FORM-I

For

PROPOSED MERGER & EXPANSION OF SPECIALITY CHEMICALS, PESTICIDE INTERMEDIATES & PESTICIDE TECHANICALS IN EXISTING UNIT

of

M/s. HEMANI INDUSTRIES LTD. (UNIT-III & IV)

PLOT NO. CH-5 & E-362, G.I.D.C. ESTATE, DAHEJ-I,

TAL: VAGRA, DIST: BHARUCH-392130, GUJARAT

APPENDIX I

FORM 1

1. Basic Information

Sr. No.	Item	Details
1.	Name of the Project/s	Hemani Industries Ltd. (Unit-III & IV)
2.	S.No. in the Schedule	5 (b) & 5 (f)
3.	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number of wells to be drilled	Proposed Specialty Chemicals, Intermediates and Pesticides Technical = 2662 + 6058 = 8207 MT/Month No bore well to be drilled within the premises.
4.	New/Expansion/Modernization	Expansion
5.	Existing capacity/area etc.	Existing Capacity = 2662 MT/Month
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 No.Ch-5 & E-362, GIDC, Dahej-I, Tal: Vagra, Dist: Bharuch-392130, Gujarat
	Plot/Survey/Khasra No.	Plot. No. CH-5 & E-362
	Village	GIDC, Dahej-I
	Tehsil	Vagra
	District	Bharuch
	State	Gujarat
10.	Nearest railway station/airport along with distance in kms.	Nearest Railway Station : Dahej = 2.5 kms Nearest Airport: Baroda: 90 kms
11.	Nearest Town, city, District Headquarters along with distance in km	Nearest town: Bharuch : 50 kms, Nearest District Head quarter: Bharuch : 50 kms
12.	Village Panchayats, zilla parishad, Municipal corporation, Local body	Village: Dahej, Tal: Vagra, Dist: Bharuch, Gujarat.
13.	Name of the applicant	Hemani Industries Ltd. (Unit-III & IV)
14.	Registered address	Plot No.CH-5 & E-362, GIDC, Dahej-I, Tal: Vagra, Dist: Bharuch-392130, Gujarat.
15.	Address for correspondence:	

	Name	Mr. Satish Patel
	Designation (Owner/Partner/CEO)	General Manager
	Address	Plot No.CH-5, GIDC, Dahej-I, Tal: Vagra, Dist: Bharuch-392130, Gujarat.
	Pin Code	392130
	E-Mail	satishpatel.patel919@gmail.com
	Telephone No.	(02641)256042 & 291111
	Mobile No.	+919726131244
	Fax No.	(022)25157491
16.	Details of Alternative Sites examined, if any location of these sites should be shown on a topo sheet.	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. 1. The Forest (Conservation) Act, 1980? 2. The Wildlife (Protection) Act, 1972?	Not applicable, as the project is located in notified industrial estate.
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? 1. Name of the Court 2. Case No. 3. Orders/directions of the Court, if any and its relevance with the 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 Expansion Project is within Dahej GIDC Estate
1.2	Clearance of existing land, vegetation and buildings?	Yes	Minor site clearance activities shall be carried out to clear shrubs and weed.
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 is attached **Annexure: 2** and manufacturing process attached as **Annexure: 3.**
1.14	Facilities for storage of goods or materials?	Yes	Dedicated storage area for storage of Raw Materials and finished products, solvents, etc. is provided.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	Effluent Treatment Plant is 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: 4.**

