No	--
4.10	Agricultural wastes	No	--
4.11	Other solid wastes	No	--

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)

Sr. No.	Information/Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels From stationary or mobile sources	Yes	Details of flue & process gas emission are attached as **Annexure: 6**
5.2	Emissions from production processes	Yes	Details of emission levels from process are attached as **Annexure: 6.** Details of Air Pollution Control measures are attached as **Annexure: 6**
5.3	Emissions from materials handling including storage or transport	Yes	Fugitive emissions from material handling, loading / unloading and transport of material will be minimal due to closed loop system. Loading / Unloading systems will be also connected with the Central Absorption /scrubbing systems.
5.4	Emissions from construction activities including plant and equipment	No	Utmost care will be taken during construction activity and water sprinklers shall be utilized whenever necessary.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	Yes	• During operation phase no major source of dust is anticipated. Sewage and waste will be treated in such a manner that no odor problem arise in the area. • To further improve the air atmosphere effective odor control system will be provided.
5.6	Emissions from incineration of waste	No	Not applicable as the Incinerable waste shall be sent to cement industries or common incineration system.

5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	No open burning of waste will be carried out.
5.8	Emissions from any other sources	No	

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

Sr. No.	Information/Checklist confirmation	Yes/ No?	Details there of (with approximate Quantities /rates, wherever possible) With source of source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	Noise will be generated from production plants but will be restricted to the plant area only. Noise level is lower than 70 dB (A) at nearest plant boundary.
6.2	From industrial or similar processes	Yes	All machinery / equipment shall be well maintained, shall be proper foundation with anti vibrating pads wherever applicable and noise levels within permissible limits. Acoustic enclosures shall be provided for DG set.
6.3	From construction or demolition	No	
6.4	From blasting or piling	No	
6.5	From construction or operational traffic	No	
6.6	From lighting or cooling systems	No	
6.7	From any other sources	No	Acoustic enclosures shall be provided for DG set.

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

Sr. No	Information/Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	Yes	All raw materials shall be stored separately in designated storage area and with safety. Bund walls shall be provided around raw materials storage tanks for containing any liquid spillage. Other materials shall be stored in bags / drums on pallets with concrete flooring and no spillage is likely to occur. Please refer **Annexure : 7.**
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	No	
7.3	By deposition of pollutants emitted to air into the land or into water	No	The factory is located in GIDC Phase II, Dahej.
7.4	From any other sources	No	Not applicable
7.5	Is there a risk of long term build up of pollution in the environment from these sources?	Yes	Full- fledged Environmental Management System (EMS) will be installed. i.e. ETP, Air Pollution Control systems, Hazardous Waste

			Handling and Management as per Rules, etc. which will eliminate the possibility of building up of pollution.

8. Risks of accident during construction or operation of the Project, which could affect human health or the environment:

Sr. No	Information/Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	Yes	The risk assessment will be carried out and all mitigative measures shall be taken to avoid accidents.
8.2	From any other causes	No	Not applicable
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	No	--

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

Sr. No.	Information/Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
9.1	Lead to development of supporting. laities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: * Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) • housing development • extractive industries • supply industries • other	Yes	Site is located in GIDC Phase II, Dahej, having the entire required infrastructure. This industrial zone is having existing road infrastructure, power supply will be utilized. Local people will be employed and no housing is required. Please refer **Annexure – 8.**
9.2	Lead to after-use of the site, which could have an impact on the environment	No	--
9.3	Set a precedent for later developments	Yes	The green belt area will give better aesthetic view of land and building. This should set precedence for subsequent entrepreneurs who will venture such projects.
9.4	Have cumulative effects due to proximity to Other existing or planned projects with similar effects	No	--

(III) Environmental Sensitivity

Sr. No	Information/Checklist confirmation	Name / Identity	Aerial distance (within 25 km). Proposed Project Location Boundary.
1	Areas protected under international conventions national or local legislation for their ecological, landscape, cultural or other related value	No	Site is located in GIDC Phase II, Dahej, Tal. Vagra, Dist. Bharuch, Gujarat.
2	Areas which are important or sensitive for Ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Yes	Site is located in GIDC Phase II, Dahej, Dist. Bharuch, Gujarat.
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	No	Site is located in GIDC Phase II, Dahej, Tal: Vagra, Dist. Bharuch, Gujarat.
4	Inland, coastal, marine or underground waters	Yes	Arabian Sea: 25 Kms River Narmada: 7 Kms
5	State, National boundaries	--	--
6	Routes or facilities used by the public for to recreation or other tourist, pilgrim areas.	Yes	GIDC is on 4 lane State Highway connecting at Bharuch (40 kms.) with National Highway No. 8.
7	Defense installations	No	NIL
8	Densely populated or built-up area	Yes	Nearest Village: Dahej, and Bharuch District Headquarters approx. 39 km
9	Areas occupied by sensitive man-made land community facilities)	No	
10	Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, tourism, minerals)	No	
11	Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)	No	
12	Are as susceptible to natural hazard which could cause the project to present environmental problems (earthquake s, subsidence ,landslides, flooding erosion, or extreme or adverse climatic conditions)	-	N.A.

I hereby given undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at our risk and cost.

Date: Sept. 13, 2017

Place: Mumbai

Dr. A. Rao
Sr. VP (Mfg.)

INDOFIL INDUSTRIES LTD. THANE 400 607

Signature of the applicant

Dr. A .Rao (Sr. Vice President-Mfg)

Indofil Industries Limited (Unit – III)

Off Swami Vivekanand Road, Sandoz Baug, Azad Nagar, Thane (West), Thane – 400 607, Maharashtra

NOTE:

1. The projects involving clearance under Coastal Regulation Zone Notification, 1991 shall submit with the application a C.R.Z. map duly demarcated by one of the authorized agencies, showing the project activities, w.r.t. C.R.Z. (at the stage of TOR) and the recommendations of the State Coastal Zone Management Authority (at the stage of EC). Simultaneous action shall also be taken to obtain the requisite clearance under the provisions of the C.R.Z. Notification, 1991 for the activities to be located in the CRZ.

2. 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 (at the stage of EC).

3. All correspondence with the Ministry of Environment & Forests including submission of application for TOR/Environmental Clearance, subsequent clarifications, as may be required from time to time, participation in the EAC Meeting on behalf of the project proponent shall be made by the authorized signatory only. The authorized signatory should also submit a document in support of his claim of being an authorized signatory for the specific project.

ANNEXURES

1	PLANT LAYOUT
2	LIST OF PRODUCTS WITH PRODUCTION CAPACITY AND RAW MATERIALS
2A	BRIEF MANUFACTRING PROCESS, CHEMICAL REACTION AND MASS BALANCE WITH FLOW DIAGRAM
3	WATER CONSUMPTION AND EFFLUENT GENERATION WITH SEGREGATION OF EFFLUENT STREAMS
4	DETAILS OF PROPOSED EFFLUENT TREATMENT PLANT
5	DETAILS OF HAZARDOUS SOLID WASTE MANAGEMENT AND DISPOSAL
6	DETAILS OF FLUE & PROCESS GAS EMISSION
7	DETAILS HAZARDOUS CHEMICAL STORAGE FACILITY
8	SOCIO - ECONOMIC IMPACTS
9	GIDC WATER SUPPLY LETTER & WASTEWATER DISPOSAL LETTER
10	TOPOSHEET
11	GIDC PLOT ALLOTMENT LETTER
12	TSDF & CHWIF MEMBERSHIP LETTER
13	MOU OF COAL
14	MOU OF FLYASH
15	MOU OF BY-PRODUCTS
16	COPY OF CTE

ANNEXURE: 1

PLANT LAYOUT

ANNEXURE: 2

LIST OF PRODUCTS WITH PRODUCTION CAPACITY

Sr. No.	Name of the Proposed Products	Quantity (MTPA)	CAS Nos.
A	**EBDC FUNGICIDES PRODUCTS**		
1	Mancozeb & its Formulation	25000	8018-01-7
2	Maneb & its Formulation	500	12427-38-2
3	Zineb & its Formulation	5000	12122-67-7
4	Propineb & its Formulation	5000	12071-83-9
A1	**HERBICIDES**		
1	Glyphosate Tech and its Intermediates Volume	30000	1071-83-6
B	**SPECIALITY CHEMICALS**		
1	Solution Polymers	3634	-
2	Re-dispersible Powder	11571	-
3	Plastic Modifiers	20055	-
4	Acrylic Emulsions	2635	-
C1	**SYNTHESIS TECHNICAL PRODUCTS**		
1	Tricyclazole and / or its intermediates: HMBT	1000	41814-78-2
2	Myclobutanil	135	88671-89-0
3	Metalaxyl	125	57837-19-1
4	Cymoxanil	300	57966-95-7
5	Dodine	150	2439-10-3
6	Hexaconazole	200	79983-71-4
7	Propiconazole	300	60207-90-1
8	Propargite	400	2312-35-8
9	Difenthuron	200	80060-09-9
10	Tebuconazole	300	107534-96-3
11	Difenconazole	200	119446-68-3
12	Thifluzamide	200	130000-40-7
13	Bispyribac	65	125401-75-4
	Sub-total of above 13 Products	**3575**	
C2	**Out of following 10 products, only 1 product shall be made at a time**		
1	Thiamethoxam	225	153719-23-4
2	Epoxyconazole		133855-98-8
3	Prothioconazole		178928-70-6
4	Fluazinam		79622-59-6
5	Azoxystrobin		131860-33-8
6	Pyraclostrobin		175013-18-0
7	Boscalid		188425-85-6
8	Cyazofamid		120116-88-3
9	Penconazole		66246-88-6
10	Cyproconazole		94361-06-5
C3	**Out of following 5 products, only 1 product shall be made at a time**		

Sr. No.	Name of the Proposed Products	Quantity (MTPA)	CAS Nos.
1	Spirodiclofen	200	148477-71-8
2	Spiromesifen		283594-90-1
3	Tolfenpyrod		129558-76-5
4	Clodinofop		105512-06-9
5	Pretilachlor		81690-06-4
	Total of (C1 + C2 +C3) products	**3575 + 225 + 200 = 4000**	
D	**AGRO FORMULATION**		
1	Powder Formulation	32000	-
2	Liquid Formulation	10000	-
	OR		
1	Glyphosate Formulations	70000	-

Note:
Either Herbicides (A1) or EBDC fungicides (A)/synthesis technical products (A+C1+C2+ C3) will be produced at a time.

LIST OF BY-PRODUCTS

Sr. No.	Name of the Proposed By- Products	Quantity (MTPM)	End use	CAS Nos.
1	Manganese Carbonate ($MnCO_3$)	980	Sold to $MnSO_4$ Manufacturer.	598-62-9
2	Sodium Sulphate (Na_2SO_4)	1200	Collection, Storage and Sold to end users.	7757-82-6
3	Spent Sulphuric Acid	2	Collection, Storage and Sold to end users.	7664-93-9
4	Aq. Hydrochloric Acid (Conc. 30%)	120		7647-01-0
5	Aq. Sodium Bromide (Conc.17%)	150		7647-15-6
6	Aq. Potassium Bromide (Conc.16% to 29%)	175		7758-02-3
7	Aq. Hydrobromic Acid (Conc. 30%)	50		10035-10-6
8	Formic Acid (conc. 50%)	100		64-18-6
9	Aq. NaSH (Conc. 20% to 25 %)	25		16721-80-5
10	Aq. Sodium Sulphite	50		7757-83-7

LIST OF RAW MATERIALS

Raw material requirement for EBDC Fungicide Products

Sr. No.	Name of EBDC Fungicide Products	Raw Materials	Quantity (MTPM)
1	Mancozeb	Carbon-Di-Sulphide (CS_2)	1056
		Caustic Soda Lye (48.50 %)	1131
		Zinc Sulphate Solution ($ZNSO_4$) (13.5% to13.9%)	398
		Sodium Lignosulphonate /Indoliga	78
		Ethylene Diamine (EDA)	416
		Manganese Sulphate Solution (29.0%)	3670
		HexamethyleneTetramine (Stabilized)	65
		NOPCO NXZ	4
2	Maneb	Carbon-Di-Sulphide (CS_2)	21.12
		Caustic Soda Lye (48.50 %)	22.62
		Sodium Lignosulphonate / Indoliga	1.56
		Ethylene Diamine (EDA)	8.32
		Manganese Sulphate Solution (29.0%)	73.4
		HexamethyleneTetramine (Stabilised)	1.3
3	Zineb	Carbon-Di-Sulphide (CS_2)	194
		Caustic Soda Lye (48.50 %)	201
		Zinc Chloride Solution	383
		Sodium Lignosulphonate / Indoliga	21.16
		Ethylene Diamine (EDA)	75.20
		Bridenol OT 50 %	3.67
		HexamethyleneTetramine (Stabilized)	17.10
		China Clay	31.50
4	Propineb	Carbon-Di-Sulphide (CS_2)	183
		Caustic Soda Lye (48.50 %)	179
		Zinc Chloride Solution	173
		Sodium Lignosulphonate / Indoliga	10
		Propylene Diamine (PDa)	88
		HexamethyleneTetramine (Stabilized)	13

Raw material requirement for Herbicides

Sr. No.	Name of Herbicide Product	Raw Materials (MT	Quantity (Ton/Ton)
1	Glyphosate	PCl3	0.60
		IDA	0.58
		Formaldehyde	0.13
		OR	
		DMHP	0.48
		Glycine	0.33
		Formaldehyde	0.13
		MeOH	0.14
		HCL	0.16

Raw material requirement for Speciality Chemicals

Sr. No.	Raw Materials	Quantity (MTPM)
1.	Ortho Xylene	20.000
2.	Di-isobutylenes	43.000
3.	Caustic soda lye	34.000
4.	Maleic anhydride	29.000
5.	Styrene	205.000
6.	Tertiary butyl per-benzonate	0.960
7.	Celite (hyflowsupercell)	0.450
8.	Lycopon	0.320
9.	Hydrogen peroxide (h2o2)	134.000
10.	Celvolit 1328 1100 kgsibc	1387.000
11.	Polyvinyl alcohol grade 205	53.000
12.	Nopconxz	5.680
13.	Micron carb 2 micron	230.000
14.	Silica 1240	27.000
15.	Precipitat silica-sipernat 22s	27.000
16.	Methyl methacrylate (m.m.a)	1663.000
17.	Ethyl acrylate (e.a)	164.000
18.	Sodium lauryl sulphate-needles	7.000
19.	Normal dodecyl marcaptan(nddm)	0.340
20.	Potassium persulphate	0.280
21.	Acetic acid glacial	0.340
22.	Alpha methyl styrene	7.000
23.	Sodium meta-bi-sulphite	0.110
24.	Ammonium persulphate	0.370
25.	Tertiary butyl hydro-preoxide	0.050
26.	Formopon	1.480

Sr. No.	Raw Materials	Quantity (MTPM)
27.	Ferrous sulphate hydrated	0.000
28.	Comman salt	0.180
29.	Dianol-25	21.000
30.	Butyl metha acrylate (bma)	20.000
31.	Sodium carbonate	1.000
32.	Tertiary dodecyl mercaptan	3.000
33.	Cumene hydro - peroxide	3.000
34.	Butyl acrylate (b.a)	429.000
35.	Tmpta	1.000
36.	Cumene hydro - peroxide	1.000
37.	Diallyl maleate	2.000
38.	Indofil k-120 nd emulsion	61.000
39.	Poly asterpolyol 3223	17.000
40.	Dimethylolpionic acid- bismpa	2.000
41.	N-methyl-2 pyrrolidone (nmp)	11.000
42.	Isopropanedisocyanate (ipdi)	7.000
43.	Triethyl amine	1.000
44.	Ethylene diamine	0.438
45.	Dibutyl tin	0.438

Raw materials requirement for Synthesis Technical Products

Sr. No.	Name of Synthesis Technical Products	Raw Materials	Consumption (Ton/Ton)
1	Tricyclazole	Orthotoludine	0.720
		Ammonium Thiocyanate	0.660
		H_2SO_4	0.370
		MCB	0.100
		Chlorine	0.450
		MDC	0.200
		Hydrazine Hydrate 80%	0.590
		MEG	0.300
		Xylene	0.300
		Formic Acid	0.450
		Sodium Carbonate	0.100
2	Myclobutanil	Para-Chloro Toluene	0.855
		Cl_2	0.550
		PCl_3	0.025
		Benzoyl Peroxide	0.025
		NaCN	0.475
		TEBA Chloride	0.027
		Butyl Bromide	0.854
		NaOH (100%)	0.962

Sr. No.	Name of Synthesis Technical Products	Raw Materials	Consumption (Ton/Ton)
		DCM	0.541
		TBAB	0.065
		Triazole	0.389
		KOH (88%)	0.357
		DMF	0.200
		Toluene	0.100
		DIPE	0.300
		Tri Ethyl Amine	0.025
3.	Metalaxyl	Methyl 2-Chloropropionate	0.670
		2,6-dimethylaniline	0.700
		Sodium Iodide	0.010
		K2CO3	0.400
		DMF	0.300
		Methoxy Acetyl Chloride	0.555
		Hexane	0.200
		Ammonia (30%)	0.300
4	Cymoxanil	CAE Urea	0.877
		Sodium Nitrite	0.475
		PTSA	0.035
		Na_2CO_3	0.090
		$DMSO_4$	1.016
5	Dodine	Dodecylamine	0.645
		Cynamide (50%)	0.542
		Acetic Acid	0.241
6	Hexaconazole	DichloroValerophenone	0.786
		Dimethyl Sulphide	0.285
		Dimethyl Sulphate	0.780
		KOH (88%)	0.394
		Toluene	0.200
		DMF	0.750
		K_2CO_3	0.210
		1,2,4-Triazole	0.235
		Methanol	0.300
		Con.HCl	0.175
7	Propiconazole	DICAP	0.715
		PDL	0.394
		PTSA	0.015
		Cyclo Hexane	0.100
		Bromine	0.410
		Chlorine	0.180
		Triazole	0.330
		KOH (88%)	0.309

Sr. No.	Name of Synthesis Technical Products	Raw Materials	Consumption (Ton/Ton)
		DMSO	0.150
		Toluene	0.150
		NaOH	0.030
		Hyflo	0.010
8	Propargite	TOLUENE	0.345
		TBPC (97.0 %)	0.698
		THIONYL CHLORIDE	0.365
		PROPARGYL ALCOHOL	0.234
		TRIETHYL AMINE	0.080
		Epoxy Soya oil	0.007
		Hydrochloric acid	0.015
		Sodium Hydroxide lye	0.400
9	Difenthuron	DIPA	1.090
		Cyclohexane	0.200
		HCl (30%)	1.200
		Bromine	0.400
		Sodium Sulphite	0.120
		CS Lye (100%)	0.650
		Xylene	0.400
		Phenol	0.620
		KOH (88%)	0.450
		CuCO3	0.040
		DMF	2.100
		Carbon	0.090
		Hyflo	0.090
		Sodium Thiocyanate	0.560
		Mesitylene	0.300
		Acetonitrile	0.400
		T-Butylamine	0.250
		Chlorine	0.180
10	Tebuconazole	2-tert-Butyl-2-[2-(4-chlorophenyl) ethyl Oxirane (Tebuconazole Intermediate)	1.02
		1,2,4 Triazole	0.352
		NaOH	0.0336
		Di-methyl Formamide (DMF)	3.13
		Toluene	0.700
		Conc. HCl	0.383
		Dilute NaOH Solution	4.08
11	Difenconazole	Bromoketal	1.41
		1H-1,2,4-Triazole	0.32
		Potassium hydroxide	0.3
		Potassium iodide	0.02

Sr. No.	Name of Synthesis Technical Products	Raw Materials	Consumption (Ton/Ton)
		DMF	0.4
		Toluene	0.3
		10% HCl solution (w/w)	0.72
12	Thiamethoxam	MMTO	0.58
		CCMT	0.64
		K2CO3	0.20
		ACETONITRILE	0.20
13	Bispyribac	4,6-Dimethoxy-2-methylsulfonylPyrimidine (99%)	1.429
		2,6-Dihydroxy Benzoic Acid 99%	0.476
		Sodium hydroxide	0.371
		DMF	1.00
		Potassium Carbonate	2.22
		Toluene	1.11
		Sodium Methoxide	0.67
		Hydrochloric acid (15%)	7.890
		Methanol	0.150
14	Thiafluzamide	ETFAA	0.47
		CHLORINE	0.19
		ACETONITRILE	0.19
		TAA	0.22
		TEA	0.64
		NaOH	0.51
		$SOCl_2$	0.49
		DBTFMA	0.64
		TOLUENE	0.19
15	Epoxyconazole	EPOXY INTERMEDIATE	1.58
		DCA	0.63
		H_2O_2	0.45
		TOULENE	0.20
		NaOMe	0.31
		TRIZOLE	0.39
		ACETONITRILE	0.20
16	Prothioconazole	CPBK	1.00
		DMS	0.20
		$DMSO_4$	0.69
		KOH	0.35
		EDC	0.20
		DHTT	0.48
		K_2CO_3	0.29
		DMF	0.20
		ACETONITRILE	0.10

Sr. No.	Name of Synthesis Technical Products	Raw Materials	Consumption (Ton/Ton)
17	Fluazinam	DCFB	0.60
		HNO_3	0.30
		H_2SO_4	0.66
		EDC	0.20
		ATCP	0.47
		TOLUENE	0.20
18	Azoxystrobin	Sodium Methoxide	0.15
		METHANOL	0.20
		HBN	0.33
		CPMBA	0.83
		TOLUENE	0.23
19	Pyraclostrobin	MABC	0.51
		MCF	0.34
		TOLUENE	0.25
		Sodium Methoxide	0.15
		Methanol	0.30
		CPHP	0.53
20	Boscalid	Thionyl Chloride	0.513
		CNC	0.566
		Toluene	0.2
		ACBP	0.624
21	Cyazofamid	CCDTI	0.74
		DMSC	0.52
		TOLUENE	0.20
22	Penconazole	BDCPP	1.34
		TRIZOLE	0.41
		KOH	0.37
		TOLUENE	0.20
		DMF	0.25
23	Cyproconazole	CPPO	1.00
		DMS	0.21
		$DMSO_4$	0.72
		KOH	0.64
		EDC	0.10
		K_2CO_3	0.67
		TRIZOLE	0.34
24	Spirodiclofen	HCC	0.47
		NaOH	0.22
		TOLUENE	0.18
		DCPC	0.61
		DMPC	0.49
25	Spiromesifen	TOLUENE	0.30

Sr. No.	Name of Synthesis Technical Products	Raw Materials	Consumption (Ton/Ton)
		NaOH	0.12
		DMPC	0.42
		MOONE	0.76
26	Tolfenpyrod	MPPMA	0.58
		CEMPCC	0.56
		TOLUENE	0.30
27	Clodinofop	DMF	0.16
		RHPPA	0.78
		K_2CO_3	1.07
		DCFP	0.72
		PC	0.79
		DCM	0.190
28	Pretilachlor	PEDA	0.78
		CAC	0.39
		HEXANE	0.14
		$NaHCO_3$	0.03
		DEA	0.65
		PEC	0.54

ANNEXURE: 2A

BRIEF MANUFACTRING PROCESS, CHEMICAL REACTION AND MASS BALANCE WITH FLOW DIAGRAM

EBDC FUNGICIDES PRODUCTS

1. MANCOZEB

Step 1:

Carbon Di Sulphide (CS2) and Ethylene Di Amine (EDA) are reacted under controlled conditions in a reactor to produce Ethylene Bisdithio Carbamic Acid. This acid is neutralized in the same reactor with Caustic Lye (NaOH) solution to get Sodium salt of Ethylene Bisdithiocarbamate (Na-EBDC).The sodium salt forms and solution in aqueous medium and is a common ingredient for production of Mancozeb.

Step 2:

The NaEBDC solution is reacted with Manganese Sulphate solution (MnSO4) to form Manganese salt of Ethylene Bisdithiocarbamate(Mn-EBDC). The Manganese salt is insoluble in aqueous medium and forms a slurry. Also by-product Sodium Sulphate (Na2S04) is formed.

Step 3:

To improve purity of the product the slurry is filtered and washed to remove Na2S04.The Manganese salt is obtained as a cake.

Step 4:

The Cake is re-slurried and additives like Sodium Ligno Sulphonate (SLS) are added to make slurry processable. Also stabilizers like Hydroxy Methyl Tetra Amine (HMT) are added. Then it is complexed with Zinc Sulphate Solution(ZnSO4) to form coordinated complex of Manganese & Zinc of Ethylene Bisdithiocarbamate (MnxZnyEBDC)

Step 5: The slurry is then Spray Dried to get Mancozeb powder with moisture content less than 12%.

Step 6: The Powder is then vacuum -dried to obtain product with less than 1% moisture and desired particle size. Simultaneously Active ingredient is adjusted by addition of NaSLS.

Step 7: The powder is then cooled in inert atmosphere.

Step 8: After getting approval of the product quality from Quality Assurance department, the product is then packed in Pouches or Bags as per requirement of Sales Department.

2. MANEB

Step 1:
Carbon Di Sulphide (CS2) and Ethylene Di Amine (EDA) are reacted under controlled conditions in a reactor to produce Ethylene Bisdithiocarbamic Acid. This acid is neutralized in the same reactor with Caustic Lye (NaOH) solution to get Sodium salt of Ethylene Bisdithiocarbamate(Na-EBDC). The sodium salt forms a solution in aqueous medium and is a common ingredient for production of Mancozeb.

Step 2:
The Na EBDC solution is reacted with Manganese Sulphate solution (MnSO4) to form Manganese salt of Ethylene Bisdithiocarbamate(Mn-EBDC). The Manganese salt is insoluble in aqueous medium and forms slurry. Also by-product Sodium Sulphate (Na2SO4) is formed.

Step 3:
To improve purity of the product the slurry is filtered and washed to remove Na2SO4.The Manganese salt is obtained as a cake.

Step 4:
Maneb Cake is passed in Stabilization vessel, in which stabilizer are added and slurry feed to spray Dryer to for Drying. Then the Dried Powder is feed to Rotary Vacuum dryer to remove M.C. Then dried powder is cooled in Cooler and suspending agent is added in Blender to make final product as per market demand i.e. 80% or 75% WP.

3. ZINEB

Step 1:

Carbon Di Sulphide (CS2) and Ethylene Di Amine (EDA) are reacted under controlled conditions in a reactor to produce Ethylene Bisdithio Carbamic Acid. This acid is neutralized in the same reactor with Caustic Lye (NaOH) solution to get Sodium salt of Ethylene Bisdithiocarbamate (Na-EBDC). The sodium salt forms an solution in aqueous medium and is a common ingredient for production of Zineb and Mancozeb.

Step 2:

The Na-EBDC solution is reacted with Zinc Chloride solution (ZnCl2) to form Zinc salt of Ethylene Bisdithiocarbamate(Zn-EBDC). The Zinc salt is insoluble in aqueous medium and forms slurry. Also byproduct Sodium Chloride (NaCl) is formed.

Step 3:

To improve purity of the product the slurry is filtered and washed to remove NaCl. The Zinc salt is obtained as a cake.

Step 4:

The Cake is re-slurried and additives like Sodium LignoSulphonate (Na-SLS) are added to make slurry process- able.

Step 5:

The slurry is then Spray Dried to get Zineb powder with moisture content less than 1%.

Step 6:

The Powder is then ground to reduce particle size to specification.

Step 7:

The powder is then adjusted for Active ingredient by addition of fillers in a Blender.

4. PROPINEB

Step 1:

Carbon Di Sulphide (CS_2) and Propylenediamine (PDA) are reacted under controlled conditions in a reactor to produce Propylene Bisdithio Carbamic Acid. This acid is neutralized in the same reactor with ammonia solution to get ammonium salt. The ammonium salt forms an solution in aqueous medium for production of Propineb.

Step 2:

The ammonium salt solution is reacted with Zinc sulfate to form Zinc salt of Propylene Bisdithiocarbamate. The Zinc salt is insoluble in aqueous medium and forms slurry. Also by-product Ammonium Sulfate is formed.

Step 3:

To improve purity of the product the slurry is filtered and washed to remove Ammonium Sulfate. The Zinc salt is obtained as a cake.

Step 4:

The Cake is re-slurries and additives like Sodium Ligno Sulphonate (Na-SLS) are added to make slurry processable.

Step 5:

The slurry is then Spray Dried to get Propineb powder with moisture content less than 1%.

Step 6:

The Powder is then ground to reduce particle size to specification.

SPECIALTY CHEMICALS

Process Description

Emulsion/ Solution Polymers

The Production is done in a batch process. Each emulsion train shall consist of Activator Preparation, Emulsion Preparation Vessel, Catalyst Preparation Vessel, Emulsion Reactor, Hold tank and Filter. Various Raw Materials are Weighted/ Metered and placed in the Reaction Vessel. The materials are agitated for a period varying between 30 minutes to 2 hrs depending on specific product. After the ingredients have been mixed/blended, a sample is withdrawn to check the properties and characteristics of the solutions. Adjustments, if necessary are made at this stage. The Batch is filtered to remove suspended impurities. The final product is stored for packing in drums/tankers as required. Majority of the Emulsion will be liquid product, however partly it will be spray dried to produce solid powder product.

Condensation Polymerization

The monomer mixed in proportions with activator is added to the reactor & heats it up to 140-150 degree centigrade. When the peak temp rises , add catalyst , then continue slow reflux to the kettle, some part of solvent is taken to the hold tank, here the post additive solutions are added. Hold the reaction for a certain period then filter the batch through filter and drum out.

Spray Drying

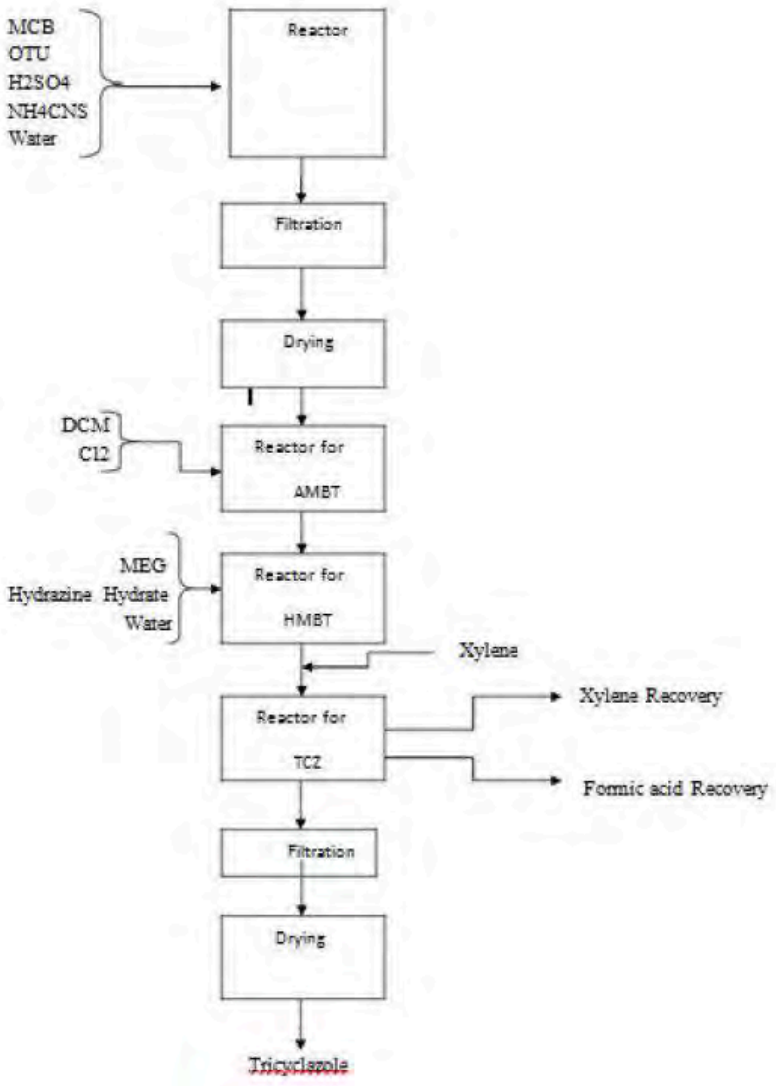
Supply hot air & the emulsion solution to the drying chamber through nozzle solution sprayed & maintained feed temperature at 150-200 degree to avoid the air pollution by dust the particles the hot air from drying chamber is further pass through cyclone separator followed by bag house where the dust particles get filtered in bag filter & air is exhausted. At the same time the product stream from drying chamber is conveyed by screw conveyer to the vibro sifter for further purity, here the undersized material is finished product & oversized material is fed to the Pulverizer& then back to product stream.

SYNTHESIS TECHNICAL PRODUCTS

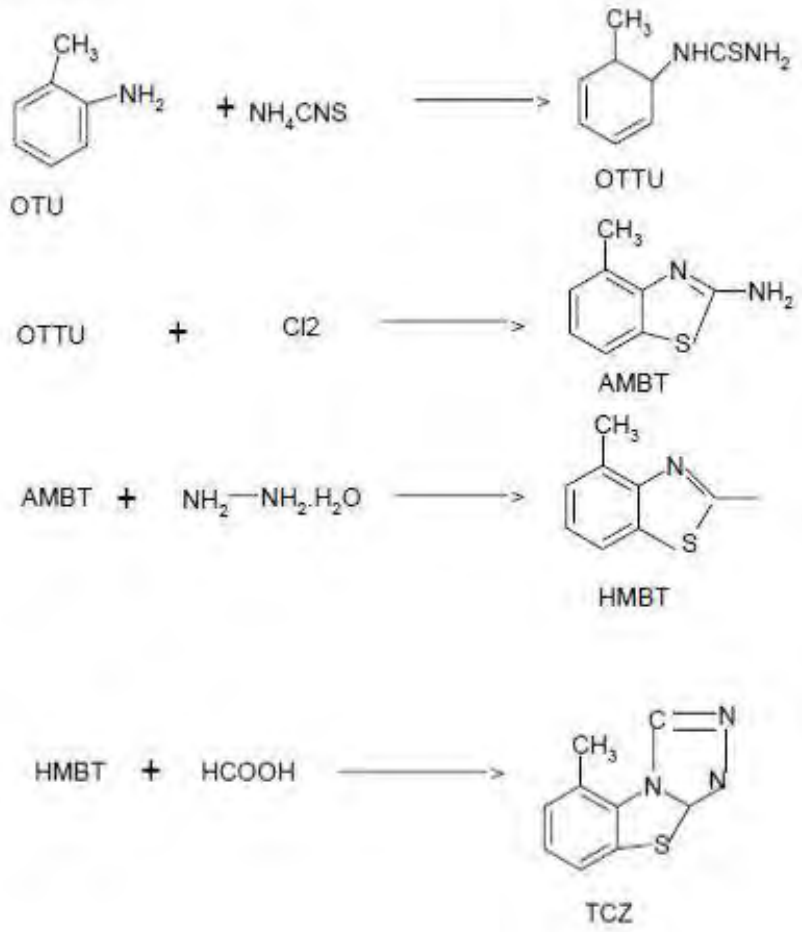
1. Tricyclazole and / or its intermediates: HMBT

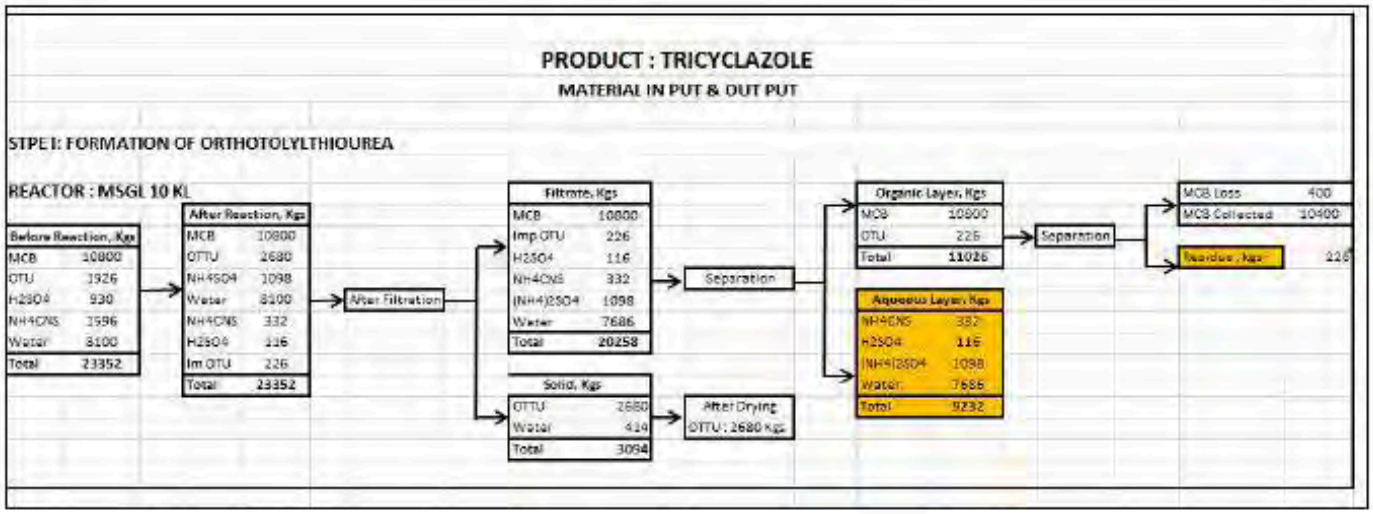
Process

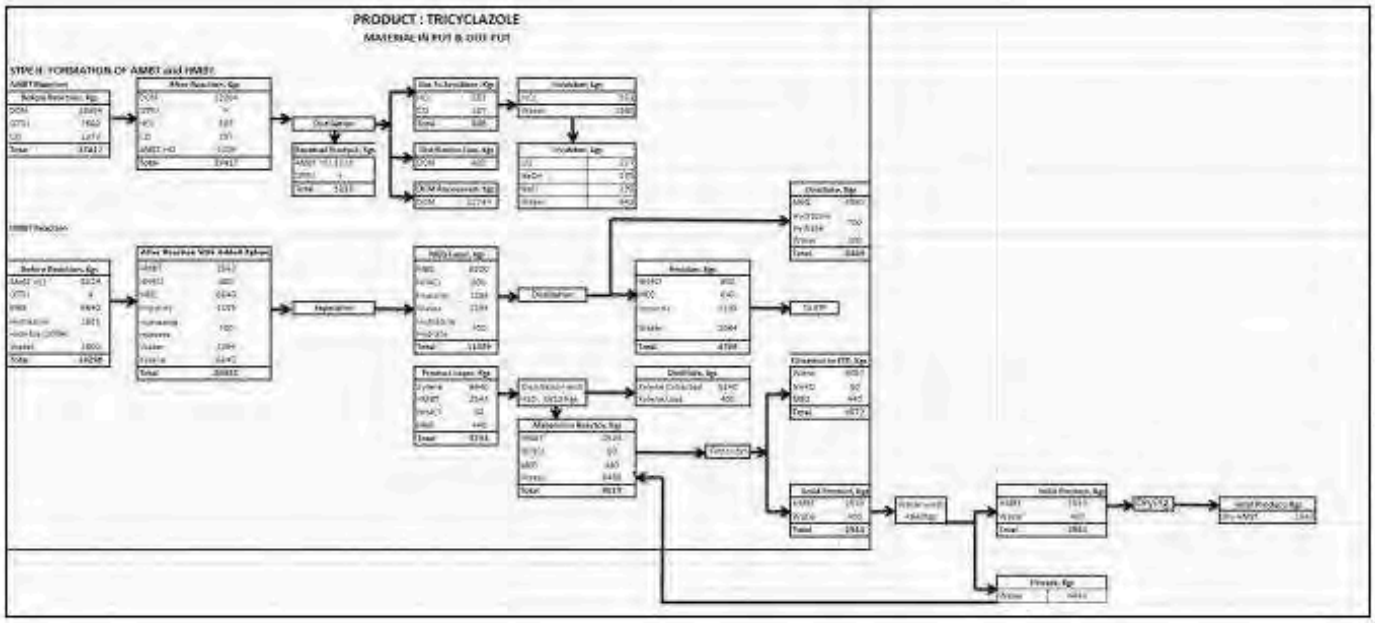
Tricyclazole is made in 3 process steps. In first step, orthotoludine is reacted with Ammonium Thicynamate in presence of solvent and acid.After work up the product Orthotolylthiourea is isolated and dried. In the second step Orthotolylthioure is Cyclised to 2-Amino-4-Methylbenzo Catalyst at room temperature. The product is then reacted with 2-hydrazo-4-methyl-henzothiazole (HMBT) in final step, HMBT is reacted with formic acid to produce Tricyclazole.

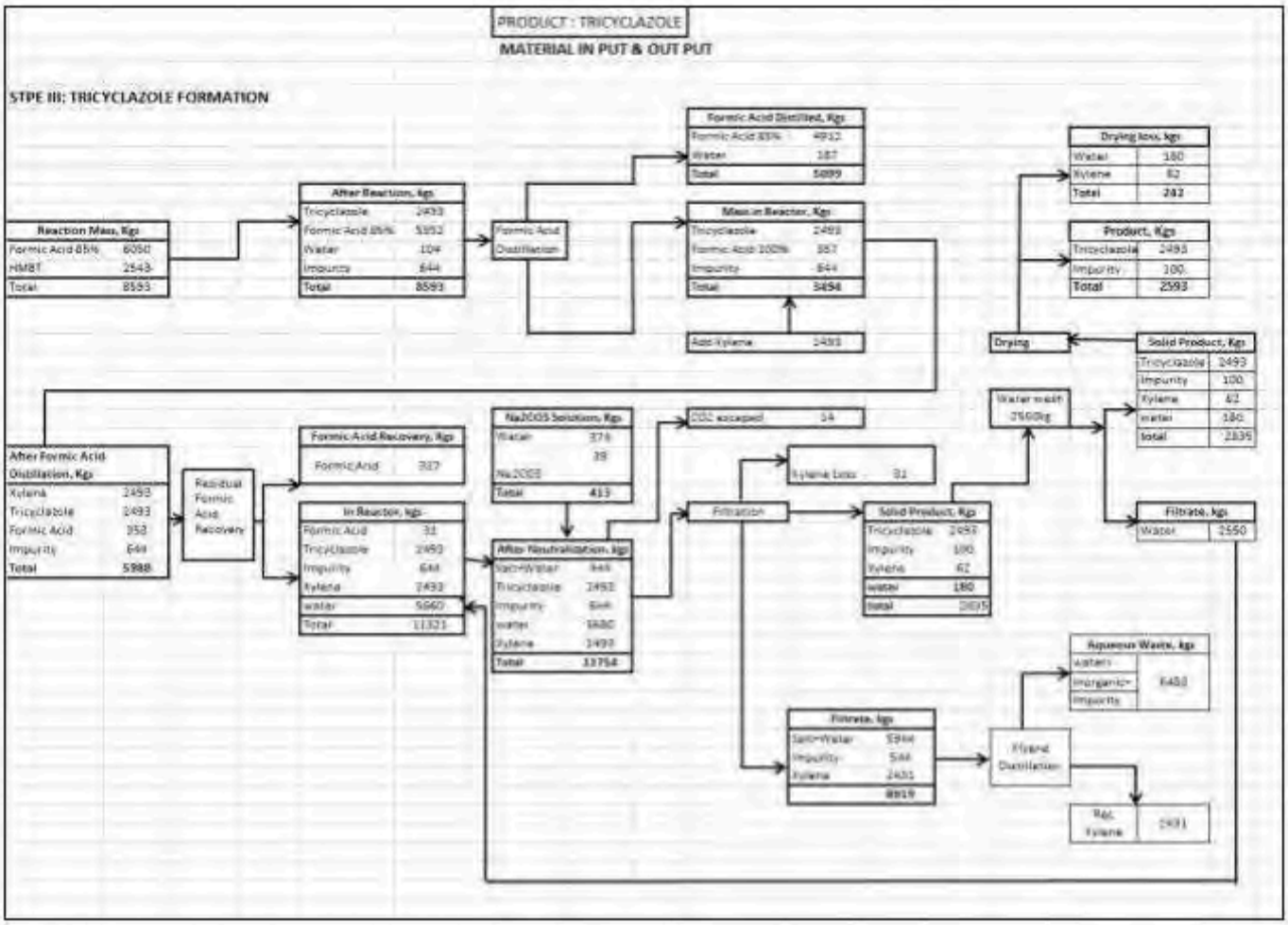


Reaction :-


CH3
NH2
+ NH4CNS
NHCSNH2
OTU
OTTU
OTTU + Cl2
N
NH2
S
AMBT
AMBT + NH2—NH2.H2O
HMBT
HMBT + HCOOH
C
N
TCZ


PRODUCT : TRICYCLAZOLE
MATERIAL IN PUT & OUT PUT
STPE I: FORMATION OF ORTHOTOLYLTHIOUREA
REACTOR : MSGL 10 KL
Before Reaction, Kgs
MCB 10800
OTU 1926
H2SO4 930
NH4CNS 3596
Water 8100
Total 23352
After Reaction, Kgs
MCB 10800
OTU 2680
NH4SO4 1098
Water 8100
NH4CNS 332
H2SO4 116
Im OTU 226
Total 23352
After Filtration
Filtrate, Kgs
MCB 10800
Imp.OTU 226
H2SO4 116
NH4CNS 332
(NH4)2SO4 1098
Water 7686
Total 20258
Separation
Solid, Kgs
OTU 2680
Water 414
Total 3094
After Drying
OTU : 2680 Kgs
Organic Layer, Kgs
MCB 10800
OTU 226
Total 11026
Separation
Aqueous Layer, Kgs
NH4CNS 332
H2SO4 116
(NH4)2SO4 1098
Water 7686
Total 9232
MCB Loss 400
MCB Collected 10400
Residue , Kgs 226


PRODUCT : TRICYCLAZOLE
MATERIAL IN PUT & OUT PUT

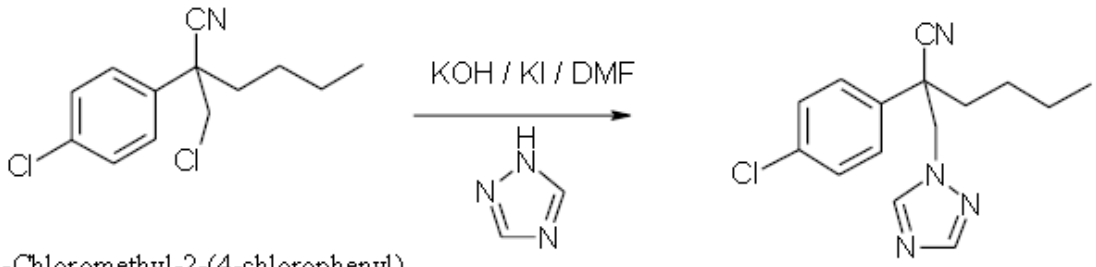

PRODUCT : TRICYCLAZOLE
MATERIAL IN PUT & OUT PUT
STPE III: TRICYCLAZOLE FORMATION
Reaction Mass, Kgs
Formic Acid 85% 6050
HMBT 2543
Total 8593
After Reaction, kgs
Tricyclazole 2493
Formic Acid 85% 5952
Water 104
Impurity 644
Total 8593
Formic Acid
Distillation
Formic Acid Distilled, Kgs
Formic Acid 85% 4912
Water 187
Total 5099
Mass in Reactor, Kgs
Tricyclazole 2493
Formic Acid 100% 357
Impurity 644
Total 3494
Add Xylene 2493
Drying loss, kgs
Water 180
Xylene 62
Total 242
Product, Kgs
Tricyclazole 2493
Impurity 100
Total 2593
Drying
Solid Product, Kgs
Tricyclazole 2493
Impurity 100
Xylene 62
water 180
total 2835
Water wash
2500kg
After Formic Acid
Distillation, Kgs
Xylene 2493
Tricyclazole 2493
Formic Acid 352
Impurity 644
Total 5988
Residual
Formic
Acid
Recovery
Formic Acid Recovery, Kgs
FormicAcid 307
In Reactor, kgs
Formic Acid 31
Tricyclazole 2493
Impurity 644
Xylene 2493
water 5660
Total 11321
Na2CO3 Solution, Kgs
Water 376
39
Na2CO3
Total 415
CO2 escaped 14
After Neutralization, kgs
Xylene Loss 31
Filtration
Solid Product, Kgs
Tricyclazole 2493
Impurity 100
Xylene 62
water 180
total 2835
Filtrate, kgs
Water 2550
Filtrate, kgs
Xylene 2431
8819
Xylene
Distillation
Aqueous Waste, kgs
Inorganic 6450
Impurity
Rec.
Xylene 2431

2. Myclobutanil

Process of Operation

Parachlorotoluene is Chlorinated by chlorine at 35 to 40 degree in presence of catalyst and the chlorinated product Parachlorobenzylchloride is reacted with sodium cyanide. The cyanated product is isolated by distillation and the pure product is then reacted with butylbromide in presence of excess Caustic. After completion of the reaction, the aqueous is separated out and the organic is taken for the next process step. The butylatedparachlorobenzylcyanide is further reacted with DCM in presence of caustic solution and the final product is isolated by distillation and is sent for next step The intermediate alpha butyl alpha chloromethyl parachlorophenylacetonitrile is then reacted with potassium Triazole at elevated temperature in presence of DMF solvent and after processing the product mass, the product is distilled to get 98% myclobutanol.