			Details of proposed Effluent Treatment Plant are attached as **Annexure: 5.** Details of Hazardous waste generation and disposal is attached as **Annexure: 6.**
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?	Yes	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?	Yes	Through hired Services
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?	No	This is a well developed Industrial Area and due to project, 150 additional people shall be employed for operation.
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 meet through the 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	Company shall use Sand, stone, Cement and Structural Steel for Construction as required.
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	Existing: Power required from DGVCL is 3000 KVA. Total Proposed: Power required from DGVCL will 8000 KVA. Standby power supply from D.G. set – Existing: 1010 KVA x 3 Nos. Total Proposed: 1010 KVA x 8 Nos. **Fuel:** **Existing** Natural Gas: 1150 m3/Day Coal or Lignite: 2250 MT/Month + 1050 MT/Month LDO: 20 KL/Month + 10 KL/Month FO: 15 KL/Month HSD: 5 KL/Month + 36 KL/Month **Proposed** Natural Gas: 4000 m3/Day Coal or Lignite: 4500 MT/Month HSD: 25 KL/Month
2.7	Any other natural resources (use appropriates standard units)	No	--

1. 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 : 8.**
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 Dahej Industrial Area, Dahej.
3.3	Affect the welfare of people e.g. by changing living conditions?	No	Not applicable as site is located in Dahej Industrial Area, 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 Dahej Industrial Area, 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)	No	--
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	Please refer **Annexure: 6**
4.4	Other industrial process wastes	Yes	Please refer **Annexure: 6**
4.5	Surplus product	Yes	As per attached **Annexure: 2**
4.6	Sewage sludge or other sludge from effluent treatment	Yes	Please refer **Annexure: 6**
4.7	Construction or demolition wastes	No	Construction waste shall be utilized for leveling, land filling in the premises.
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: 7**
5.2	Emissions from production processes	Yes	Reactors shall be connected to common scrubber system. Details of emission levels from process are attached as **Annexure: 7** Details of Air Pollution Control measures are attached as **Annexure: 7**
5.3	Emissions from materials handling including storage or transport	Yes	All liquid raw materials shall be procured in bulk tankers and shall be transferred through a closed circuit pipe lines by pumps. Solid raw material shall be handled in closed charging rooms with proper ventilation and charged through close pipeline into reactors.
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	No	
5.6	Emissions from incineration of waste	No	
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	
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	Acoustic enclosures shall be provided for DG set.
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 the raw material shall be stored separately in designated storage area and safely. 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 : 8.**
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	No	Sewage shall be treated in STP and reused. The treated effluent shall be drained into underground pipe line of GIDC.
7.3	By deposition of pollutants emitted to air	No	The factory is located in Dahej Industrial

	into the land or into water		Area, Dahej. The emissions shall conform to the GPCB / CPCB norms of discharge. The treated effluent shall be drained into underground pipe line of GIDC.
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?	No	Full- fledged Environmental Management System (EMS) is installed. i.e. ETP, Air Pollution Control systems, Hazardous Waste Handling and Management as per norms, etc. which will eliminates 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 mitigate 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 facilities, 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.) 1. housing development 2. extractive industries 3. supply industries 4. other	Yes	Site is located in Dahej Industrial Area, Dahej, having the entire required infrastructure. This industrial zone is having existing road infrastructure, power supply are to be utilized. Local people will be employed and no housing is required. Please refer **Annexure – 9.**
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	No	Not applicable
9.4	Have cumulative effects due to proximity to Other existing or planned projects with similar effects	No	The ETP of the company shall be designed such that the treated effluent conforms to the statutory requirement. The treated effluent shall be drained into underground pipe line of GIDC.

(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 Dahej Industrial Area, 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	No	Site is located in Dahej Industrial Area, 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 Dahej Industrial Area, Dahej, Tal: Vagra, Dist. Bharuch, Gujarat.
4	Inland, coastal, marine or underground waters	Yes	Gulf of Kambay = 5 Kms River Narmada = 7.5 Kms
5	State, National boundaries	No	--
6	Routes or facilities used by the public for to recreation or other tourist, pilgrim areas.	No	Not applicable
7	Defense installations	No	NIL
8	Densely populated or built-up area	Yes	Bharuch city – 4 lakh population
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)	Yes	The project being in notified industrial area does not affect agricultural land.
11	Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)	Yes	Site is located in Dahej Industrial Area, Dahej, Tal: Vagra, Dist. Bharuch, Gujarat.
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.

(IV). Proposed Terms of Reference for EIA studies: For detail please refer **Annexure – 10.**

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: 04.07.2018

Place: Dahej

For Hemani Intermediates Pvt. Ltd.

Satish Patel
(General Manager)

NOTE:

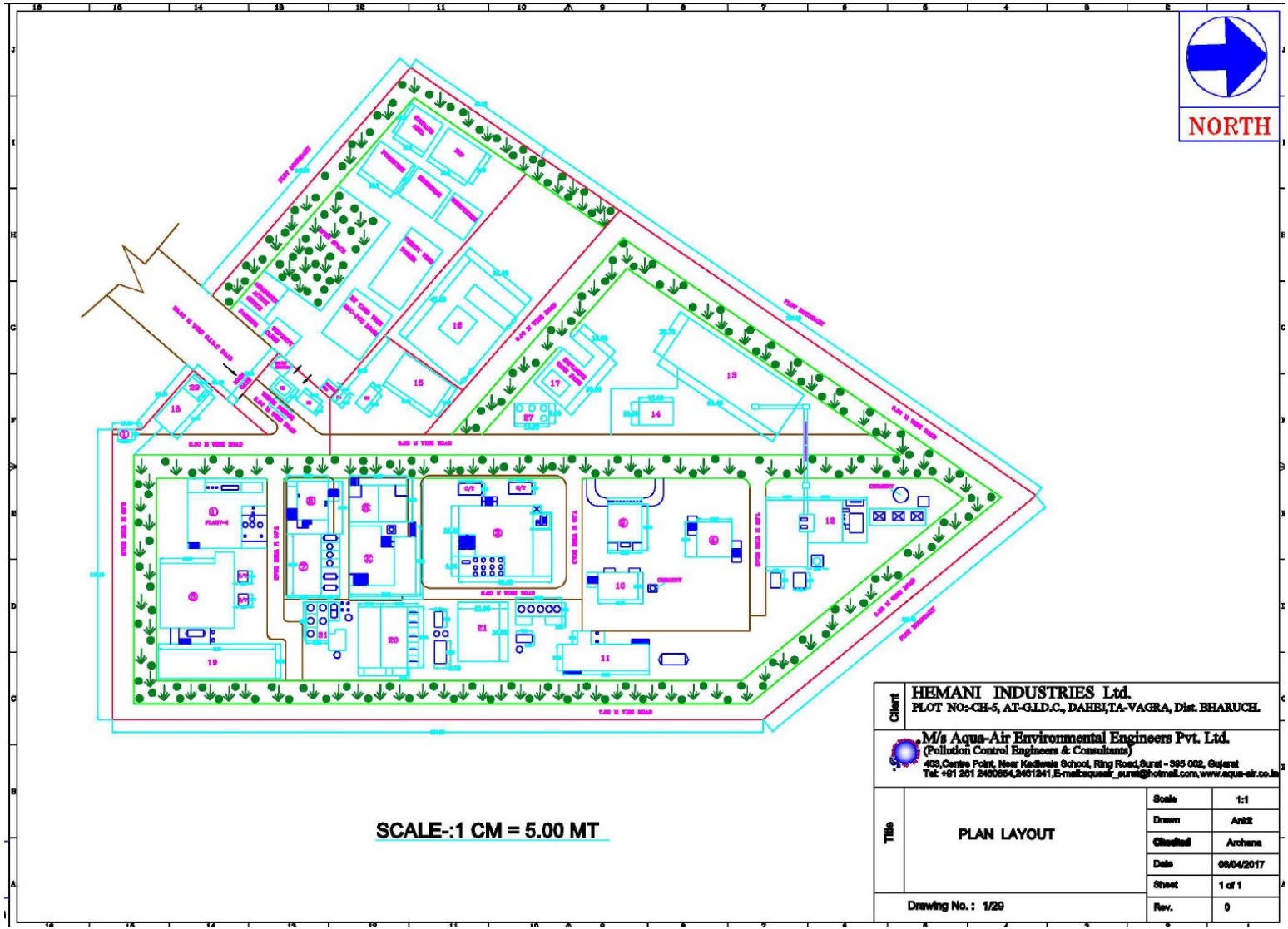
1. The projects involving clearance under Coastal Regulation Zone Notification, 1991 shall be submitted with the application a C.R.Z. map duly demarcated by one of the authorized agencies, showing the project activities, w.r.t. C.R.Z. (at the stage of TOR) and the recommendations of the State Coastal 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 60 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
3	BRIEF MANUFACTRING PROCESS, CHEMICAL REACTION AND MASS BALANCE WITH FLOW DIAGRAM
4	WATER CONSUMPTION AND EFFLUENT GENERATION WITH SEGREGATION OF EFFLUENT STREAMS
5	DETAILS OF PROPOSED EFFLUENT TREATMENT PLANT
6	DETAILS OF HAZARDOUS SOLID WASTE MANAGEMENT AND DISPOSAL
7	DETAILS OF HAZARDOUS CHEMICAL STORAGE FACILITY
8	DETAILS OF AIR POLLUTION CONTROL MEASURES
9	SOCIO - ECONOMIC IMPACTS
10	PROPOSED TERMS OF REFERENCES
11	NAME CHANGED FROM "HEMANI INTERMEDIATES P. LTD." TO "HEMANI INDUSTRIES LTD
12	PLOT ALLOTMENT LETTERS OF GIDC
13	EC COPY OF UNIT-3 & MOM/EC COPY OF UNIT-4
14	CTE COPY
15	CCA COPY OF UNIT-3
16	GIDC LETTER TO SUPPLY 2425 KL/DAY FRESH WATER TO HEMANI
17	GIDC LETTER TO ACCEPT 715 KL/DAY TREATED EFFLUENT INTO DRAINAGE SYSTEM FROM HEMANI
18	SEPPL, KUTCHH & BEIL, ANKLESHWAR'S MEMBERSHIP LETTERS
19	COPY OF APPLICATION SUBMITTED IN GPCB FOR MERGER OF THESE TWO UNITS
20	COPY OF APPLICATION SUBMITTED IN GIDC FOR MERGER OF THESE TWO UNITS
21	BHOPAL OFFICE'S FIRST EC COMPLIANCE REPORT OF UNIT-3
22	EC COMPLIANCE REPORT
23	TOPOSHEET