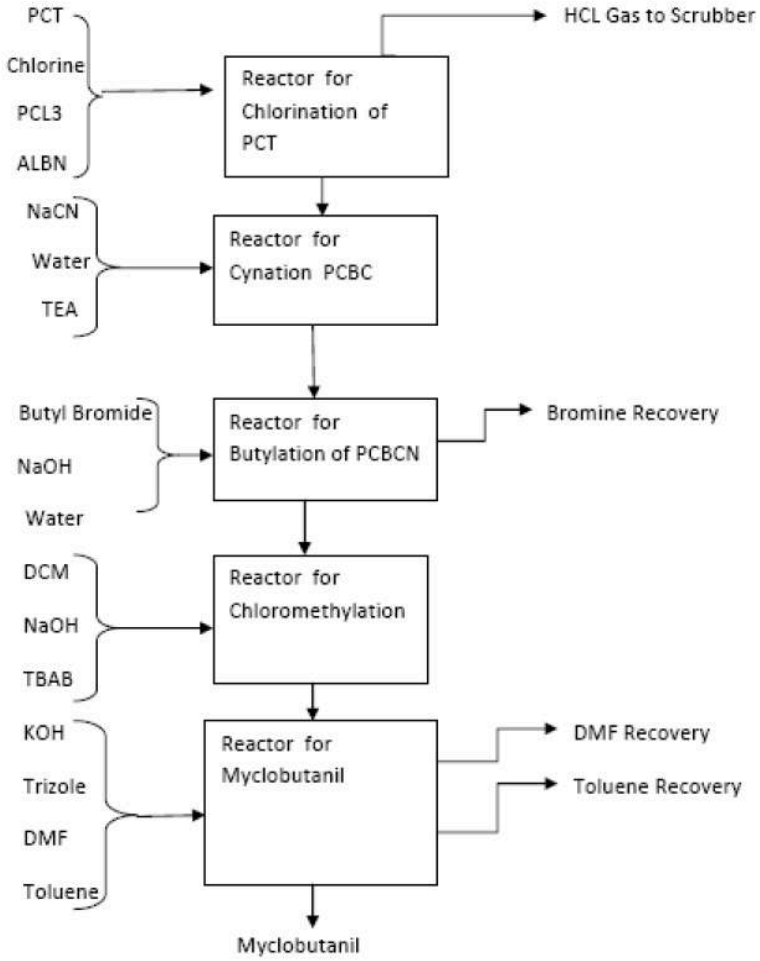
REACTION SCHEME:

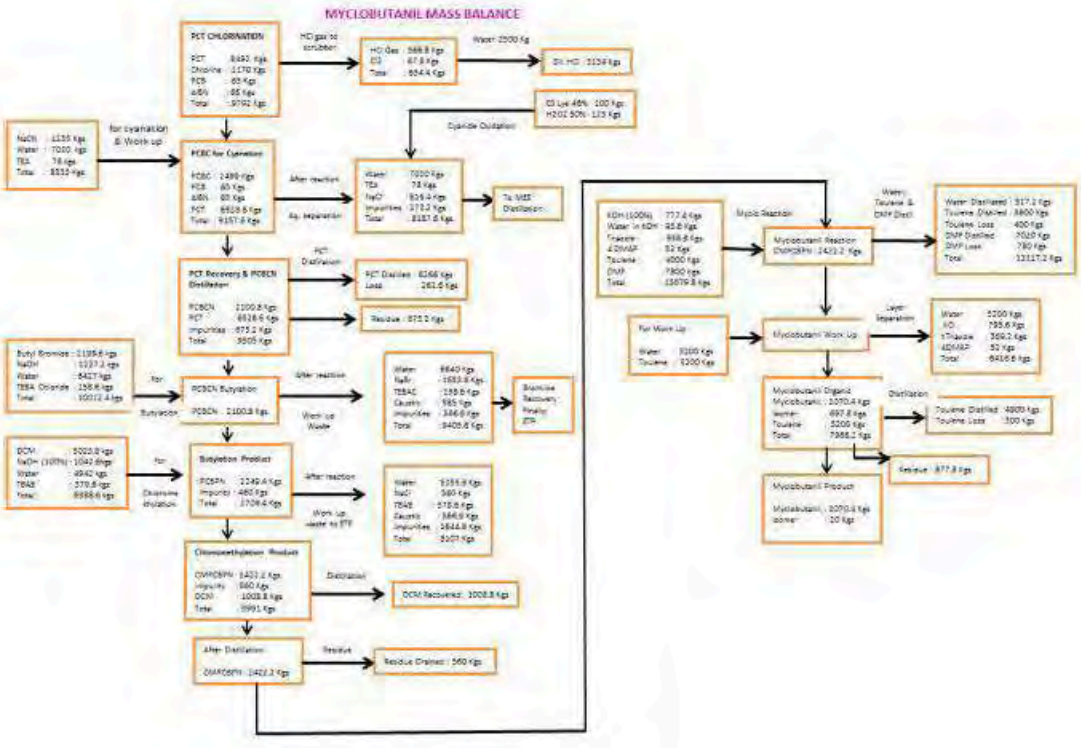


2-Chloromethyl-2-(4-chlorophenyl) hexanenitrile
(Myclobutanil Intermediate)
254

1H -1,2,4-Triazole
69.1

Myclobutanil Technical
288.5


PCT
Chlorine
PCL3
ALBN
Reactor for Chlorination of PCT
HCL Gas to Scrubber
NaCN
Water
TEA
Reactor for Cynation PCBC
Butyl Bromide
NaOH
Water
Reactor for Butylation of PCBCN
Bromine Recovery
DCM
NaOH
TBAB
Reactor for Chloromethylation
KOH
Trizole
DMF
Toluene
Reactor for Myclobutanil
DMF Recovery
Toluene Recovery
Myclobutanil


MYCLOBUTANIL MASS BALANCE

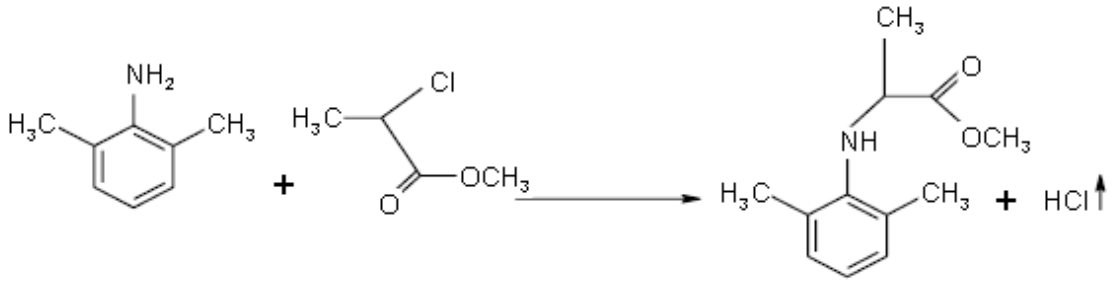
3. Metalaxyl Technical

Manufacturing of N-(1-Methoxycarbonylethyl) -2,6-dimethyl aniline.

Manufacturing of Metalaxyl

Step-I: Manufacturing of N-(1-Methoxycarbonylethyl)-2,6-dimethyl aniline

N-(1- Methoxycarbonylethyl)-2,6-dimethyl aniline is manufactured by reacting 2,6-Dimethyl aniline with Methyl 2-Chloro propionate in presence of KI/ Na_2CO_3at110-115°C.



2,6- Dimethyl anilene
M.wt- 121

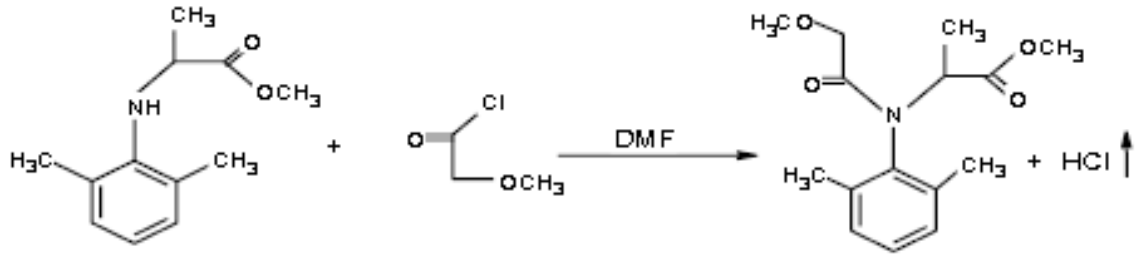
Methyl 2-chloro propionate
M. wt.- 122.5

N-(1 -Methoxycaronylethyl)
-2,6-dimethyl aniline
M. Wt. - 207

In 2000 L MSGL reactor charged 181.5 kg of 2,6-Dimethyl aniline, 208.2kg Methyl 2-chloro propionate, 106.6kg anhydrous sodium carbonate, 24.9kg potassium iodide and 109.5kgDMF. Heated the RM to 110 – 115°C for 12 hrs. After 12 hrs, reaction monitored by GC qualitative analysis then reaction mass cooled at 30°C and calculated amount of water and toluene is added. Organic layer separated and then washed with approximate amount of water. Finally Toluene,2,6-Dimethyl aniline and N-(1- Methoxycarbonylethyl)-2,6-dimethyl aniline fractionated under vacuum to get 273 kg of N-(1- Methoxycarbonylethyl)-2,6-dimethyl aniline.

Step-II: Manufacturing of Methyl N-(2,6-Dimethylphenyl)-N-(Methoxyacetyl)-DL-Alaninate

N-(1- Methoxycarbonylethyl)-2,6-dimethyl aniline is reacted with Methoxy acetyl chloride at 60°C to form Methyl N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-DL-alaninate.

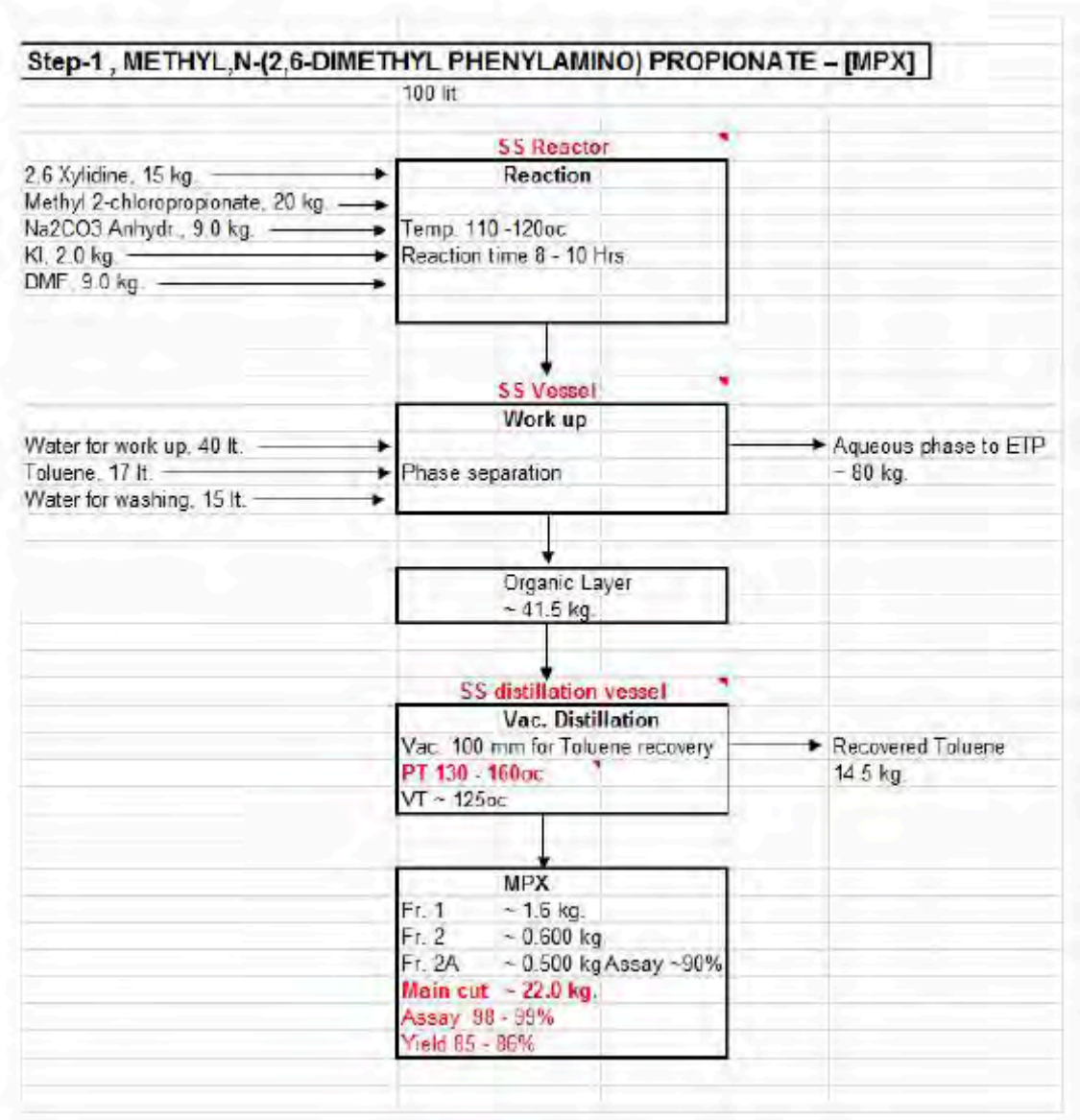


N-(1 -Methoxycarbonylethyl)
-2,6- dimethyl aniline
M. Wt. - 207

Methoxy acetyl chloride
M. wt.- 108.5

Methyl N-(2,6-dimethylphenyl)
-N-(methoxyacetyl)-DL-
alaninate
M. Wt. 279

In 2000LMSGL reactor 554 kg of Hexane, 273kgN-(1- Methoxycarbonylethyl)-2,6-dimethyl aniline (obtained from first step) and 9.6 kg of DMF is charged. Added 143 kg of Methoxy acetyl chloride slowly at 30°C. The reaction mass is heated to 60°C for 5hrs. Reaction monitored by GC analysis. After completion of reaction RM cooled to 30°C and filter. Wet cake washed with approximate amount of sodium bicarbonate solution followed by water wash to get 378.5 kg of Methyl N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-DLalaninate.



Step-2, Preparation of Metalaxyl tech. 100 lit

MSGL Reactor

Step-1 (MPX), 10.35 kg.	**Reaction**	
Hexane, 30 lt.	RMs addition at RT	→ Gas to scrubber
Dimethyl formamide, 360 gm.	Controlled addition of MAC in 2 hrs. at RT	
Anhyd. Sodium carbonate, 2.85 kg.	Cooking temp. 55 - 60oc	
Methoxy acetyl chloride, 5.85 kg.	Cooking time 3 hrs.	

↓

MSGL vessel

Water, 20 lt.	**Work up** Water addition at 50oc Agitation at RT for 3 hrs. for complete crystallization	

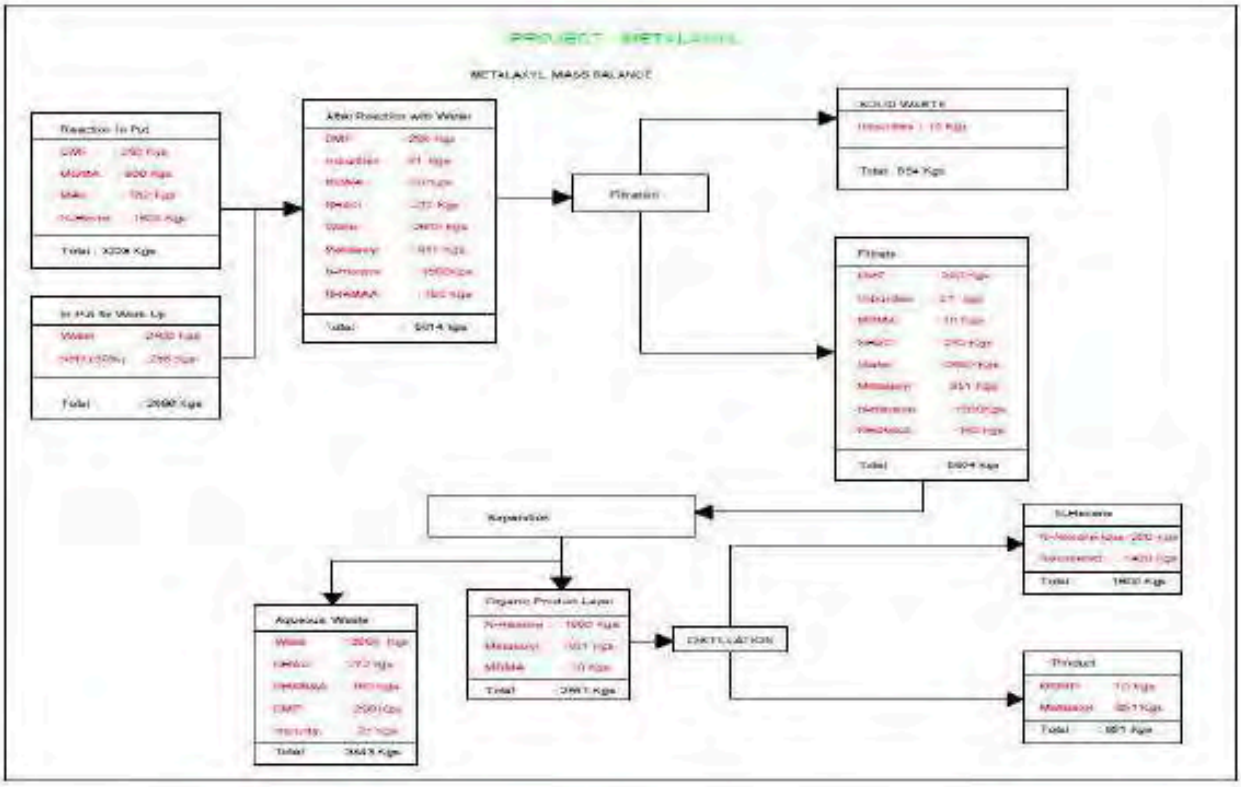
↓

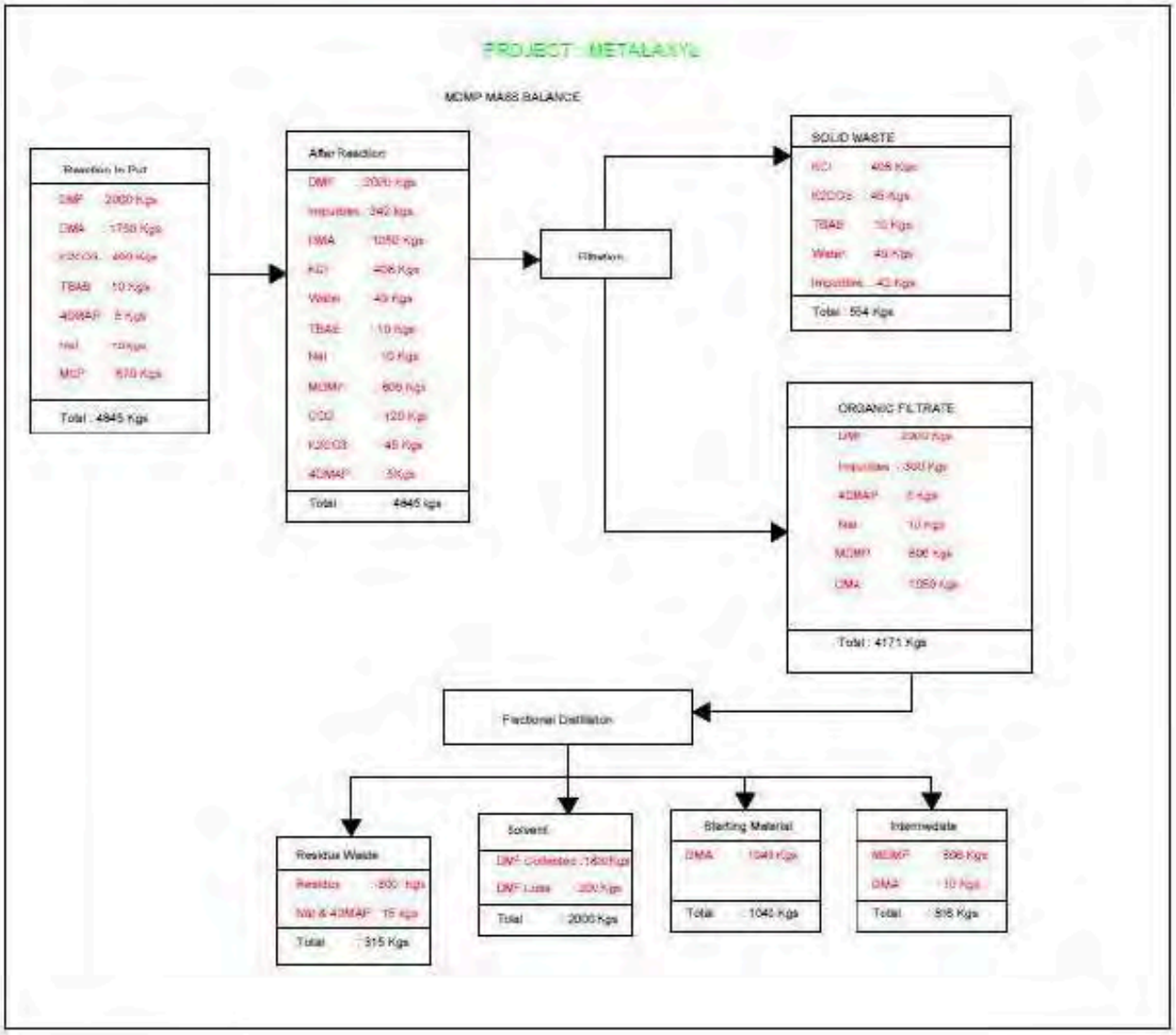
In Neutch Filter

Hexane wash, 10 lt. X 1	**Filtration**	→ Recovered Hexane, 22 kg.
Water wash, 10 lt. X 2	**Washing**	→ Aqueous phase, 45 kg.

↓

Drying
In Tray dryer at 50oc
Metalaxyl tech. ~ 12 kgs.
Assay 98%
Yield ~ 84%

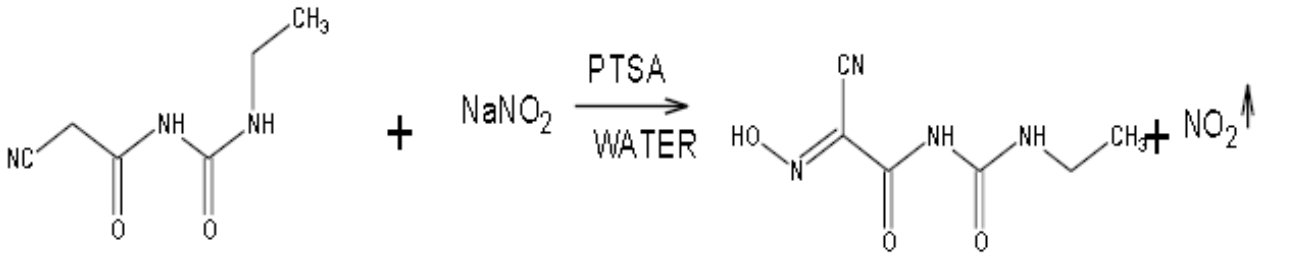



PROJECT: METALAXYL
MDMP MASS BALANCE
Reaction In Put
DMF 2000 Kgs
DMA 1750 Kgs
TBAB 10 Kgs
MCP 630 Kgs
Total : 4845 Kgs
After Reaction
DMF 2000 Kgs
Impurities 342 kgs
DMA 1050 Kgs
KCl 406 Kgs
Water 40 Kgs
TBAB 10 Kgs
Nat 10 Kgs
MDMP 606 Kgs
CO2 120 Kgs
K2CO3 45 Kgs
4DMAP 5Kgs
Total 4845 kgs
Filtration
SOLID WASTE
KCl 406 Kgs
K2CO3 45 Kgs
TBAB 10 Kgs
Water 40 Kgs
Impurities 42 Kgs
Total : 554 Kgs
ORGANIC FILTRATE
DMF 2000 Kgs
Impurities 300 Kgs
4DMAP 5 Kgs
Nat 10 Kgs
MDMP 606 Kgs
DMA 1050 Kgs
Total : 4171 Kgs
Fractional Distillation
Residue Waste
Residue 300 kgs
Nat & 4DMAP 15 Kgs
Total 315 Kgs
Solvent
DMF Collected 1700 Kgs
DMF Loss 300 Kgs
Total 2000 Kgs
Starting Material
DMA 1040 Kgs
Total 1040 Kgs
Intermediate
MDMP 606 Kgs
DMA 10 Kgs
Total 616 Kgs

4. Cymoxanil

Cymoxanil technical is manufactured in two steps. In first step intermediate Nitroso derivative is prepared by reaction of Cymoxanil intermediate with NaNO2 in presence of PTSA as a catalyst at 48 to 50 deg. In second step reaction mass is react with DMS and form methylation which gives Cymoxanil technical.

Cymoxanil Technical : Step 1

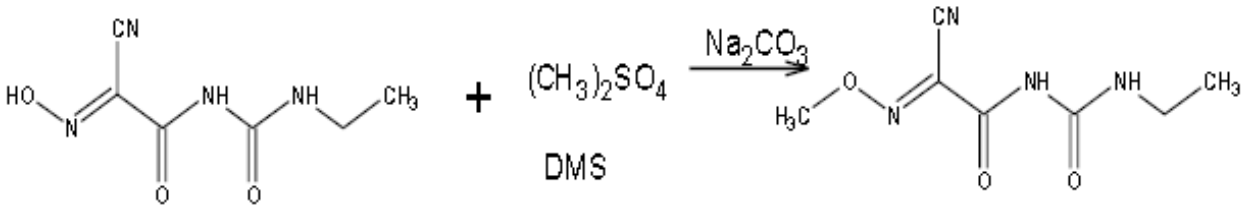


2-Cyano –2 (methoxyimino)-N- [(ethylamino)carbonyl] Acetamide (MW= 69)

Sodium Nitrite (MW = 184)

2-Cyano –2 Hydroximino -N- [(ethylamino)carbonyl] Acetamide (MW = 155)

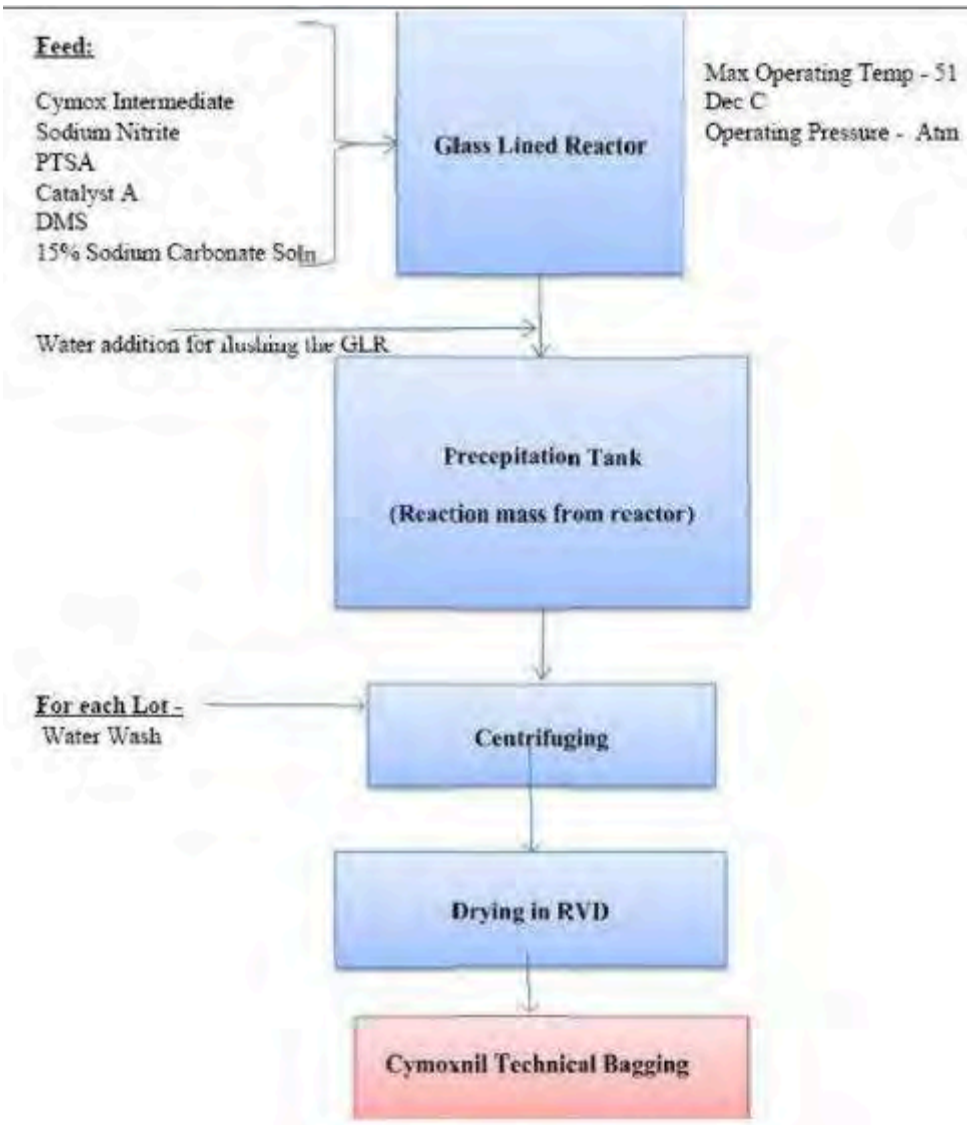
Cymoxanil Technical : Step 2



+ Mono Sodium Sulphate

2-Cyano –2 Hydroximino -N- [(ethylamino)carbonyl] Acetamide+ **CO2**

(MW = 184) **Cymoxanil Tech.** (MW= 198)



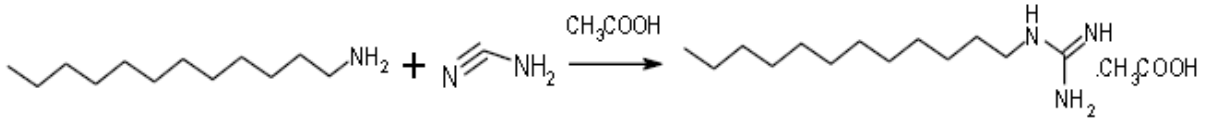
Mass Balance of Cymoxanil

Cymoxanil Tech Material Balance

Raw Material = 8035 kg		**Process**	**Cymox Tech**
2 CYANO (ETHYLAMINO)CARBONYL ACT =	1200 kg		**1280 kg**
SODIUM NITRITE =	636 kg		
DIMETHYL SULPHATE =	1337 kg		
SODIUM CARBONATE =	120 kg		
PARA TOLUENE SULPHONIC ACID =	42 kg		
Water =	4700 kg		
		Effluent = 13755 kg	
	(Mother Liquor = 6755 kg		
	Water for Washing = 7000 kg)		

5. Dodine:

Dodine technical is manufactured in a single step. In this single step molten Dodecilamine is react with cynamide in presence of acetic acid at 95 to 100 deg. which gives Dodine technical.



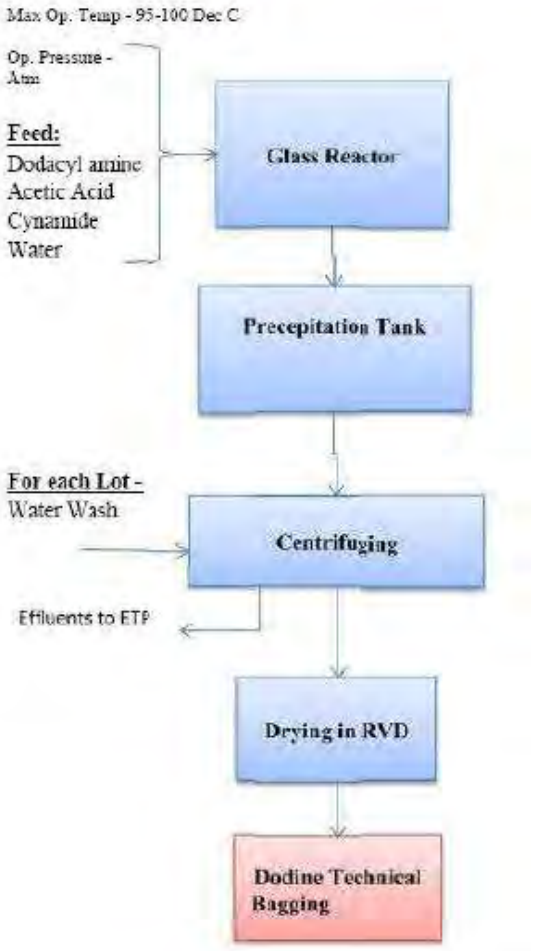
Dodicyl amine

M.W.=185.36
M.F.=C12H27N

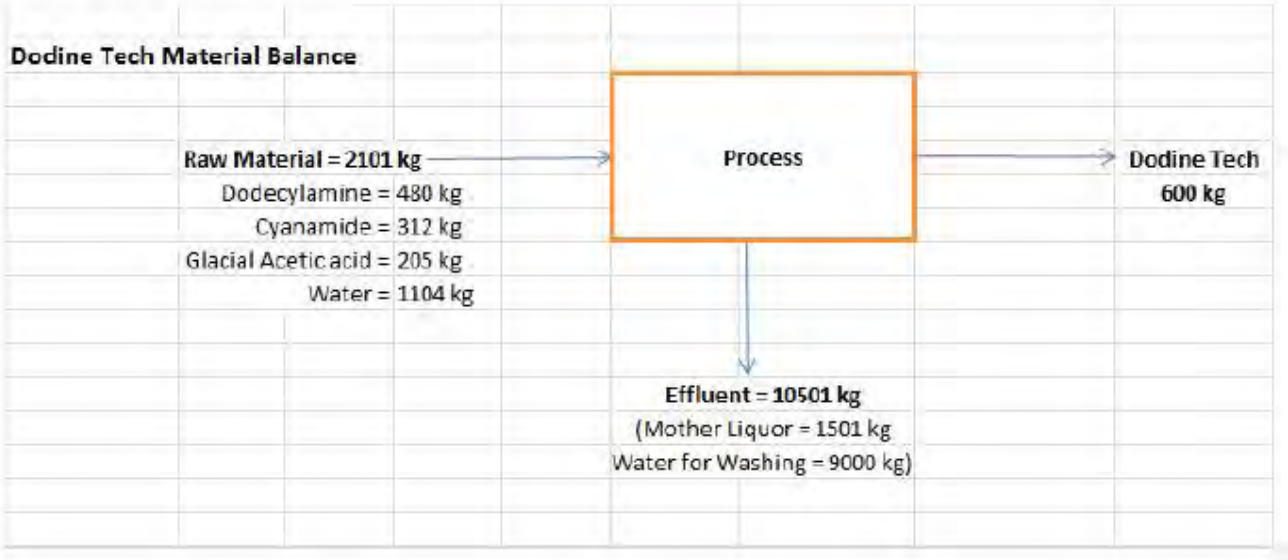
Cynamid
e
MW.=42.04
MF.=CH2N2

Dodine Technical

M.. =287.44
M.F. =C15H33N3O2

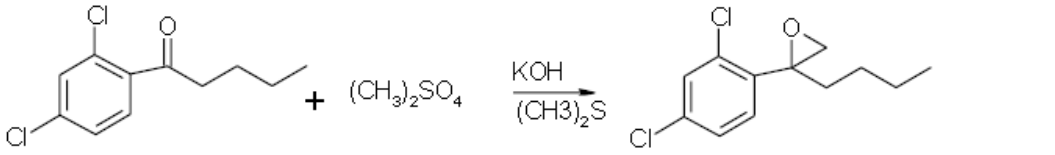


Mass Balance for Dodine				
Raw material	Total input Kg / Kg of product		Out put	Kg
Dodecyl amine	0.80		Mother Liquor	4.66
water in reaction	1.86		Washed effluent	3.10
GAA	0.14		Moisture in wet cake	0.20
Cyanamide	0.64		Dodine (product)	1.00
GAA	0.08			
GAA	0.06			
water in reaction	2.01			
GAA	0.06			
Water washing	3.33			
Total	8.99		total output	8.96



6. Hexaconazole

Step-1 Preparation of OxiraneIntermediate



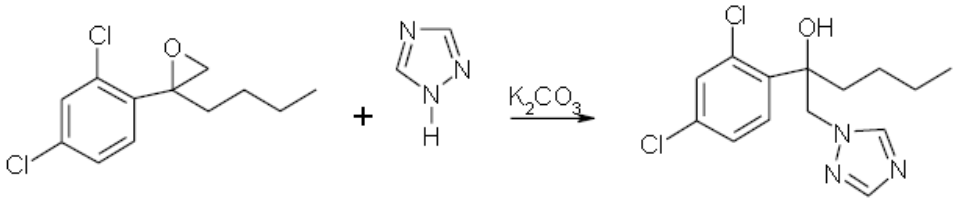
2,4-Dichlorovalerophenone

M.W. =231.15
M.F. =$C_{11}H_{12}Cl_2O$

2-Butyl-2-(2,4-dichlorophenyl)-Oxirane
(Hexa intermediate)

M.W. =245.15
M.F. =$C_{12}H_{14}Cl_2O$

Step-2 Preparation of Hexaconazole technical



Oxirane

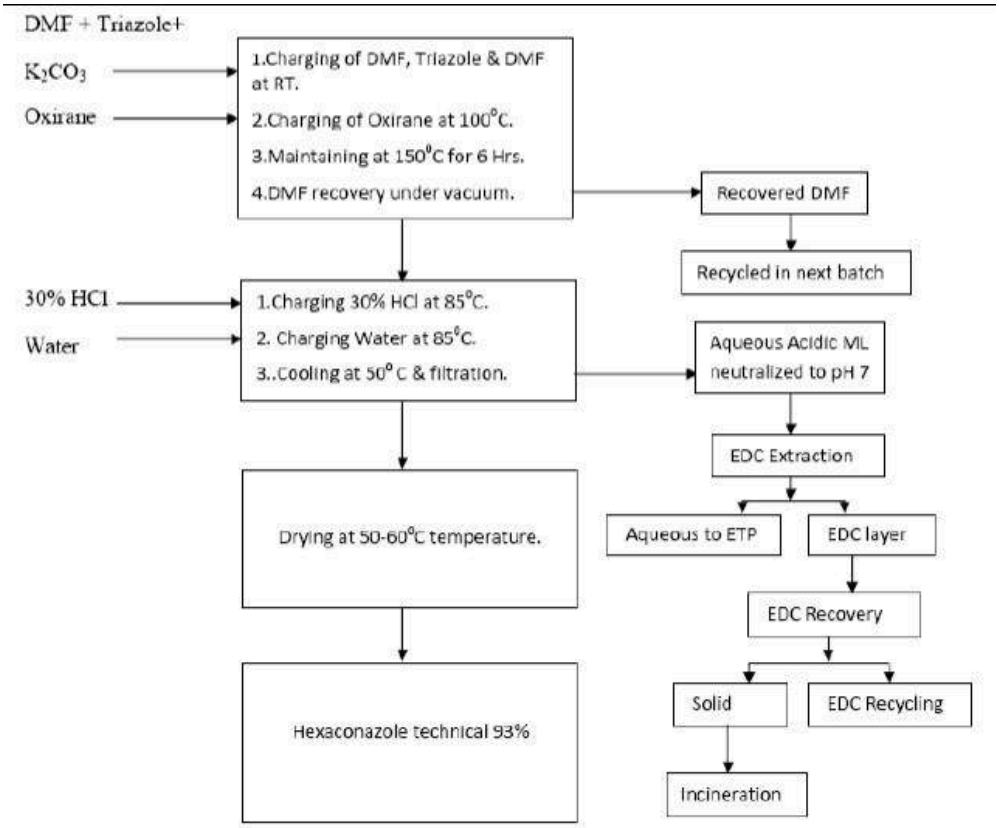
M.W. =245.15
M.F. =$C_{12}H_{14}Cl_2O$

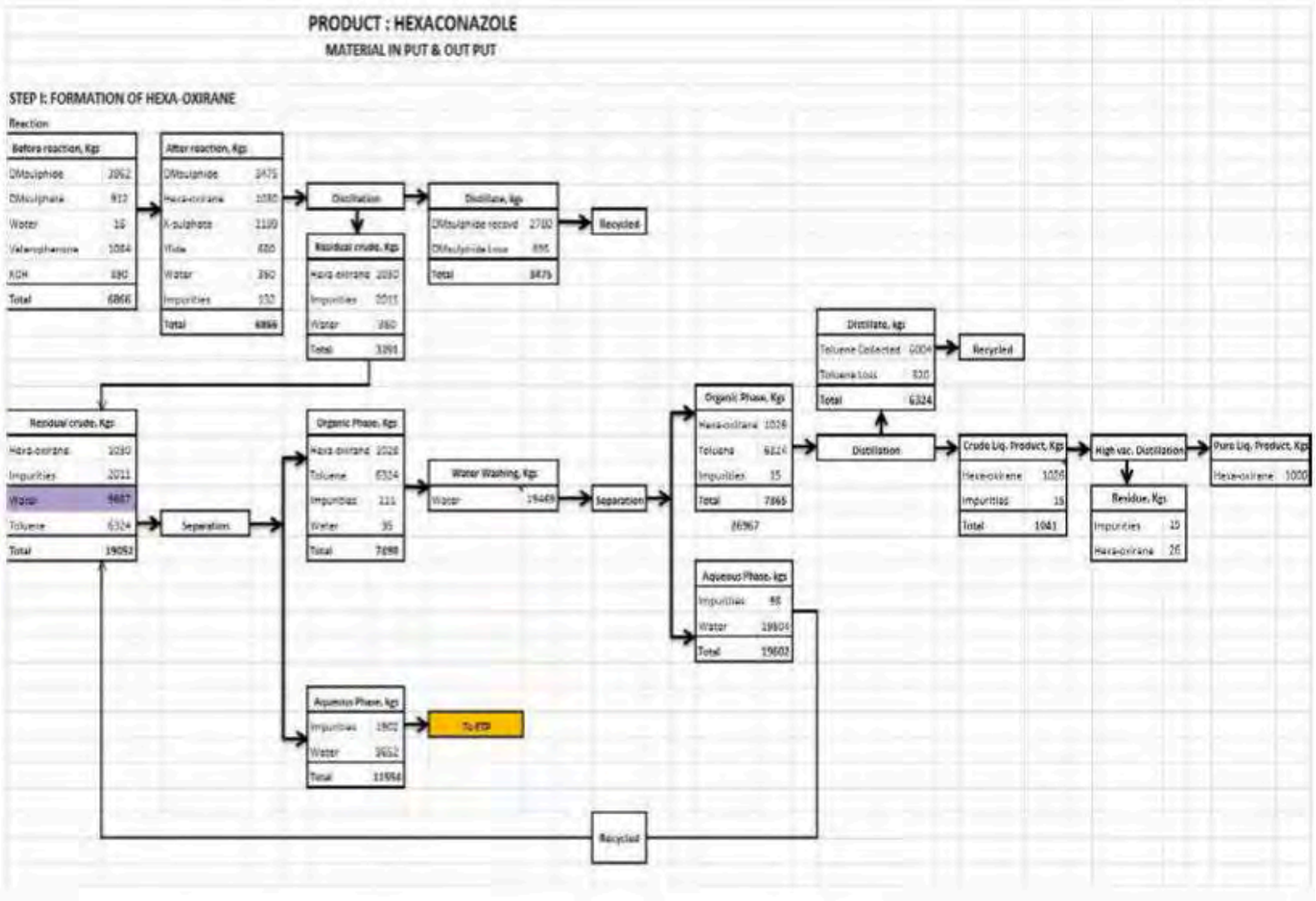
1,2,4 Triazole

M. W. =69.07
M. F. =$C_2H_3N_3$

Hexaconazole Technical

M.W. =314.22
M.F. =$C_{14}H_{17}C_{12}N_3O$




PRODUCT : HEXACONAZOLE
MATERIAL IN PUT & OUT PUT
STEP I: FORMATION OF HEXA-OXIRANE
Reaction
Before reaction, Kgs
DMsulphide 2862
DMsulphate 912
Water 10
Valerophenone 1064
KOH 690
Total 6866
After reaction, Kgs
DMsulphide 2475
Hexa-oxirane 1080
X-sulphate 1109
Water 390
Impurities 132
Total 6866
Distillation
Distillate, Kgs
DMsulphide recovd 2780
DMsulphide Loss 695
Total 3475
Recycled
Residual crude, Kgs
Hexa oxirane 2080
Impurities 2011
Water 390
Total 3391
Residual crude, Kgs
Hexa-oxirane 2080
Impurities 2011
Water 9687
Toluene 6324
Total 19052
Separation
Organic Phase, Kgs
Hexa-oxirane 2028
Toluene 6324
Impurities 211
Water 35
Total 7098
Water Washing, Kgs
Water 19469
Separation
Organic Phase, Kgs
Hexa-oxirane 1028
Toluene 6324
Impurities 15
Total 7865
86967
Distillation
Distillate, kgs
Toluene Collected 6004
Toluene Loss 320
Total 6324
Recycled
Crude Liq. Product, Kgs
Hexaoxirane 1026
Impurities 15
Total 1041
High vac. Distillation
Residue, Kgs
Impurities 15
Hexa-oxirane 26
Pure Liq. Product, Kgs
Hexaoxirane 1000
Aqueous Phase, kgs
Impurities 88
Water 19804
Total 19892
Aqueous Phase, kgs
Impurities 1902
Water 9652
Total 11554
To ETP
Recycled

7. Propiconazole:

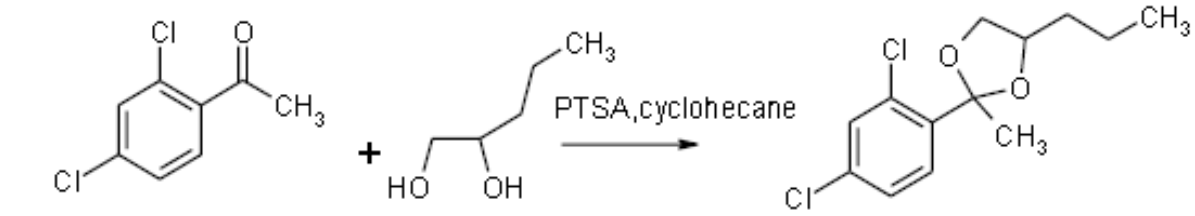
Preparation of Propiconazole:

In this reaction potassium salt of 2-Bromomethyl-2-(2,4-dichlorophenyl)-5-propyl-1,3- dioxolane is reacted with potassium salt of 1H-1,2,4-triazole at 150 oC to give Propiconazole technical.