ANNEXURE: 1

PLANT LAYOUT



Annexure-2

LIST OF PRODUCTS WITH PRODUCTION CAPACITY

SR. NO.	NAME OF PRODUCTS	CAS No.	TYPE OF PRODUCT	EXISTING CAPACITY	ADDITIONAL CAPACITY	TOTAL AFTER PROPOSED EXPANSION
				(MT/MONTH)		
1	m-Phenoxy Benzaldehyde (MPBAD)	67-36-7	Intermediate	300	400	700
2	m-Bromo Nitrobenzene	586-78-7	Intermediate	100	-	100
3	m-Bromo Anisole	2398-37-0	Intermediate	100	-	100
4	Lambda-Cyhalothrin	91465-08-6	Pesticides	50	-	50
5	Deltamethrin (T)	52918-63-5	Pesticides	12	38	50
6	DV-Acid Chloride/ CMAC	52314-67-7	Intermediate	200	450	650
7	Cypermethrin (T)	52315-07-8	Pesticides	150	850	1000
8	Apha Cypermethrin/ Permethrin (T)	67375-30-8/ 52645-53-1	Pesticides	100	300	400
9	Metamitron (T) / Glyphosate (T)	41394-05-2/ 1071-83-6	Pesticides	100	300	400
10	Thionyl Chloride	7719-09-7	Specialty Chemicals	450	-	450
11	Sulphur chloride	7719-09-6	Specialty Chemicals	100	-	100
12	Acid chloride (Valeroyl chloride, (Phenyl acetyl chloride)	--	Specialty Chemicals	100	-	100
13. Fungicide						
a.	Hexaconozole (T)	79983-71-4	Fungicide	300	250	550
b.	Tebuconozole (T)	107534-96-3	Fungicide			
C.	Propioconzole (T)	60207-90-1	Fungicide			
14. Herbicide						