Manufacturing Process –

It is a one step process for preparation of Propiconazole technical. In this reaction potassium saltof1H-1,2,4-triazole (prepared from corresponding 1H-1,2,4-triazole& potassium hydroxide by azeotropic removal of water) is reacted with 2-Bromomethyl-2-(2,4-dichlorophenyl)-5-propyl-1,3-dioxolane (Bromoketal) in N,N dimethyl formamide in presence of catalytic quantity of potassium iodide at 145-150°C to give Propiconazole technical. After completion of the reaction, DMF is distilled out & the reaction is quenched with water. It is extracted with toluene & the organic layer is washed successively with water, 10% HCl solution& water. The solvent toluene is distilled out to get pure Propiconazole technical.

Step-1 Preparation of Br-Ketal intermediate



2,4-Dichloro acetophenone

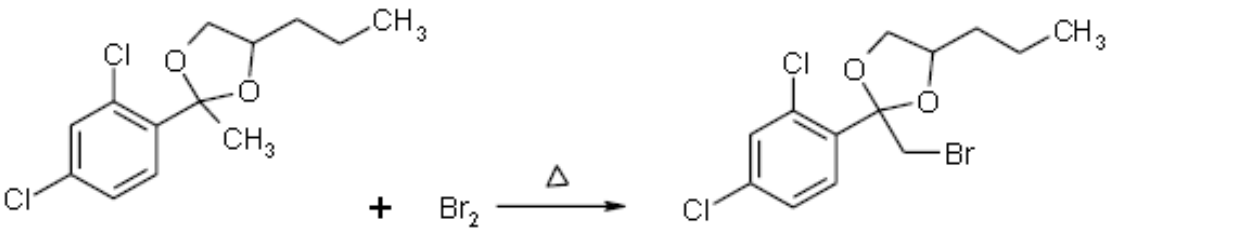
M. W. =189.04
M. F. =$C_8H_6Cl_2O$

Pentanediol

M.W. =104.15
M.F.=$C_5H_{12}O_2$

Ketal

M.W. =275.18
M F. =$C_{13}H_{16}Cl_2O_2$



Ketal

M.W. =275.18
M F. =$C_{13}H_{16}Cl_2O_2$

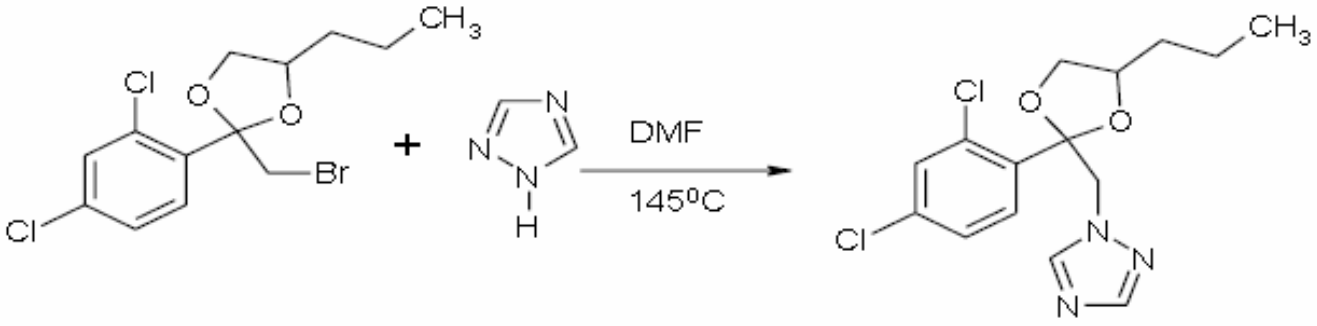
Bromine

MW=159.808

2-(Bromomethyl)-[2-(2,4-Dichlorophenyl)-4-Propyl]-1,3-dioxalan
(Br-Ketal)

M.W. =354.07
M.F. =$C_{13}H_{15}BrCl_2O_2$

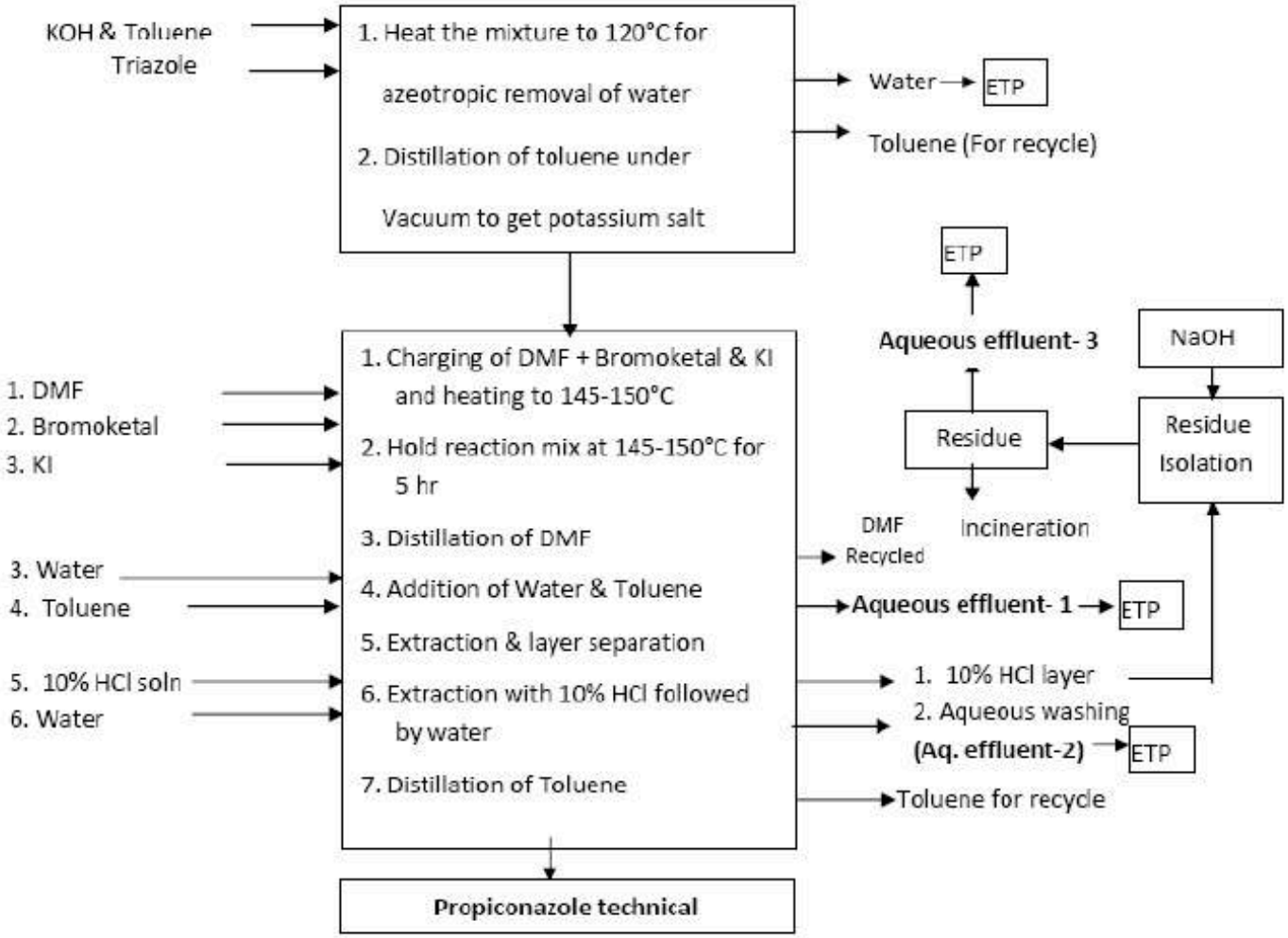
Step-2 Preparations of Propiconazole Technical -



Bromo intermediate
M.W. =354.07
M.F. =$C_{13}H_{15}BrCl_2O_2$

1,2,4-Triazole
M.W. =69.07
M.F. =$C_2H_3N_3$

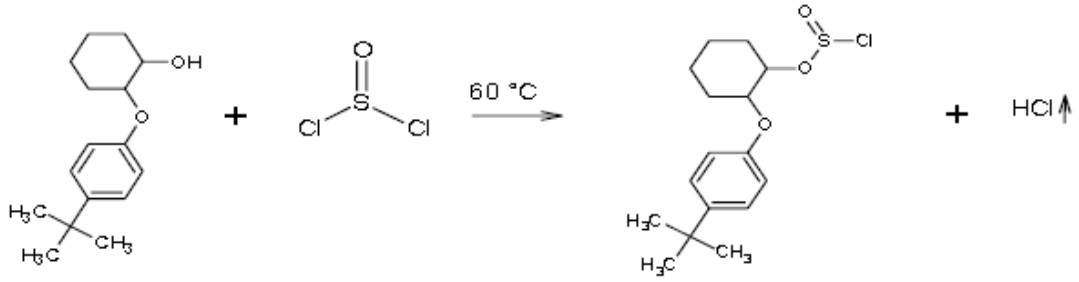
Propiconazole Technical
M.W. =342.23
M.F. =$C_{15}H^{17}Cl_2N_3O^2$



8. Propargite:

Propargite technical is manufactured in two steps. In first step intermediate chlorosufinate is prepared by reaction of p-tert- butyl phenoxy cyclohexanol and Thionyl chloride at 50 ^{o}C. Reaction mass is stirred for 18 hrs & further reacted with Propargyl alcohol in presence of Triethylamine at 30 to 35 deg temperature for 5 hrs to get Propragite technical.

STEP I - Preparation of Chlorosufinate :-



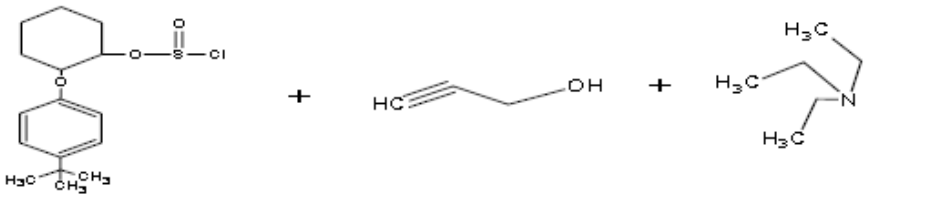
2-(p-ter.-butylphenoxy) cyclohexanol (MW = 248)

Thionyl chloride

2-(p-ter.-butylphenoxy) cyclohexyl chlorosulfinate (MW 119)

(MW = 330.5)

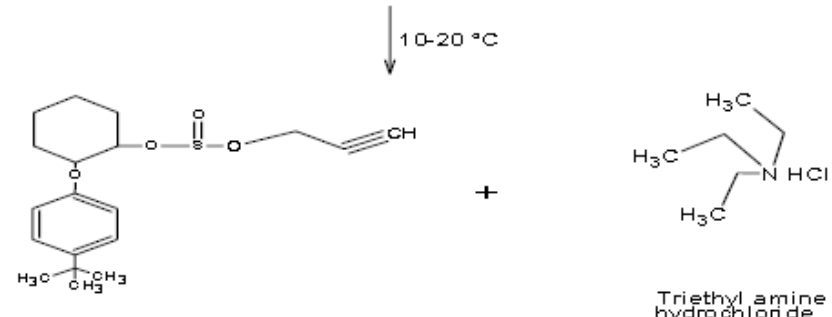
STEP II - Preparation of Propargite Technical :-



2-(p-ter.-butylphenoxy) cyclohexanol (MW- 330.5)

Propargyl alcohol (MW- 56)

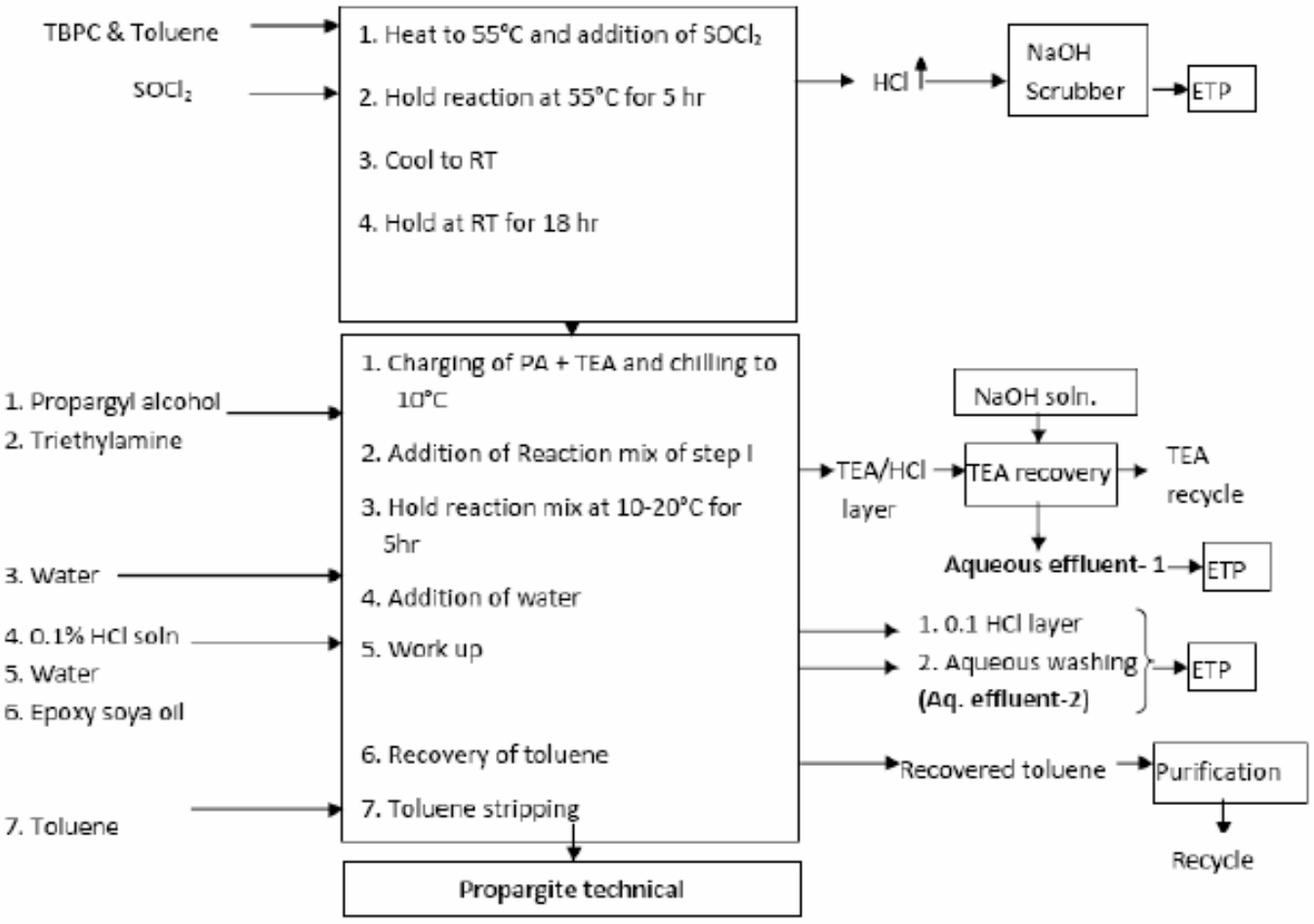
Triethyl amine (MW –101)

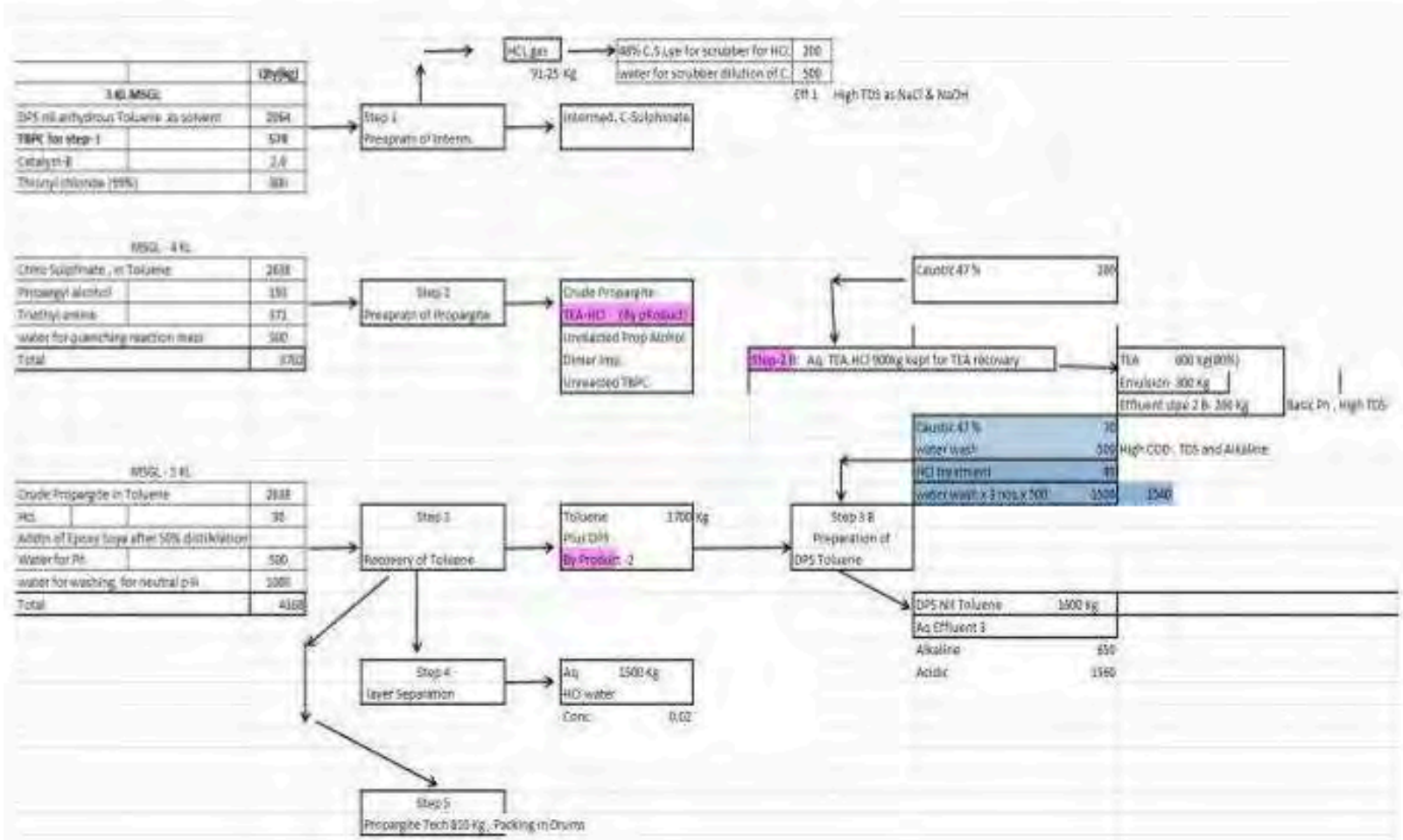


Propargyl-2-(p-tert.-butylphenoxy) cyclohexyl sulfite

Triethyl amine hydrochloride

Flow diagram for manufacturing of Propargite technical -

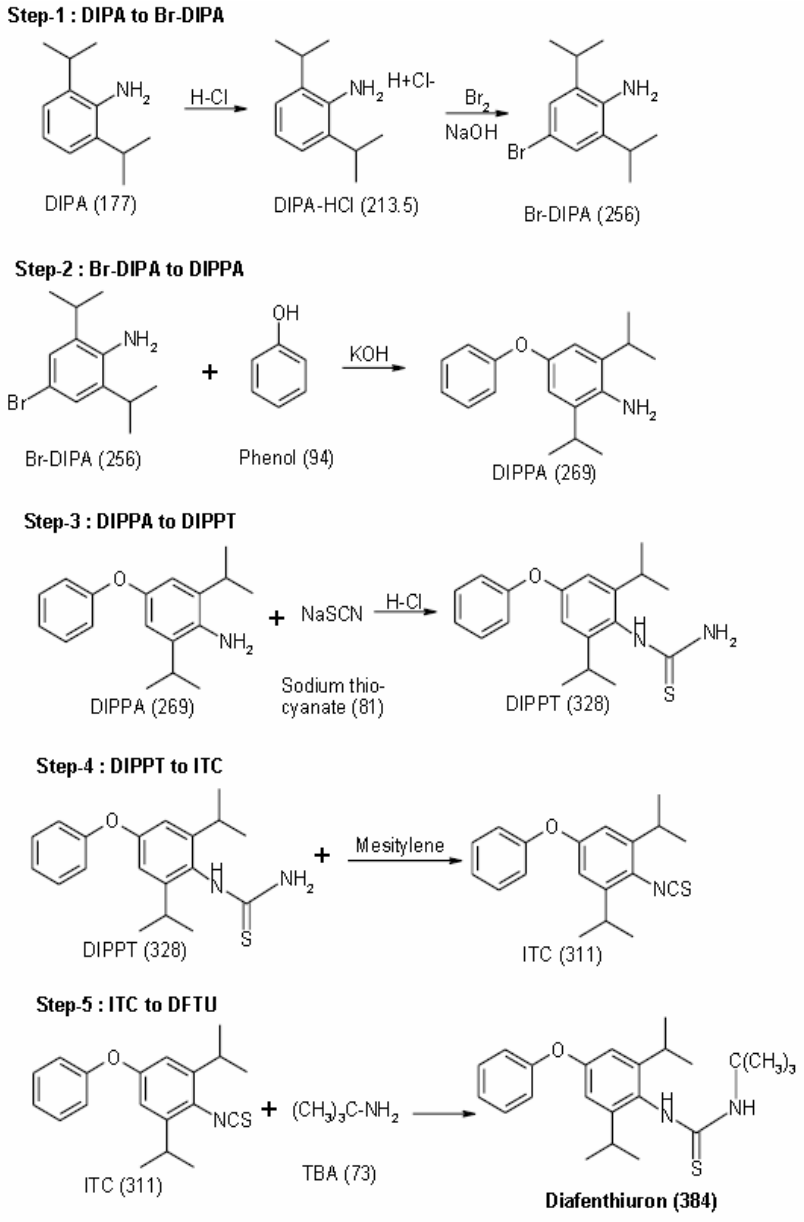


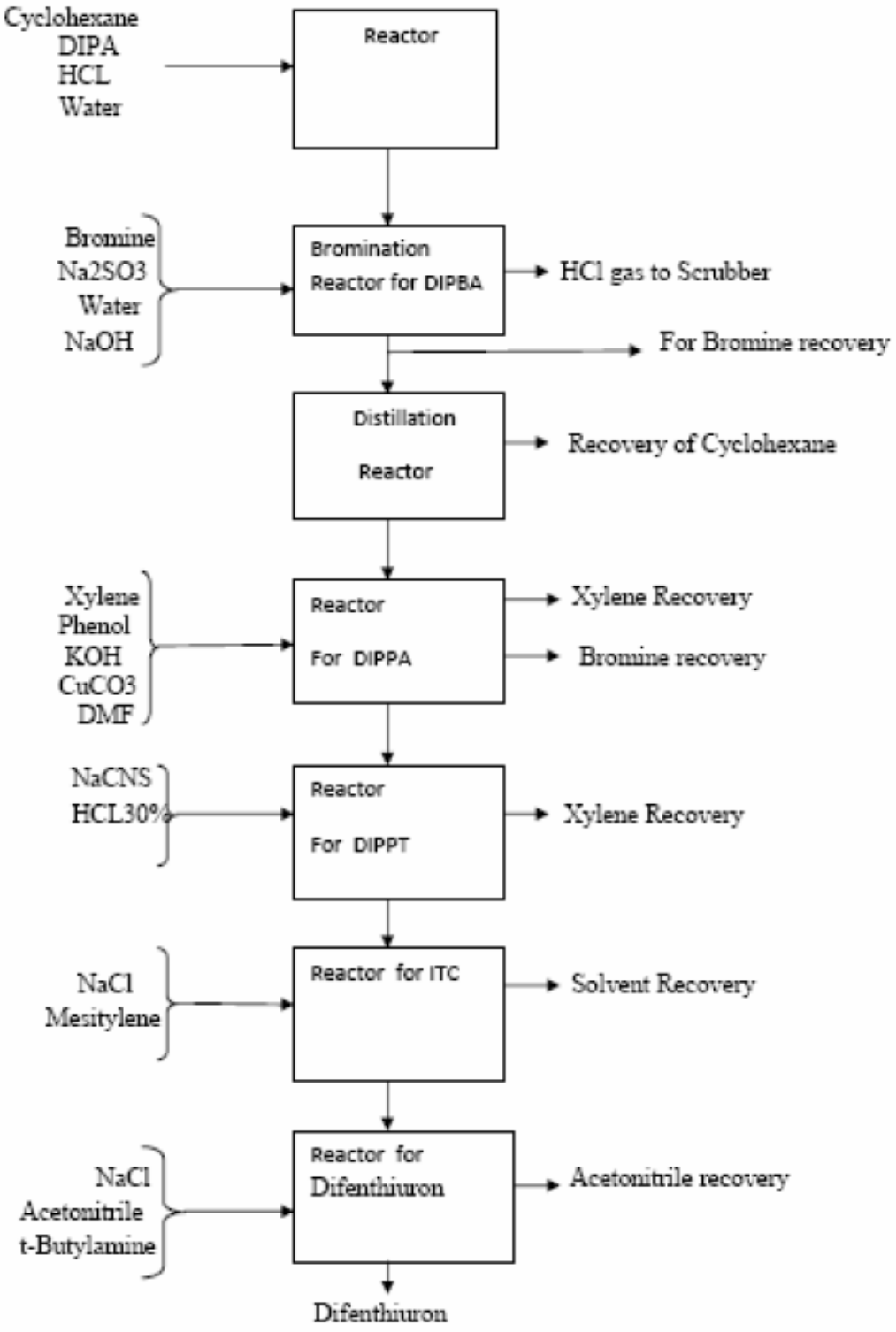

HCl gas
91.25 Kg
48% C.S Lye for scrubber for HCl 200
water for scrubber dilution of C. 500
Eff 1 High TDS as NaCl & NaOH
Step 1
Preapratn of Interm.
Intermed. C-Sulphinate
Step 2
Preapratn of Propargite
Crude Propargite
TEA-HCl (By product)
Unreacted Prop Alcohol
Dimer Imp.
Unreacted TBPC
Caustic 47 % 280
Step-2 B: Aq. TEA.HCl 900kg kept for TEA recovary
TEA 600 kg(80%)
Emulsion 300 Kg
Effluent step 2 B- 300 Kg
Basic PH , High TDS
Caustic 47 % 70
water wash 500
High COD , TDS and Alkaline
HCl treatment 80
water wash X 3 nos x 500 1500 1540
Step 3
Recovery of Toluene
Toluene 3700 Kg
Plus DPS
By Product -2
Step 3 B
Preparation of
DPS Toluene
DPS Nil Toluene 1600 kg
Aq Effluent 3
Alkaline 650
Acidic 1560
Step 4
layer Separation
Aq 1500 Kg
HCl water
Conc 0.02
Step 5
Propargite Tech 810 Kg , Packing in Drums

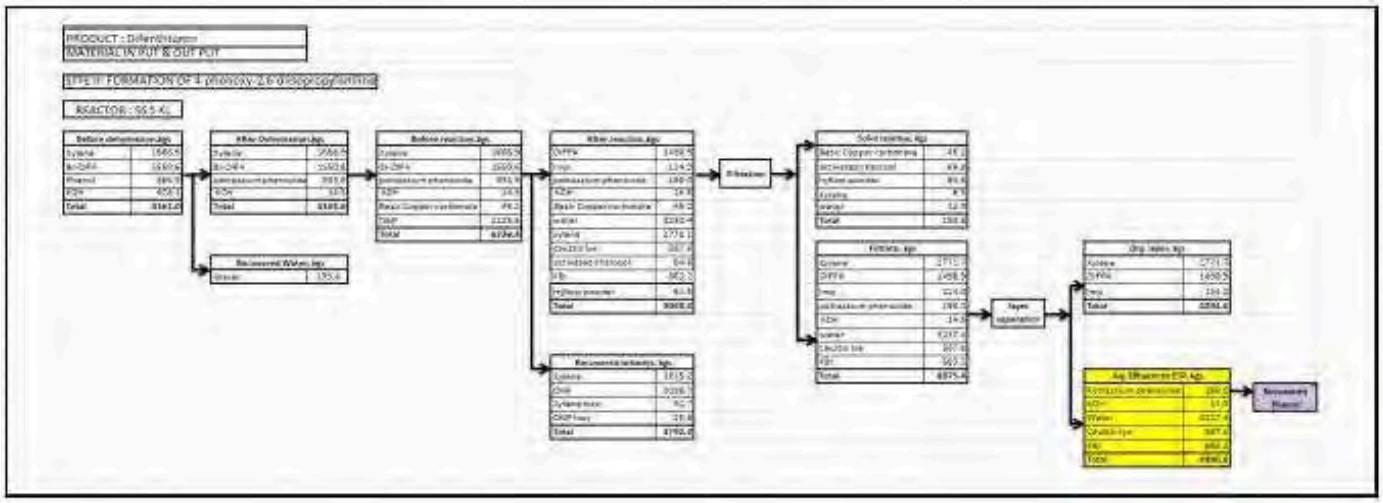
9. Difenthiuron

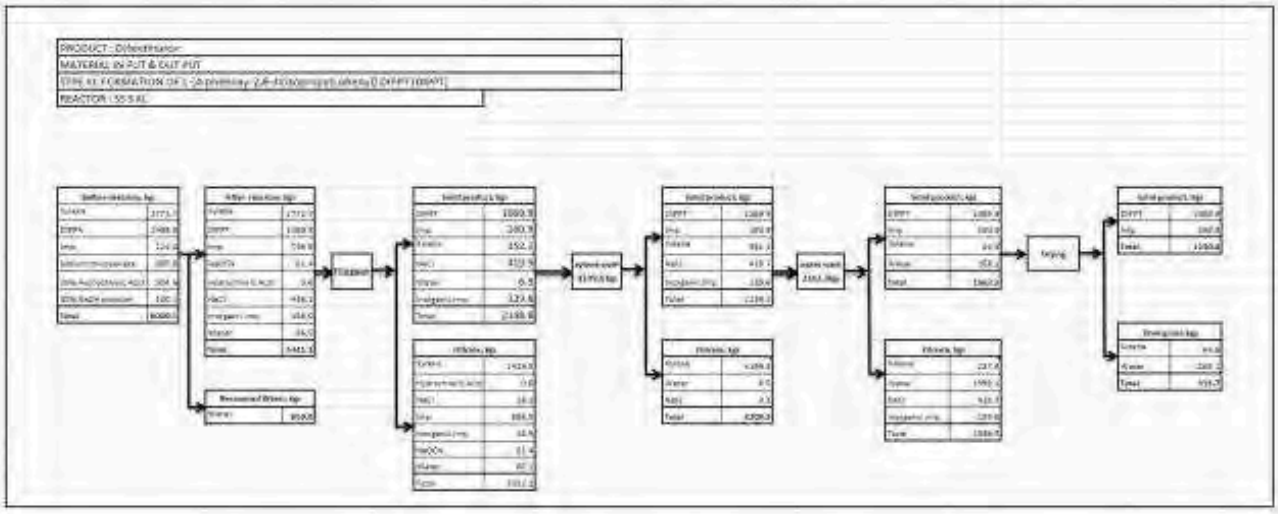
Process of Operation

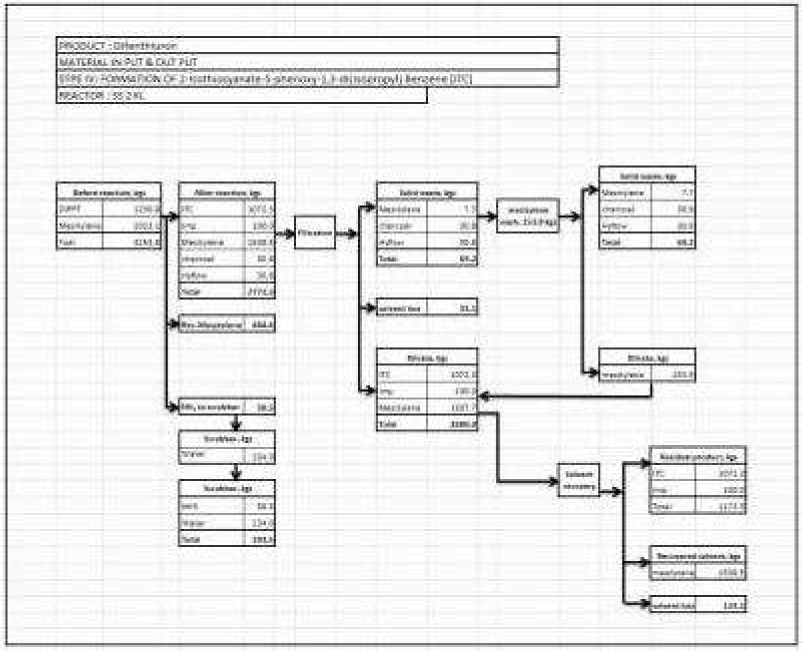
In the initial step, 2,6-di-isopropylaniline is brominated in the para position by Bromine. The reaction is done at 30 degree and the solution is neutralized by caustic and the product is taken for the next operation. In the second step, bromo product is reacted with potassium phenate in presence of solvent DMF and copper catalyst. After reaction, the solvent is distilled and the product is taken in xylene and washed with water and filtered to remove impurities and finally taken for next step reaction. In the third step, the phenated product is reacted with sodium thiocyanate to get thiourea. The product is washed with water and dried. The dried product is converted into iso thiocyanate under nitrogen atmosphere and the product is washed with water and dried to get pure Thiocyanate. In the final step, Thiocyanate is reacted with tbutylamine amine in solvent and crystallized to get product difenthiuron.

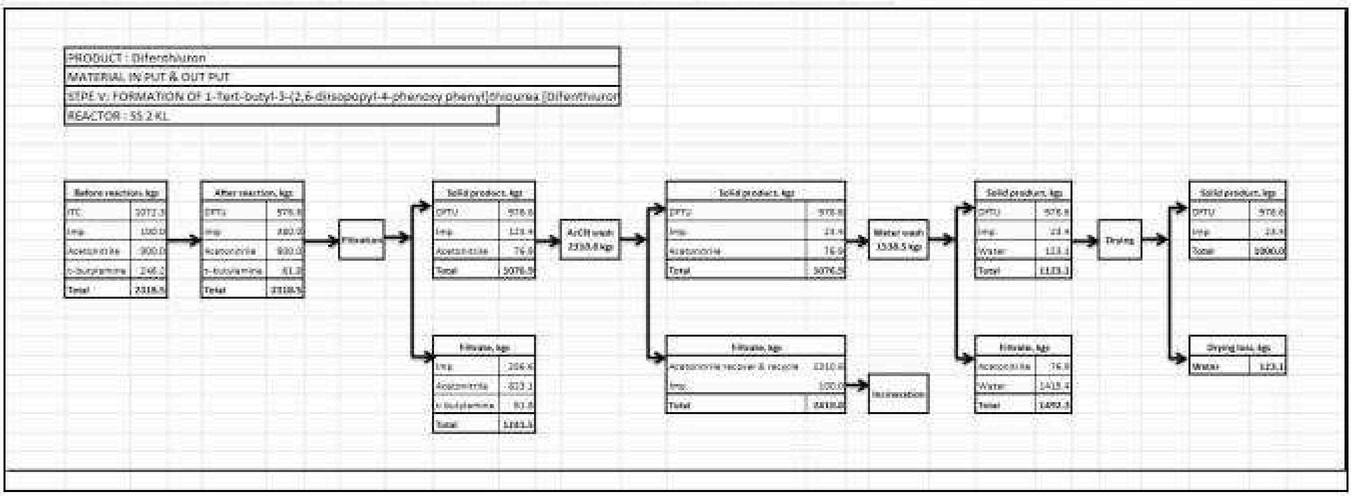



Cyclohexane
DIPA
HCL
Water
Reactor
Bromine
Na2SO3
Water
NaOH
Bromination
Reactor for DIPBA
HCl gas to Scrubber
For Bromine recovery
Distillation
Reactor
Recovery of Cyclohexane
Xylene
Phenol
KOH
CuCO3
DMF
Reactor
For DIPPA
Xylene Recovery
Bromine recovery
NaCNS
HCL30%
Reactor
For DIPPT
Xylene Recovery
NaCl
Mesitylene
Reactor for ITC
Solvent Recovery
NaCl
Acetonitrile
t-Butylamine
Reactor for
Difenthiuron
Acetonitrile recovery
Difenthiuron





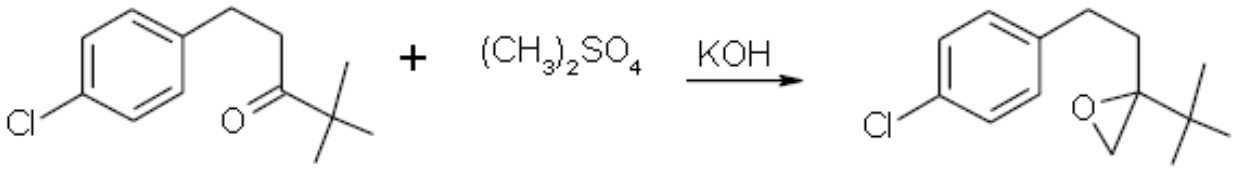



PRODUCT : Difenthiuron
MATERIAL IN PUT & OUT PUT
REACTOR : 55.2 KL

10. Tebuconazole:

Tebuconazole technical is prepared by reacting Intermediate 2-tert-Butyl-2-[2-(4-chlorophenyl)ethyl]oxirane with 1H-1,2,4-Triazole in presence of NaOH in solvent DMF at 1400 to 1550 C temp. After completion of reaction DMF is recovered. To the residue toluene is added. Toluene solution is filtered and solids separated. Toluene Recovered under vacuum by distillation. To residue added HCl & water and solution is filtered to isolate solid. Finally solid is washed with dil. NaOH solution. Drying of wet product gives Tebuconazole technical.

Step 1 : Tebuconazole intermediate - Oxirane.



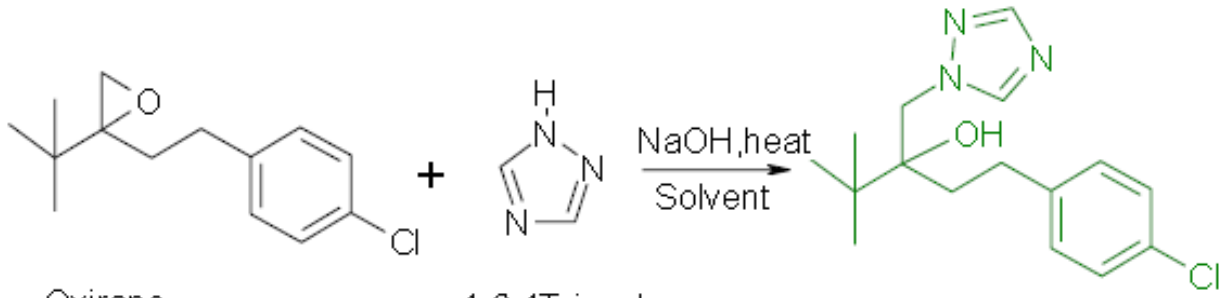
Tebu-ketone

M.W. =224.5
M.F. =$C_{13}H_{17}ClO$

Tebu-oxirane

M.W. =238.5
M.F. =$C_{14}H_{19}ClO$

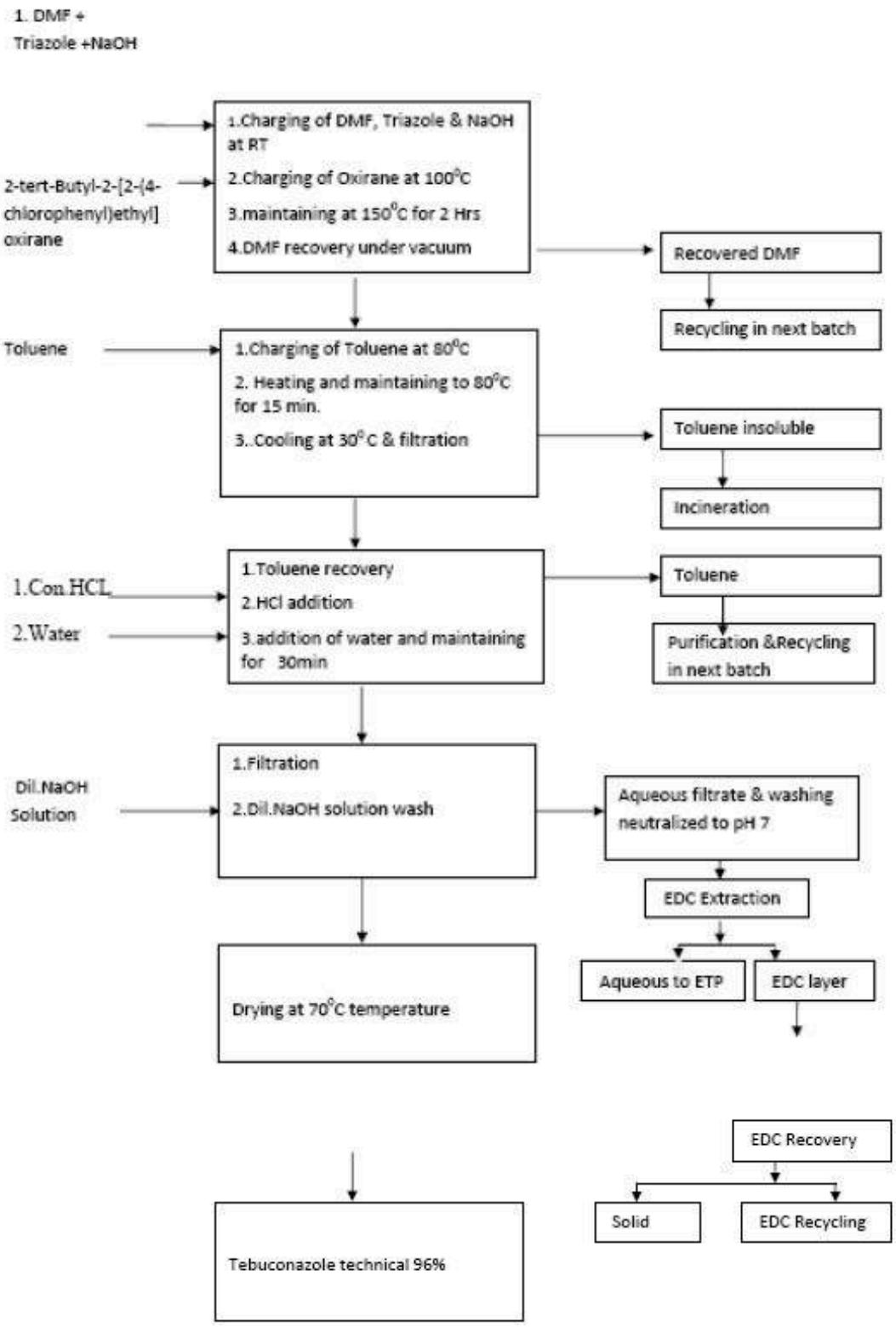
Step 2: Tebuconazole technical

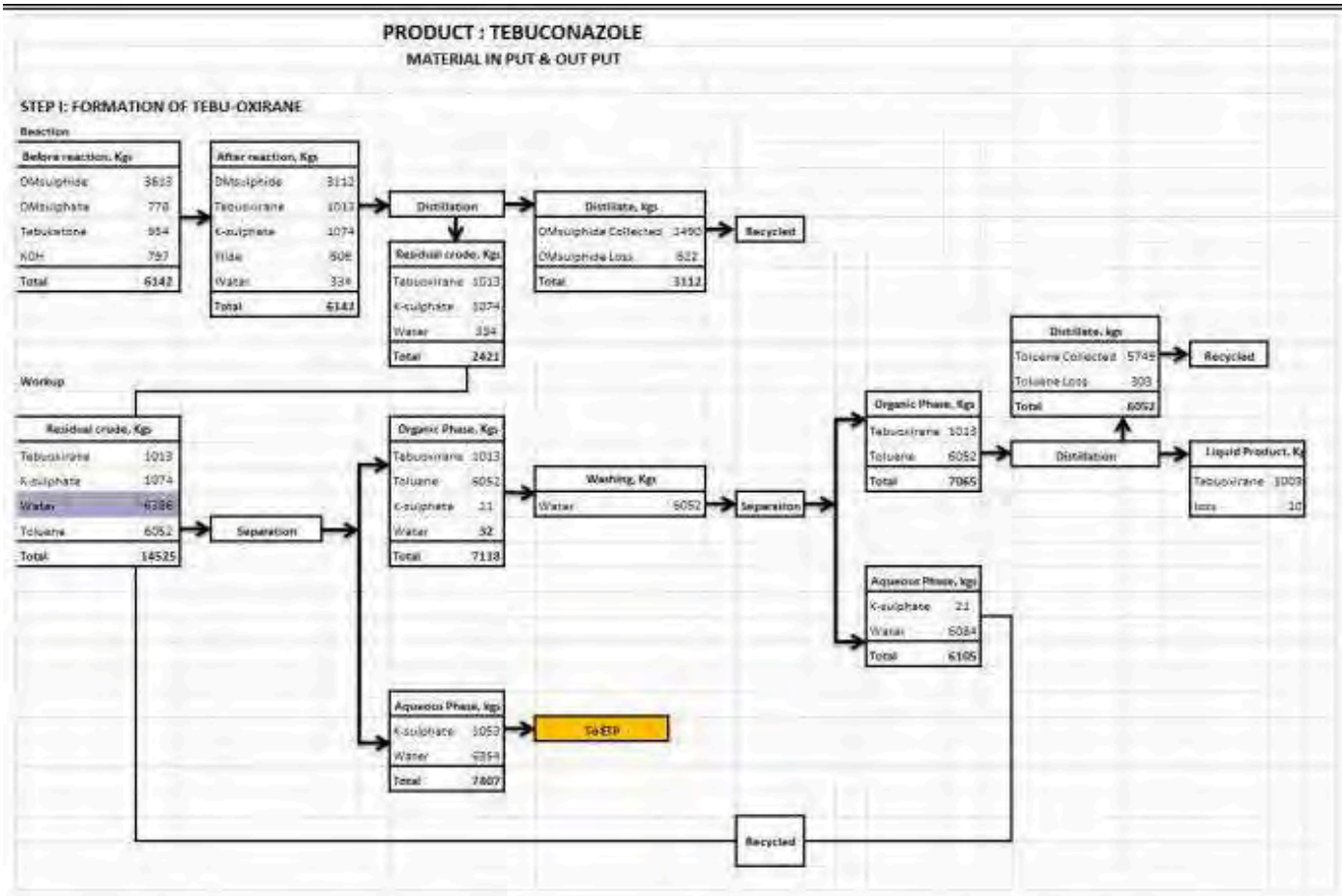


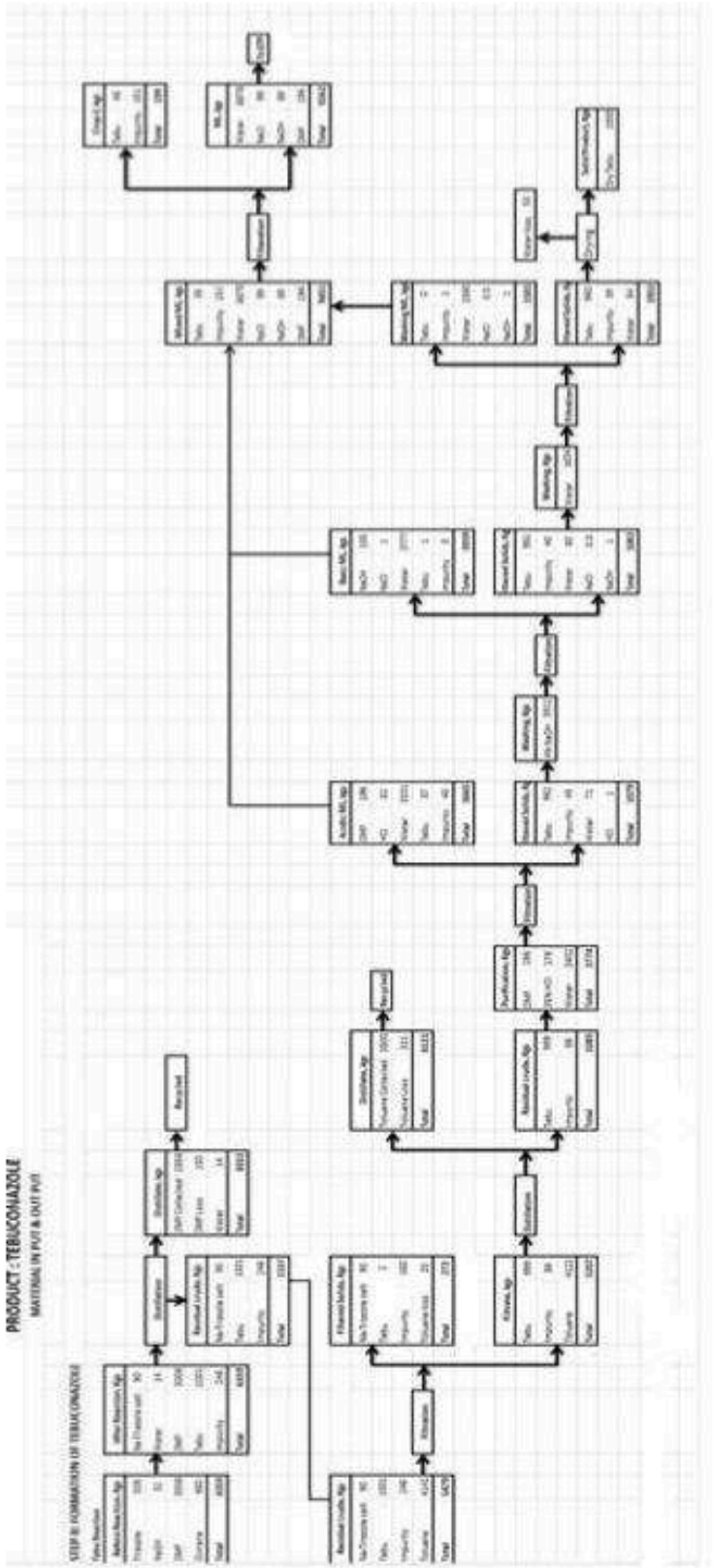
Oxirane
MW=238.75

1.2.4Triazole
MW=69.1

Tebuconazole Technical
MW=307.8


1. DMF +
Triazole +NaOH
1.Charging of DMF, Triazole & NaOH at RT
2.Charging of Oxirane at 100°C
3.maintaining at 150°C for 2 Hrs
4.DMF recovery under vacuum
2-tert-Butyl-2-[2-(4-chlorophenyl)ethyl] oxirane
Recovered DMF
Recycling in next batch
Toluene
1.Charging of Toluene at 80°C
2. Heating and maintaining to 80°C for 15 min.
3. Cooling at 30°C & filtration
Toluene insoluble
Incineration
1.Con HCL
2.Water
1.Toluene recovery
2.HCl addition
3.addition of water and maintaining for 30min
Toluene
Purification &Recycling in next batch
Dil.NaOH Solution
1.Filtration
2.Dil.NaOH solution wash
Aqueous filtrate & washing neutralized to pH 7
EDC Extraction
Aqueous to ETP
EDC layer
Drying at 70°C temperature
EDC Recovery
Solid
EDC Recycling
Tebuconazole technical 96%


PRODUCT : TEBUCONAZOLE
MATERIAL IN PUT & OUT PUT
STEP I: FORMATION OF TEBU-OXIRANE
Reaction
Before reaction, Kgs
OMsulphide 3613
OMsulphate 770
Tebuketone 954
KOH 797
Total 6142
After reaction, Kgs
OMsulphide 3112
Tebuoxirane 1013
K-sulphate 1074
Water 334
Total 6142
Distillation
Distillate, kgs
OMsulphide Collected 2490
OMsulphide Loss 622
Total 3112
Recycled
Residual crude, Kgs
Tebuoxirane 1013
K-sulphate 1074
Water 334
Total 2421
Workup
Residual crude, Kgs
Tebuoxirane 1013
K-sulphate 1074
Water 6386
Toluene 6052
Total 14525
Separation
Organic Phase, Kgs
Tebuoxirane 1013
Toluene 6052
K-sulphate 21
Water 92
Total 7138
Washing, Kgs
Water 6052
Separation
Organic Phase, Kgs
Tebuoxirane 1013
Toluene 6052
Total 7065
Distillation
Distillate, kgs
Toluene Collected 5749
Toluene Loss 303
Total 6052
Recycled
Liquid Product, Kg
Tebuoxirane 1003
loss 10
Aqueous Phase, kgs
K-sulphate 21
Water 6084
Total 6105
Aqueous Phase, kgs
K-sulphate 1053
Water 6354
Total 7407
To ETP
Recycled


PRODUCT : TERBUCONAZOLE
MATERIAL IN PUT & OUT PUT

11. Difenoconazole:

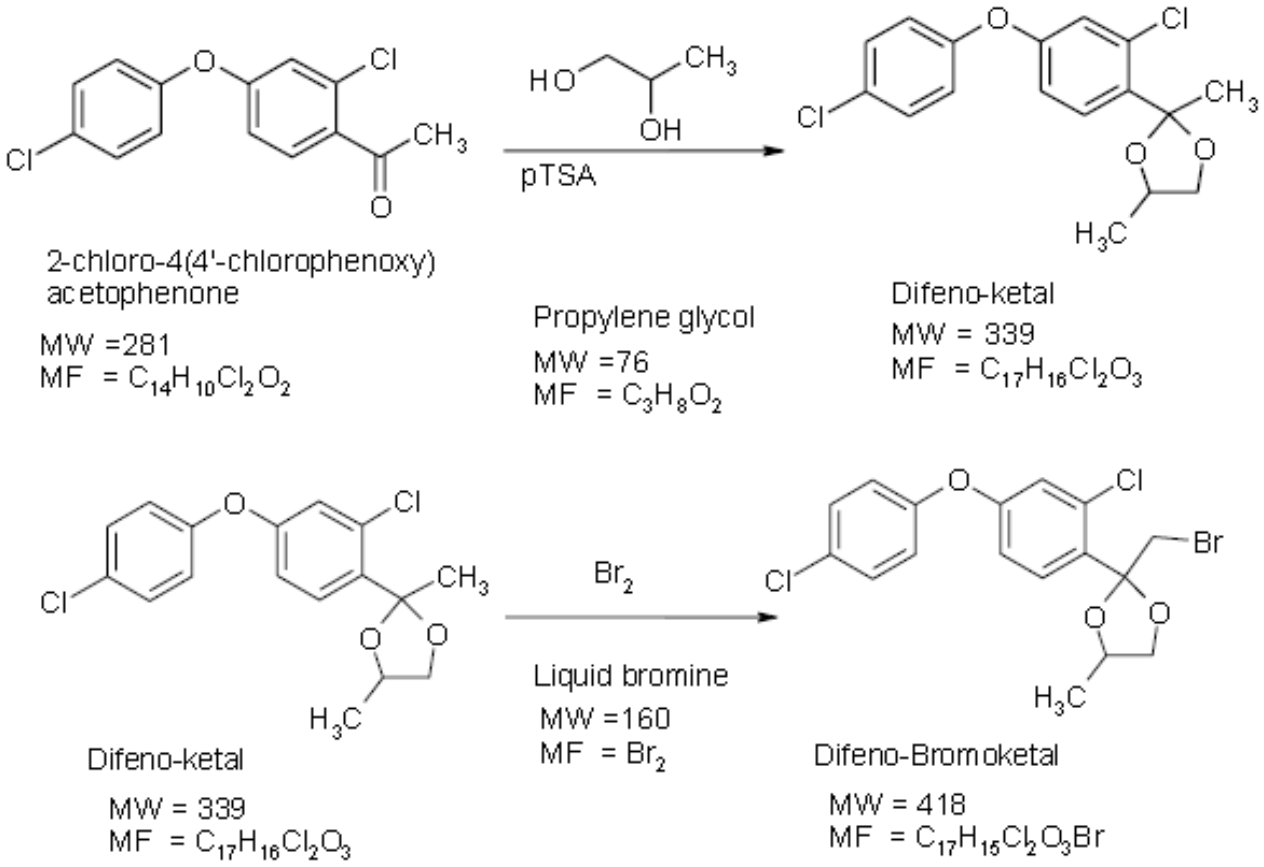
Manufacturing Process -

It is a one step process for preparation of difenoconazole technical. In this reaction potassium salt of 1H-1,2,4-triazole (prepared from corresponding 1H-1,2,4-triazole& potassium hydroxide by azeotropic removal of water) is reacted with 2-(Bromomethyl)-2-[4-(4-chlorophenoxy)-2- chlorophenyl]-2-methyl-1,3-dioxolane (Bromoketal) in N,N-dimethyl formamide in presence of catalytic quantity of potassium iodide at 145-150°C to give Difenoconzole technical. After completion of the reaction, DMF is distilled out & the reaction is quenched with water. It is extracted with toluene & the organic layer is washed successively with water, 10% HCl solution & water. The solvent toluene is distilled out & product is crystallized from DMF water system to get light beige colored crystalline solid product. It is centrifuged & dried to get pure Difenoconazole technical.

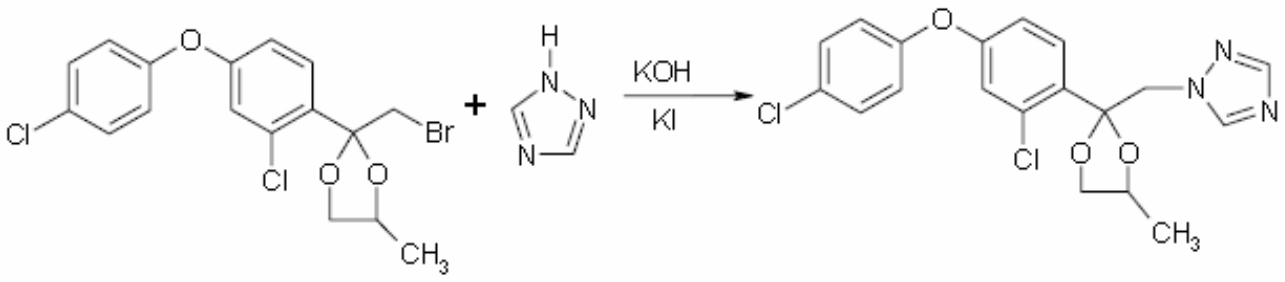
Reaction:

In this reaction 2-Bromomethyl-4-(4-chlorophenoxy)-2-chlorophenyl-2-methyl-1,3-dioxalane reacted with potassium salt of 1H-1,2,4-triazole at 150 ^{o}C to give Difenoconazole technical.

Step-1 Preparation of Difeno-Bromo-ketal-intermediate



Step-2 Difenoconazole technical -

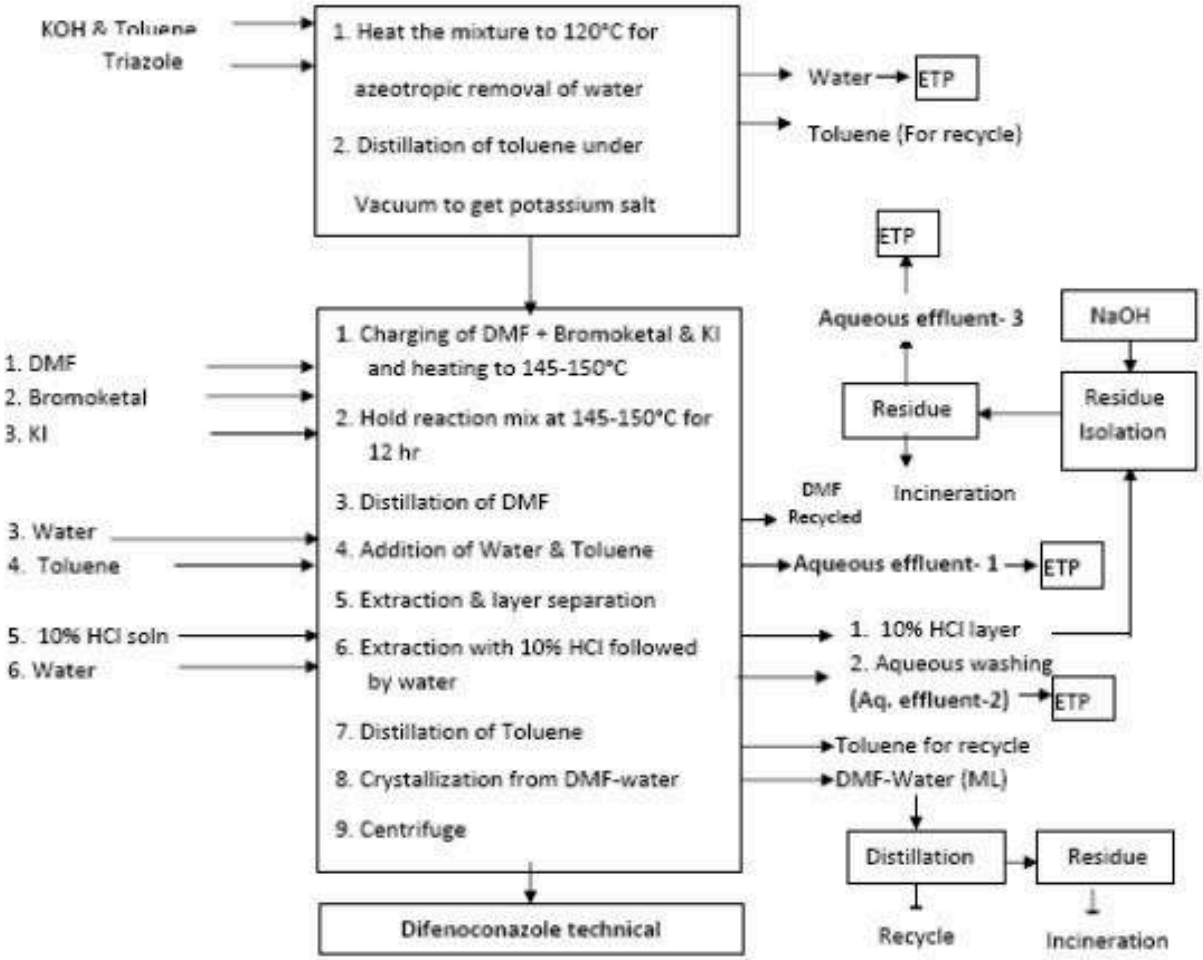


Bromoketal
Mol. wt - 418

1H-1,2,4-triazole
Mol. wt - 69

Difenoconazole
Mol.wt - 406

FLOWSHEET DIAGRAM FOR MANUFACTURE OF DIFENOCONAZOLE TECHNICAL:



Product - DIFENOCONAZOLE TECHNICAL

Material Input and out put

STPE III: Formation of ketal of CCAP

All figures in metric tons

Ketalisation reaction

Before reaction in. MT	
CCAP	1.01
DCAP	0.01
Cyclohexane	2.24
PG	0.30
pTSA	0.02
Total	3.58

After reaction in. Kg	
Ketal	1.20
cyclohexane	2.24
PG	0.03
pTSA	0.02
Impurity	0.03
water	0.07
Total	3.58

Work up	
Ketal	1.20
Cyclohexane	2.24
PG	0.03
pTSA	0.02
Impurity	0.03
water	2.10
Total	5.61

Separation

Organic layer	
Ketal	1.2
Cyclohexane	2.24
Impurity	0.03
Total	3.47

Bromination in next step

Aqueous layer	
PG	0.03
Water	2.1
pTSA	0.02
Total	2.15

Product - DIFENOCONAZOLE TECHNICAL

Material Input and out put

STEP IV -Preparation of bromo ketal

all quantities in metric tons

Before reaction	
Ketal	1.20
Cyclohexane	2.24
Impurity	0.03
Bromine	0.40
Total	4.07

HBr gas to scrubber, kg	
HBr	0.54

Scrubber	
HBr	0.54
Water	1
NaOH	0.165
Total	1.5

Scrubber	
NaBr	0.452
Water	1
NaOH	0.1
Total	1.0

D6010300: NaBr should be send for bromine recovery

After reaction, in reactor	
Br-ketal	1.4
Cyclohexa	2.24
Impurity	0.06
Bromine	0.03
Total	3.73

Work up	
water	1.12
Br-Ketal	1.4
Cyclohexane	2.24
Impurity	0.06
Bromine	0.03
Total	4.85

Layer separation

Organic layer, Kg	
Br-ketal	1.4
Cyclohexane	2.24
Impurity	0.06
HBr	0.01
Total	3.71

Aqueous layer, Kg	
Water	1.12
HBr	0.01
Total	1.13

Water Washing

Organic layer, Kg	
Br-ketal	1.4
Cyclohexane	2.24
Impurity	0.06
Total	3.7

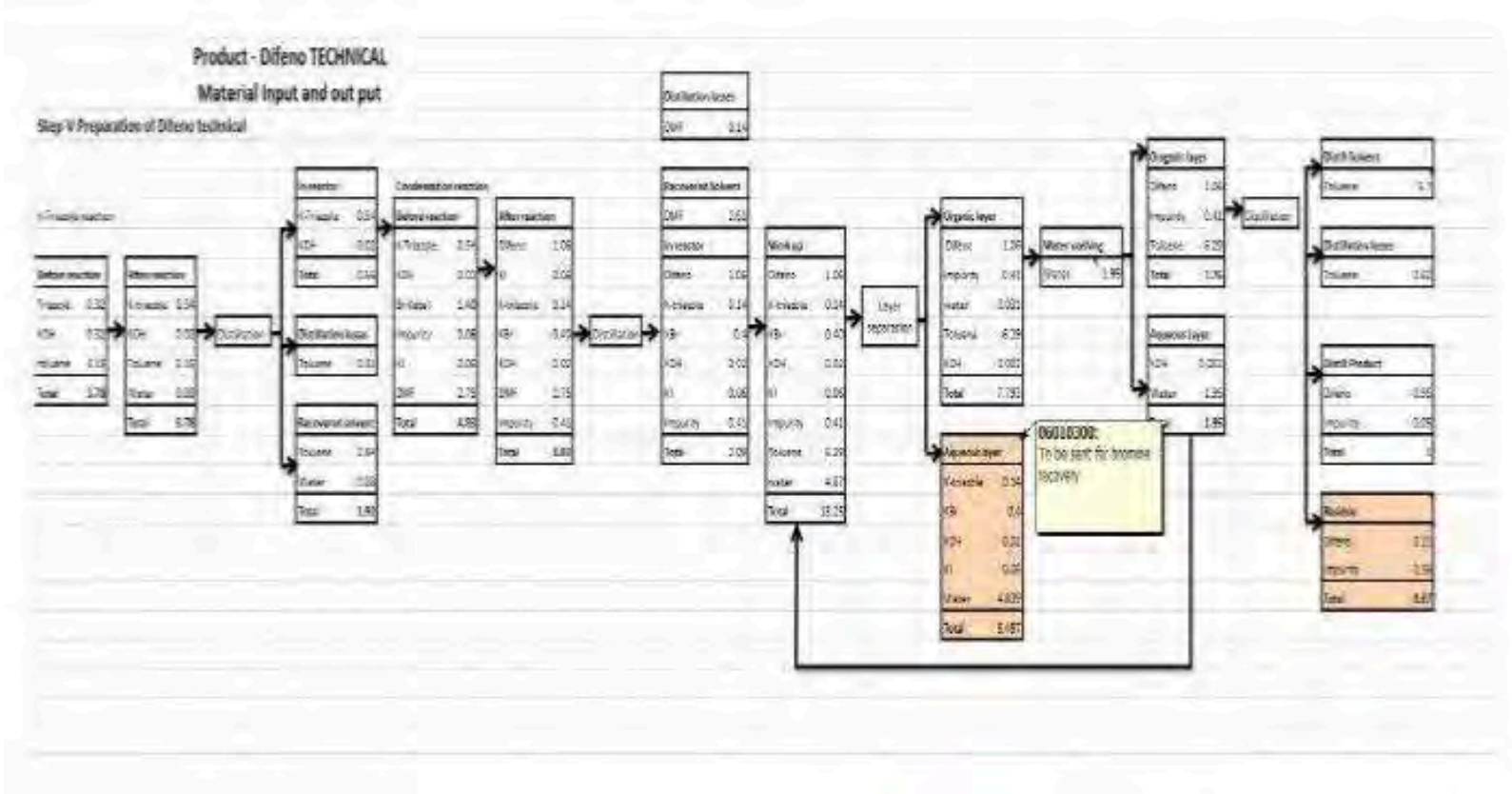
Aqueous layer, Kg	
Water	1.12
HBr	0.01
Total	1.13

Distillation

Product, Kg	
Br-ketal	1.4
Impurity	0.06
Total	1.46

Distillation losses,Kg	
Cyclohexane	0.234

Recovered solvent	
Cyclohexane	2.016


Product - Difeno TECHNICAL
Material Input and out put
Step-V Preparation of Difeno technical
06018300:
To be sent for bromine recovery

12. Thifluzamide:

Manufacturing Process

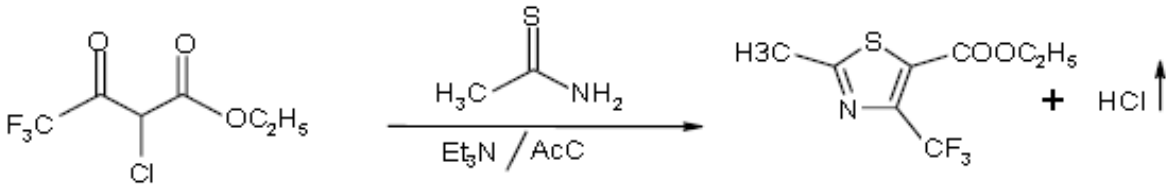
In the first step, Ethyl trifluoroacetate (ETFFA) is chlorinated at low temperature and the chlorinated compound is thioacetamide in presence of solvent and finally reacted NaOH and acidified to get Thiazole acid. The acid is chlorinated by Thionyl chloride in toluene. Finally the thiazole acid chloride is reacted with 2,6-dibromo-4-trifluoromethoxyaniline in presence of solvent. The product is isolated by filtration and washing and drying.

Step–I: Preparation of Ethyl - 4, 4, 4- Tri-fluoro -2 - Chloro Acetoacetate.

Ethyl - 4, 4, 4 - trifluoro acetoacetate
M.W. =184
M.F. = $C_6H_7O_3F_3$

Ethyl - 4, 4, 4 - trifluoro - 2 - chloro acetoacetate
M.W. = 218.5
M.F. = $C_6H_6O_3F_3Cl$

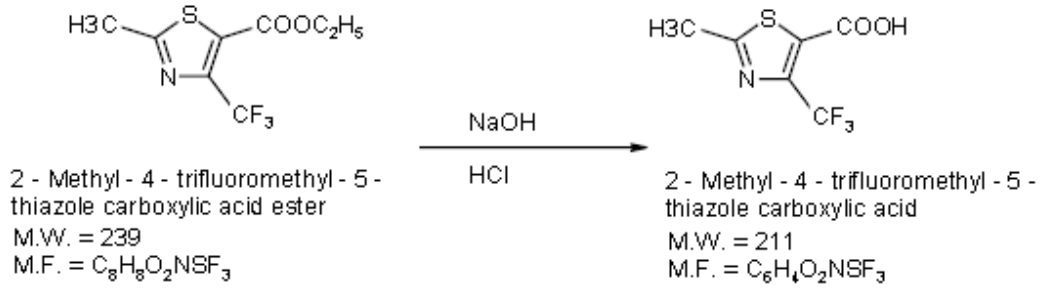
Step-II: Preparation of 2 - Methyl -4 - trifluoromethyl -5 - thiazole carboxylic acid ethyl ester.



Ethyl - 4, 4, 4 - trifluoro - 2 - chloro acetoacetate
M.W. = 218.5
M.F. = $C_6H_6O_3F_3Cl$

2 - Methyl - 4 - trifluoromethyl - 5 - thiazole
M.W. = 239
M.F. = $C_8H_8O_2NSF_3$

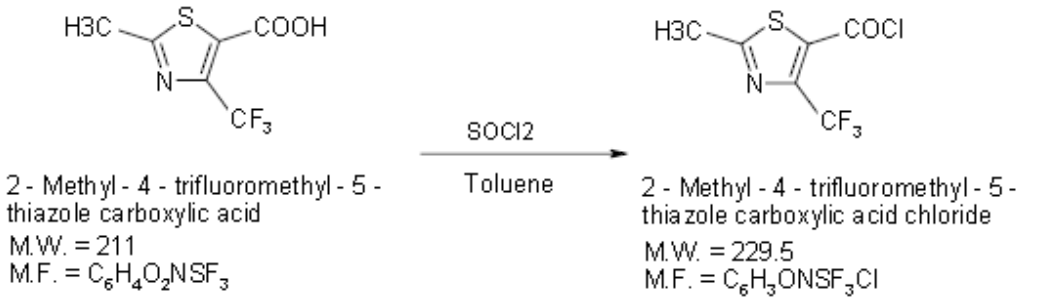
Step-III: Preparation of 2- Methyl- 4- trifluoromethyl -5 - thiazole carboxylic acid.



2 - Methyl - 4 - trifluoromethyl - 5 - thiazole carboxylic acid ester
M.W. = 239
M.F. = $C_8H_8O_2NSF_3$

2 - Methyl - 4 - trifluoromethyl - 5 - thiazole carboxylic acid
M.W. = 211
M.F. = $C_6H_4O_2NSF_3$

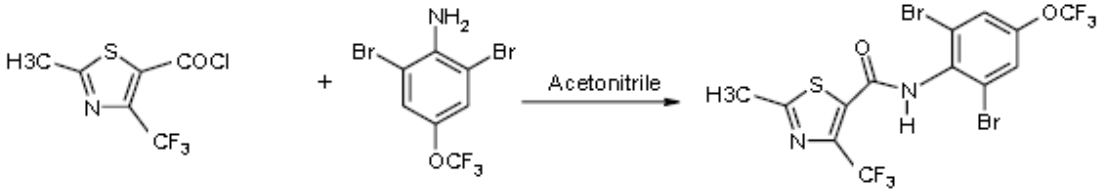
Step-IV: Preparation of 2- Methyl- 4- trifluoromethyl- 5- thiazole carboxylic acid chloride.



2 - Methyl - 4 - trifluoromethyl - 5 - thiazole carboxylic acid
M.W. = 211
M.F. = $C_6H_4O_2NSF_3$

2 - Methyl - 4 - trifluoromethyl - 5 - thiazole carboxylic acid chloride
M.W. = 229.5
M.F. = $C_6H_3ONSF_3Cl$

Step-V: Preparation of N - (2, 6- dibromo -4 - (trifluoromethoxy) phenyl)-2-methyl-4- trifluoromethyl -5 - thiazolecarboxamide.



2 - Methyl - 4 - trifluoromethyl - 5 - thiazole carboxylic acid chloride
M.W. = 229.5
M.F. = $C_6H_3O_2NSF_3Cl$

2, 6 - Dibromo - 4 - (trifluoromethoxy) aniline
M.W. = 335
M.F. = $C_7H_4ONF_3Br_2$

N - (2, 6 - dibromo - 4 - (trifluoromethoxy) phenyl) - 2 - methyl - 4 - trifluoromethyl - 5 - thiazolecarboxamide
M.W. = 528
M.F. = $C_{13}H_6O_2N_2SF_6Br_2$

PRODUCT : THIFLUZAMIDE

MATERIAL IN PUT & OUT PUT

STPE I: Preparation of Ethyl - 4, 4, 4 – trifluoro – 2 - chloro acetoacetate.

REACTOR : MSGL 500 liters

Before Reaction, Kgs	
ETFAA	497.8
Chlorine	198.0
Total	695.8

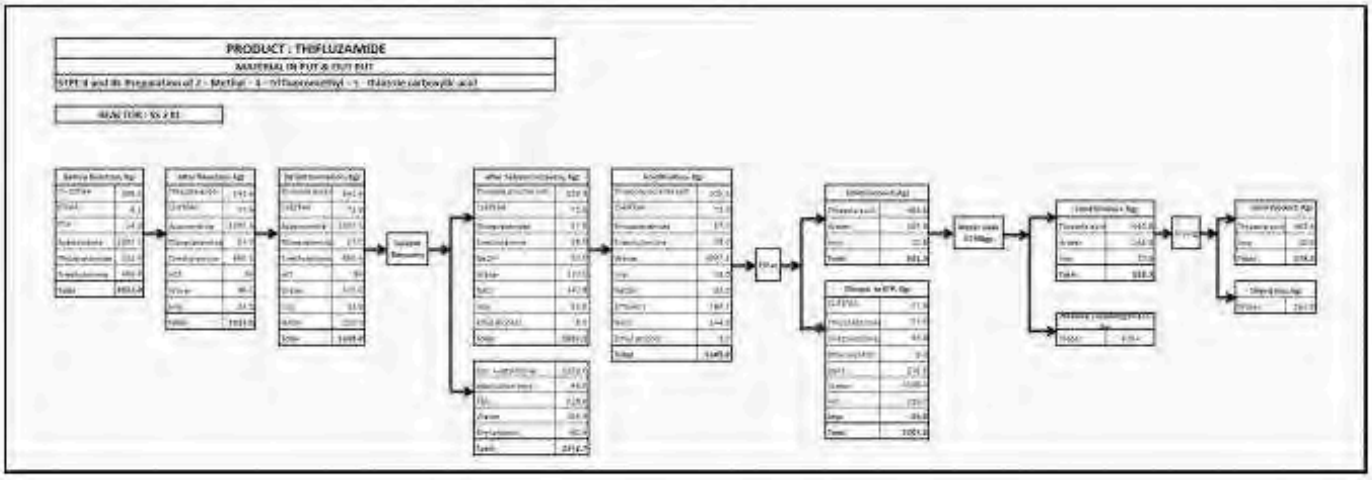
After Reaction, Kgs	
Cl-ETFAA	569.8
ETFAA	9.0
Dihloro ETFAA	12.0
Other Imp.	12.0
HCl	93
Total	695.8

After N2 purging

After N2 purging	
Cl-ETFAA	569.8
ETFAA	9.0
Dihloro ETFAA	12.0
Other Imp.	12.0
Total	602.8

Gas to scrubber, Kgs	
HCl	93.0

Scrubber, kgs	
NaOH	15.0
Water	1124.5
NaCl	152.9
Total	1292.4



PRODUCT : THIFLUZAMIDE

MATERIAL IN PUT & OUT PUT

STPE IV: Preparation of 2-Methyl-4-trifluoromethyl-5-thiazole carboxylic acid chloride

REACTOR : MSGL 1 KL

Before dehydration, Kgs	
Thiazole acid	463.6
Toluene	1559.0
Total	2022.6

Solvent Recovery

Before dehydration, Kgs	
Thiazole acid	463.6
Toluene	1204.0
Total	1667.6

Recovered Solvent, kgs	
Toluene	352.0
Water	3.0
Total	355.0

Before reaction, Kgs	
Thiazole acid	463.6
Toluene	1204.0
Thionyl Chloride	499.7
Total	2167.3

After reaction, Kgs	
Thiazole acid chloride	469.2
Toluene	1204.0
Thionyl Chloride	237.4
Imp	25.8
Total	1936.4

Gas to scrubber, kgs	
HCl	80.3
SO_2	140.7
Total	221.0

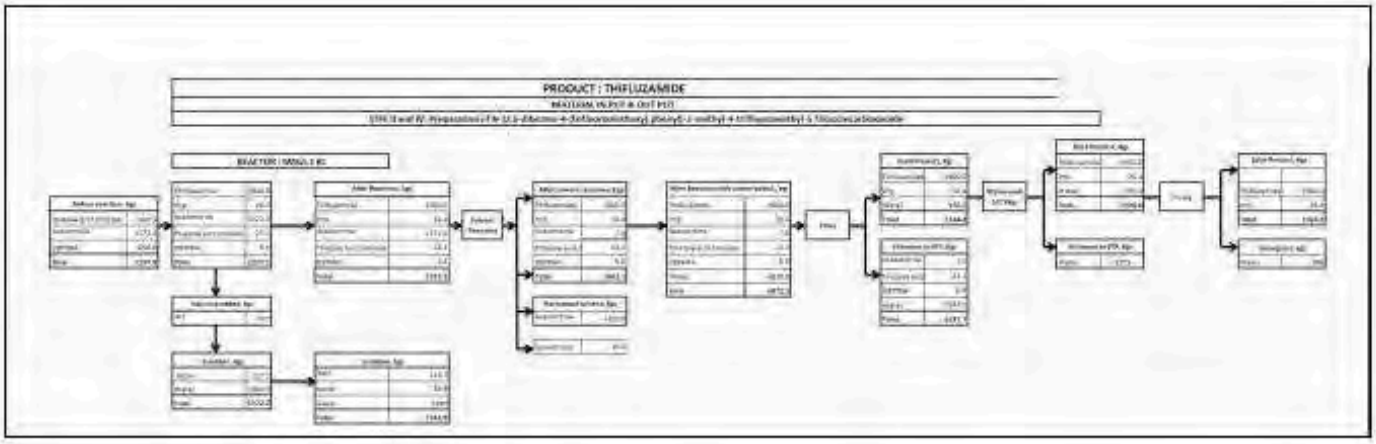
Solvent Recovery

Residual Product, Kgs	
Thiazole acid chloride	469.2
Imp	25.8
Total	495.0

Recovered Solvent, kgs	
Toluene	1148.0
Thionyl Chloride	220.0
Toluene loss	61.5
Thionyl Chloride loss	17.6
Total	1447.1

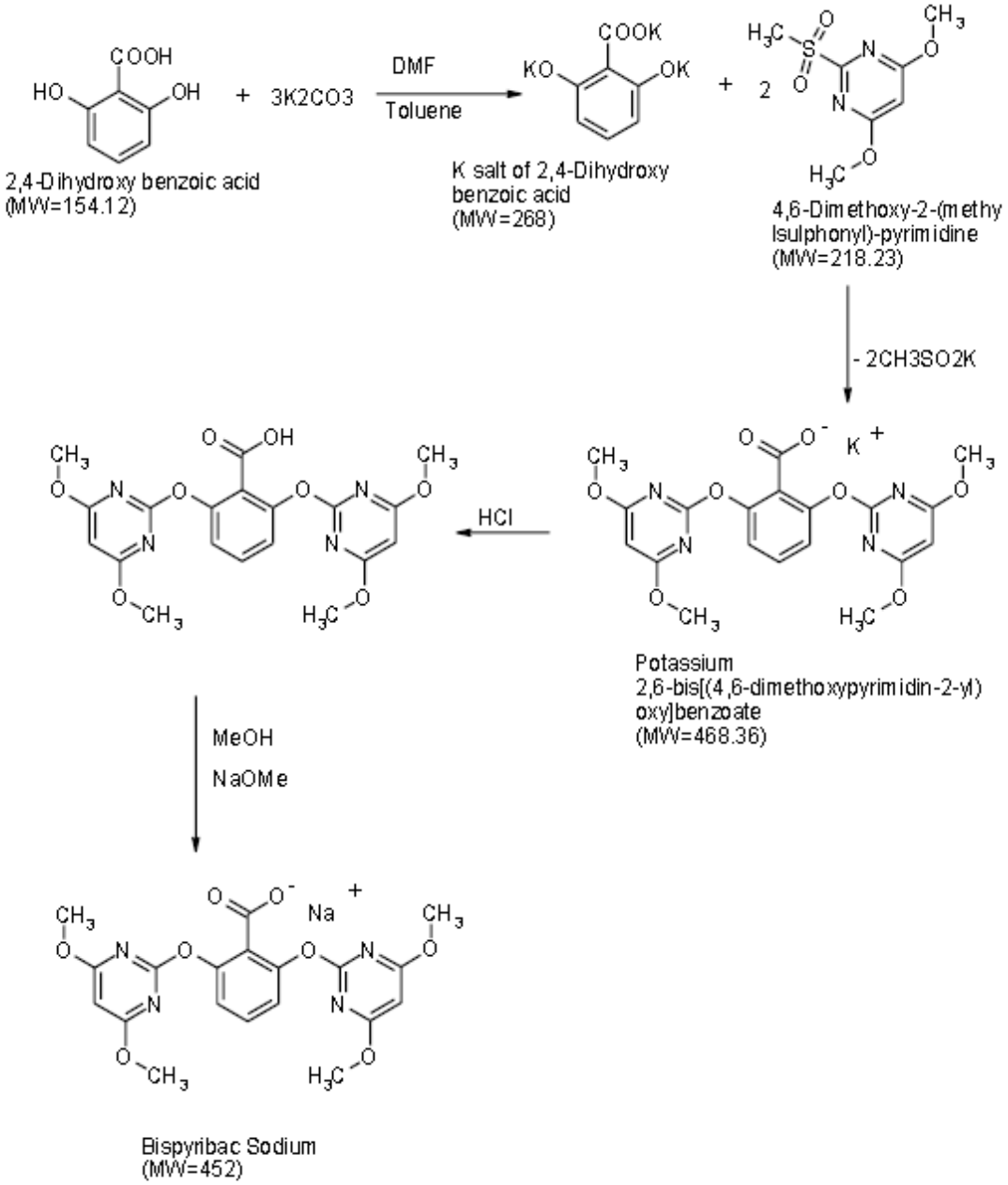
Scrubber, kgs	
NaOH	650.0
Water	5670.0
Total	6308.0

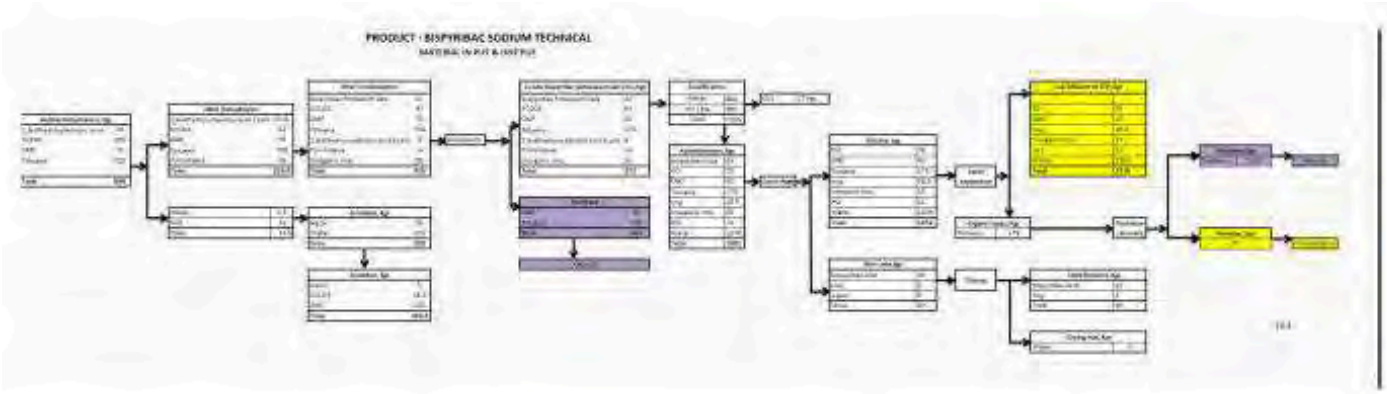
Scrubber, kgs	
NaCl	129.0
$NaHSO_3$	228.6
NaOH	454.4
Water	5709
Total	6521.0



13. Bispyribac:

4,6-Dimethoxy-2-methylsulfonylpyrimidine & 2,6-Dihydroxy Benzoic Acid are to be cooked to 100-130 ^{o}C, with help of steam, then acidified and then purified, may be crystallised to give Bispyribac-Sodium. The reactants are to be cooked in condensation reaction with range of pH 10-12 and acidified with range of pH.





PRODUCT : BISPYRIBAC SODIUM TECHNICAL

MATERIAL IN PUT & OUT PUT

Purification

Before purification, Kgs	
bispyribac Acid	43
Imp	2
Methanol	120
Sodium methoxide	30
Total	195

After purification, Kgs	
bispyribac Sodium	43
Imp	2
Methanol	146.8
Sodium methoxide	3.2
Total	195

centrifuge

Wet product, Kgs	
bispyribac Sodium	43
Imp	2
Methanol	10
Total	55

Filtrate , Kgs	
Methanol	140

Drying

Solid Product, Kgs	
bispyribac Sodium	43
Imp.	2
Total	45

Drying loss, Kgs	
Methanol	10

Recovery

Distillate, Kgs	
Methanol	130.2

Recycle

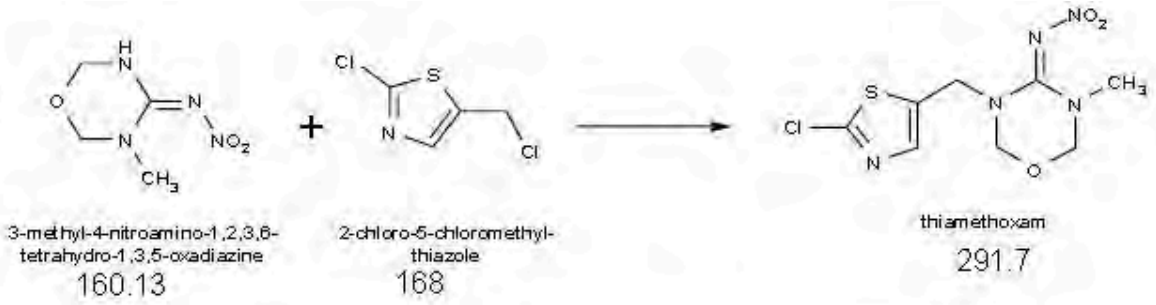
Residue, Kgs
19.8

Incineration

14. Thiamethoxam:

Manufacturing Process:

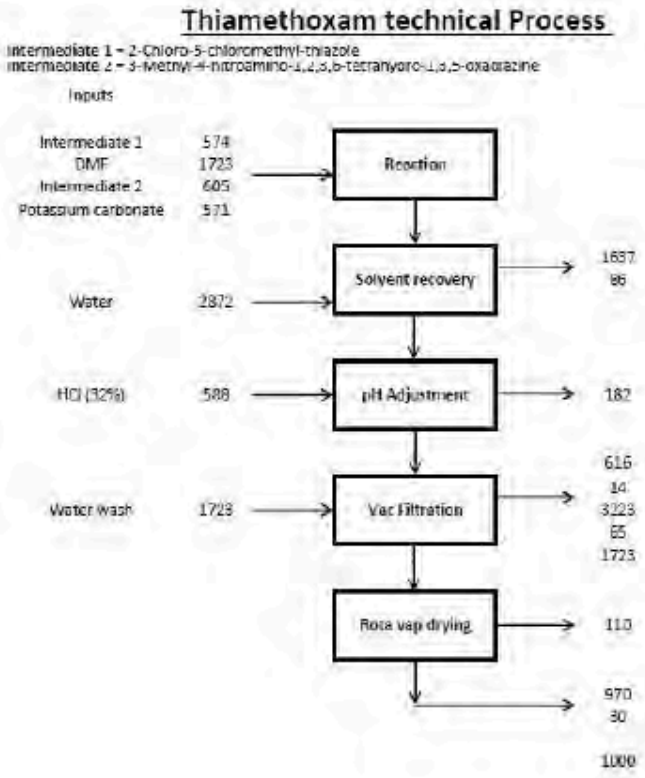
The Intermediate 3-Methyl-4-nitroimino-1,2,3,6-tetrahydro-1,3,5-oxadiazine (MMTO) is taken in solvent Acetonitrile and is reacted with 3-Chloro-5-chloromethylthiazole (CCMT) in presence of K_2CO_3 under reflux. After completing the reaction, the mass is cooled and the product is crystallized, filtered. The MI is collected and is sent for solvent recovery. The solid product is washed with water and dried to get the product.