a.	Dicamba (T)	40487421	Herbicide	300	700	1000
b.	Metribuzine (T)	21087-64-9	Herbicide			
c.	Pendimethrin (T)	1918-00-9	Herbicide			
15. Insecticide						
a.	Transfluthrin (T)	118712-89-3	Insecticide	300	100	400
b.	Cyfluthrin & Beta isomer (T)	68359-37-5	Insecticide			
c.	Bifenthrin (T)	82657-04-3	Insecticide			
d.	Cypermethrin (T) & Beta / Zeta/ Theta Isomer (T)	52315-07-8 86753-92-6 52315-07-08	Insecticide			
e.	Imidacloprid	138261-41-3	Insecticide			
f.	Acetamaprid	160430-64-8	Insecticide			
16.	Chlorantraniliprole	500008-45-7	Insecticide	-	50	50
17.	Fipronil	120068-37-3	Insecticide	-	50	50
18.	2,5 Dichloro Phenol	583-78-8	Intermediates	-	800	800
19.	2,4 Di chloro phenoxy Acetic Acid	94-75-7	Herbicide	-	500	500
20.	Pyraclostobin	175013-18-0	Organic Intermediate	-	50	50
21.	1R Hightrans CMA	52314-67-7	Intermediate	-	20	20
22.	High Trans CMA and CMAC High Cis CMA and CMAC	52314-67-7 52314-67-7	Intermediates	-	50	50
23.	Diclobenil(T)	1194-65-6	Herbicides	--	100	100
24.	Diflubenzoron (T)	35367-38-5	Herbicides	--	50	50
25.	Methyl Chloride	74-87-3	Intermediate	--	600	600
26.	Quizalofop Pethyl(T)	100646-51-3	Insecticide	--	100	100
27.	Teflubenzuron (T)	83121-18-0	Insecticide	--	100	100
28.	Sulfentrazone (T)	122836-35-5	Insecticide	--	200	200
29.	CPP	--	Power generation	1.5 MW	--	1.5 MW

	Total			**2,662**	**6058**	**8720**
30	HCl (30%)		By-product	263.75	1,401.25	1,665
31	Sodium Sulfite		By-product	1,000.25	3,829.75	4,830
32	Ammonium Chloride (20% Solution)		By-product	425	4,495	4,920
33	Aluminum Chloride (25% Solution)		By-product	1,500	--	1,500
34	KCl (25% Solution)		By-product	1,610	940	2,550
35	Spent Sulphuric Acid		By-product	700	405	1,105
36	Sodium Sulphate (30% to 35% Solution)		By-product	2,000	5,240	7,240
37	Potassium Bromide		By-product	--	215	215
38	HBr		By-product	--	3,153	3,153
39	Cupric Chloride Solution		By-product	--	80	80
40	Cuprous Hydroxide		By-product	--	100	100
41	Sodium Bisulfite		By-product	--	550	550
	Total			**7,499**	**20,409**	**27,908**
	Grand Total			**10,161**	**23,954**	**34,115**