3-methyl-4-nitroamino-1,2,3,6-tetrahydro-1,3,5-oxadiazine
160.13

2-chloro-5-chloromethyl-thiazole
168

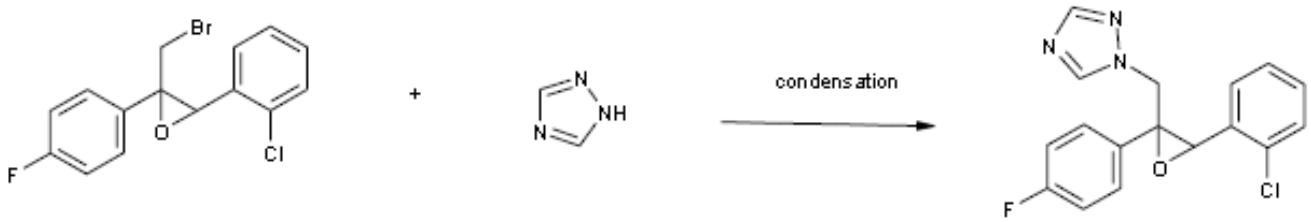
thiamethoxam
291.7



15. Epoxyconazole:

Manufacturing Process

The Bromopropene intermediate is taken in solvent toluene and is reacted with Hydrogen peroxide in presence of Dichloroacetic acid. After the reaction, the aqueous is separated out and the organic is taken for toluene recovery. The crude is dissolved in Acetonitrile and is reacted with Triazole and Sodium Methoxide. The reaction mass is taken for solvent recovery and the crude is dissolved in diisopropylether and is washed with water and finally crystallized to get the product.



341

2-Bromomethyl-2-(4-Fluorophenyl)-3-(2-chlorophenyl)-oxirane

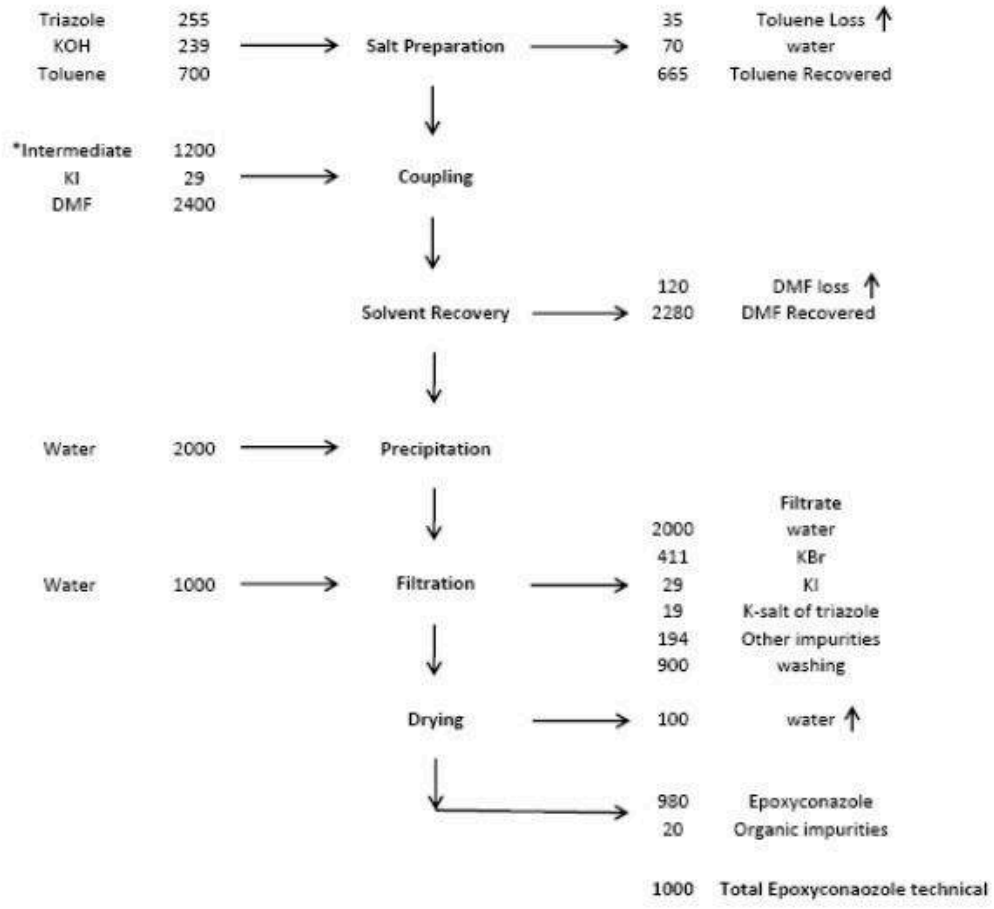
69

1,2,4-triazole

329

epoxiconazole

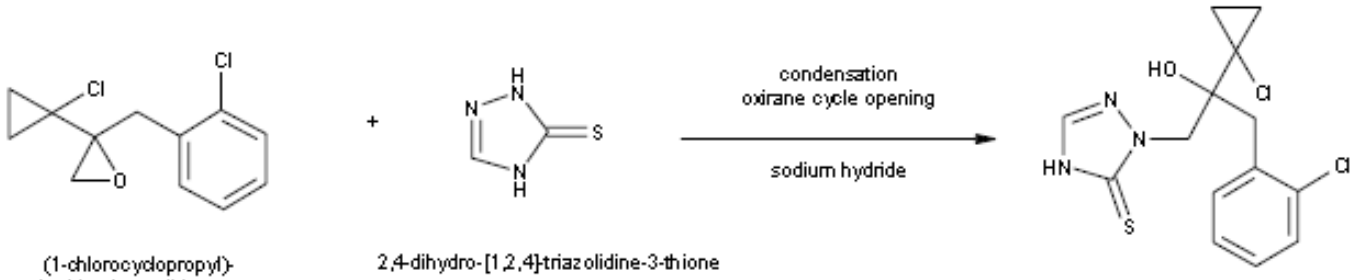
*Intermediate : 2-bromomethyl-2-(4-fluorophenyl)-3-(2-chlorophenyl)Oxirane



16. Prothioconazole:

Manufacturing Process

The intermediate 1-Chlorocylopropyl –2-chlorobenzyl ketone (CPBK) is converted into Oxirane by DMS, $DMSO_4$ and KOH. After the reaction, DMS is distilled and EDC is charged and filtered to remove the solid impurities. The filtered mass is washed with water and the organic is distilled to remove EDC. The product Oxirane is reacted with 2,4-Dihydrotriazolidine-3-thione in presence of K_2CO_3 and solvent DMF. After completion of the reaction, the mass is filtered and the solid free organic is taken for DMF distillation. The crude product is washed with water and finally crystallized in Acetonitrile to get product.



(1-chlorocyclopropyl)-(o-chlorobenzyl) ketone

242

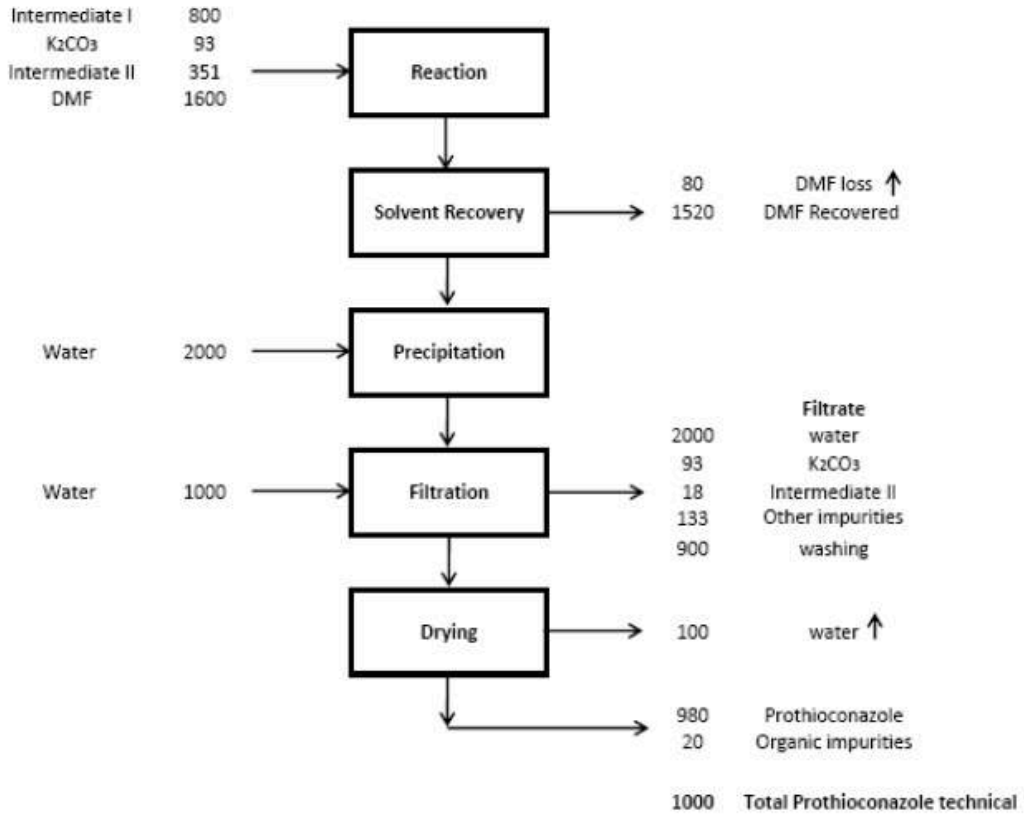
2,4-dihydro-[1,2,4]-triazolidine-3-thione

101

prothioconazole

343

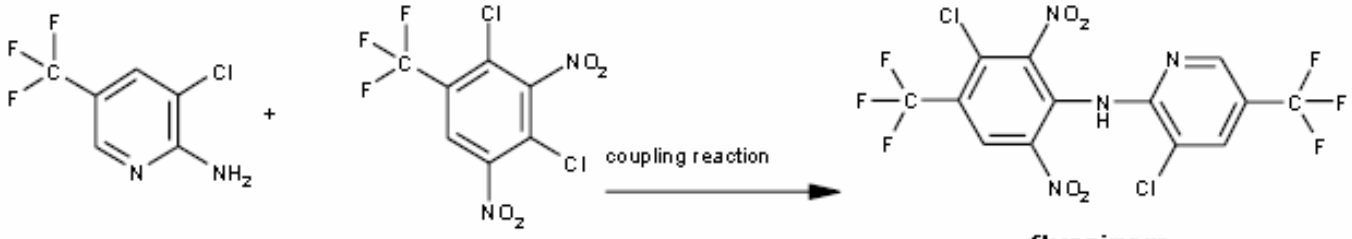
Intermediate I: (1-Chlorocyclopropyl)(O-chlorobenzyl)ketone (N-1)
Intermediate II : 2,4-dihydro-[1,2,4]-triazolidine-3-thione



17. Fluazinam:

Manufacturing Process

Dichloro trifluoromethyl benzene is nitrated by the nitration mixture of nitric acid and sulphuric acid. After nitration, the mass is washed with water and is isolated and dried. The dry product is then reacted with aminochlorotrifluoromethlpyridine in solvent toluene and isolated by water wash and drying.



2-amino,3-Chloro,5-tifloromethyl pyridine

196.5

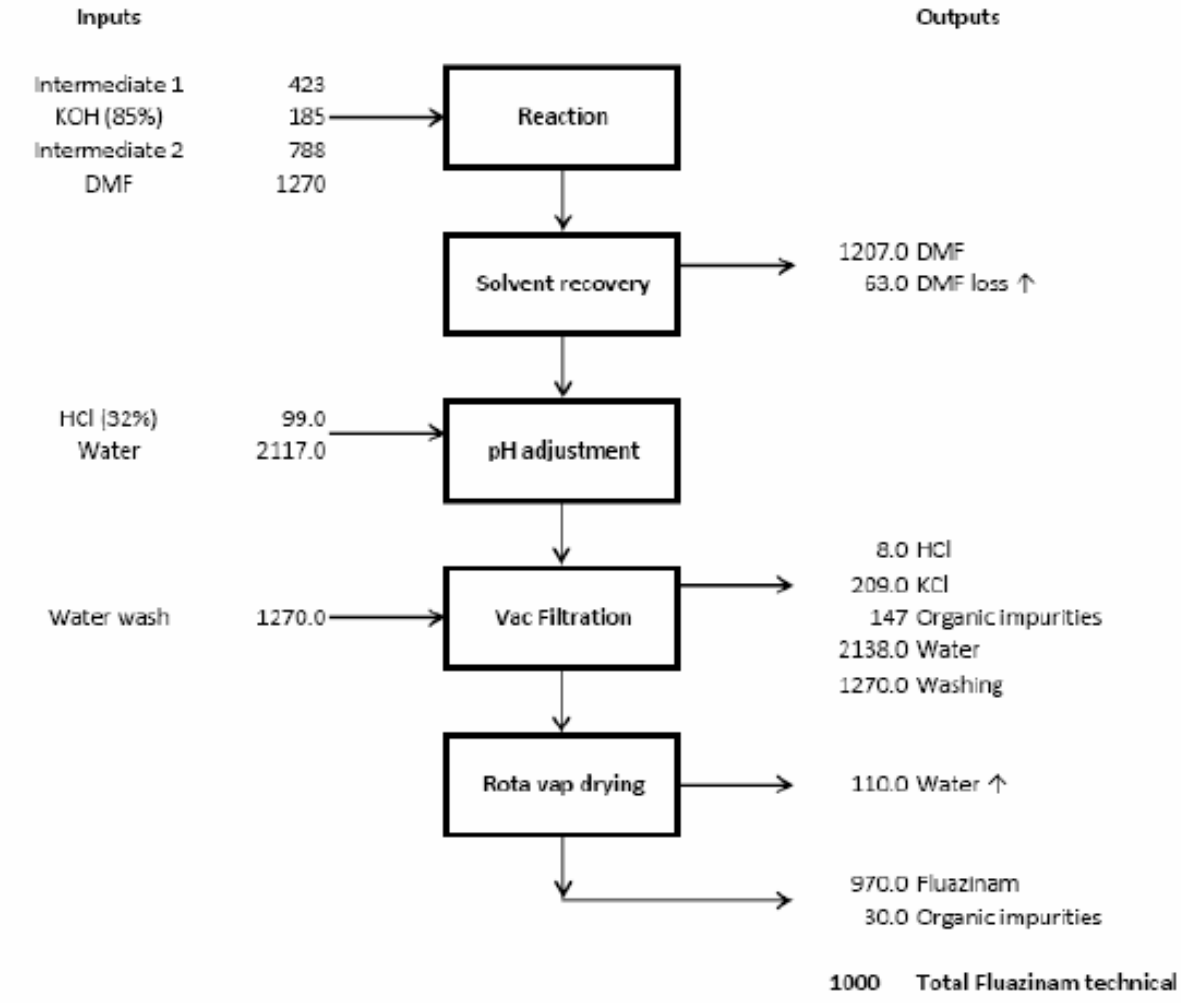
2,4-dichloro-3,5-dinitro benzotrifluoride

305

fluazinam

465.1

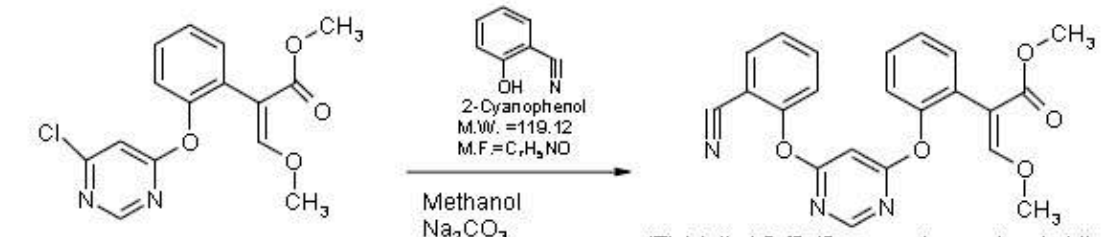
Intermediate 1 = 2-Amino-3-chloro-5-trifluoromethylpyridine
Intermediate 2 = 2,4-Dichloro-3,5-dinitro benzotrifluoride



18. Azoxystrobin:

Manufacturing Process

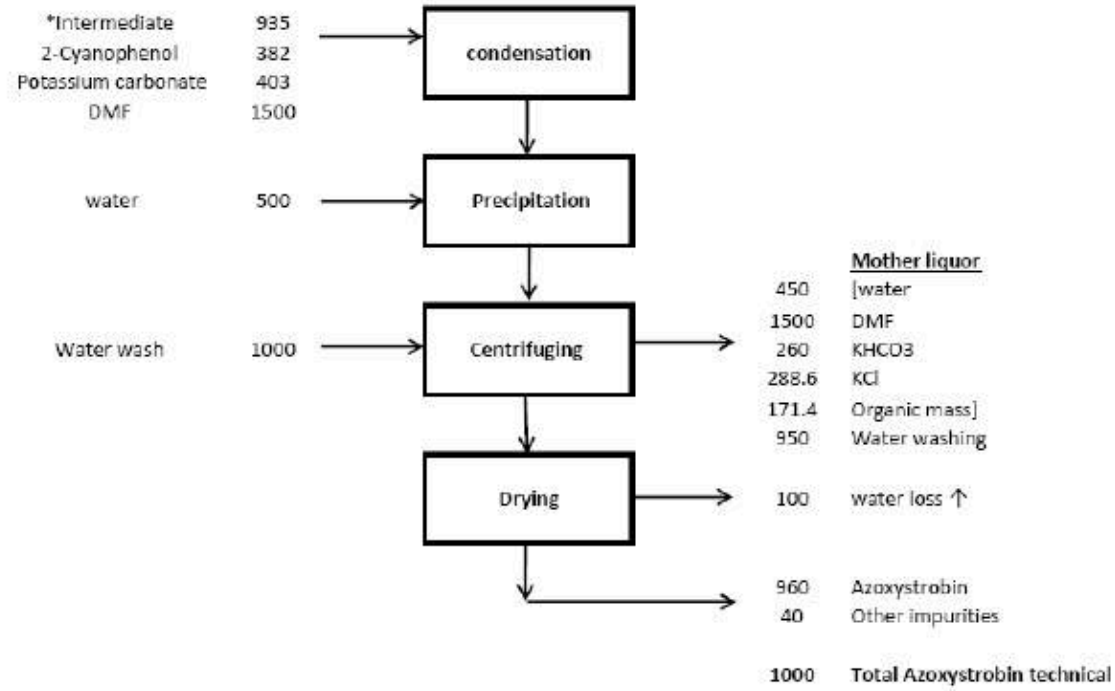
In solvent methanol, 2-hydroxybenzonitrile is charged and is reacted with sodium methoxide under reflux. After completion of the reaction, the compound, 6-chloro-4 pyrimidinyloxymethoxymethylenebenzene acetate is added and the reaction is completed. After the reaction, the solvent is distilled and toluene is charged and washed with water and finally the solvent is distilled and the product is packed.



Methyl-(E)-2-(2-(6-chloropyrimidine -4-yloxyphenyl)-3-methoxyacrylate
M.W. =320.73
M.F. =$C_{15}H_{13}ClN_2O_4$

(E)-Methyl-2-[2-(6-cyanophenoxy)pyrimidin-4-yloxy)phenyl]-3-methoxyacryate
M.W. =403.40
M.F. =$C_{22}H_{17}N_3O_5$
(AZOXYSTROBIN)

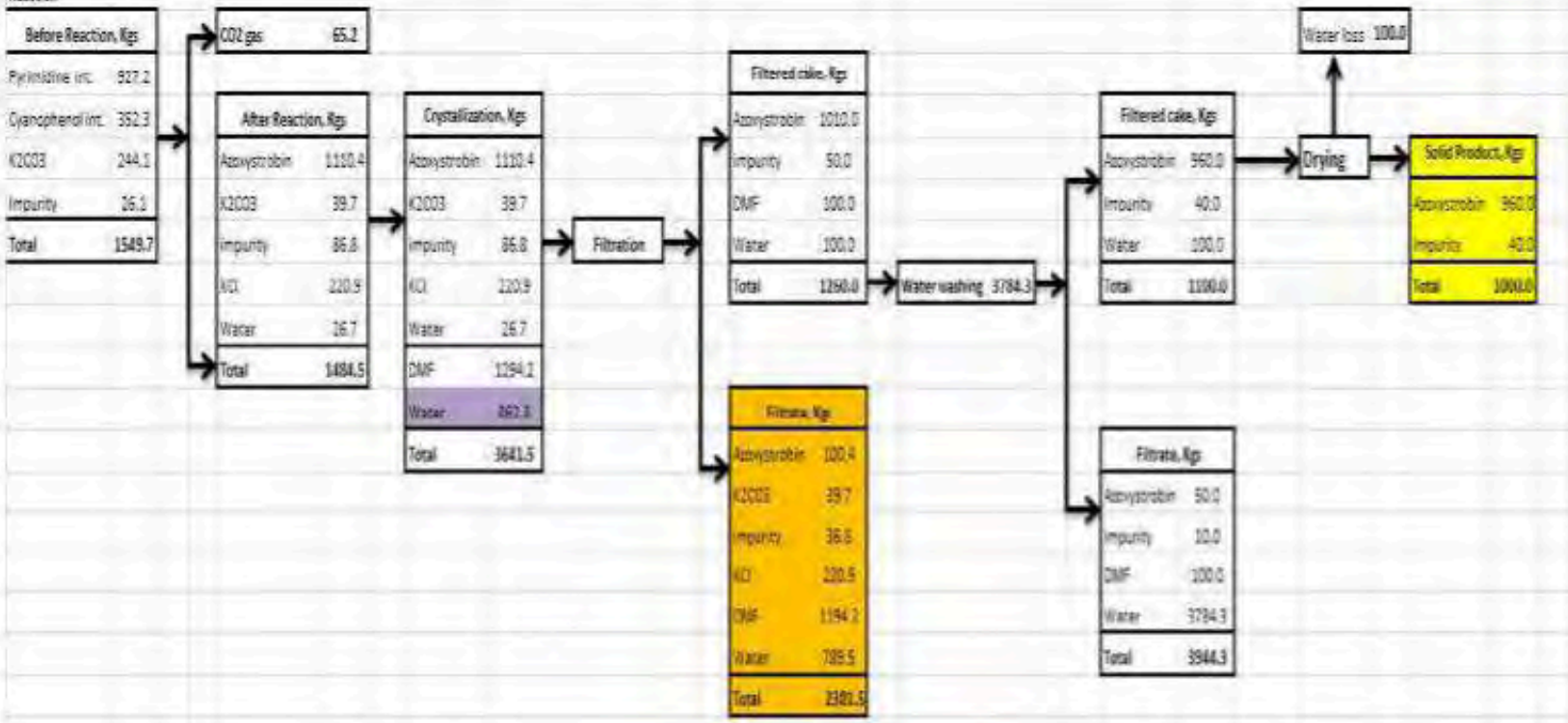
*Intermediate = (E)-Methyl-2-(2-(6-chloropyrimidine-4-yloxy)-phenyl)-3-methoxyacrylatete.



PRODUCT : AZOXYSTROBIN

MATERIAL IN PUT & OUT PUT

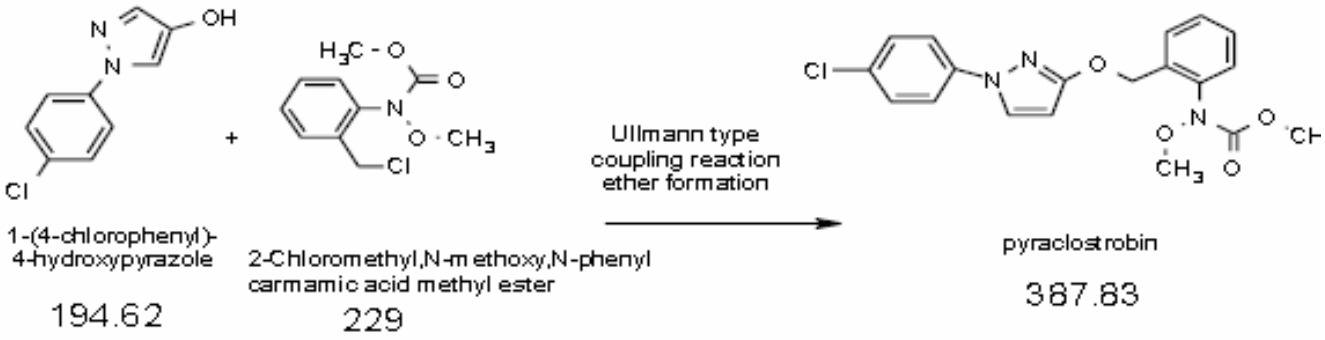
STEP I: FORMATION OF AZOXYSTROBIN TECHNICAL



19. Pyraclostrobin:

Manufacturing Process

2-Methoxyaminobenzylchloride is dissolved in toluene solvent and is reacted with MCF under reflux. After the reaction, solvent toluene is distilled out and methanol is added and CPHP is added followed by sodium methoxide is added and the reaction is completed. After the reaction, solvent methanol is distilled out and DIPE is charged and is washed with water and part of the solvent is distilled and the product is crystallized.



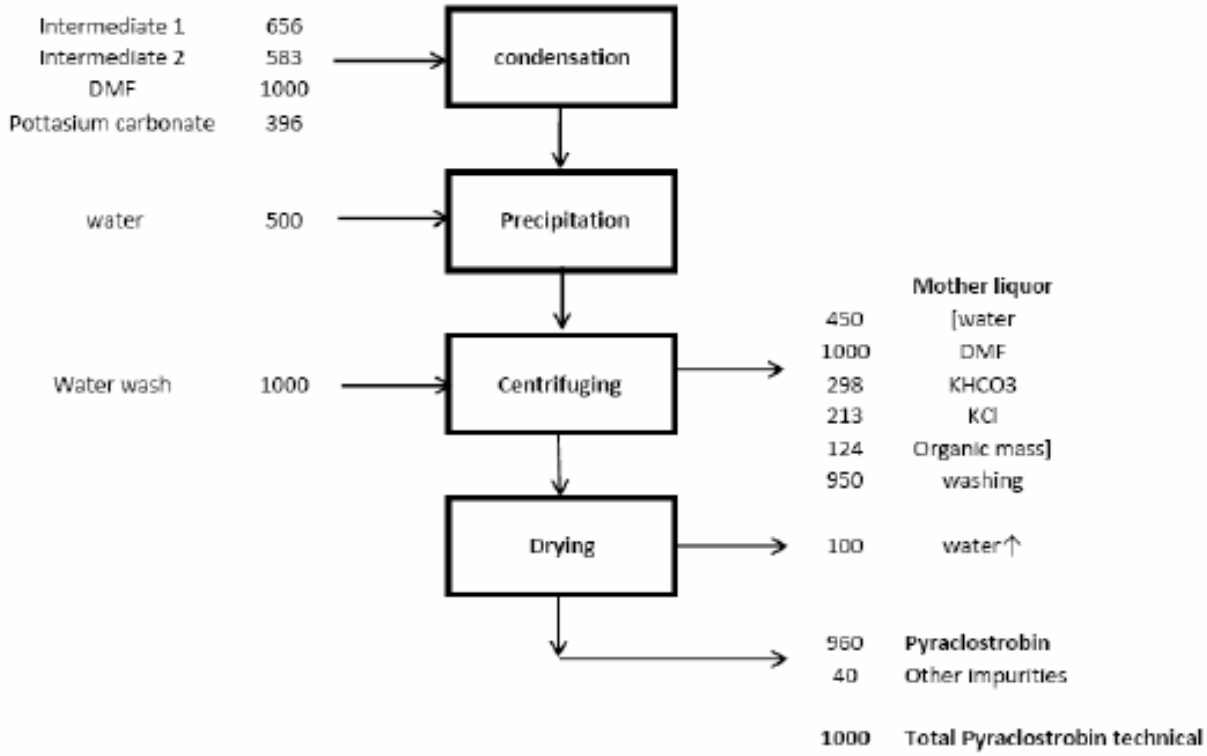
1-(4-chlorophenyl)-4-hydroxypyrazole — 194.62

2-Chloromethyl,N-methoxy,N-phenyl carmamic acid methyl ester — 229

pyraclostrobin — 387.83

* Intermediate-1 = 2-chloromethyl -N-methoxy,N-phenyl carbamic acid methyl ester

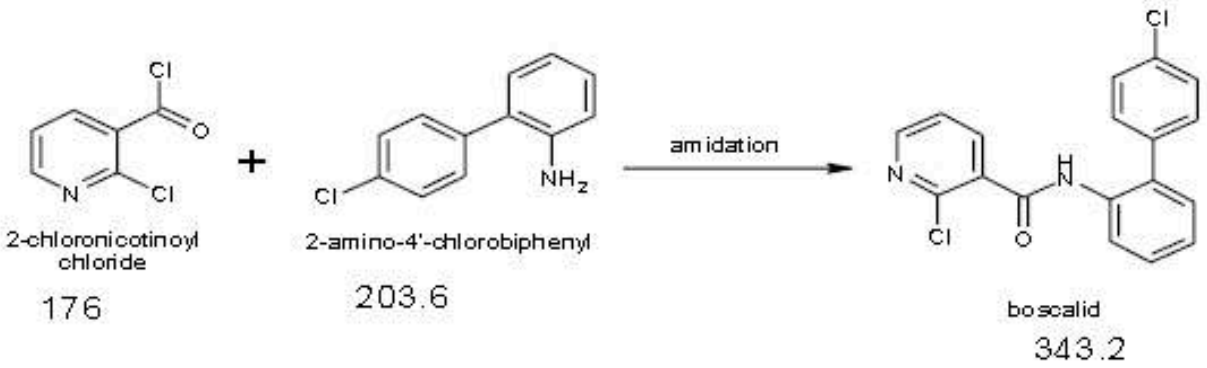
* Intermediate-2 = 1-(4-Chlorophenyl)-4-hydroxypyrazole



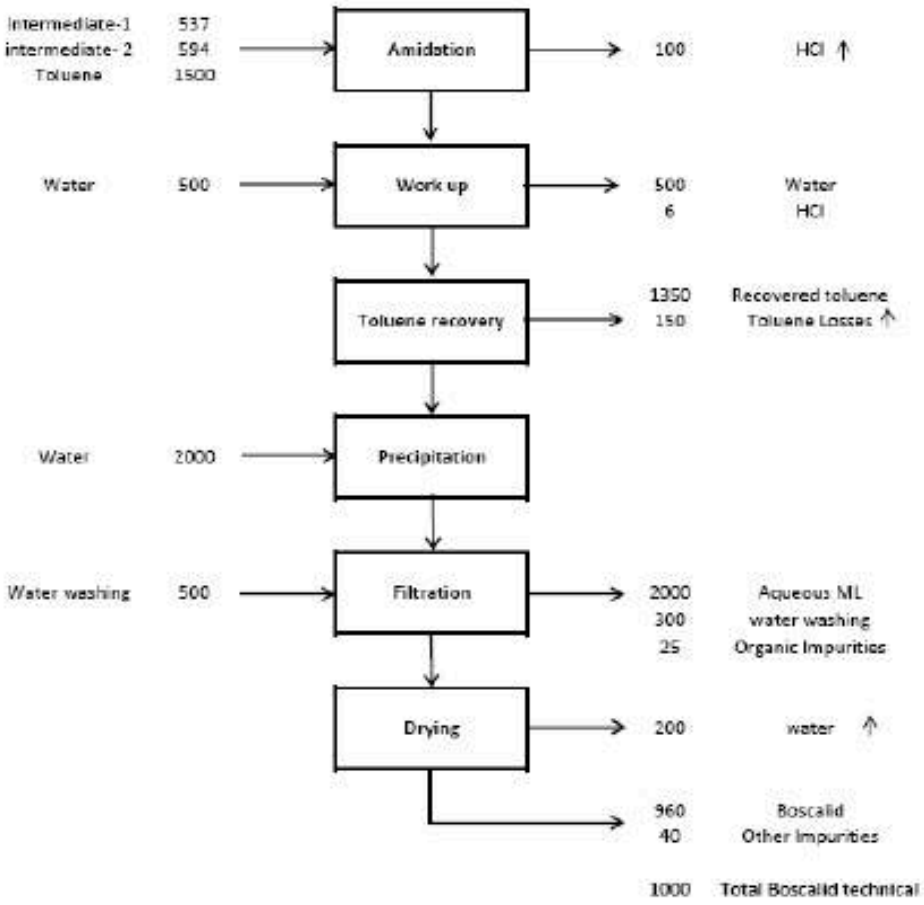
20. Boscalid:

Manufacturing Process:

In the first step, 2-Chloro-3-nicotinic Acid (CNA) is taken in toluene and is reacted with Thionyl chloride and the gases are removed by nitrogen purging. In the second step, the acid chloride is coupled with 2-Amino-4'-chlorobiphenyl (ACBP) at room temperature and the product is filtered, washed and dried to get the product.



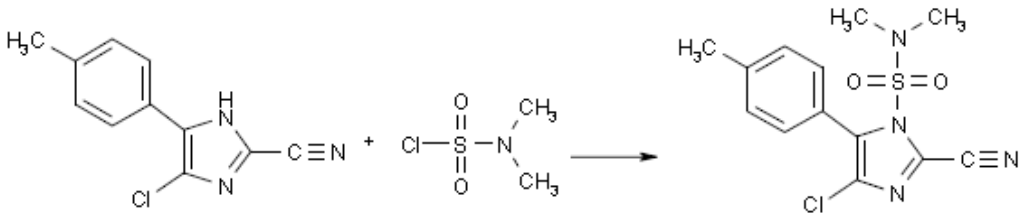
*Intermediate-1 2-chloronicotinoyl chloride
intermediate- 2 2-amino-4'-chlorobiphenyl



21. Cyazofamid:

Manufacturing Process

4-Chloro-2-cyano-5-p-tolylimidazole (CCDTI) is taken in toluene solvent and is reacted at elevated temperature with Dimethylsulfamoyl Chloride . After completion of the reaction, the organic layer is washed with water and the aqueous layer is separated. The organic layer is taken for the recovery of solvent and the crude is sent through ATFE to remove the impurities and the product is packed.



condensation
dehydrochlorination
sulfonamide formation

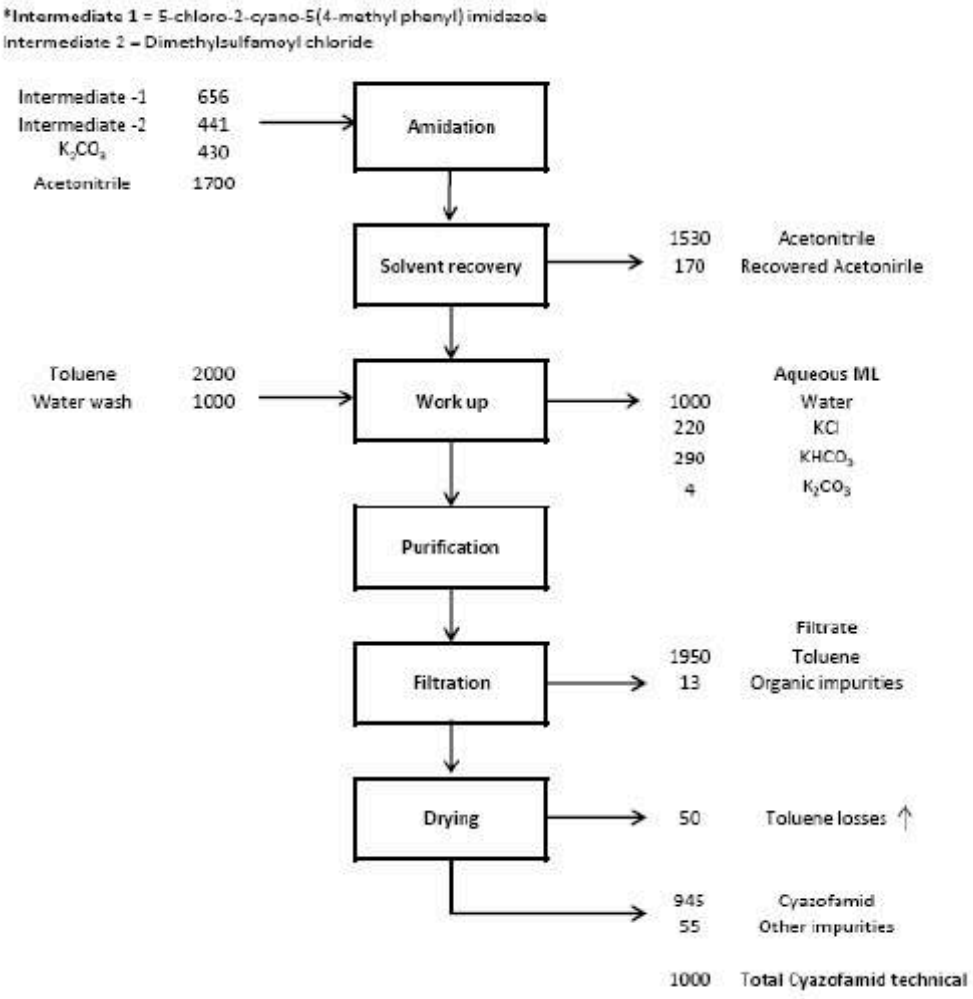
217.66

Dimethylsulfamoyl
chloride

143.6

cyazofamid

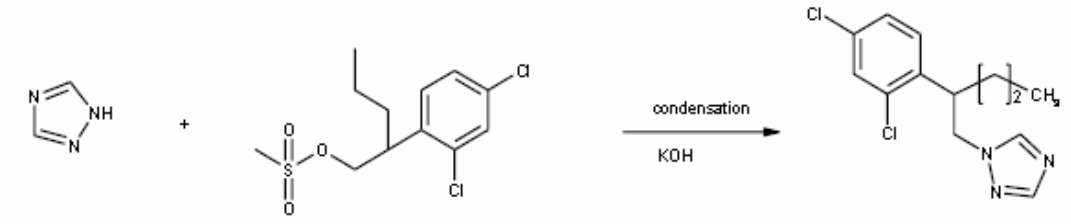
324.8



22. Penconazole:

Manufacturing Process

Starting material is 1-Bromo-2-(2,4-dichlorophenyl)-pentane (BDCPP). This is reacted with Triazole in presence of KOH in solvent DMF. After the reaction, the solvent is distilled and the product is washed with water finally it is crystallized in Methanol-water at low temperature.

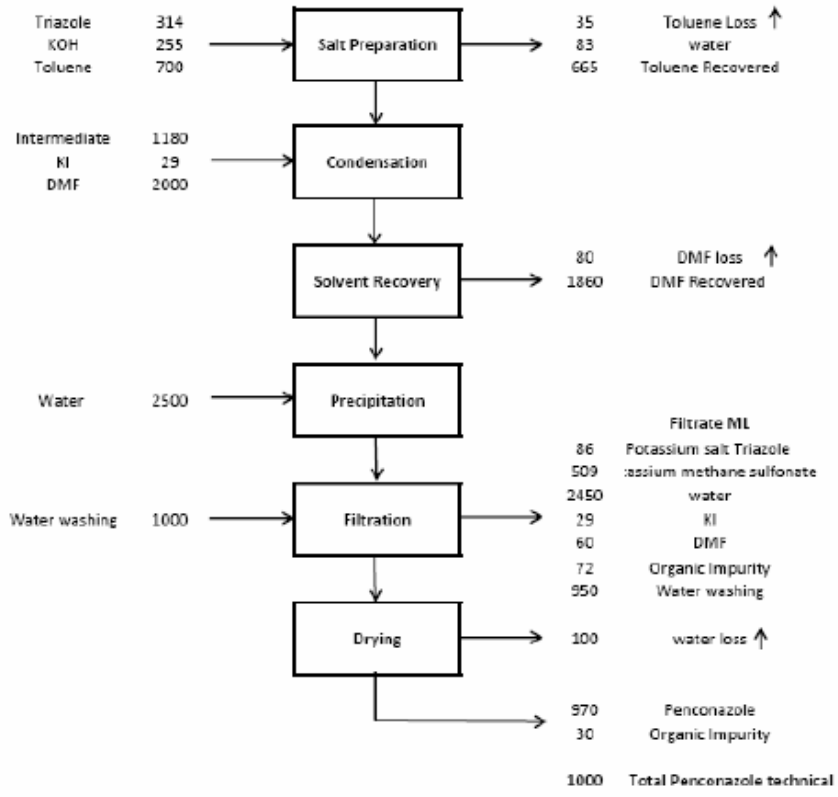


1,2,4-triazole — 69

2-(2,4-dichlorophenyl) pentyl methane sulfonate — 311

penconazole — 284

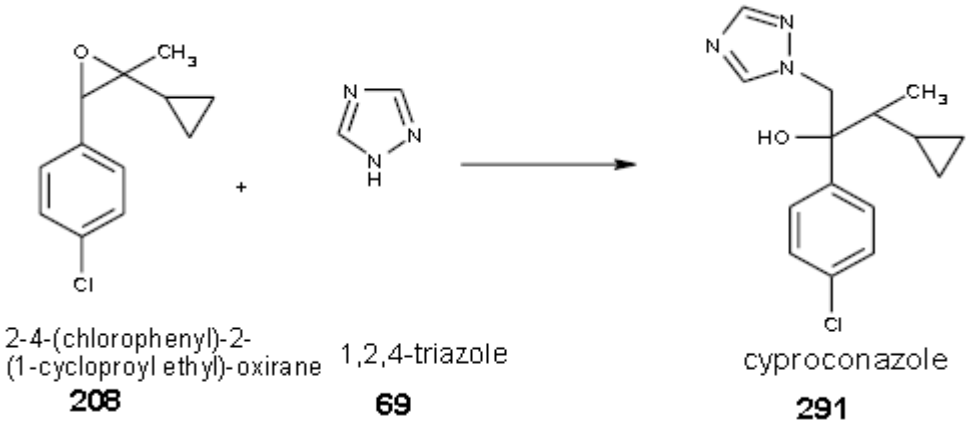
Intermediate- 2-(2,4-dichlorophenyl) pentyl methane sulfonate

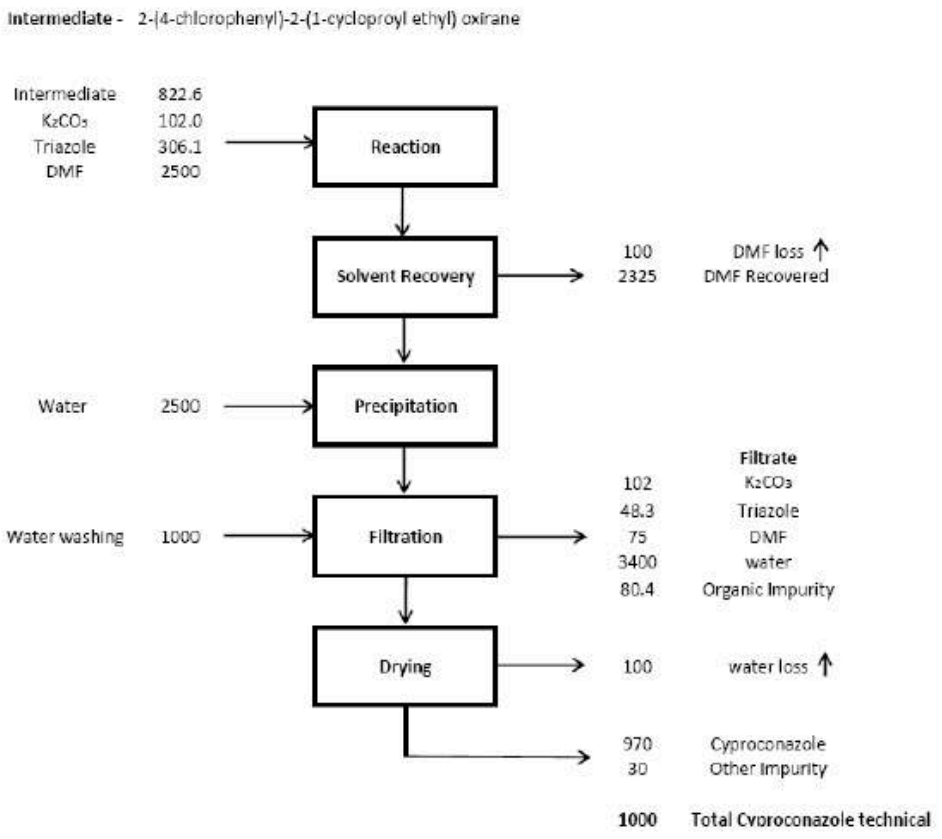


23. Cyproconazole:

Manufacturing Process

The intermediate CPPO is taken in large excess DMS and is reacted in presence of DMSO4, KOH, and Catalyst to produce the Oxirane. The solvent DMS is distilled and the product is dissolved in EDC and is filtered to remove all the solid impurities. The organic is washed with water and the aqueous is separated out. The organic is taken for distillation to recover solvent and the product Oxirane is taken for second step. The oxirane is dissolved in DMF solvent and is reacted with Triazole in presence of K2CO3. The mass after reaction is filtered to remove the solid particles and distilled to recover solvent and the product is distilled under high vacuum to get pure product.

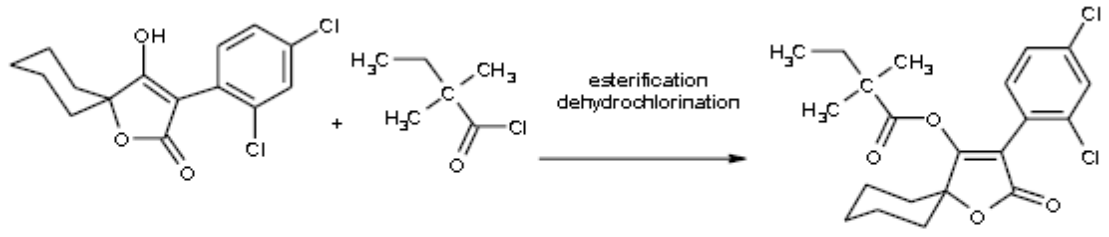




24. Spirodiclofen:

Manufacturing Process

Spirodiclofen is manufactured in 2 step process. In the first step, 1-hydroxycyclohexane carboxylate (HCC) is reacted with 2 ,4-dichlorophenylacetyl chloride (DCP C) in presence of acid scavenger. After the reaction, the mass is heated in presence of alkali to get a cyclaised product, 3-(2,4-dichlorophenyl)-4-hydroxy-1 -oxaspiro[4. 5]decan-2-one (DPHD).In the second step, DPHD is reacted with 2,2-dim ethylbutanoyl chloride in presence of base to produce the product Spirodiclofen.

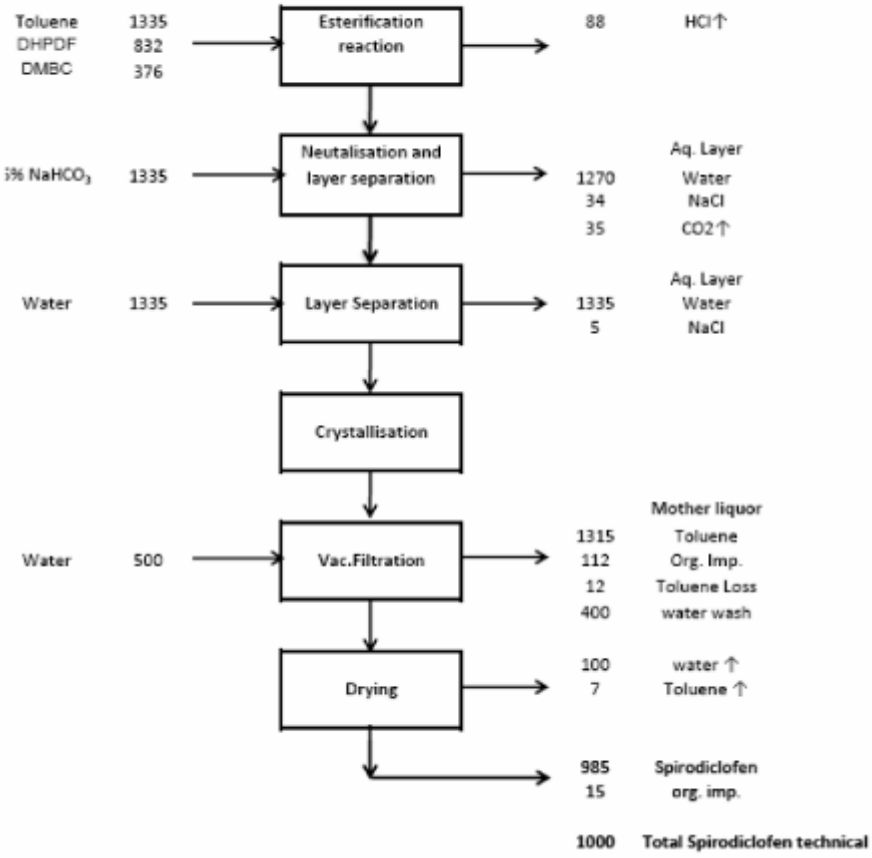


3-(2,4-dichlorophenyl)-4-hydroxy-5,5-pentamethylene-dihydrofurane-2-one
313.2

2,2-Dimeththylbutyryl chloride
134.6

spirodiclofen
411.3

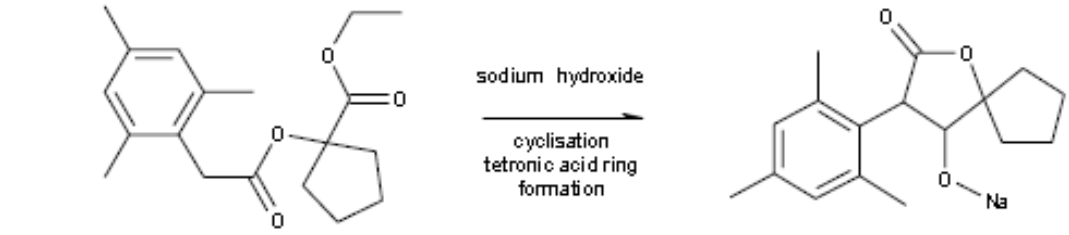
DHPDF : 3-(2,4-dichlorophenyl)-4-hydroxy-5,5-pentamethylene-dihydrofurane-2-one
DMBC 2,2-Dimethylbutyryl chloride



25. Spiromesifen:

Manufacturing Process

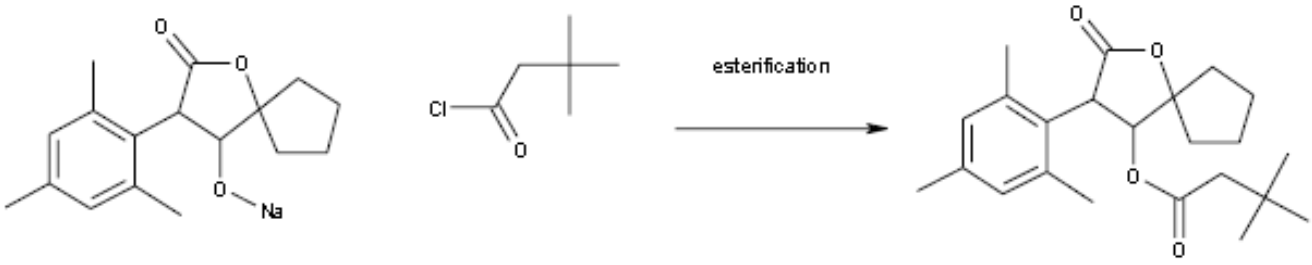
In the manufacturing process, 3,3-Dimethylpentanoyl chloride (DMPC) is reacted with 3-Mesityl-2-oxo- 1-oxaspiro[4,4]non-3-ene (MOONE) in presence of solvent toluene , caustic and water. The aqueous layer is separated out and the toluene solvent is distilled partially and crystallized, filtered and dried to get the product



1-[2-(2,4,6-trimethyl-phenyl)-acetoxy]-cyclopentane carboxylic acid ethyl ester

318.42

296



tert-butylacetyl chloride

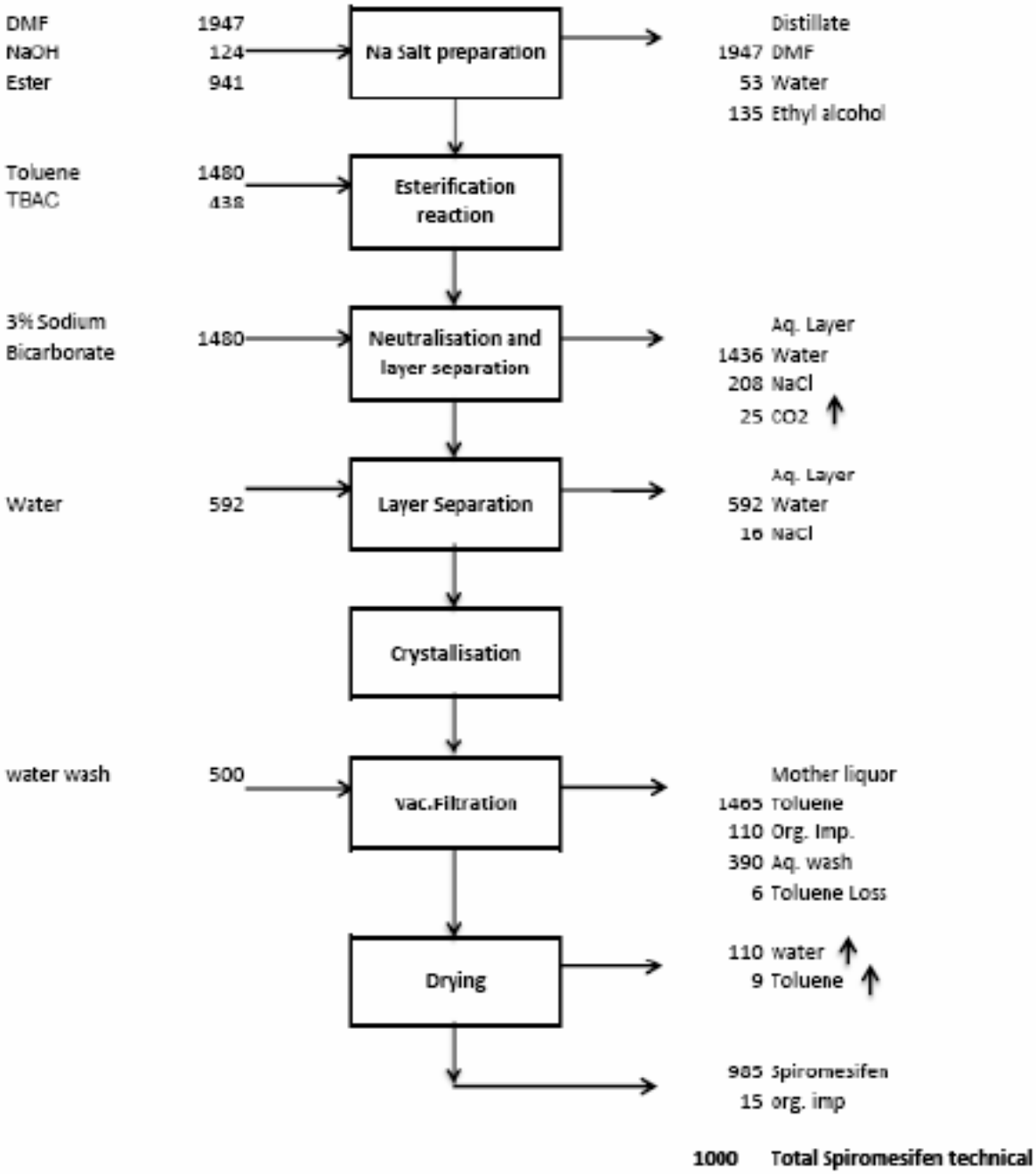
134.6

spiromesifen

372.5

Ester : 1-[2-[2,4,6-trimethyl-phenyl)-acetoxy]-cyclopentane carboxylic acid ethyl ester

TBAC : tert-butylacetyl ester

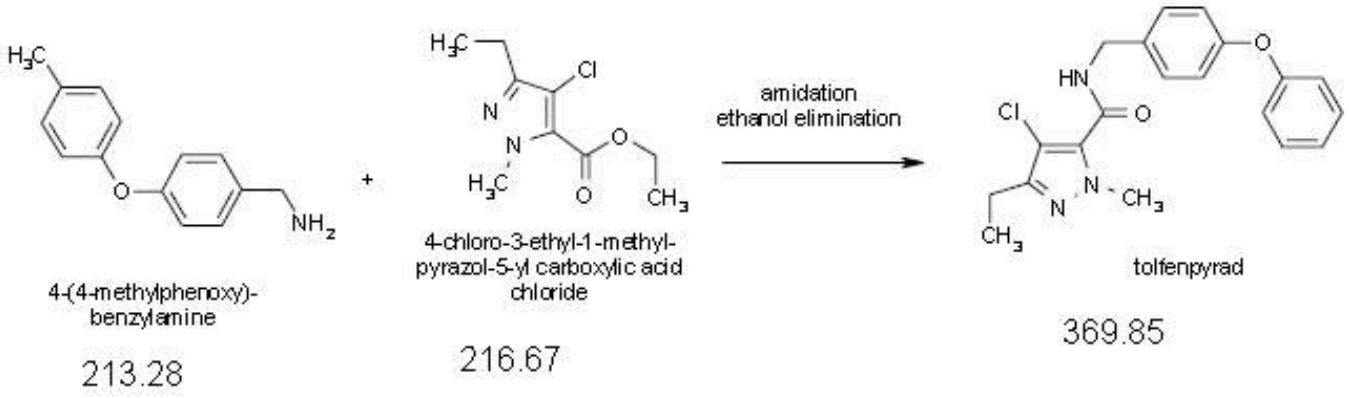


1000 Total Spiromesifen technical

26. Tolfenpyrod:

Manufacturing Process

In solvent toluene 4-Methylphenoxyphenylmethylamine is taken and under reflux, the acid chloride 4-chloro-3-ethyl-1-methylpyrazole-5-carboxyl chloride is added and the reaction is completed. After completion of the reaction, the reaction mass is cooled to 40 degree and washed with water and the solvent is refluxed to remove traces of water. Finally the organic mass is cooled and crystallized, filtered and dried to get product.



4-(4-methylphenoxy)-benzylamine

213.28

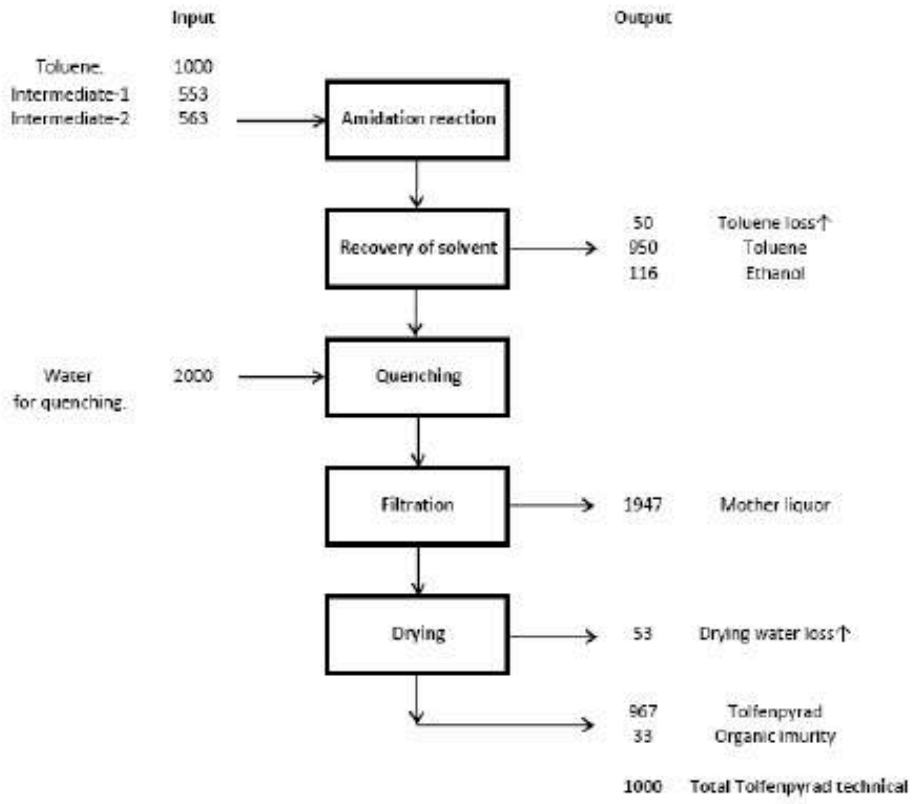
4-chloro-3-ethyl-1-methyl-pyrazol-5-yl carboxylic acid chloride

216.67

tolfenpyrad

369.85

Intermediate-1 = 4-(4-methylphenoxy)-benzylamine.
Intermediate-2 = 4-chloro-3-ethyl-1-methyl-pyrazol-5-yl carboxylic acid chloride.

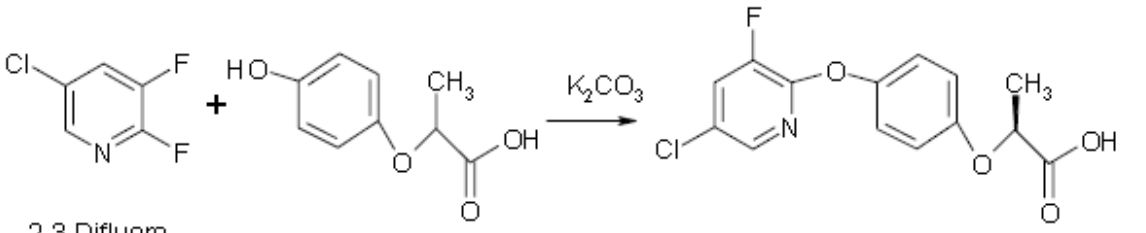


27. Clodinofop:

Manufacturing Process

ClodinafopPropargyl manufacture starts from the intermediate RHPPA. This is taken in solvent DMF and K2CO3 and is reacted with DCFP at elevated temperature. The reaction is done for 8 hours to complete the reaction. Thereafter, propargyl chloride is added for 2 hours and carried out he reaction to completion. Afterwards, the mass is filtered to remove the solids and the liquid part is taken for distillation and the solvent is recovered. The crude is extracted in DCM and washed with water and the solvent is recovered. The crude is crystallized in methanol-water and filtered, dried to get the product.

Stage-1



2,3-Difluoro, 5-chloro pyridine

M.W =149.53
M.F =$C_5H_2ClF_2N$

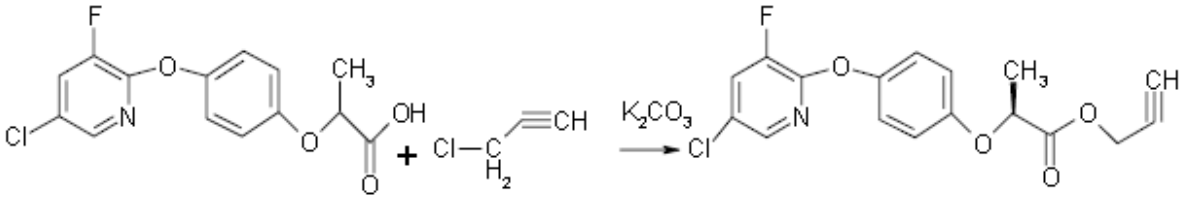
2-4-(hydroxyphenoxy) -propionic acid

M.W. =182.18
M.F. =$C_9H_{10}O_4$

(R)-2-[-(5-chloro-3-fluoro-2-pyrydyloxy) phenoxy]propionic acid. (Clodinafop)

M.W. =311.70
M.F =$C_{14}H_{11}ClFNO_4$

Stage-2



Clodinafop

M.W. =311.70
M.W. =$C_{14}H_{11}ClFNO_4$

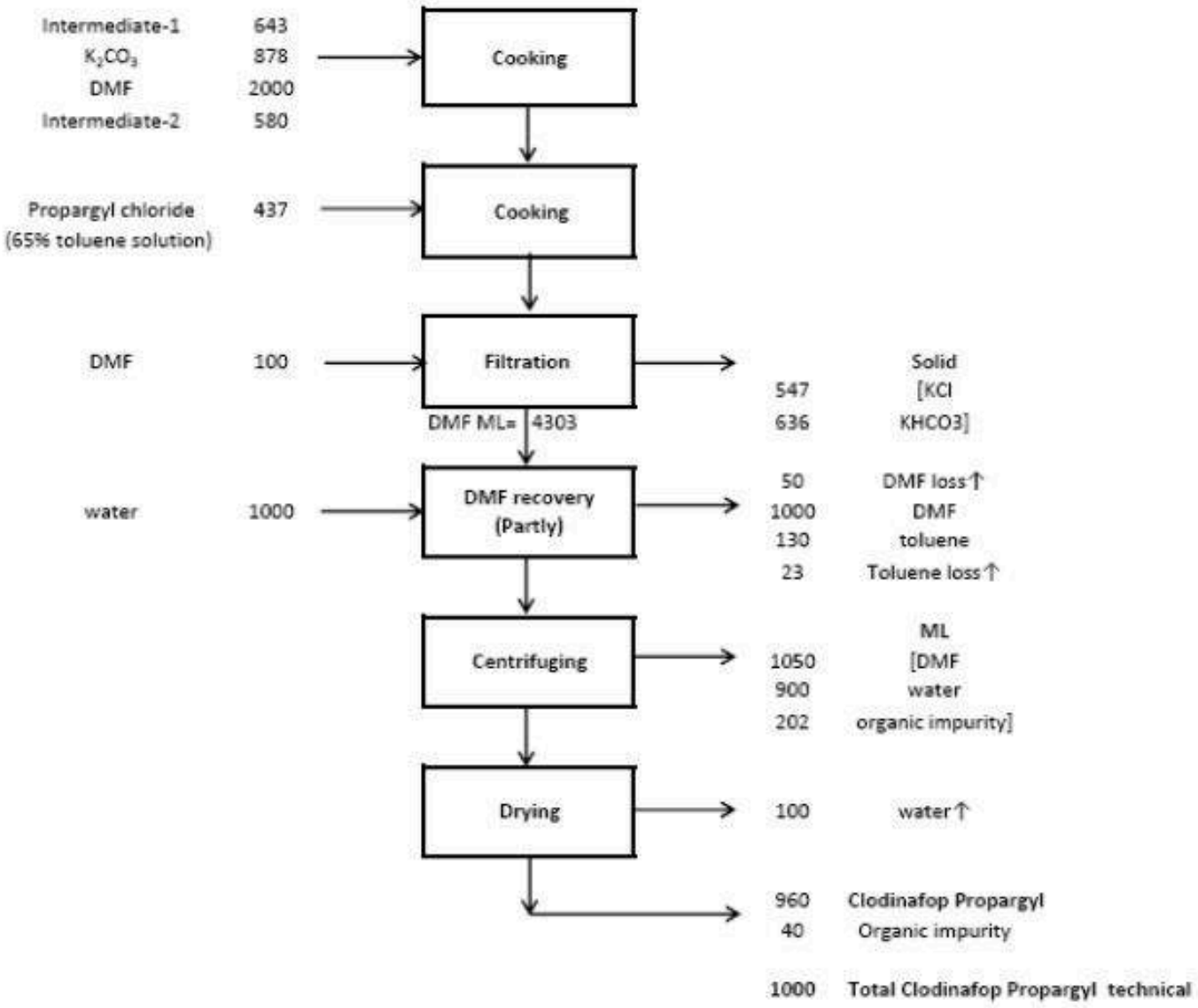
Propargyl Chloride

M.W. =74.51
M.F. =C_3H_3Cl

Prop-2-ynyl(R)-2-[4-(5-chloro-3fluoro-2-pyrydyloxy)-phenoxy]propionate (Clodinafop propargyl)

M.W.=349.75
M.F. =$C_{17}H_{13}ClFNO_4$

Intermediate - 1 = 2-4-{hydroxyphenoxy}propionic acid
Intermediate-2 = 2,3-Difluoro,5-chloro pyridine

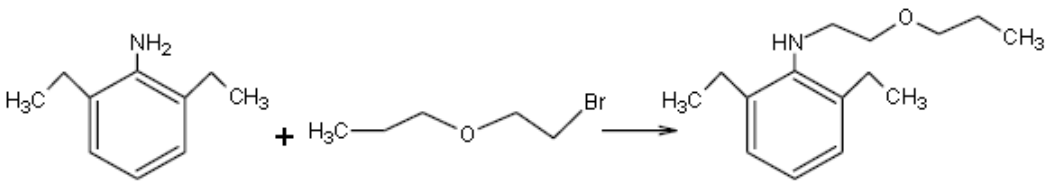


28. Pretilachlor:

Manufacturing Process

In the first step, 2,6-Diethylanilie (DEA) is taken excess in a reactor and is reacted with Propoxychloroethane at reflux temperature for 20 hours. After completion of the reaction, the mass is neutralized by caustic and the aqueous is separated. The organic is taken for the recovery of the excess DEA and the product N-Propoxyethyl-2,6-diethylaniline (PEDA) is vacuum distilled. In the second step, the step 1 product PEDA is reacted with chloroacetylchloride in presence of solvent N-hexane at room temperature. After the reaction, the acid HCl is neutralized and the product is washed with water and the solvent is distilled and the product is packed as technical Pretilachlor.

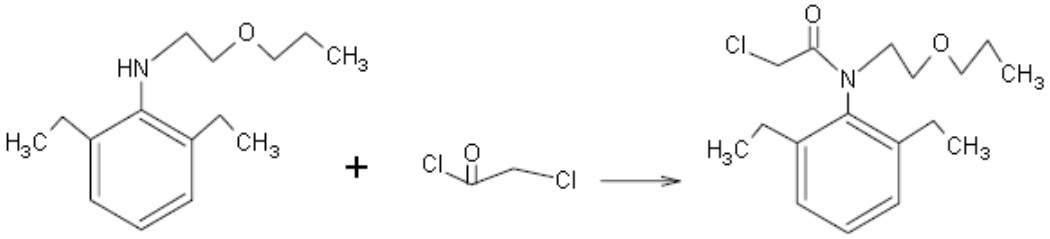
Stage-1



2,6-Diethyl aniline **1-Bromo-2-Propoxy Ethane** **N-Propoxy Ethyl -2,6-Diethyl Aniline**

Mol.wt= 149 **Mol.wt =167** **Mol.wt= 235**

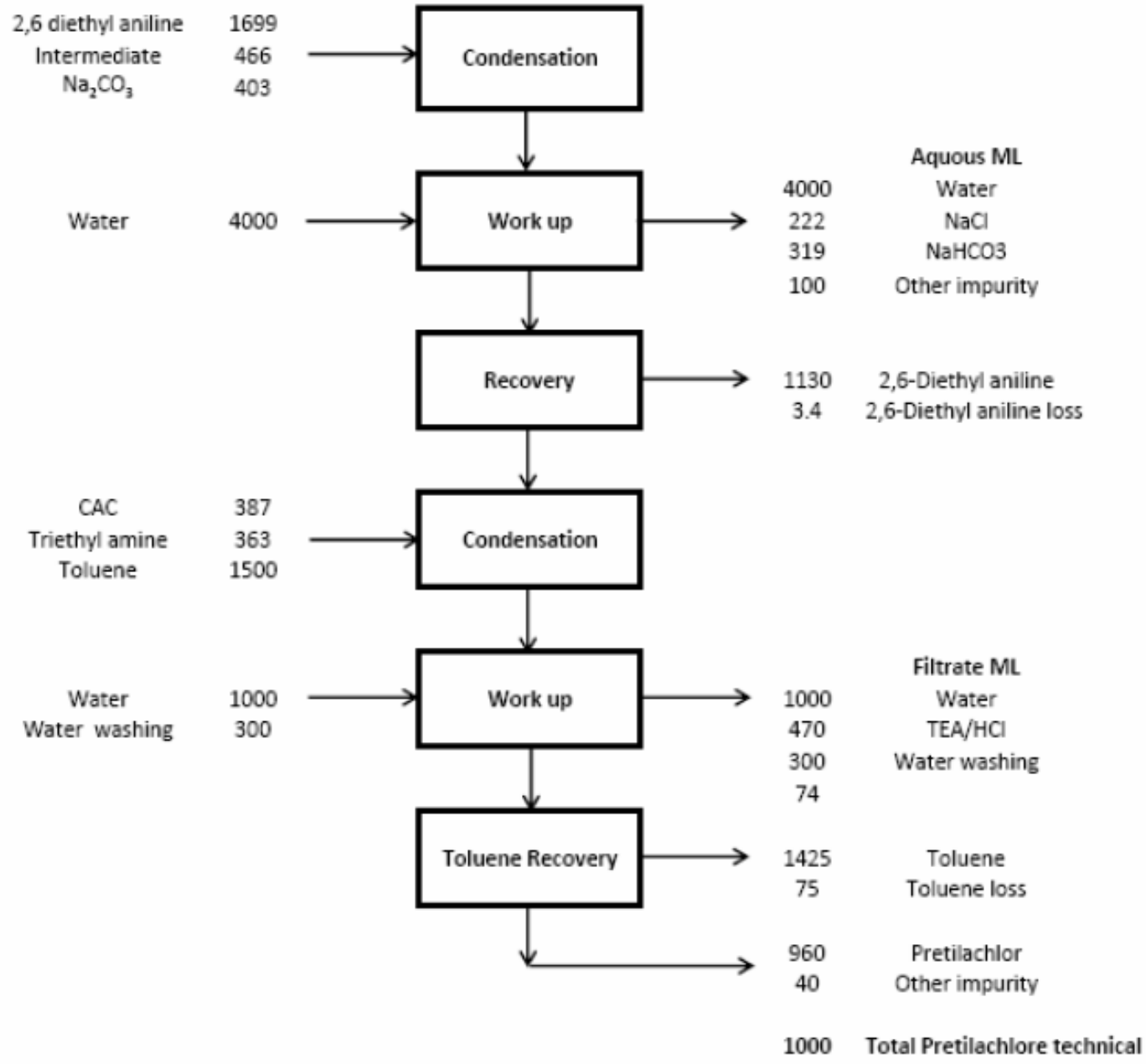
Stage-2



N-propoxyethyl-2,6-diethylaniline **Chloro acetyl chlorides** **Pretilachlor**

Mol.Wt=235 **Mol.Wt=113** **Mol.Wt=311.85**

Intermediate = 2-(n-propoxy)ethyl chloride
CAC = Chloro acetyl chloride



MANUFACTURING PROCESS OF AGRO FORMULATION

a) Solid (Powder) Products: 32,000 TPA
b) Liquid Products: 10,000 TPA

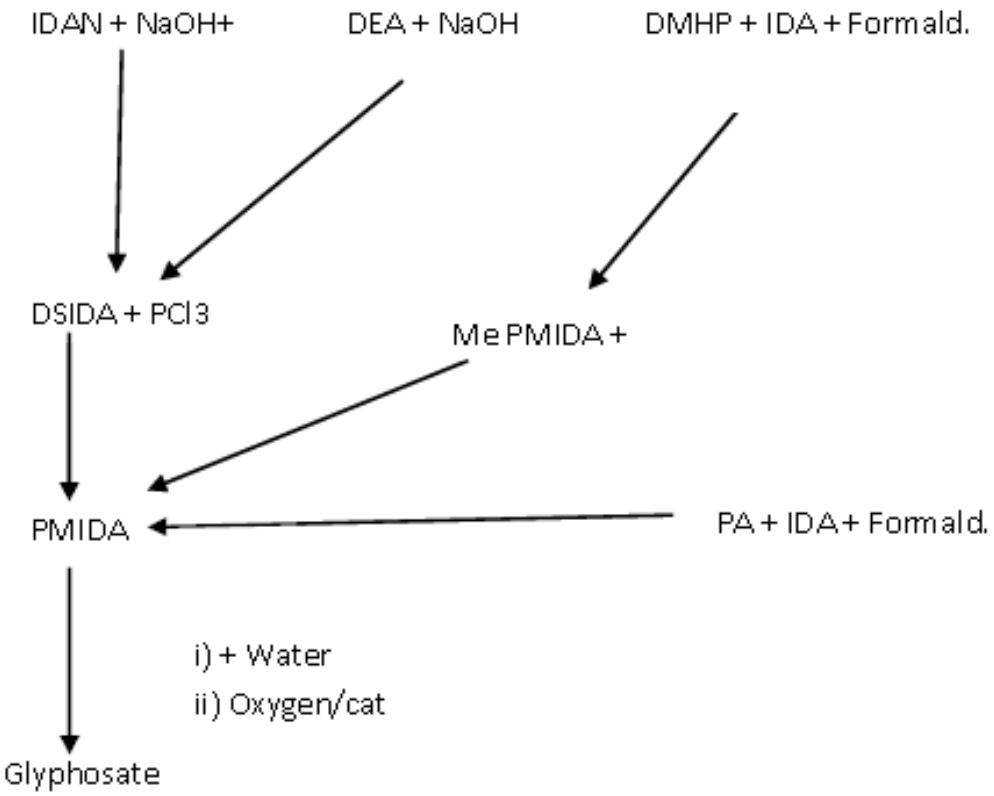
For Liquid Formulations:

The liquid formulations will be manufactured by mixing specific quantities of active ingredients (AI) with specified quantity of water/solvent and surfactants/performance chemicals for a particular product, in a stirred vessel. The homogeneous liquid formulation of that product will be analyzed for quality and will be packed using automatic weighing and packing machine.

For Solid Formulations:

The solid formulations will be manufactured by blending specific quantities of active ingredients (AI) with specified surfactants and diluents (Such as China clay, silica etc.) in a specified quantities in blender. The properly blended product will be analyzed for quality and will be packed using automatic weighing and packing machine.

MANUFACTURING PROCESS OF GLIPHOSATE



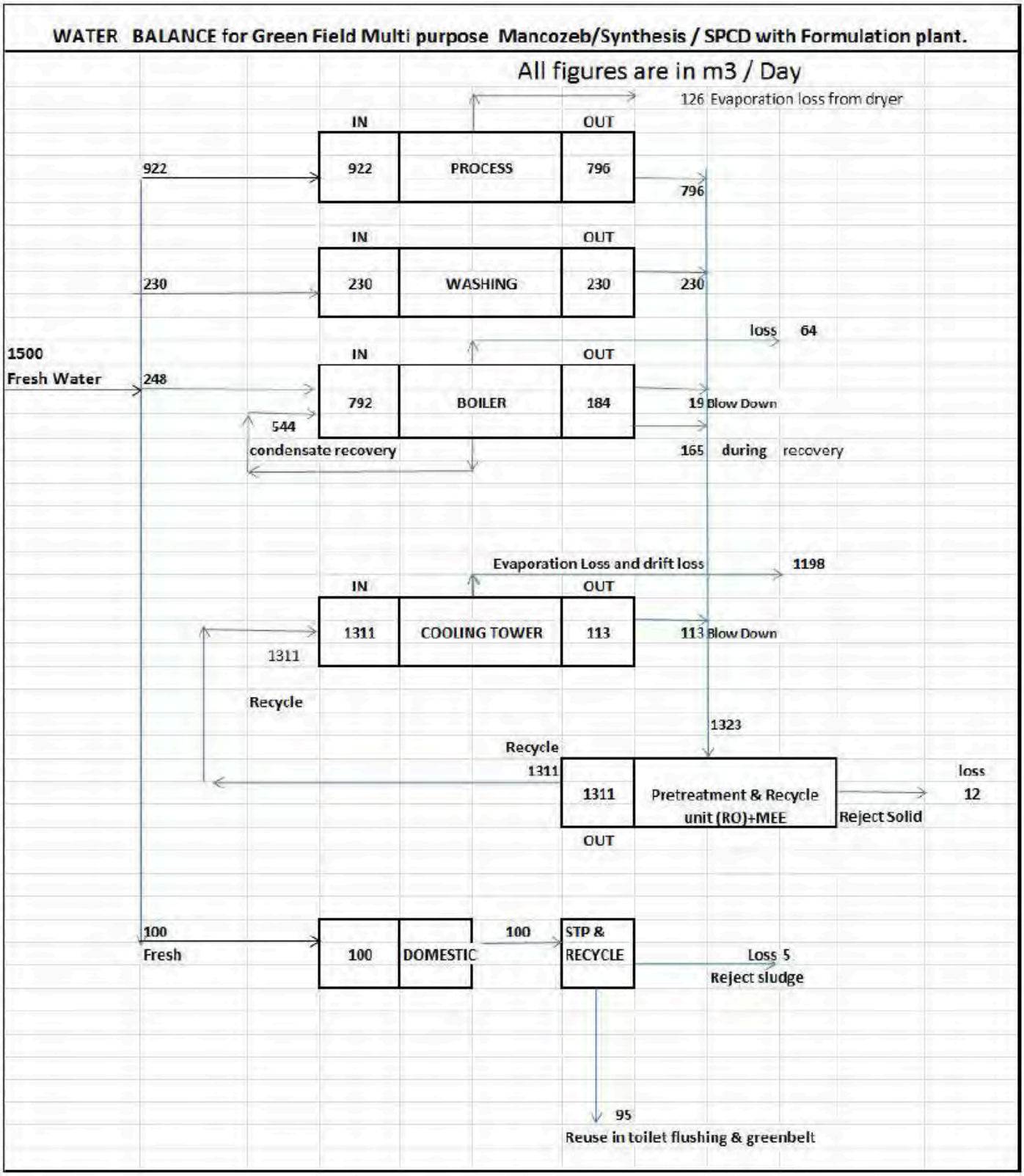
ANNEXURE: 3

WATER CONSUMPTION AND EFFLUENT GENERATION

EXISTING

Activity	Water Consumption KLD	Waste Water Generation KLD
1. Industrial use		
Process	922 (Fresh)	796
Washing + Scrubber	230 (Fresh)	230
Boiler	792 (248 Fresh + 544 Condensate Recycle)	184
Cooling	1311 (Recycle Water)	113
Sub- Total	**1400 (Fresh Water) 1311(Recycle Water)**	**1323**
Net Fresh Water Consumption	**1400 (922+230+248)**	**--**
2. Domestic		
Domestic	100	95
Fresh Water requirement (1+2)	**100 + 1400 = 1500 KLD**	

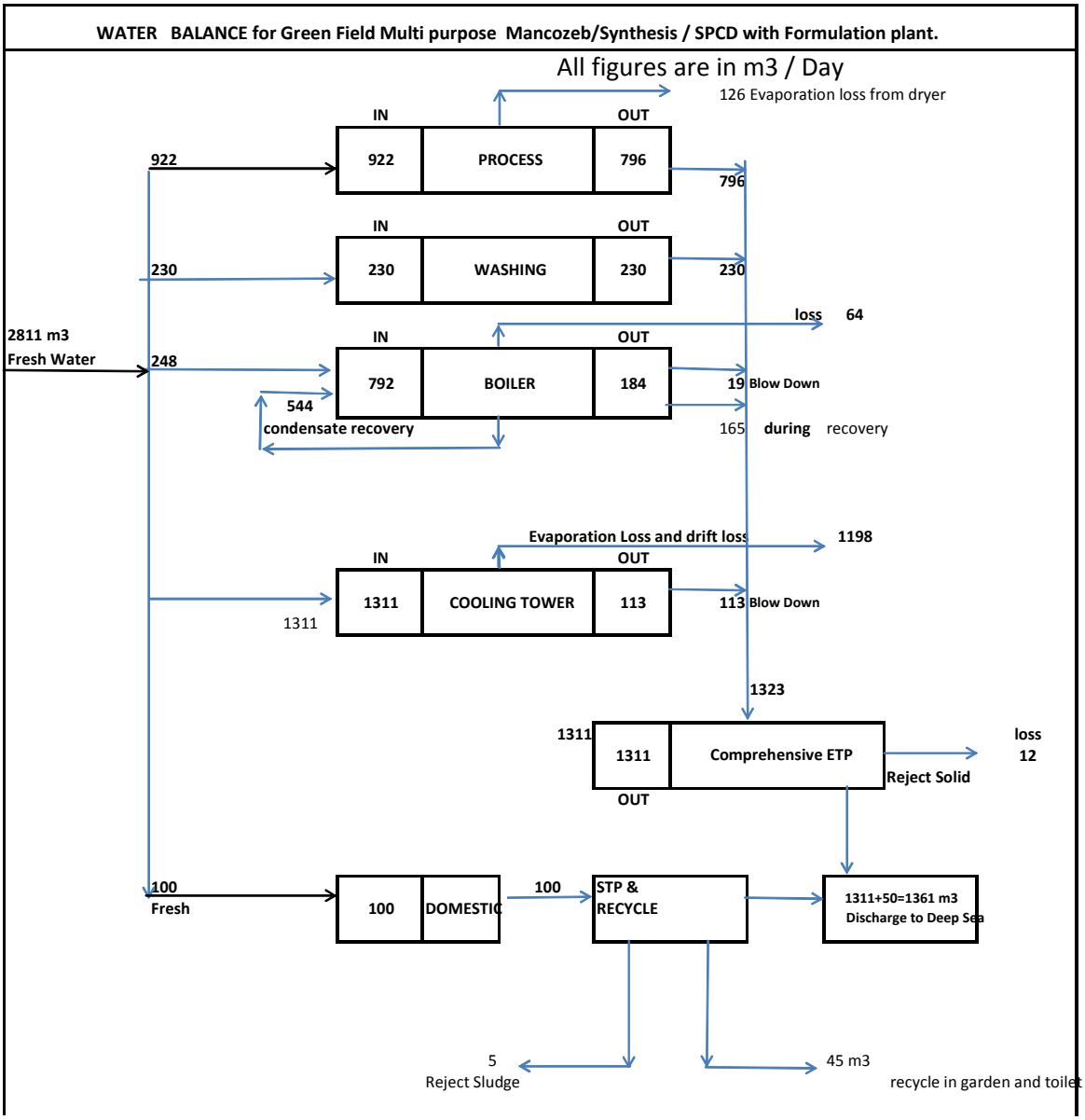
Note: Zero Liquid Discharge Unit


WATER BALANCE for Green Field Multi purpose Mancozeb/Synthesis / SPCD with Formulation plant.
All figures are in m3 / Day
126 Evaporation loss from dryer
IN
OUT
922
922
PROCESS
796
796
IN
OUT
230
230
WASHING
230
230
loss 64
1500
Fresh Water
IN
OUT
248
792
BOILER
184
19 Blow Down
544
condensate recovery
165 during recovery
Evaporation Loss and drift loss
1198
IN
OUT
1311
1311
COOLING TOWER
113
113 Blow Down
Recycle
1323
Recycle
1311
1311
Pretreatment & Recycle unit (RO)+MEE
loss
12
Reject Solid
OUT
100
Fresh
100
DOMESTIC
100
STP &
RECYCLE
Loss 5
Reject sludge
95
Reuse in toilet flushing & greenbelt

AMEMDMENT REQUIRED

Activity	Water Consumption (KLD)	Waste Water Generation (KLD)
1. Industrial		
Process	922 (Fresh)	796
Washing + Scrubber	230 (Fresh)	230
Boiler	792 (248 Fresh + 544 Recycle)	184
Cooling	1311 (Fresh)	113
Sub- Total	**3255 (2711 Fresh + 544 Recycle)**	**1323** **(1311 Discharge to Deep Sea +** **12 Reject Solid Loss)**
2. Domestic		
Domestic, including Gardening	100	95 (45 Recycle in Garden & Toilet + 50 Discharge to Deep Sea)
Fresh Water requirement (1+2)	**100 + 2711 = 2811**	**1418** **(1361 Discharge to Deep Sea** **+ 12 Reject Solid Loss** **+ 45 Recycle in Garden & Toilet)**

WATER BALANCE (All Figures in KL/Day)



Power and Fuel Requirements

Power Requirement:

Electricity requirement for proposed project is estimated 7500 KVA which will be supplied by Torrent Energy Limited. Three D.G. sets of capacity 1500 KVA each have been proposed for use it as backup power source at the time of power interruption.

Fuel Requirement:

Coal required for boiler will be 100 MTPD. HSD for D G sets are 110 Ltrs./Hr. Natural gas for main plant as well as utility will be used as fuel. Estimated quantity of natural gas is 3500 SM^3/hr., which will supply through pipeline. We want to propose dual fuel use as below:

Coal = 100 MT/Day

Or

Natural Gas = 3500 SM^3/Hr

&

HSD = 110 Lts./Hr

Because supply and cost of natural gas keeps on fluctuating and that disturbs our routine operations.

Details for comparison of Coal vs NG are given below:

- There is comprehensive EMP for coal boiler operation which includes –
  - Use of coal below 0.5% sulfur as suggested by committee.
  - ESP shall be installed for SPM
  - Coal handling area shall be in close shed to avoid dusting. Water sprinkler system shall be installed.
  - Fly ash shall be stored in confined area and shall be disposed as per guideline of CPCB and GPCB.
  - Online stack analysis instrument shall be installed to monitor SOx, NOx and SPM emission and we commit to comply with standard specified by CPCB and GPCB.
- **Major hurdle to go for Natural gas boiler is cost of steam. Steam cost is 2.404 times costlier which increases cost price of all products ranging from 5-16 Rs per Kg.**
- Project feasibility was prepared on basis of coal boiler. Natural gas boiler would impact on feasibility in terms of payback period and projected profit per annum. Payback period increases by 1.5 years due to cost impact of NG boiler.
- Finance options from different financial institute also getting impact due to new financial figures by inclusion of NG boiler in place of coal boiler.
- Details of Steam cost for Coal Vs Natural Gas is attached herewith as Annexure 1 for your perusal.
- We request to consider the proposal with coal boiler to make project financially viable.

Steam Cost Coal Vs Natural Gas			
S.NO.	Description	Coal Boiler	NG Boiler
A.Fuel Cost of Steam			
1	Boiler Capacity (Kg/Hr)	33000	33000
2	AVG OPERATING LOAD 30000 KG/HR	30000	30000
3	Avg. GCV OF FUEL (kcal/kg)	5000	8500
4	BOILER EFFICIENCY %	82	90
5	FUEL CONSUMPTION PER HR(KG/HR)	4865.85	2607.84
6	ANNUAL FUEL CONSUMPTION (MT)	35034	18776
7	FOR 24 HRS AND 300 DAYS(TONS)		
8	AVERAGE FUEL COST (Rs./ ton)	5850	32000
	ANNUAL FUEL BILL (Rs. In lacs)	2049.50	6008.47
B.Electricity Cost of Steam			
9	CONNECTED LOAD (kw)	300	120
10	RUNNING LOAD (kw)	225	90
	ANNUAL POWER COST - RS. IN LACS.(@ Rs 5.50)	89.10	35.64
C.Manpower Cost of Steam			
11	MAN POWER REQD.(3 Shift)		
	SKILLED	8	8
	UNSKILLED	24	0
12	AVG. SALARY Rs./Month		
	SKILLED	12000	12000
	UNSKILLED	6000	6000
	Total Manpower Cost (Rs.in Lacs)	28.80	11.52
D.Equipment Maintenance Cost of Steam			
13	MAINTENANCE (Rs. in Lacs)	28.00	10.00
E.Other Miscsellenious Cost of Steam			
14	Water Cost (Rs. Lacs per Year)	75.600	75.600
15	Chemical & Spares (Rs. Lacs per Year)	259.200	259.200
16	Ash Handling Cost (Rs. Lacs per Year)	54.000	0.000
	Total Misc. Cost (Rs.in Lacs)	388.800	334.800
F.Depreciation Cost of Steam			
17	Capital Cost of Boiler (Rs. Lacs Approx.)	600	400
18	Depreciation cost @ 18% (Rs. Lacs per Year)	108	72
Total Cost of Steam per annum		2692.198	6472.431
Total Steam Production per annum @30 MT/Hr and 300 day (Kg/annum)		216000000	216000000
Steam Cost Rs./Kg		1.246	2.996
Ratio of Cost (NG Vs Coal)		2.404	

Effect on Cost Price of Products due to NG boiler Steam

Product	Capacity (MT/day)		Steam Cons. MT/MT of product	Steam Cons. MT/MT of Product due to MEE	Total Steam Cons. MT/MT of Product	Increase of product Cost Price due to NG Boiler Rs/Kg
	Annual	Daily				
Mancozeb, Zineb, Maneb, Propineb	35500	118.3	1.25	1.4000	2.6500	**4.6375**
Glyphosate	30000	100.0	1.00	0.7875	1.7875	3.1281
SPCD	37895	126.3	0.74	0.0	0.7400	1.2950
Synthesis Products – 28 No.	4000	13.3	4.40	4.725	9.125	**15.969**
Formulation	42000	140.0	0.10	0.0	0.1000	0.1750

ANNEXURE: 4

ETP DETAILS

Water requirement for the operation phase shall be met through GIDC water supply. GIDC water supply authority is ready to supply the required water to M/s. IIL.