LIST OF RAW MATERIALS

SR. NO.	RAW MATERIALS	QUANTITY (MT/MONTH)
1.	**Meta Phenoxy Benzaldehyde (Organic Intermediate)**	
	C.S. Lye	162.4
	BZH	581.0
	Bromine	472.5
	Chlorine	185.2
	EDC	2691
	HCl	612
	Formic Acid	6.9
	Na_2SO_4	16.0
	ASR	7.00
	MEG	6.00
	PTSA	2.8
	Phenol	513.76
	KOH	314.5
	Toluene	765.4
	H_2SO_4	45.43
2.	**Meta Bromo Nitrobenzene (Organic Intermediate)**	
	H_2SO_4	140
	Oleum	160
	Nitro Benzene	98.4
	Bromine	52
	Catalyst	0.6
	Toluene	344
3.	**Meta Bromo Anisole (Organic Intermediate)**	
	3 – Bromo Nitrobenzene	125
	KOH	98.6
	Tetra butyl Ammonium Bromide	31.6
	Methanol	26
	Toluene	4.6
	30 % HCl	42
4.A	**Lambda Cyhalothrin (Pesticide)**	
	C. S. Lye	25.52
	Lambda Cyhalothric Acid	29.12
	Thionyl Chloride (TC)	15.52
	D M Formamide (DMF)	0.12
	Hexane	271.68
	NaCN	8
	TEBA (Catalyst)	0.56
	Soda Ash	0.56

	MPB	22.28
	Acid Chloride	30.56
	Hypo Soln.	42.84
	NaOH	42.84
	IPA	147
	Di – Isopropyl Amine	5.32
	HCl	7.6
	Acidic Aqueous	112.92
5.	**DV Acid Chloride**	
	Forcut	247
	Acrylonitrile	325
	CTC	1007
	Acetonitrile	14.3
	Catalyst	6.5
	DEA HCl	7.15
	DMF	20.0
	TC	1087
	C. Lye	4570
	n-Hexane	5940
	IB	386.0
	TEA	542
	1% Soda Soln.	330
	Catalyst (BF_3)	6.5
	Caustic (100%)	632.1
	H_2SO_4	780
6.	**Cypermethrin**	
	NaCN	91
	Catalyst	6.5
	Soda Ash	6.5
	CMAC	380
	MPBD	311.76
	n-Hexane	128.6
a.	**Transfluthrin (MT/MT)**	
	2,3,5,6 Tetra Fluoro Benzyl Alcohol	0. 5
	R- Trans Cypermethric Acid Chloride	0.62
	Catalyst	0.012
	Solvent- Hexane	2.0
	5 % Soda Ash Solution	0.25
b.	**Cyfluthrin & Beta Isomers (T)**	
	3- Phenoxy -4- Fluoro Benzaldehyde	0.51
	CMAC- Cypermethric Avid Chloride	0.56
	Sodium Cyanide	0.132
	Solvent –n- Hexane	2.9

	Catalyst	0.01
	5 % Soda Ash Solution	0.49
	5 % Acetic Acid Solution	0.49
	8-10 % Sodium Hypochorite Solution	0.78
c.	**Imidacloprid (T)**	
	2- Chloro -5- Chloromethyl Pyridine	0.88
	N- Nitro N- Methyl Imidazolidine	0.83
	Sodium Carbonate	0.68
	Catalyst -1	0.01
	Solvent - DMF	2.14
	Caustic Lye 47 %	0.05
	Solvent - Methanol	0.39
7.A	**Alphamethrin**	
	Cypermethrin	500
	Tri Ethylamine	120
	n-Hexane	245
7.B	**Permethrin**	
	DV Acid Chloride (CMAC)	62
	M P B A L Meta Phenoxy Benzyl Alcohol	52
8.A	**Metamitron**	
	Mendelonitrile	550.8
	Ethanol	568
	Toluene	817.6
	TC	380.4
	HCl	191.2
	Sodium Hypo Chloride	4006
	CS Lye	60.4
	TEBA	22.8
	Sodium Bisulfite	8.4
	Ammonia	120
	HH 80%	608
	Ethyl Acetate	367.2
	Sodium Acetate	48
	Thionyl Chloride	
	Sulphur	135
	Chlorine	270
	Sulpher Di Oxide	90
	Sulpher Chloride	
	Sulphur	47.5
	Chlorine	52.5
	Acid Chloride (MT/MT)	