DETAIL OF EFFLUENT TREATMENT PLANT

STREAM I (LOW-MEDIUM COD STREAM: 121 KLD PROCESS + 475 KLD MANCOZEB + 527 KLD UTILITIES = 1123 KLD)

1) The low COD streams from the manufacturing process plants and utilities effluent shall be passed through Screen Chamber (SC) where manual screen (S-01) shall be provided to remove floating material. Then effluent shall be collected in Collection cum Equalization Tanks-1 (CETs-01). Pipe grid is provided at bottom of the CETs-01 to keep all suspended solids in suspension and to provide proper mixing. 2 nos. of Air Blowers (B-01) shall supply air through diffusers to pipe grid.
2) Then after, equalized wastewater shall be pumped to Neutralization Tank-01 (NT-01) where the continuous addition and stirring of Caustic solution is done (to maintain neutral pH of wastewater) from Caustic Dosing Tanks (CDTs) as per requirement by pumping. Then after, neutralized wastewater shall go to Flash Mixer-01 (FM-01). Alum shall be dosed from Alum Dosing Tank by gravity into FM to carry out coagulation by using a Flash Mixer. Then effluent shall be sent to Flocculator-1 (FCL-01) where Poly shall be dosed from Poly Dosing Tank (PEDT-01) for flocculation. Then after, coagulated wastewater shall be settled in Primary Clarifier (PCFL-01). Clear supernatant from Primary Clarifier shall be passed in Aeration Tank-1 (AT-01).
3) Here, condensate from MEE shall be added to AT-01. Biodegradation of organic matter of the wastewater shall be carried out by bacteria (suspended growth) in the AT-01. The aeration tank provides proper mixing and supplies oxygen to the microorganisms in the dissolved form through the fine bubble diffusers. A constant feed rate shall be maintained in the aeration tank. A sludge percentage of around 25 to 30 % by volume shall be maintained in the aeration tank. Also MLSS and MLVSS ratio shall be maintained to ensure active microorganisms growth. Various nutrients like Urea and DAP shall be added from Nutrient Dosing Tanks (NDTs-01) regularly so as to ensure proper growth of the microorganisms. Oxygen shall be supplied by 2 nos. of air blowers (B-02) through diffusers. Air blowers also keep MLSS in suspension. Due to Nitrification process in Aeration Tank-2 , pH of effluent will go down in AT-02. To neutralize the effluent, Caustic is added in Aeration Tank-2 as per requirement from Caustic Dosing Tank.

4) Then the overflow of the aeration tank shall be diverted into the Secondary Clarifier-1 (SCL-01) for biomass separation. An appropriate retention time is given to the effluent to ensure proper settling. The sludge settles down into the bottom of the SCL-01 and required amount of settled sludge shall be recycled back into the aeration tank to maintain desired concentration of biomass. Excess biomass shall be pumped to sludge sumps (SS-01).
5) Then after, overflow (clear supernatant) of SCL-01 shall be collected Aeration Tank-2 (AT-02). Here, again biodegradation of left out organic matter of the wastewater shall be carried out by bacteria (suspended growth) in the AT-02 and for that oxygen shall be supplied by two nos. of blowers (B-03) with help of diffusers. Then after, wastewater shall go to Secondary Clarifier-2 (SC-02) from AT-02. Here, the suspended solids shall be settled. Activated sludge shall be removed from bottom of SC-02 and pumped to AT-02 to maintain MLSS and remaining will be sent to SS. Nutrients will be added from NDTs to Aeration Tank-2 for growth of Bacteria.
6) Then after, Clear supernatant from SC-02 shall be collected in Intermediate Sump (IS-01) by gravity. Thereafter, the wastewater shall be passed through Pressure Sand Filters (PSFs-01) to remove left out TSS and Activated Carbon Filters (ACFs-01) for final effluent polishing. After tertiary treatment, treated water shall be collected in Treated Water Sump(TWS-01) where partly treated water (50 KLD) from STP shall be mixed before sent to GIDC drain. Guard Pond (GP-01) shall be provided of min two days storage to store treated effluent before disposal.
7) The primary and secondary sludge from the sludge sumps (SSs-01) shall be pumped to the Filter Presses (FP-01-A/B) for sludge dewatering. We will provide two nos. Filter presses to use alternately. The sludge cake shall be collected and packed into the plastic bags and stored in the HWSA for ultimate disposal to TSDF. The leachate from the FP-01-A/B shall be collected in Drain Pit and then pumped back to collection cum equalization tanks (CETs-01) for further treatment.

STREAM II (HIGH COD & HIGH TDS STREAM: 200 KLD)

1) The high COD & TDS streams from the manufacturing process plants shall be collected in Collection cum Equalization Tank-2 (CET-02). Pipe grid is provided at bottom of the CET-02 to keep all suspended solids in suspension and to provide proper mixing. 2 nos. of Air Blowers (B-04) shall supply air through diffusers to pipe grid.

2) Then after, equalized wastewater shall be pumped to Neutralization Tank-2 (NT-2) where the continuous addition and stirring of Caustic solution is done (to maintain neutral pH of wastewater) from Caustic Dosing Tank (CDT) as per requirement by pumping. Then after, neutralized wastewater shall go to Flash Mixer-2 (FM-2). Alum shall be dosed from Alum Dosing Tank (ADT) by gravity into FM to carry out coagulation by using a Flash Mixer. Then effluent shall be collected in Flocculator-1 (FL-1) where, Polyelectrolyte shall be dosed from Polyelectrolyte Dosing Tank (PEDT). Then after, coagulated wastewater shall be settled in Primary Tube Settler (PTS-01) Sludge settled at bottom shall be sent to Sludge Sump. Clear supernatant from PTS-01 shall be collected in Holding Tank (HT). Then effluent shall be pumped to Stripper (S) for removal of solvent. After that effluent shall collected in MEE Feed Tank (MFT) where RO reject water shall be mixed with it.
3) Then effluent shall be sent to four stages Evaporator (refer specifications in offer). Condensate from MEE shall be collected in Condensate Storage Tank (CST) and then pumped back to Aeration Tank-1 for further Treatment. Solid from Dryer shall be collected and stored in HWSA for ultimate disposal to TSDF.

SIZE OF UNITS FOR STREAM I & II

Sr. No.	Name of Unit	Size (m X m X m) L x B x H (LD + FB)	No.	MOC / Remark
STREAM I (LOW-MEDIUM COD STREAM-1311 KLD (121 KLD PROCESS + 475 MANCOZEB + 527 UTILITIES) + 188 MEE CONDENSATE				
1	Screen Chamber (SC-01)	4.0 x 2.0 x (0.2LD+0.3 FB)	1	RCC M25 + A/A BK. Lining
2	Collection Cum Equalization Tanks-1 (CETs-01)	10.0x 7.0 (4.0 LD+ 0.5 FB)	2	RCC M25 + A/A BK. Lining
3	Neutralization Tank-1 (NT-01)	3.75 x 3.75 (3.0 LD+ 0.5 FB)	1	RCC M25 + A/A BK. Lining
4	Flash Mixer-1 (FM-01)	3.75 x 3.75 (2.8 LD+ 0.5 FB)	1	RCC M25
5	Flocculator-1 (FL-01)	3.75 x 3.75 (2.6 LD+ 0.5 FB)	1	RCC M25
6	Primary Clarifier (PCL-01)	12.0 Ø x (3.0 SWD + 0.5 FB)	1	RCC M25
7	Aeration Tank-1(AT-01)	30.0 x 17.5 x (6 LD+ 0.5 FB)	1	RCC M25
8	Secondary Clarifier -1(SC-01)	13.5 Ø x (3.0 SWD + 0.7 FB)	1	RCC M25

9	Aeration Tank-2(AT-02)	22.0 x 17.5 x (6.0 LD+ 0.5 FB)	1	RCC M25
10	Secondary Clarifier -2(SC-02)	12.0 Ø x (3.0 SWD + 0.7 FB)	1	RCC M25
11	Intermediate Sump (IS-01)	7.0 x 5.0 x (4.0 LD+ 0.5 FB)	1	RCC M25
12	Multi Grain Filters (MGFs-01)	40 KLD (EACH)	2	MSEP
13	Activated carbon Filters (ACFs-01)	40 KLD (EACH)	2	MSEP
14	Treated Water Sump (TWS-01)	10.0 x 7.0 x (4.0LD + 0.5 FB)	1	RCC M25
15	Guard Pond (GP-01)	30.0 x 15.0 x (6.0LD + 0.3 FB)	1	RCC M25
16	Sludge Sumps (SSs-01)	4.5 x 4.5 x (3.0LD + 0.5 FB)	1	RCC M25
17	Filter Press(FPs-01)	100 KLD (EACH)	2	MS+ PP
14	Drain Pit (DP-01)	2.0 x 2.0 x (2.0 LD+0.5FB)	1	RCC M25
15	MCC/PLC Room (MCC)	8.0 x 6.0	1	RCC M20 + BKMS
STREAM II (HIGH COD & HIGH TDS STREAM – 200 KLD)				
1	Collection Cum Equalization Tank-2 (CET-02)	10.0 x 5 x (4.0LD + 0.5 FB)	1	RCC M25 + A/A BK. Lining
2	Neutralization Tank-2 (NT-02)	1.75 x 1.75 x (3.0LD+ 0.5 FB)	1	RCC M25 + A/A BK. Lining
3	Flash Mixer-2 (FM-02)	1.75 x 1.75 x (2.8LD+ 0.7 FB)	1	RCC M25
4	Flocculator-2 (FLC-02)	1.75 x 1.75 x (2.6LD+ 0.9 FB)	1	RCC M25
5	Primary Tube Settler (PTS-01)	4.5 x 2.0 x (1.5 SWD + 1.0 HB + 0.7 FB)	1	RCC M25
6	Holding Tank (HT-01)	4.5 x 4.0 x (4.0LD +0.5 FB)	1	RCC M25
7	Strippers (ST-01)	200 KLD	1	SS316
8	MEE Feed Tank (MFT-01)	10.0 x 5 x (4.0 LD+ 0.5 FB)	1	RCC M25
9	Multiple Effect Evaporator (MEE-01) & Agitated Thin Film Dryer (ATFD-01)	200 KLD	1 set	SS316
10	Condensate Storage Tank (CST-01)	4.5 x 4.0 x (4.0LD +0.5 FB)	1	RCC M25

Characteristics of Effluent

(High COD/High TDS Effluent Stream)

No	Parameter	Units	Inlet to Primary Treatment	Outlet of Primary Treatment (feed to MEE)
1.	pH	---	6.5 to 8.5	6.5 to 8.5
2.	TSS	mg/l	500-1000	50.00
3.	COD	mg/l	30000-50000	23000-38000
4.	BOD	mg/l	15000-25000	11000-19000
5.	TDS	ppm	40000-65000	40000-65000
6.	Oil & grease	mg/l	20-40	10-15

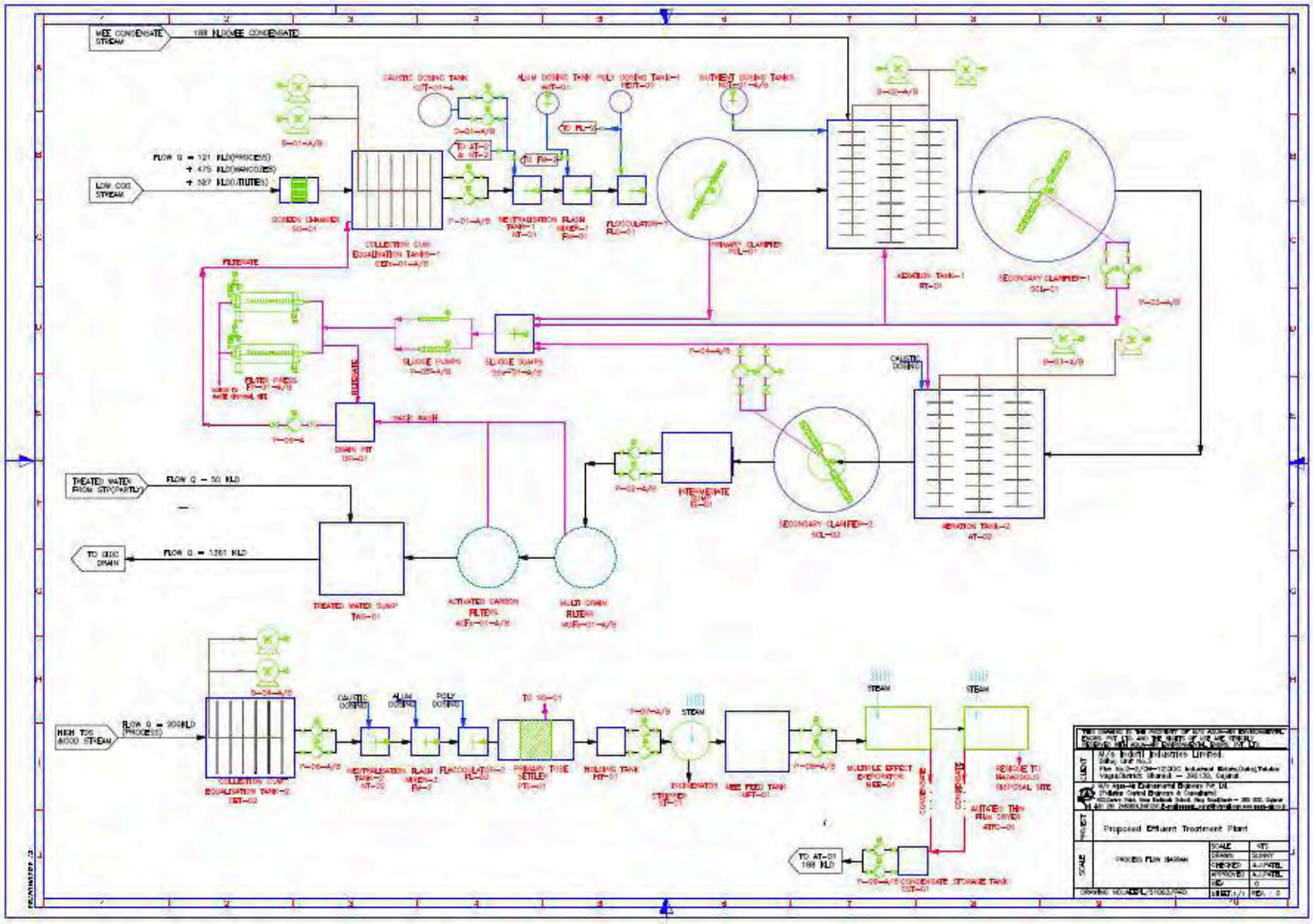
(Low COD/Low TDS Effluent Stream)

Sr. No	Parameter	Units	Inlet to Secondary Treatment	Outlet of Secondary Treatment (Feed to RO)	Permeate from RO for reuse/recycle
1.	pH	--	4.0-9.0	7.0 to 8.0	7.0 to 7.5
2.	TSS	mg/l	40-50	40-50	Nil
3.	TDS	ppm	2000-8000	< 5000	<100
4.	COD	mg/l	2000-8000	< 250	<10
5.	BOD	mg/l	1000-4000	<30	Nil
6.	Oil & grease	mg/l	20-40	10-15	Nil
7.	Ammonical Nitrogen	mg/l	250-300	< 50	Nil

(Mancozeb Effluent Stream)

PRIMARY TREATMENT FOR MANCOZEB EFFLUENT STREAM BEFORE MEE					
No	Parameter	Units	Inlet to Primary Treatment	Outlet of Primary Treatment (feed to MEE-2)	Outlet of MEE-2
1.	pH	---	6.5 to 8.5	6.5 to 8.5	7-7.5
2.	TSS	mg/l	500-1000	50.00	Nil
3.	COD	mg/l	2000-2500	1500-1800	<50
4.	BOD	mg/l	1000-1200	800-900	<30
5.	TDS	ppm	100000-140000	100000-140000	<100
6.	Oil & grease	mg/l	<10	<10	Nil
7.	Manganese	mg/l	1500-2000	<2	Nil

ETP DIAGRAM


MEE CONDENSATE STREAM
LOW COD STREAM
HIGH TDS &COD STREAM
TREATED WATER FROM STP(PARTLY)
TO COIC DRAIN
FLOW Q = 50 KLD
FLOW Q = 1261 KLD
FLOW Q = 200KLD (PROCESS)
FILTERATE
BACK WASH
TREATED WATER SUMP
ACTIVATED CARBON FILTERS
MULTI GRAIN FILTERS
AERATION TANK-1
AT-01
AERATION TANK-2
AT-02
PRIMARY CLARIFIER
SECONDARY CLARIFIER-1
SECONDARY CLARIFIER-2
MEE FEED TANK
MULTIPLE EFFECT EVAPORATOR
STEAM
CONDENSATE
CONDENSATE STORAGE TANK
REMOVE TO HAZARDOUS DISPOSAL SITE
M/s Indrani Industries Limited.
Proposed Effluent Treatment Plant
PROCESS FLOW DIAGRAM

MEE DETAILS

- We have proposed to operate Multi effect evaporator system with stripper having design capacity of 200 KL/Day MEE having following tentative operating parameters,
- Primary effect vacuum range 450-550 mmHg and temperature 78 Deg C - 82 Deg C
- Secondary effect vacuum range 600-650 mmHg and temperature 68 Deg C - 70 Deg C
- The collected condensate, after treatment shall be used for Industrial purpose.
- The evaporated collected solid waste shall be sent to TSDF.

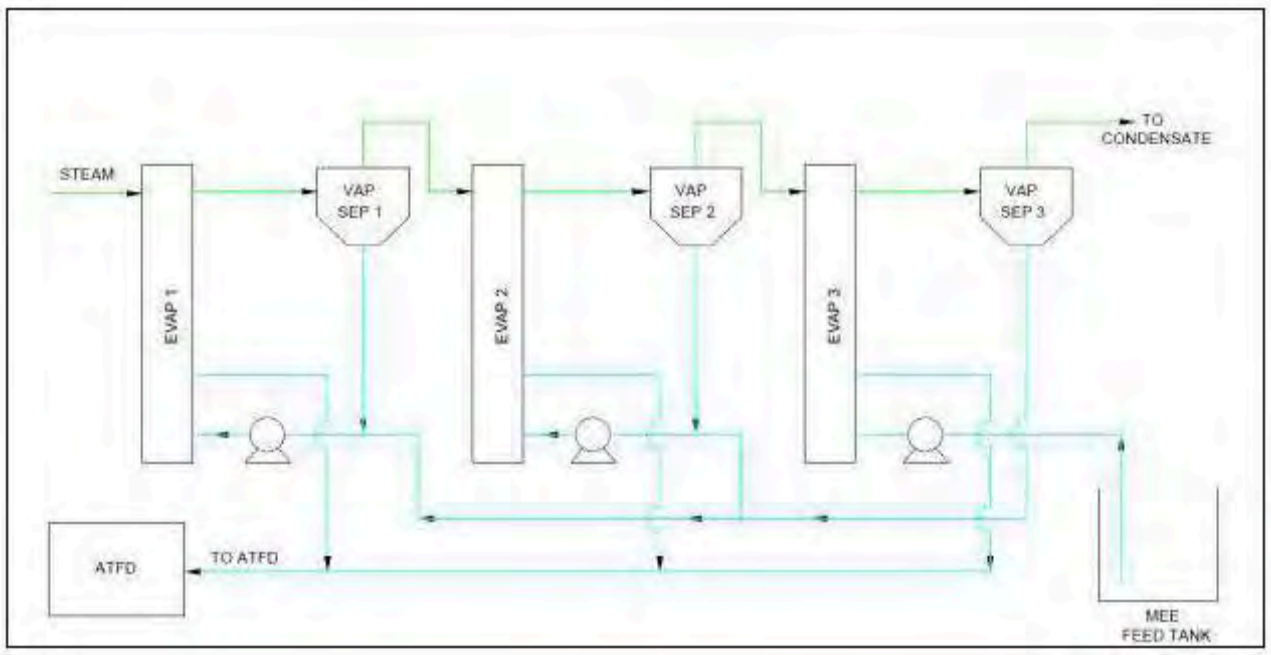
Process Description: The High COD/High TDS effluent shall be passed through the SS bar screen for removal of floating impurities, if any. Thereafter, it shall be passed through Oil & Grease Tank wherein floating oil shall be removed by mechanical moving belt Oil Skimmer. The effluent from the Oil & Grease Tank will then be sent to Equalization Tank to ensure the homogeneity of the effluent characteristics. Acid or Alkali dosing shall be done for pH correction in the Neutralization Tank. The neutralized effluent shall then be transferred to Clariflocculator. Coagulant and Suitable flocculants shall be added to facilitate the settling of suspended solids in primary treatment. There will be an incidental reduction in COD up to 25%, BOD up to 15% and TSS about 80%. Multi grade sand filter with different grades of quartz sand shall be provided to remove the fine suspended solids before feeding the effluent to MEE. The capacity of MEE shall be suitable to treat 400 m3/day of High COD/High TDS effluent. The effluent after primary treatment is fed to Packed Column Stripper to strip all the organic matters. The bottom of the stripper is fed to MEE to evaporate the water.

The concentrated bottom of MEE goes to ATFD for further concentration. The solids from ATFD shall be sent to TSDF. The condensate from ATFD & MEE are mixed with low COD/TDS effluent and treated in conventional Effluent Treatment Plant with biological treatment system. The details of different units for the High COD/High TDS stream are as under:

Description of different units

No	Description	Size	Qty	MOC
1.	Bar Screen Chamber	1.3m x 1.3m x 1m	1	RCC
2.	Oil & Grease Trap	1.5m x 4m x 3.5m	1	RCC
3.	Equalization Tank	4.5m x 4.5m x 3.5m	2	RCC
4.	Chemical Dosing Tanks	1m x 1m x 1m	3	RCC
5.	Neutralization Tank	3m x 3m x 3.5m	1	RCC
6.	Primary Clarifier	7m ϕ x 3.5m	1	RCC
7.	Multi Grade Sand Filter	20 m3 capacity	1	RCC
8.	Stripper	20 m3 capacity	1	SS
9.	MEE feed tank	6m x 6m x 3.5m	1	RCC
10.	MEE	400 m^3 treatment capacity	1	SS
11.	ATFD	3.5 x 8 x 3 SWD	1	RCC
12.	MCC Room & Laboratory, Chemical Storage Room & Dosing Area	10m x 10m	1	Brick

FLOW DIAGRAM OF MEE



DETAIL OF SEWAGE TREATMENT PLANT

The treatment shall be carried out in three phases:
(1) Primary Treatment
(2) Secondary Biological Treatment
(3) Tertiary Treatment

(**1) Primary Treatment**

Initially the sewage shall be subjected to pre-treatment which includes removal of floating material through bar screen chamber. Two nos. of bar screen shall be placed. The bar screen shall be provided in the bar screen chamber to remove all the floating impurities. The screen sewage shall be then led to grit chamber where the gritty material and other inorganic impurities will be separated from the sewage and removed periodically manually. The sewage free of floating impurities shall be diverted to oil & grease trap. The scum collected in the oil & grease trap shall be removed manually.

The raw sewage free of inorganic impurities, floating impurities and oil & grease shall then be led to equalization tank. The basic function of equalization tank is to homogenize the sewage quality in order to ensure that there shall be no shock loading to the further bioreactor. For this purpose, pre-aeration shall be given throughout the equalization basin through a well designed air distribution grid& an artificial air source like air blower.

(2) Secondary Biological Treatment

FMR Reactor

Fluidized Media Reactor (FMR) is the heart of the treatment process and the efficient design of FMR shall help us to get the best result of treatment. Fluidized Media Reactor (FMR) uses the attached growth process for waste water/sewage treatment and recycled. The main advantage of this system over the submerged fixed film process is that it prevents chocking of the media. This also avoids sludge recirculation. Compared to conventional technologies the FMR is compact, energy efficient and user friendly. It also allows flexibility in design of the reactor.

The raw sewage from the equalization basin shall be transferred to FMR Reactor. This tank shall be constructed in RCC and microbial growth shall be developed as a floating bio-media in the aeration tank. This growth shall help in biodegradation of the organic impurities. The FMR Tank shall have three zones

(a) Fluidized Media Zone

(b) Clarifier Zone to separate the sewage from sludge

(c) Disinfection Zone for disinfecting the sewage with sodium hypochlorite.

The clear supernatant from the FMR tank shall be transferred to the Secondary Clarifier. The Secondary Clarifier shall be constructed in RCC. The sludge shall be settled at the bottom of the Clarifier.

(3) Tertiary Treatment

The supernatant from the clarifier settler shall be diverted to Supernatant sump. Disinfectant – Hypochlorite shall be added through a metering pump in the filter feed pump to make the sewage free of any pathogenic bacteria. The filter feed tank shall be constructed in RCC. The clear sewage after disinfection shall be pumped to the pressure sand filter. This filter shall be a pressure vessel including the frontal piping, valving pressure gauges, inlet, and outlet including the backwash system. The pressure vessel shall be fabricated from 6 mm thick MS plate and 8 mm thick dish ends. The media shall be graded quartz sand and provided in MS trays with drains. The vessel shall be epoxy coated from inside. The sewage shall be pumped through pressure pumps where in the sewage shall be completely free from inorganic impurities if any, and minute suspended solids.

The sewage filtered through pressure sand filter shall be passed through activated carbon filter. This filter shall be pressure vessel filled with activated carbon media, iodine value of activated carbon shall be 900-1100. The accessories shall include the frontal piping valving, pressure gauges, inlet and outlet including the backwash system. The pressure vessel shall be fabricated from MS plate similar to pressure sand filter. The media shall be graded and provided in MS trays with drains. The vessel shall be epoxy coated from inside.

The activated carbon shall act as a polishing material and render the sewage free of traces of organic impurities, Colour, Odour etc. The sludge from the Clarifier shall be recycled to aeration tank and excess sludge shall be transferred to the sludge drying beds. The dried sludge shall be used as organic manure for

green belt development in the premises. The clear treated sewage from the activated sludge process will be finally collected in a storage tank from where it shall be used for gardening, toilet flushing, etc.

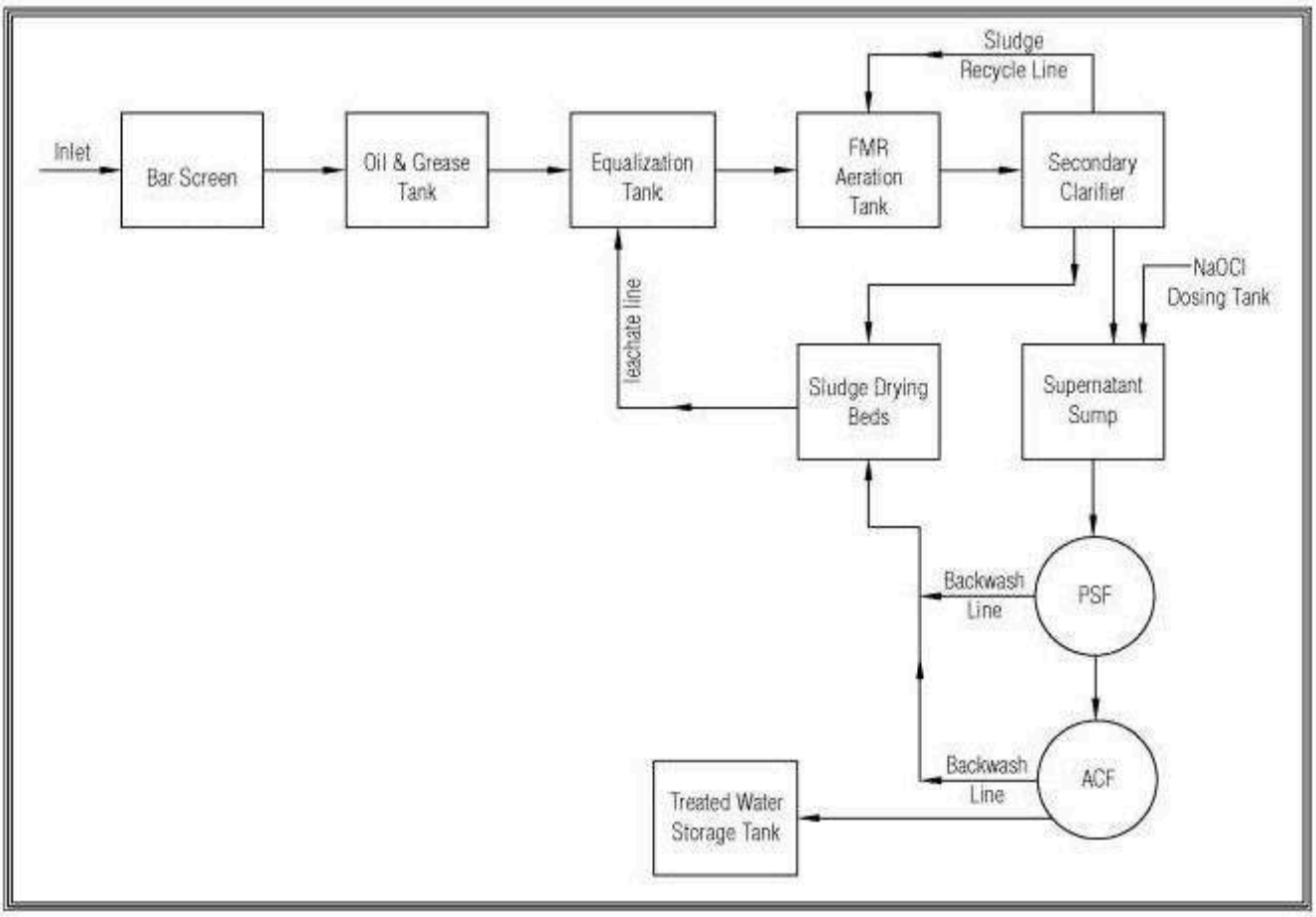
Raw Sewage Characteristics:

No.	Parameters	Units	Values
1	Flow	M^3/Day	100
2	pH	-	6.5 to 8.0
3	Biochemical Oxygen Demand(BOD5)	mg/l	250-300
4	Chemical Oxygen Demand	mg/l	400-500
5	Total Suspended solids	mg/l	150-200
4	Oil and Grease	mg/l	10-20

Treated Sewage Characteristics:

No.	Parameters	Units	Values
1	PH	-	7.0 to 7.5
2	Biochemical Oxygen Demand	mg/l	20
3	Suspended solids	mg/l	30
4	Residual Chlorine	mg/l	>0.5

SEWAGE TREATMENT SCHEME



ANNEXURE: 5

DETAILS OF HAZARDOUS SOLID WASTE MANAGEMENT AND DISPOSAL

Sr. No.	Name of Waste	Source of waste generation	Waste category	Process Quantity	Solid waste Disposal / Management
1	ETP Sludge	ETP	34.3	100 MTPM	Collection, Storage, Transportation & Disposal at TSDF site
2	Used Oil	From machine	5.1	1200 Ltr./ Month	Collection, Storage & Selling to authorized recycler
3	Discarded Containers	Raw material storage	33.3	1500 Nos./ Month	Collection, Storage & Selling to GPCB approved scrap dealer.
4	Incineration Ash	Incinerator	36.2	10 MTPM	Collection, Storage, Transportation & Disposed at TSDF site
5	Process Residue	Mfg. process	29.1	60 MTPM	Incinerated at our own incinerator or sent to Incinerator facility of TSDF site.
6	MEE Salt	MEE	34.3	600 MTPM	Collection, Storage, Transportation & Disposal at TSDF site
Solid Waste					
7	Fly ash	Boilers	--	9 MT/Day	Collection, Storage, Transportation & send to brick manufacturer

ANNEXURE: 6

DETAILS OF FLUE & PROCESS GAS EMISSION

Flue Gas Emission

Sr. No.	Stack Attached to	Fuel Type	Stack Height, m	APC Measures	Fuel Consumption	Probable Pollutant
1.a	Boiler–1(8 TPH) for Process	Coal	32	ESP	24 MT / Day	PM, SO_2& NOx
1 b	Boiler–2(8 TPH) for Process	Coal	32		24 MT / Day	PM, SO_2&NOx
1 c	Boiler–3(8 TPH) for Process	Coal	32	ESP	24 MT / Day	PM, SO_2&NOx
1 d	Boiler–4(9 TPH) for Process	Coal	32		27 MT / Day	PM, SO_2&NOx
2.	Thermo Pack – 1 No.	Natural Gas	20	NA	45 m^3/hr	PM, SO_2 & NOx
3.	D. G. Sets – 3 Nos (Cap 1500 KVA each)	HSD	15	NA	110 Lit/hr	PM, SO_2& NOx
4.	Incinerator & Thermal Oxidation (Common, for all distillation residues & Vapors etc.- Capa: 2 MT/Day)	Natural Gas / FO	35	Alkali Scrubber	50 m^3 / hr or 50 Lit/hr	SPM, HCl, SO_2, NOx, CO etc.

Process Emission

Sr. No.	Stack Attached to	Probable Gaseous Emissions	Stack Height	APC Measures
1	Plant 1A - FOR (Fungicides/insecticides)	HCL,HBr,Cl_2,SO_2,NH_3	15 mtrs	Water Scrubber followed by Alkali Scrubber connected to Alkali Ventury scrubber.
2	Plant 1B - FOR (Fungicides/insecticides)	HCL, HBr, Cl_2,SO_2	15 mtrs	Water Scrubber followed by Alkali Scrubber connected to Alkali Ventury scrubber.
3	Plant 2 (Herbicides)	HCL	15 mtrs	Water Scrubber followed by Alkali Scrubber connected to Alkali Ventury scrubber.
4	Mancozeb / Maneb Plant- Preparation of Sodium Salt of Dithio Carbamate.	H_2S, CO_2,CS_2	15 mtrs	Caustic Scrubber.
5	Propineb / Zineb Plant- Preparation of Sodium Salt of Dithio Carbamate& Propylene bisdiathiocarbamic acid.	H_2S, CO_2,CS_2 & NH_3	15 mtrs	Water Scrubber followed by Caustic Scrubber.
6	Spray Dryer No.1 for Mancozeb / Maneb plant.	Total Particulate Matter	31 mtrs	Bag House filter
7	Spray Dryer No.2 for Propineb/Zineb plant.	Total Particulate Matter	31 mtrs	Bag House filter
8	Spray Dryer No.3 for Specialty Chemicals Plant.	Total Particulate Matter	31 mtrs	Bag House filter
9	Spray Dryer No.4 for Specialty Chemicals Plant.	Total Particulate Matter	31 mtrs	Bag House filter

ANNEXURE: 7

DETAILS HAZARDOUS CHEMICAL STORAGE FACILITY

Sr. No	Raw Material	Max. Storage Qty. (Ton)	Hazards	Mode of Storage	No of Units	Physical State in storage	Mode of transportation	Precautions to be provided
1	Conc. H_2SO_4	15	Corrosive	Storage Tank, MS	1	Liquid	By Tanker/By Road	• Dyke wall shall be made around the H_2SO_4 storage tank.
2	Monochloro Benzene	10	Flammable	Storage Tank, MS	1	Liquid		• Fire extinguisher and Hydrant point shall be provided. • Fire fighting network shall be provided. • Solvent storage tank shall be earthed. • Dyke wall shall be made around the Solvent storage tank.
3	Xylene	20	Flammable	Storage Tank, MS	1	Liquid		
4	Toluene	25 x 2	Flammable	Storage Tank, (25 KL), MS	2	Liquid		
5	Methanol	15	Flammable	Storage Tank, MS	1	Liquid		
6	Hexane	15	Flammable	Storage Tank, MS	1	Liquid		
7	Cyclo hexane	15	Flammable	Storage Tank, MS	1	Liquid		
8	Chlorine	10	Toxic/Corrosive	Tonner (900 Kg)	11	Pressurized Gas	By Road	• Facility for Eye wash station and quick drenching shall be provided proximal to work area. • Exhaust hood connected with caustic Scrubber shall be provided over chlorine handling area. • Solution of Sodium Thiosulphate shall be provided near Bromine handling and storage area for neutralization.
9	Bromine	12	Toxic/Corrosive	Storage Tank, MSGL	1	Liquid	By Tanker/By Road	
10	Thionyl Chloride	15	Toxic/Corrosive	Storage Tank, MSGL	1	Liquid	By Tanker/By Road	• Exhaust hood connected with caustic Scrubber shall be provided over Thionyl Chloride storage and handling area.
11	Phenol	15	Flammable	Drums (200Kg HDPE)	1	Liquid	By Tanker/By Road	• Facility for Eye wash station and quick drenching shall be provided proximal to working area. • Adequate PPE's and safety gears shall be provided to workers. • Adequate ventilation system shall be installed in the working Area. • Adequate antidote provision for sodium cyanide leakage shall be made available on the facility.
12	Hydrazine Hydrate	15	Toxic	Drums (200Kg HDPE)	75	Liquid	By Road	
13	Triethyl Amine	15	Toxic	Storage Tank	1	Liquid		
14	PCl_3	1	Toxic/ Corrosive	Drums (200 kg)	5	Liquid		
15	Ortho-toluidine	15	Toxic	Drums (200 kg)	75	Liquid		
16	Sodium Cyanide	3	Toxic	Drums (50 kg)	5	Solid		
17	Benzoyl peroxide	1	Flammable, Toxic	Drums (50 kg)	60	Solid		• Ware house shall be made as per statutory requirement with restricted access.
18	Carbon Disulphide	65 x 2	Flammable	Storage in Closed tank under water layer.	2	Liquid		• Sprinkler system will be installed. • Other points same as Toluene.
19	Ethylene Diamine	100 x 2	Corrosive/ Flammable	Storage Tank	2	Liquid	By Tanker/By Road	• Dyke wall shall be made around the EDA storage tank.
20	Manganese Sulphate Aq. Solution	143 x 3	-	Storage Tank	3	Liquid	By Tanker/By Road	• Dyke wall shall be made around the MnSO4 storage tank.
21	Cautic Lye 48%	69.4 x 1, 143 x 1	Corrosive	Storage Tank	2	Liquid	By Tanker/ By Road	• Dyke wall shall be made around the Caustic storage tank.
22	Zinc Sulphate	69.4 x 1	-	Storage Tank	1	Liquid	By Tanker/By Road	• Dyke wall shall be made around the storage tank.
23	Monomers	100 x 2	Flammable	Storage Tank	2	Liquid	By Tanker/By Road	• Dyke wall shall be made around the storage tank.

ANNEXURE 8

SOCIO - ECONOMIC IMPACTS

1) EMPLOYMENT OPPORTUNITIES

The manpower requirement for the proposed project is expected to generate some permanent jobs and secondary jobs for the operation and maintenance of plant. This will increase direct / indirect employment opportunities and ancillary business development to some extent for the local population. This phase is expected to create a beneficial impact on the local socio-economic environment.

2) INDUSTRIES

Required raw materials and skilled and unskilled laborers will be utilized maximum from the local area. The increasing industrial activity will boost the commercial and economical status of the locality, to some extent.

3) PUBLIC HEALTH

The company regularly examines, inspects and tests its emission from sources to make sure that the emission is below the permissible limit. Hence, there will not be any significant change in the status of sanitation and the community health of the area, as sufficient measures have been taken and proposed under the EMP.

4) TRANSPORTATION AND COMMUNICATION

Since the existing factory is having proper linkage for the transport and communication, the development of this project will not cause any additional impact. In brief, as a result of the proposed project there will be no adverse impact on sanitation, communication and community health, as sufficient measures have been proposed to be taken under the EMP. The proposed project is not expected to make any significant change in the existing status of the socio - economic environment of this region.

ANNEXURE –9

GIDC WATER SUPPLY LETTER

GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION
(A Govt. of Gujarat Undertaking)
Office of the Dy. Executive Engineer (w/s)
1st Floor, Narmada Commercial Complex,
M.G.Road, PanchBatti, Bharuch-392001
Phone: (02642)242432/242442 FAX:(02642)241902

NO.GIDC/Dy. EE/BHARUCH/ 691 Date : -14 /10/2015

To,
M/s Indofil Industries,
Plot No. D2/CH/12
GIDC Dahej – II.

Sub: Application for water withdrawl permission for your unit No. 3 @ Dahej – II.

Ref: 1) Your application dated: 05/10/2015

Dear sir,

In context to the above, this office has received an application for issue consent/permission for inlet water supply for 1600 KLPD in your Plot No. D2/CH/12 GIDC Dahej – II vide letter under reference. In this regards it is to state that GIDC will supply the 1600KLPD water subject to condition that GPCB consent, approval from competent authority for addition quantity of water than the entitled quantity as wel as availability of water. During the execution of form of agreement in office of the Regional Manager you have not mentioned any water requirement. Your entitled water quantity is 550.73 KLPD, hence you have to draw the required quantity of water from source at your cost.

It is also to inform to you, that for total quantity of water you have to pay the capital contribution charges towards water supply at the applicable rate at present the capital contribution charges is 13.00 crore per MGD.

This is for favour of information and further needful please.

Thanking you,

Your's faithfully

(C.V.Rajani)
DEE (w.s.)
GIDC Bharuch

Copy swr To:

1) The Executive Engineer GIDC for favor of information please.

ADDITIONAL WATER SUPPLY LETTER

GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION

GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION

(A Govt. of Gujarat Undertaking)
Office of the Dy. Executive Engineer, WS
1st & 2nd Floor, Narmada Commercial Complex,
Station Road, Panchbatti, Bharuch - 392 001
Ph: 242432/244184 Fax: (02642)241902
Email: gidcbharuch@rediffmail.com

No. GIDC/BRH/DEE/WS/5584 Date: 13/09/2017

To
M/s Indofil Industries Limited,
Plot No D-2/CH/12,
Dahej-II, Tal- Vagra,
Dist: Bharuch.

Sub: Assurance letter to provide 2811 KL per day of water to M/s Indofil Industries Limited,, plot no. D-2 / CH / 12 at Dahej-II.

Ref: Your Letter dated 09/09/2017

Dear Sir,

Vide letter under reference, you have demanded an assurance letter to provide 2811 KLD of water to M/s Indofil Industries Limited,, plot no. D-2 / CH / 12 at Dahej-II.

In this regard, this office assures that 2811 KL per day of water can be supplied to M/s Indofil Industries Limited subject to the following conditions:

1. You will have to make deed of rectification for revision in water quantity from competent authority of GIDC.
2. Availability of spare water quantity at the time of actual demand.
3. The allottee pays the contribution and other applicable charges for the said quantity of water.
4. The allottee has to make their own provision to convey water from GIDC water source i.e. Sump/Reservoir if the quantity demanded is more than the entitled quantity.
5. The water connection would only be released after the approvals from the competent authority.
6. The water connection shall only be released after the submission of GPCB consent as per the approved quantity.

This is for your information please.

Thanking you

Yours faithfully

Dy. Executive Engineer (WS),
GIDC, Bharuch.

DRAINAGE LETTER

GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION

GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION
(A GOVT. OF GUJARAT UNDERTAKING)
Office of the Dy. Executive Engineer (DRG)
1st FLOOR ,NARMADA COMM. COMPLEX,
STATION ROAD, PANCHBATTI,
BHARUCH –392001PH :242432/244184 FAX:(02642)241902
Mail ID: gidcbharuch@rediffmail.com

NO: GIDC/BRH/DEE (DRG)/ 679 Date: 12 / 9 /2017

To,
M/s Indofil Industries Limited,
Plot No D-2/CH/12,
GIDC, Dahej-II,
Dist- Bharuch

Sub : Assurance letter to discharge of 1361.00 klpd of Treated Industrial Effluent by M/s Indofil Industries Limited Plot no. D-2/CH/12 at Dahej-II.

Ref: - Your Letter no IL/EHS/61-17 dated 09/09/2017

Dear Sir,

Vide letter under reference, you have demanded an assurance letter to discharge of Total quantity of 1361.00 Klpd of Treated Industrial Effluent.

In this regard, this office assures that 1361.00 Klpd of Treated Industrial Effluent can be discharged by M/s Indofil Industries Limited Plot no D-2/CH/12 subject to the following conditions:

1. Availability of infrastructure.
2. Availability of spare quantity in design capacity of sewer line. If the effluent quantity exceeds the entitled quantity, you will have to lay the pipeline up to collection well as directed by engineer in charge.
3. You will have to pay the contribution and other applicable charge for the said quantity of Treated Industrial Effluent.
4. You will have to make your own arrangement to discharge Treated Industrial Effluent in to GIDC's sewer line or in to collection wells directed by GIDC.
5. The Treated Industrial Effluent discharge connection would only be released after the approvals from the competent authority.
6. The Drainage connection shall only be released after the submission of GPCB consent as per the approved quantity.

This is for your Information Please.

12/9/17

Dy. Executive Engineer (DRG),
GIDC Bharuch.

ANNEXURE – 10
TOPOSHEET

ANNEXURE – 11
GIDC PLOT ALLOTMENT LETTER

GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION
(A GOVT. OF GUJARAT UNDERTAKING)
Administrative Office Building,
Plot No.624/B, GIDC, Ankleshwar, Dist. Bharuch
Phone: 02646, 221351,221451,221403

HHG → SJ/RN

No. GIDC/RM/ANK/ 6000 6310 **BY R.P.A.D.** Date: 09 /08/2011

" Corrigendum order " 100004

Sub : Offer cum allotment of Plot No.D-2/CH/12 at Dahej -2 Industrial estate.
Ref : This office offer cum allotment letter No.GIDC/RM/ANK/5229 dated 26-7-2010.

Paid - 1900007722 -

Corporation has allotted Plot No.D-2/CH/12 admeasuring 1,00,133.05 sq.mtrs(tentative)at Dahej-II Industrial estate to M/s. Indofil Chemicals Company lvide offer cum allotment letter under reference. The license agreement was executed on dated 31-8-2010. As per the report of survey branch, the additional area i.e. 1767.70 sq.mtrs in addition to earlier allotted area.