	Acid	0.4
	Thionyl Chloride	0.55
	DMF	0.03
9	**Cypermethrin (T) & Beta/Zeta/Theta Isomers (T) (MT/MT)**	
	Meta Phenoxy Benzaldehyde	0.463
	CMAC- Cypermethric Acid Chloride	0.542
	Sodium Cyanide	0.463
	Solvent –n- Hexane	0.126
	Catalyst	2.78
	4 % Soda Ash Solution	0.009
	5 % Acetic Acid Solution	0.463
	8-10 % Sodium Hypochorite Solution	0.74
10	**Chlorantraniliprole**	
	2-Amino – 5 – Chloro-N, 3-Dimethylbenzamide	22
	3-Bromo -1-(3- Chloropyridine -2-yl)-1H – Pyrazole -5- carbonyl chloride	35.3
	Tri ethyl amine	11.25
	Toluene	7.3
11.	**Fipronil**	
	P-Toluene sulfonic acid	20.00
	Toluene	1.675
	Di methylamine solution	25.60
	Pyrazole	24.40
	Tri Ethyl amine	2.325
	Trifluoromethane Sulfinyl Chloride	22.00
	Sodium Hydroxide (30%)	36.37
	EDC	6.25
12.	**Acetamiprid**	
	N-Cyano-N-Methylacetamidine	44.00
	Potassium Carbonate	62.00
	Ammonium Benzyltriethyl chloride	2
	DMF	100
	2-Chloro -5- Chloromethyl Pyridine	72.8
	Ethyl Acetate	8.00
13.	**Hexaconzole (T) (MT/MT)**	
	1,3 Di Chloro Benzene	0.51
	Pentanoyl Chloride	0.417
	Alumimun Chloride	0.632
	Solvent - EDC	1.85
	Methylene Triphenyl Phosphorane	0.944
	Bromine	0.54

	Solvent - THF	1.2
	Hydrogen Peroxide	0.116
	Potassium Hydroxide	0.195
	1,2,4 - Triazole	0.22
	Solvent – Dimethyl Formamide	1.1
14	**Tebuconazole (MT/MT)**	
	1-(4 – Chlorophenyl) 4-4- Dimethyl -3-Pentanoate	0.675
	Sodium Methoxide	0.162
	Di Methyl Sulfide	0.186
	Solvent - Toluene	1.4
	1,2,4 - Triazole	0.206
	Solvent – DMF	1.1
15	**Propioconzole (T) (MT/MT)**	
	1,3 Di Chloro Benzene	0.452
	Acetyl Chloride	0.238
	Alumimun Chloride	0.558
	Solvent - EDC	1.6
	Bromine	0.553
	Catalyst	0.010
	1,2 - Butanediol	0.32
	Solvent - Toluene	1.0
	Potassium Hydroxide	0.166
	1,2,4 - Triazole	0.21
	Solvent – Dimethyl Formamide	1.0
16)	**Pendimethalin (T) (MT/MT)**	
	Hydrogen	0.032
	Diethylketone	0.692
	EDC	1.000
	Sulfuric acid 98 %	0.263
	Nitric acid 60 %	0.826
17)	**Metribuzine (T) (MT/MT)**	
	ATMT	1.0
	Di Methyl Sulphate	0.652
	Sulfuric Acid	1.274
	Soda Ash	1.6
	Caustic Soda Flakes	0.03
18)	**Dicamba (T) (MT/MT)**	
	2,4-dichloro phenol	0.820
	Carbon dioxide	0.260
	Dimehtyl sulfate	0.320
	Sodium hydroxide	0.205
	Solvent -Methenol	1.4