In view of the above, it is hereby order to read the area of Plot No.D-2/CH/12 admeasuring 1,01,900.75 sq.mtrs in place of 1,00,133.05 sq.mtrs in offer cum allotment letter, agreement and possession wherever its appeared therein. The calculation of additional area is as under:-

Plot No.	D-2/CH/11
Area	1767.70 sq.mtrs tentative
Allotment price	Rs.715 per sq.mtr
Cost of plot	Rs.12,63,906/-
FC @ Rs.15.00 for 1767.10 sq.mtrs	Rs. 26,516/-
Total	Rs.12,90,421/-
30% down payment	Rs. 3,87,126/-
70% balance capital	Rs. 9,03,295/-
PCPIR charges	Rs. 26,516/-
1% adm.charges	Rs. 9,033/-
Service tax @ 10.00%	Rs. 903/-
Education cess 0.30%	Rs. 27/-
Total amount to be paid by DD	Rs. 4,23,605/-

To rectify the area discrepancy, you shall have to execute the Deed of Rectification on stamp paper of Rs.100/- as per enclosed proforma.

Other terms and conditions of offer cum allotment letter, agreement remain unchanged.

Encl:As above.

Regional Manager
GIDC Ankleshwar

To
M/s. Indofil Chemicals Company
Division of Indofil Organic Ind Limited,
Off Swami Vivekanand road,
Azad Nagar Sandoz baug
PO Kolshret, Thane 400 607
Maharashtra

S.P.
PL Provide for a cheque Rs 4,23,605 in the name of GIDC for additional land for SPCD PSD found after the re-measurement

GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION
(A GOVT. OF GUJARAT UNDERTAKING)

2nd floor, Narmada Commercial Complex,
Panch Batti, Bharuch.
Phone :(02642) 242432, FAX :(02642): 241902

NO.GIDC / DEE (road) /BRH / 225 DATE: 27-9-18

Ref : (1) Allotment Order No. : GIDC / RM /ANK / ALT /5229 Date : 26/07/2010
(2) Poss. Advice No. : GIDC / RM /ANK / ALT / 6376 Date : 14/09/2010
(3) Extension letter No.. : GIDC / RM /ANK / ALT / Date : -----
(4) corrigendum Order No. : GIDC / RM /ANK / ALT / Date

Possession Receipt

In pursuance of allotment of Ind. Plot /~~Comm. plot / Hsg. plot No. / Hsg.qtr No. /shed No.~~ D-2 / CH-12 admeasuring 100133.05 sq.mt (Tentative) situated in the ~~housing~~ / Industrial phase Dahej – II ' As is Where is basis ' consisting survey No. 863/P,864/P,865,866,867/P,868/P,871/P,1053/P,1054/P,1112/P,870/P at. GIDC Industrial estate Dahej , Ta. Vagra , Dist Bharuch is handed over to day i.e on 20/09/2010 in good condition.

The Said Premises Are Bounded As Follows :

Plot No:	D-2 / CH-12
On towards North By	30.00 mt wide road
On towards South By	Estate boundary (Dahej -1 Plot No. Ch1 & 2)
On towards East By	Plot No. D-2/ Ch-11
On towards West By	40.00 mt wide U T Corridor

Possession Taken Over By :

Shri Rabi Mishra
For, INDOFIL CHEMICALS COMPANY
Sign
Desi Executive AUTHORISED SIGNATORY

Place GIDC / BRH
Dt:

Possession Handed Over By:

Shri K S Gamit
sign
Desi AAE

place GIDC / BRH
Dt :

Copy to :
(1)Shri. / M/s : **Indofil chemical company,**
Division of Indofill Organic Ind. Plot,
Off Swami Vivekanand road,
Azad nagar Sandoz baug,
Po. Kolshret ,Thane 400 067.(Maharashtra)

(2) The R M GIDC / Ankleshwar.
(3) The A O GIDC / Ankleshwar.
(4) The Executive Engineer GIDC Bharuch.
(5) The Dy Ex Engineer (W/s) , GIDC Bharuch.
(6) The Dy.Ex Engineer (Org). GIDC Bharuch.

Dy Ex Engineer (Road)
GIDC Bharuch.

Sign Of Party
For, INDOFIL CHEMICALS COMPANY
AUTHORISED SIGNATORY

ANNEXURE – 12
TSDF & CHWIF MEMBERSHIP LETTER

BHARUCH ENVIRO INFRASTRUCTURE LIMITED

Ref. BEIL/ANK/2016

2nd February, 2016

Indofil Industries Ltd.
Plot No.D-2, CH/12,
Dahej-II GIDC,
Dist: Bharuch.

Sub : NOC for receiving Landfilling waste and Incinerable waste.

Dear Sir,

We have received your letter dtd.01.02.2016. We would like to inform you that we have no objection in granting you our membership. We shall be accepting your **hazardous landfill waste Qty.730 MT/Month at Bharuch Enviro Infrastructure Ltd., Dahej site Plot No.D-43, GIDC, Dahej and Incinerable Waste Qty.60 MT/Month at Bharuch Enviro Infrastructure Ltd., Plot No.9701-16, GIDC, Ankleshwar.**

The Hazardous waste acceptance is subject to verification of quality and it should be as per GPCB authorization.

Thanking you,

Yours faithfully,
For, BHARUCH ENVIRO INFRASTRUCTURE LTD.

AUTHORISED SIGNATORY

CIN No.: U45300GJ1997PLC032696
Works Office : Plot No. 9701-16 GIDC Estate, Post Box No. 82, Ankleshwar 393 002, Dist. : Bharuch (Gujarat)
Phones (02646) 253135, 226228 • Fax : (02646) 222849 • E-mail : panjwania@uniphos.com

ANNEXURE – 13
MOU OF COAL

C.I.N. No. U10200GJ2006PTC048648
Tel.: 91-261-2325978
Fax : 91-261-2342674

S. N. Tradelink Pvt. Ltd.

Email : director@sntradelink.com
sntcoal@gmail.com
Web : www.sntradelink.com

Dealing in Imported Coal, Indian Coal, Screened Coal, Ligaite, Firewood & all type of industrial fuels

MEMORANDUM OF UNDERSTANDING

BETWEEN

M/s . S.N. Tradelink Pvt Ltd.

3010-3011, Momai Complex , Outside Sahara Darwaja, Surat-395010

AND

M/s INDOFIL INDUSTRIES LIMITED

D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

H.O. Kalpataru Square, 4th Floor, Kondivita Road, Off Andheri- Kurla Road, Andheri East, Mumbai- 400 059

We, **M/s. SN Tradelink Pvt Ltd** situated at 3010-3011, Momai Complex , Outside Sahara Darwaja, Surat-395010 are the Importer of Steam Coal of various grades.

For enabling us the purchase Coal, We have valid Import /Export License NO 5207011693 dated 10.05.2007

At present our company is importing Above 10,00,000 MT of Coal per annum & supplying to renowned organizations like Meghmani, Colour Tex, NOCIL etc.

Pursuant to this MOU, we hereby agree to supply 3000 MT/ Month of Imported Steam Coal to Indofil Industries Limited at its proposed Manufacturing Plant situated at D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

The exact terms and conditions of this future arrangement will be negotiated in due course of time.

For SN Tradelink Pvt. Ltd.

For S. N. Tradelink Pvt. Ltd.

Director/Auth.Sign.

Authorized signatory

Name/ Designation/ Company seal

M/s Indofil Industries Limited

Indofil Industries Limited

Authorised Signatory

Authorized signatory

Name/ Designation/ Company seal

Regd. Office : 3010-3011, Momai Complex, Outside Sahara Darwaja, Kadodara Road, SURAT-395 010 (Gujarat)

ANNEXURE – 14
MOU OF FLYASH

amc
Chemicals Private Limited

MEMORANDUM OF UNDERSTANDING

BETWEEN

AMC Chemicals pvt Ltd

ADDRESS ; Plot No:3402, Phase-III, G.I.D.C., Panoli

AND

M/s INDOFIL INDUSTRIES LIMITED

D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat.

H.O. Kalpataru Square, 4th Floor, Kondivita Road, Off Andheri-Kurla Road, Andheri East, Mumbai-400 059

We, M/s AMC Chemicals pvt ltd situated at Plot No:3402, Phase-III, G.I.D.C., Panoli, are the manufacturers of MnSO4 solution, Zinc Sulphate & also have a valid permission for Brick manufacturing , for which we need Fly Ash as a raw material.

Pursuant to this MOU, we hereby agree to purchase Fly Ash = 2700 MT to be generated by Indofil Industries Limited at its proposed Manufacturing Plant situated at D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

The exact terms and conditions of this future arrangement will be negotiated in due course of time.

For AMC CHEMICALS PVT. LTD.
For Amc Chemicals private Limited

DIRECTOR

Authorized signatory

Name/ Designation/ Company seal

M/s Indofil Industries limited

Authorized signatory

Name/ Designation/ Company

ffice : G6, Hi Life Mall, santacruz West, Mumbai - 400054, Maharashtra, India P: +91 22 4264 3913 www.amc-chemicals.com
Works : Plot No. 3402, G, I.D.C. NEXT TOJ BSEZ, Panoli, Ph : +91 93760 18654, +91 9377064865

ANNEXURE – 15
MOU OF BY-PRODUCTS

IMPORTERS & DEALERS IN :
CHEMICALS & GENERAL MERCHANDISE
D-501, Neelkanth Business Park,
Behind Bus Depot, Vidyavihar (W),
Mumbai - 400 086. Tel.: +91-22-6127 1617 /18
FAX : +91-22-2515 1500
E-MAIL : nishachemicals@rediffmail.com

Nisha CHEMICALS

MEMORANDUM OF UNDERSTANDING

BETWEEN

M/s NISHA CHEMICALS

D-501, Neelkanth Business Park, behind Bus Depot, Vidyavihar (West), Mumbai

AND

M/s INDOFIL INDUSTRIES LIMITED

D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

H.O. Kalpataru Square, 4th Floor, Kondivita Road, Off Andheri- Kurla Road, Andheri East, Mumbai- 400 059

We, M/s Nisha Chemicals situated at D-501, Neelkanth Business Park, Behind Bus Depot, Vidyavihar (West), Mumbai – 400 086 are the suppliers of Industrial chemicals to manufacturing companies pan India.

Our portfolio of industrial chemicals includes both organic and Inorganic chemicals.

Pursuant to this MOU, we hereby agree to purchase following chemicals to be produced by Indofil Industries Limited situated D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

1. Aq. Hydrobromic Acid (Conc. 30%)= 50 MT / Month
2. Aq Sodium Hydro Sulfide (Conc. 20% to 25 %) = 25 MT/Month

The exact terms and conditions of this future arrangement will be negotiated in due course of time.

For Nisha Chemicals

For NISHA CHEMICALS

Partner

Authorized signatory

Name/ Designation/ Company seal

M/s Indofil Industries Limited

Indofil Industries Limited

Authorised Signatory

Authorized signatory

Name/ Designation/ Company seal

SPECTRA CHEMICALS
Importers & Dealers in Chemicals & Solvents

Regd. Off. : 701, Ramniwas, N S Road 3, JVPD Scheme, Vile Parle (W), Mumbai - 400 056
Admin. Off. : 35, Bombay Mutual Annexe, 4th Flr., R.S.Marg, Fort, Mumbai - 400 001
Tel. : +91 22 2266 5386 / +91 22 2262 5876 **Fax** : +91 22 2266 2437
Website : www.spectrochemicals.net **Email** : sales@spectrochemicals.net

MEMORANDUM OF UNDERSTANDING

BETWEEN

M/s SPECTRA CHEMICALS
701,RAMNIWAS, NS ROAD 3, JVPD SCHEME,
VILE PARLE (WEST), MUMBAI 400 056

AND

M/s INDOFIL INDUSTRIES LIMITED

D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

H.O. Kalpataru Square, 4th Floor, Kondivita Road, Off Andheri- Kurla Road, Andheri East, Mumbai- 400 059

We, M/s Spectra Chemicals situated at 701 Ramniwas, NS Road 3, JVPD Scheme, Vile Parle(West), Mumbai 400 056 are the suppliers of Bromide compounds to various industries.

Our company holds expertise in supplying various grades Bromide compounds to our valuable customers and sale almost 500 MT/ Month.

Pursuant to this MOU, we hereby agree to purchase following Bromides to be produced by Indofil Industries Limited situated D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

1. Aq. Sodium Bromide (Conc.17%) = 150 MT / Month
2. Aq. Potassium Bromide (Conc.16% to 29%) = 200 MT/Month

The exact terms and conditions of this future arrangement will be negotiated in due course of time.

For Spectra Chemicals

Authorized signatory

Name/ Designation/ Company seal
Company seal

SANKET MRUGESH GANDHI

Indofil Industries Limited
M/s Indofil Industries Limited
Authorised Signatory

Authorized signatory

Name/ Designation/

amc
Chemicals Private Limited

MEMORANDUM OF UNDERSTANDING

BETWEEN

M/s AMC Chemicals Private Limited

ADDRESS: Plot No:3402, G.I.D.C, Panoli, District: Bharuch, Gujarat 394116

AND

M/s INDOFIL INDUSTRIES LIMITED

D-2/CH/12, Dahej-2 Industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

H.O. Kalpataru Square, 4th Floor, Kondivita Road, Off Andheri- Kurla Road, Andheri East, Mumbai- 400059

We,M/s AMC Chemicals Private Limitedsituated Plot No:3402, G.I.D.C, Panoli, District: Bharuch Gujarat 394116are the suppliers of Sodium Sulphate to various industries.

Our company holds expertise in supplyingvarious grades Sodium Sulphate to our valuable customers and sale almost 2000 MT/ Month of Sodium Sulphate.

Pursuant to this MOU, we hereby agree to purchase the Sodium Sulphateto the tune of 1500 MT per month to be produced by Indofil Industries Limited situated D-2/CH/12, Dahej-2 Industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

The exact terms and conditions of this future arrangement will be negotiated in due course of time.

M/s AMC Chemicals Private Limited
For AMC CHEMICALS PVT. LTD.
DIRECTOR
Authorized signatory

M/s Indofil Industries Limited
Indofil Industries Limited
Authorised Signatory
Authorized signatory

HARSIDDHA CHEMICAL INDUSTRIES

MANUFACTURER & DEALERS IN CHEMICALS

An ISO 9001-2008 Certified Company

Factory:
Plot No. 1511, Phase-III,
G.I.D.C., Vatva,
Ahmedabad-382 445.
Phone: 079-65237109
Website: www.patelchemicalworks.com
Email: info@patelchemicalworks.com

Office:
D/206, Ghantakarna Market,
Near New Cloth Market,
Sarangpur, Ahmedabad-380002.
Phone: 079-22121928, 22122511

Ref No.:

Date: 6/7/2015

MEMORANDUM OF UNDERSTANDING
BETWEEN
M/s HARSIDDHA CHEMICAL INDUSTRIES
ADDRESS : Plot No:1511, Phase-III, G.I.D.C., Vatva,
Ahmedabad.
AND
M/s INDOFIL INDUSTRIES LIMITED

D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat
H.O. Kalpataru Square, 4th Floor, Kondivita Road, Off Andheri-Kurla Road, Andheri East, Mumbai – 400059.

We, M/s HARSIDDHA CHEMICAL INDUSTRIES situated at Plot No:1511, Phase-III, G.I.D.C., Vatva, Ahmedabad, are the manufacturers of Sodium Sulphite Anhydrous , for which we need Aq. Sodium Sulphite as raw material.

For enabling us the purchase of this raw material, we have valid permission from GPCB board vide order/ letter no AWH-63427 dated 18/7/2014 valid upto 20/3/2019.

Pursuant to this MOU, we hereby agree to purchase the Aq. Sodium Sulphite = 50 MT/ Month to be produced by Indofil Industries Limited at its proposed new project situated at D-2/CH/12, Dahej-2 Industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat.

The exact terms and conditions of this future arrangement will be negotiated in due course of time.

For Harsiddha Chemical Industries

Partner
Gautambhai Shivabhai Patel – Partner.

Indofil Industries Limited
M/s Indofil Industries Limited

Authorised Signatory
Authorized signatory
Name/ Designation/ Company seal

Pioneer Chemical Industries (P) Ltd.

Admn. Office : 119, B-Wing, Gokul Arcade Premises, Garware Chowk, Vile Parle (E.) Mumbai - 400 057.
Ph. : 6159 9018 / 19, 6159 9040 / 41 / 43 • Fax : 6159 9082 • Email : pioneer@pioneerchemical.in

MEMORANDUM OF UNDERSTANDING

BETWEEN

M/s PIONEER CHEMICAL INDUSTRIES PVT LTD

119,B wing,Gokul Arcade Premises, Nityanand Rd., Garware chowk- Vileparle(East), Mumbai

AND

M/s INDOFIL INDUSTRIES LIMITED

D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat.

H.O. Kalpataru Square, 4th Floor, Kondivita Road, Off Andheri-Kurla Road, Andheri East, Mumbai-400 059

We, M/s Pioneer chemicals situated at Plot No:1511, Phase-III, G.I.D.C., Vatva, Ahmedabad are the authorized distributors of Rashtriya Chemicals & Fertilizers Ltd (RCF) for supply of Formic Acid to various manufacturing companies across India.

We are in the business of Formic Acid for past 10 years and Sale average 250 MT per month in tanker load as well as drum packing.

Pursuant to this MOU, we hereby agree to purchase Formic Acid 50% = 100 MT Per Month to be produced by Indofil Industries Limited at its proposed Manufacturing Plant situated at D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

The exact terms and conditions of this future arrangement will be negotiated in due course of time.

For PIONEER CHEMICAL INDS. PVT. LTD.,

Authorized signatory

Name : PRAKASH SHAH

Designation : DIRECTOR

Company seal

M/s Indofil Industries Limited

Indofil Industries Limited

Authorised Signatory

Authorized signatory

Name : S.N. Pandey

Designation : G.M. (mfg.)

Company seal

MANMOHAN
MINERALS & CHEMICALS PVT. LTD.

MEMORANDUM OF UNDERSTANDING

BETWEEN

M/S. Manmohan Minerals & Chemicals Pvt. Ltd.

ADDRESS : 769/4 Jhagadia GIDC Bharuch, Gujarat

AND

M/s INDOFIL INDUSTRIES LIMITED

D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat.

H.O. Kalpataru Square, 4th Floor, Kondivita Road, Off Andheri-Kurla Road, Andheri East, Mumbai-400 059

We, M/s Manmohan Minerlas situated at Plot 769/4, Jhagadia GIDC Bharuch are the manufacturers of Manganese Sulphate Solution , for which we need Manganese Carbonate (MnC03) & Sulphuric Acid as a raw material.

For enabling us the purchase of these raw material, we have valid permission from GPCB board vide order/ letter no. H-47909 dated 06/08/2012 and AWH -53637 dated 05/06/2013

Pursuant to this MOU, we hereby agree to purchase following products to be produced by Indofil Industries Limited at its proposed Manufacturing Plant situated at D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

1. Manganese Carbonate (MnC03) = 200 MT/ Month

2. Spent Sulphuric Acid= 10 MT/ Month

MANMOHAN
MINERALS & CHEMICALS PVT. LTD.

The exact terms and conditions of this future arrangement will be negotiated in due course of time.

For MANMOHAN MINERALS AND CHEMICALS (P) LTD

Director/Auth. Sign.

Authorized Signatory
Name/ Designation/ Company seal
DIVYAM SINGHANIA

M/s Indofil Industries Ltd.

Authorized Signatory
Name/Designation/Company Seal

amc Chemicals Private Limited

MEMORANDUM OF UNDERSTANDING

BETWEEN

M/s AMC Chemicals Pvt Ltd

ADDRESS: Plot No:3402, G.I.D.C, Panoli, District: Bharuch, Gujarat 394116

AND

M/s INDOFIL INDUSTRIES LIMITED

D-2/CH/12, Dahej-2 Industrial Estate, GIDC Dahej, Tal. Vagra, Dist: Bharuch, Gujarat

H.O. Kalpataru Square, 4th Floor, Kondivita Road, Off Andheri-Kurla Road, Andheri East, Mumbai-400 059

We, M/s AMC Chemicals situated at Plot No:3402, G.I.D.C, Panoli, District: Bharuch, Gujarat 394116 are the manufacturers of Zinc Chloride Solution , for which we need Aq. Aq. Hydrochloric Acid (Conc 30%)as raw material.

For enabling us the purchase of this raw material, we have valid permission from GPCB board vide order/ letter no AWH-32836 dated 25/5/2009 valid upto 1/3/2014.

Pursuant to this MOU, we hereby agree to purchase the Aq. Hydrochloric Acid (Conc 30%)= 200 MT/ Month to be produced by Indofil Industries Limited at its proposed new project situated at D-2/CH/12, Dahej-2 industrial Estate, GIDC Dahej, Tal: Vagra, Dist: Bharuch, Gujarat

The exact terms and conditions of this future arrangement will be negotiated in due course of time.

M/s AMC Chemicals Private Limited

For AMC CHEMICALS PVT. LTD.

DIRECTOR

Authorized signatory

Name/ Designation/ Company seal

seal

M/s Indofil Industries Limited

Indofil Industries Limited

Authorised Signatory

Authorized signatory

Name/ Designation/ Company

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ANNEXURE – 16
COPY OF VALID CTE

GPCB

GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN
Sector 10-A, **Gandhinagar** 382 010
Phone : (079) 23226295
Fax : (079) 23232156
Website : www.gpcb.gov.in

Consent to Establish (CTE)
(CTE Amendment No.-80549)

NO: GPCB/BRCH-B/CCA-122/ID-43026
TO,
M/s. INDOFIL INDUSTRIES LTD (UNIT-3),
PLOT NO.D-2, CH/12, GIDC,
DAHEJ-II, TAL: VAGRA,
DIST: BHARUCH.

SUB: Amendment to **Consent to Establish** under Section 25 of Water Act 1974 and Section 21 of Air Act 1981.

REF: (1) Previously issued CTE vide letter no: **GPCB-BRCH-B-CTE-205/ID-43026/206286 dated: 05/03/2014** under various Environmental Acts/Rules.
(2) Your CTE amendment application vide inward Id No: - 104938 dated: 10/03/2016.

Sir,

Without prejudice to the powers of this Board under the Water (Prevention and Control of Pollution) Act-1974, the Air Act-1981 and the Environment (Protection) Act-1986 and without reducing your responsibilities under the said Acts in any way, this is to inform you that this Board grants Amendment to **Consent to Establish (CTE)** for setting up of an industrial plant/activities by **M/s. INDOFIL INDUSTRIES LTD** (UNIT-3) at **PLOT NO.D-2, CH/12, GIDC,DAHEJ-II, TAL: VAGRA, DIST: BHARUCH** for the manufacturing of the following products.

The Validity period of the order will be Five years from date of issue. i. e. up to 06/06/2021.

1. **NAME OF THE PRODUCTS ALONG WITH QUANTITY:-**

Sr No.	Name Of Products	Quantity (MT/Annum)		
		Existing	Proposed	Total
1	(KM355) PVC Impact Modifier	600	-	600
2	(K-600F) PVC Processing Aid	600	-	600
3	(K 400) PVC Processing Aid	240	-	240
4	(SM5050) PVC Processing Aid for clear / transparent application	60	-	60
5	Indtron (Adhesive Chemical)	420	-	420
A	**EBDC FUNGICIDES PRODUCTS**		-	
1	Mancozeb & its Formulation	-	25000	25000
2	Maneb & its Formulation	-	500	500
3	Zineb & its Formulation	-	5000	5000
A1	**HERBICIDES**			
B	**SPECIALTY CHEMICALS**			
1	Solution Polymers	-	3634	3634
2	Re-dispersible Powder	-	11571	11571
3	Plastic Modifiers	-	20055	20055
4	Acrylic Emulsions	-	2635	2635
C1	**SYNTHESIS TECHNICAL PRODUCTS**			

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1	Tricyclazole and/or its intermediates: HMBT	-	1000	1000
2	Myclobutanil	-	135	135
3	Metalaxyl	-	125	125
4	Cymoxanil	-	300	300
5	Dodine	-	150	150
6	Hexaconazole	-	200	200
7	Propiconazole	-	300	300
8	Propargite	-	400	400
9	Difenthuron	-	200	200
10	Tebuconazole	-	300	300
11	Difenconazole	-	200	200
12	Thifluzamide	-	200	200
13	Bispyribac	-	65	65
SUB-TOTAL OF ABOVE 13 PRODUCTS		-	3575	3575
C2	**Out of the following 10 Products, only 1 Product shall be made at a time**			
1	Thiamethoxam	-	225	225
2	Epoxyconazole	-		
3	Prothioconazole	-		
4	Fluazinam	-		
5	Azoxystrobin	-		
6	Pyraclostrobin	-		
7	Boscalid	-		
8	Cyazofamid	-		
9	Penconazole	-		
10	Cyproconazole	-		
C3	**Out of the following 5 products, only 1 product shall be made at a time**			
1	Spirodiclofen	-	200	200
2	Spiromesifen	-		
3	Tolfenpyrod	-		
4	Clodinofop	-		
5	Pretilachlor	-		
Total of (C1 + C2 +C3) products		-	3575 + 225 + 200 = 4000	3575+225+200= 4000
D	AGRO FORMULATION			
1	Powder Formulation	-	32000	32000
2	Liquid Formulation	-	10000	10000

2. SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS RELATED TO ENVIRONMENT CLEARANCE (EC):-

2.1 The applicant shall not produce any products as well as not carry out any activities for products/process listed in the EIA Notification dated 14/09/2006 as amended from time to time, requiring prior Environmental Clearance from competent authority.

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GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN
Sector 10-A, **Gandhinagar** 382 010
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2.2 Applicant shall strictly comply/fulfill with all the conditions stipulated by competent authority in the order of Environmental Clearance as and when issued.

2.3 Unit shall not start development activity (including construction activity) without obtaining Environment clearance.

2.4 Unit shall maintain zero liquid discharge (ZCL) Status.

2.5 Unit shall not manufacture Glyphosate technical and Formulations.

3. **CONDITIONS UNDER WATER ACT:-**

3.1 The quantity of total water consumption shall not exceed **2711 KL/ day [1400 KL/day fresh + 1311 KL/day recycled]** (Break up as below).
 a) Domestic –**100 KL/day**.
 b) Industrial – **2611 KL/day**.

4.2 The quantity of total waste water generation shall not exceed **1418 KL/day**(Break up as below)
 a) Domestic – **95 KL/ day**.
 b) Industrial – **1323 KL/day**.

3.2 The quantity of the industrial effluent from the manufacturing process and other ancillary industrial operations shall be **1323 KL/day** and the quantity of domestic waste water (sewage) shall not exceed **95 KL/day**.

3.3 **200 Kl/day** of concentrated / high TDS stream of industrial effluent from process shall be the evaporation system, condensate from MEE shall be treated with low stream. The generating solids after settlers, nutch filters and centrifuged shall be sold to end users or disposed off at approved TSDF site. The ML coming from the evaporation system/centrifuge shall be totally pumped back in the evaporation system.

3.4 **Total 1123 KL/day** of biological industrial effluent shall be sent to ETP for primary, secondary and tertiary treatment. Treated effluent shall be sent to RO for further treatment RO Permeate shall be recycled in process plant and thus unit shall maintain zero liquid discharge status.

3.5 Sewage shall be treated separately and it shall be reused/ recycled.

3.6 The unit shall affix of water meters as per Section 4 (1) of the water (Prevention and Control of Pollution) Cess Act 1977 for the purpose of measuring and recording the quantity of water consumed at such places as may be required, within 15 days and it shall be presumed that the quantity indicated by the meter has been consumed by the industry until the contrary is proved.

3.7 **SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS UNDER WATER ACT:-**

3.7.1 The effluent shall be stripped off, of VOC's in a closed system before further treatment into ETP.

3.7.2 Unit shall provide treated effluent holding facility for at least 48 hrs, having vertical tank design preferably.

3.7.3 Applicant shall carry out Bio Assay and Toxicity test for the treated waste water and same shall be submitted to the GPCB.

3.7.4 Unit shall install continuous monitoring as well as alarm system for parameters of treated effluent, such as:-Ph meter, TOC analyzer, magnetic flow meter along with totalizer and recorder at the final outlet of factory drain/pipe of ETP. Records of the same shall be maintained invariably by the unit and shall be submitted to GPCB every month.

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PARYAVARAN BHAVAN
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3.7.5 Applicant shall ensured & undertake on Rs. 100 stamp paper that it has no outlet in GIDC U/G drain.

4. CONDITIONS UNDER AIR ACT:-

4.1 The following shall be used as fuel in the Boiler / Thermic Fluid Heater/ /D G Set/ Incinerator as following rates:

Sr. No.	Name of Fuel	Quantity
1	Coal (For Boiler)	100 MT/day
2	HSD	900 lit/hr
3	Natural Gas	1000 Sm^3/hr

4.2 The flue gas emission through stack attached to Boiler / Thermic Fluid Heater/ /D G Set/ Incinerator shall conform to the following standards:

SR NO	STACK ATTACHED TO	HEIGHT (M)	AIR POLLUTION CONTROL SYSTEM	AIR EMISSION	
				POLLUTANT	CONCENTRATION
1	Boiler-1(8 TPH) for Process	32	ESP	Particulate Matter SO2 NO2	150 mg/Nm3 100 ppm 50 ppm
2	Boiler-2(8 TPH) for Process				
3	Boiler-3(8 TPH) for Process	32	ESP		
4	Boiler-4(9 TPH) for Process				
5	Thermo Pack - 1 No.	20	-		
6	D. G. Sets - 3 Nos. (Cap 1500 KVA each)	15			
7	Incinerator & Thermal Oxidation (Common, for all distillation residues & Vapors etc.)	30	Venturi Scrubber followed by Alkali scrubber	Particulate Matter	50 mg/Nm^3
				HCl	50 mg/Nm^3
				SO_2	200 mg/Nm^3
				CO	100 mg/Nm^3
				Total Organic Carbon	20 mg/Nm^3
				Total Dioxins and Furans	0.1 ng TEQ / Nm^3
				Sb+ As+ Pb+ Cr +CO +Cu +Mn + Ni+ V and their compounds	1.5 mg/Nm^3

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GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN
Sector 10-A, Gandhinagar 382 010
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4.3 The Process emission through various stacks/ vents of reactors, process, vessel shall conform to the following standards: (Whichever is applicable).

SR NO	STACK ATTACHED TO	HEIGHT (M)	AIR POLLUTION CONTROL SYSTEM	AIR EMISSION	
				POLLUTANT	POLLUTANT
1	Plant 1A - FOR (Fungicides/insecticides)	15	Water Scrubber followed by Alkali Scrubber connected to Alkali venturi scrubber.	HCL	20 mg/Nm^3
				NH_3	30 mg/Nm^3
				HBr	5 mg/Nm^3
				Cl_2	5 mg/Nm^3
				SO_2	40 mg/Nm^3
2	Plant 1B - FOR (Fungicides/insecticides)	15	Water Scrubber followed by Alkali Scrubber connected to Alkali venturi scrubber.	HCL	20 mg/Nm^3
				Cl_2	5 mg/Nm^3
				HBr	5 mg/Nm^3
				SO_2	40 mg/Nm^3
3	Plant 2 (Herbicides)	15	Water Scrubber followed by Alkali Scrubber connected to Alkali venturi scrubber.	HCL	20 mg/Nm^3
4	Mancozeb / Maneb Plant-Preparation of Sodium Salt of DithioCarbamate.	15	Caustic Scrubber.	H_2S. CS_2	5 mg/Nm^3 180 mg/Nm^3
5	Propineb / Zineb Plant-Preparation of Sodium Salt of DithioCarbamate& Propylene bisdiathiocarbamic acid.	15	Water scrubber followed by Caustic Scrubber.	H_2S. NH_3	5 mg/Nm^3 30 mg/Nm^3
6	Spray Dryer No.1 for Mancozeb / Maneb plant.	31	Bag House filter	Pesticides compounds in the form of Particulate Matter	20 mg/Nm^3
7	Spray Dryer No.2 for Mancozeb / Maneb plant.	31	Bag House filter	Pesticides compounds in the form of Particulate Matter	20 mg/Nm^3
8	Spray Dryer No.3 for Propineb/Zineb Plant.	31	Bag House filter	Pesticides compounds in the form of Particulate Matter	20 mg/Nm^3
9	Spray Dryer No.4 for Specialty Chemicals Plant.	31	Bag House filter	Pesticides compounds in the form of Particulate Matter	20 mg/Nm^3

4.4 Stack monitoring facilities like port hole, platform/ladder etc, shall be provided with stacks/vents chimney in order to facilitate sampling of gases being emitted into the atmosphere.

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GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN
Sector 10-A, Gandhinagar 382 010
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4.5 Ambient air quality within and outside the premises of the unit shall conform National Ambient Air Quality standards notified by MOEF vide notification dated 16/11/2009 and mainly to the following standards:-

Sr. No.	Pollutant	Time Weighted Average	Concentration in Ambient air
1.	Sulphur Dioxide (SO2), µg/m3	Annual	50
		24 Hours	80
2.	Nitrogen Dioxide (NO2), µg/m3	Annual	40
		24 Hours	80
3.	Particulate Matter (Size less than 10 µm) OR PM10 µg/m3	Annual	60
		24 Hours	100
4.	Particulate Matter (Size less than 2.5 mm) OR PM 2.5 µg/m3	Annual	40
		24 Hours	60
5.	Carbon Monoxide (CO) mg/m^3	8 Hours	02
		1 Hour	04
6.	Ammonia (NH_3) µg/m^3	Annual	100
		24 Hours	400

*Annual arithmetic mean of minimum of 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 Hourly or 08 Hourly or 01 Hourly monitored values as applicable, shall be complied with 98 % of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: - Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

4.6 The applicant shall operate industrial plant / air pollution control equipment very efficiently and continuously so that the gaseous emission always conforms to the given standards.

4.7 The consent to operate the industrial plant shall lapse if at any time the parameters of the gaseous emission are not within the tolerance limits specified in the conditions.

4.8 The applicant shall provide portholes, ladder, platform etc. at chimney(s) for monitoring the air emissions and the same shall be open for inspection to / and for use of Board's staff. The chimney(s) vents attached to various sources of emission shall be designed by numbers such as S-1, S-2, etc. and these shall be painted /displayed to facilitate identification.

4.9 All measures for the control of environmental pollution shall be provided before commencing production.

4.10 SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS UNDER AIR ACT:-

4.10.1 Total control of odour nuisance from the plant premises, shall be achieved & maintained by the applicant continuously.

4.10.2 The applicant shall install continuous /online monitoring system on the stacks for the parameters such as SO2, NOx & PM, etc.

GPCB

GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN
Sector 10-A, Gandhinagar 382 010
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5. CONDITIONS UNDER HAZARDOUS WASTE:-

5.1 Applicant shall have to comply with provisions of Hazardous and other wastes (Management and Transboundry Movement) Rules, 2016, for all the types/categories of the generating hazardous waste.

5.2 The applicant shall obtain membership of common TSDF site for disposal of Hazardous and other wastes as categorized in Hazardous and other wastes (Management and Transboundry Movement) Rules, 2016, as amended from time to time.

5.3 The applicant shall obtain membership of common Hazardous and other wastes incinerator for disposal of incinerable waste.

5.4 The applicant shall provide temporary storage facilities for each type of Haz. Waste as per Hazardous and other wastes (Management and Transboundry Movement) Rules, 2016, as amended from time to time.

5.5 By-Products mentioned in the application falls in the Haz-waste category as per Hazardous and other wastes (Management and Transboundry Movement) Rules, 2016, and shall be managed as per the rules.

6. GENERAL CONDITOINS:-

6.1 Regular maintenance of the pipeline shall be carried out to avoid any spillage or leakage during conveyance of the effluent.

6.2 Unit shall keep accurate records of their water consumption and wastewater generation, discharge, quantity of each product manufactured, and consumption of electricity on day-to-day basis and shall be required to submit the compiled record for each month to GPCB on or before seventh day of the succeeding month. Separate logbooks shall be maintained for recording all the necessary data.

6.3 Magnetic flow meters shall be installed at the various stages of inlet & outlet of pipeline to measure the quantity of effluent at each stage of conveyance.

6.4 SEZ - GIDC shall constitute a monitoring committee for monitoring of the effluent discharged by its members in the pipeline.

6.5 In case of power failure, separate stand-by D.G. set having power generation capacity equivalent to the requirement of power to run the APCM system shall be installed, so that it shall always be operated round the clock even in case of power failure also. The unit shall not keep any bypass line or system for stack emission.

6.6 Unit shall have only one outlet for the discharge of its effluent and no effluent shall be discharged without requisite treatment and without meeting with the GPCB norms. Convenient easy approach shall be provided at the outlet for ease of sampling. The unit shall not keep any bypass line or system, or loose or flexible pipe for discharging effluent outside or even within the effluent treatment plant. The unit shall not keep dual disposal modes.

6.7 Unit shall submit, to the GPCB, the site plan of the unit indicating the location of the effluent treatment plants, and also a separate plan indicating the channels / pipelines through which water / effluent passes from different stages of effluent treatment process right up to the stage of its final outlet. Such plan shall also be displayed by the unit on a Board of adequate size within its compound and near its effluent treatment plant.

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6.8 The company shall have to undertake and implement following measures:

- Water conservations measures to minimize the fresh water consumption, Metering system for water consumption.
- Cleaner production options.
- Reuse / recycle of trade waste, ground (rain) water recharging, electricity conservation.
- Use of solar or wind energy for lighting / heating purpose.
- Control of odour nuisance from the plant premises.

6.9 The company shall have to keep baseline quality data of land, water and air and shall be required to submit to GPCB with CTE / CCA applications.

6.10 The company shall carry out regular monitoring of ground water quality (including for all pesticides) within the premises as well as around the impervious guard ponds. Separate logbook shall be maintained. The data shall be submitted for each month to GPCB on or before 7th day of succeeding month, and shall also comply with the instructions of GPCB in case of deterioration if applicable.

6.11 Handling, manufacturing, storage and transport of hazardous chemicals shall be in accordance with the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.

6.12 Transportation of effluent, solid waste or any other goods pertaining to treatment activities, shall be carried out as per central Motor Vehicle Rule-1989 & hazardous waste Management, Handling & Trans Boundary Rule 2008.

6.13 The hazardous wastes shall be handled as per the Hazardous Waste (Management and Handling) Rules of the Environment (Protection) Act, 1986

6.14 On site and off site emergency plan as required under the Rules 13 & 14 of handling, manufacturing, storage and import of the Hazardous chemicals Rules, 1989 shall be prepared and approval from the Board shall be obtained.

6.15 Periodic medical checkup of the workers shall be done and records maintained as a measure to provide occupational health protection to the workers.

6.16 Unit shall provide state of the art composite samplers & set up testing laboratory facilities for collection, analysis of samples under the supervision of competent technical personnel.

6.17 The Environmental Management Unit / Cell shall be setup to ensure implementation and monitoring of environmental safe guards and other conditions stipulated by statutory authorities. The Environmental Management Unit / Cell shall directly report to the Chief Executive of the organization and shall works as a focal point for internalizing environmental issues. These Cells /Units shall also coordinate the exercise of the environmental audit and preparation of the environmental statements.

6.18 The Environmental audit shall be carried out yearly and the environmental statements pertaining to the previous year shall be submitted to the GPCB latest by 30th September every year.

6.19 Storm water shall not be mixed with the industrial effluent. Disposal system for storm water shall be provided separately.

6.20 Good housekeeping shall be maintained within the premises. All pipes, valves and drains shall be leak proof. Floor washing shall be admitted in to the effluent collection system for subsequent treatment and disposal.

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6.21 The entire pipeline shall be protected from external corrosion/damage.

6.22 Necessary clearances for the adequacy & safety measures shall be obtained from the concerned authority.

6.23 Unit shall comply with the provisions of all the laws of land including safety, disaster management and prevention of eco contamination.

6.24 The applicant shall have to submit the returns in prescribed form regarding water consumption and shall have to make payment of water cess to the Board under the Water Cess Act- 1977.

6.25 In case of change of ownership/management the name and address of the new owners/ partners/ directors/ proprietor shall immediately be intimated to the Board.

6.26 The applicant also comply with the General conditions as per Annexure - 1 attached herewith (No.1 to 38) (whichever applicable).

6.27 Any change in personnel, equipment or working conditions as mentioned in the consents form/order should immediately be intimated to this Board.

6.28 Adequate plantation shall be carried out all along the periphery of the industrial premises in such a way that the density of plantation is at least 1000 trees per acre of land and a green belt of adequate width is developed. Unit shall comply with CPCB guideline for green belt development.

6.29 The applicant shall however, not without the prior consent of the Board bring into use any new or altered outlet for the discharge of effluent or gaseous emission or sewage waste from the proposed industrial plant. The applicant is required to make applications to this Board for this purpose in the prescribed forms under the provisions of the Water Act-1974, the Air Act-1981 and the Environment (Protection) Act-1986.

6.30 The concentration of Noise in ambient air within the premises of industrial unit shall not exceed following levels:

Between 6 A.M. and 10 P.M.: 75 db(A)
Between 10 P.M. and 6 A.M.: 70 db(A)

6.31 All other conditions of CCA issued vide letter no. PC/BRCH/B-CCA-39/ID-29307/154165 dated 21/07/2013 under the provisions of various Environmental Act/Rules shall remain unchanged till CCA Amendment is obtained.

For and on behalf of
Gujarat Pollution Control Board

D. M. Thaker 7/9
(D.M.Thaker)
Environmental Engineer

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By R.P.A.D
02/02/2017

NO: GPCB/BRCH-B/CCA-122/ID-43026 403032

TO,
M/s. INDOFIL INDUSTRIES LTD (UNIT-3),
PLOT NO.D-2, CH/12, GIDC,
DAHEJ-II, TAL: VAGRA,
DIST: BHARUCH.

SUB: Amendment to **Consent to Establish** under Section 25 of Water Act 1974 and Section 21 of Air Act 1981.

REF: (1) Previously issued CTE vide letter no: **GPCB-BRCH-B-CTE-205/ID-43026/206286 dated: 05/03/2014** under various Environmental Acts/Rules.
(2) Previously issued CTE vide letter no: **GPCB-BRCH-B-CCA-122/ID-43026/368984 dated: 07/09/2016** under various Environmental Acts/Rules.
(3) Your letter dated: 15/09/2016.

Sir,

This has reference to the CTE Amendment issued vide letter no. **GPCB-BRCH-B-CCA-122/ID-43026/368984 dated: 07/09/2016** under various Environmental Acts/Rules, which stands amended as under,

1 At Condition no. 1 (of the CTE Amendment dated 07/09/2016) in the name of the products along with quantity stands amended and accordingly shall be read as under,

Sr No.	Name Of Products	Quantity (MT/Annum)		
		Existing	Proposed	Total
1	(KM355) PVC Impact Modifier	600	-	600
2	(K-600F) PVC Processing Aid	600	-	600
3	(K 400) PVC Processing Aid	240	-	240
4	(SM5050) PVC Processing Aid for clear / transparent application	60	-	60
5	Indtron (Adhesive Chemical)	420	-	420
A	**EBDC FUNGICIDES PRODUCTS**		-	
1	Mancozeb & its Formulation	-	25000	25000
2	Maneb & its Formulation	-	500	500
3	Zineb & its Formulation	-	5000	5000
4	Propineb & its Formulation	-	5000	5000
B	***SPECIALTY CHEMICALS***			
1	*Solution Polymers*	-	3634	3634
2	*Re-dispersible Powder*	-	11571	11571
3	Plastic Modifiers	-	20055	20055
4	Acrylic Emulsions	-	2635	2635
C1	**SYNTHESIS TECHNICAL PRODUCTS**			
1	Tricyclazole and/or its intermediates: HMBT	-	1000	1000

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2	Myclobutanil	-	135	135
3	Metalaxyl	-	125	125
4	Cymoxanil	-	300	300
5	Dodine	-	150	150
6	Hexaconazole	-	200	200
7	Propiconazole	-	300	300
8	Propargite	-	400	400
9	Difenthuron	-	200	200
10	Tebuconazole	-	300	300
11	Difenconazole	-	200	200
12	Thifluzamide	-	200	200
13	Bispyribac	-	65	65
SUB-TOTAL OF ABOVE 13 PRODUCTS		-	3575	3575
C2	**Out of the following 10 Products, only 1 Product shall be made at a time**			
1	Thiamethoxam	-	225	225
2	Epoxyconazole	-		
3	Prothioconazole	-		
4	Fluazinam	-		
5	Azoxystrobin	-		
6	Pyraclostrobin	-		
7	Boscalid	-		
8	Cyazofamid	-		
9	Penconazole	-		
10	Cyproconazole	-		
C3	**Out of the following 5 products, only 1 product shall be made at a time**			
1	Spirodiclofen	-	200	200
2	Spiromesifen	-		
3	Tolfenpyrod	-		
4	Clodinofop	-		
5	Pretilachlor	-		
Total of (C1 + C2 +C3) products		-	3575 + 225 + 200 = 4000	3575+225+200= 4000
D	AGRO FORMULATION			
1	Powder Formulation	-	32000	32000
2	Liquid Formulation	-	10000	10000

3 **Condition no. 3.1 (of the CTE Amendment dated 07/09/2016) stands amended and accordingly shall be read as under,**

The quantity of total water consumption shall not exceed 2811 KL/ day [1500 KL/day fresh + 1311 KL/day recycled] (Break up as below).

Domestic. –100 KL/day.

Industrial – 2711 KL/day.

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4 **At Condition no. 4.2 (of the CTE Amendment dated 07/09/2016) (Condition under Water Act) stands amended and accordingly shall be read as condition no. 3.1 (a) instead of 4.2.**

5 **Condition no. 3.3 (of the CTE Amendment dated 07/09/2016) stands amended and accordingly shall be read as under,**

400 KL/day of high COD/ high TDS stream of industrial effluent from process and RO reject and **475 KL/day** of industrial effluent from Mancozeb plant shall be the evaporation system, condensate from MEE shall be treated with low stream. The generating solids after settlers, nutch filters and centrifuged shall be sold to end users or disposed off at approved TSDF site. The ML coming from the evaporation system/centrifuge shall be totally pumped back in the evaporation system.

6 **At Condition No. 4.3 serial no. 3 Stack attached to Plant 2 (Herbicides) stand deleted.**

7 All other conditions of CTE Amendment issued vide letter no. **GPCB-BRCH-B-CCA-122/ID-43026/368984 dated: 07/09/2016** under the provisions of various Environmental Act/Rules shall remain unchanged.

For and on behalf of
Gujarat Pollution Control Board

D.M.Thaker
2/2/17

(D.M.Thaker)
Environmental Engineer

COPY TO:
1. The Regional Officer, G.P.C. Board, BHARUCH
   For information and submission of monitoring reports under various Environmental Act / Rules at regular interval in accordance with office circular issued time to time.
2. BRCH UNIT...2B