	Solvent -Toluene	1.6
19)	**2,5 Di Chloro Phenol**	
	2, 5-Dichloro Aniline	196
	Sulfuric Acid (98 %)	230
	Nitrosyl Sulfuric Acid (40 %)	448
	Solvent : Mix Xylene	16
20)	**2,4 Di Chloro Phenoxy Acetic Acid**	
	2,4-D sodium salt	250
	HCl (30%)	1125
21)	**Pyraclostrobin**	
	1,4 Dichloro Benzene	25.75
	3-Chloropyrazole	15.00
	Solvent - Xylene	5.00
	Catalyst	0.50
	2-Chlorobenzyl Alcohol	15.00
	N-Methoxy Carbamate	12.5
22)	**Diflubenzoron (T)**	
	2, 6 difluorobenzamide	0.510
	4 chloro phenyl isocyanate	0.560
	Mono Chlorobenzene	1.800
23)	**Methyl Chloride**	
24)	**Quizalofop Pethyl(T)**	
	2, 6 Dichloro Quinoxaline	0.580
	2 – (4 – Hydroxy Phenoxy) Propionic Acid	0.525
	Sodium Hydroxide	0.230
	Solvent – Di Methyl Formamide	1.100
	Ethyl Bromide	0.311
	Solvent - Xylene	1.000
25)	**Sulfetrazone(T)**	
	Phenyl hydrazine	0.765
	Acetaldehyde	0.376
	Sodium cyanate	0.530
	Chlorine	2.308
	Acetic acid	0.500
	Methanol	0.212

	10% Sodium Hydroxide	1.500
	Potassium Carbonate	0.900
	Dimethyl formamide	0.972
	Dichlorofluoromethane	0.650
	Oleum	4.450
	Nitric acid	0.386
	Dichloroethane	0.073
	Catalyst Pd/C	0.063
	Methane Sulfonyl chloride	0.689
	Pyridine	0.049
	Hydrogen	0.005
	Toluene	0.384
	Dichloromethane	0.319
	IPA	3.848

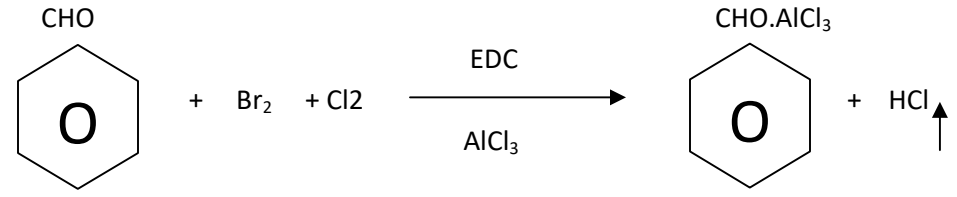
ANNEXURE: 3
BRIEF MANUFACTRING PROCESS, CHEMICAL REACTION AND MASS BALANCE WITH FLOW DIAGRAM

1) META PHENOXY BENZALDEHYDE (ORGANIC INTERMEDIATE) (EXISTING)
PROCESS DESCRIPTION
Metabromobenzaldehyde (MBB) Preparation:-
Benzaldehyde is reacted with Chlorine and Bromine in the presence of EDC (as solvent) and Aluminium Chloride as catalyst .Then the reaction mass is drowned in chilled water containing HCl and Formic acid ; and then washed with Sodium Thiosulphate solution . Crude MBB, thus obtained is further purified by distillation.

Metabromobenzaldehyde Acetal (MBBA) Preparation:-
MBB is reacted with MEG in the presence of PTSA (as catalyst) and Water formed is distilled off and pure MBBA is obtained.
Metaphenoxybenzaldehyde Acetal (MPBA) Preparation:-
First, Potassium Phenoxide is prepared by reacting Phenol with Potassium Hydroxide (KOH) in presence of Toluene .Then Potassium Phenoxide is reacted with MBBA and MPBA is formed. Crude MPBA is purified by Water washings.
Hydrolysis:-
MPBA is hydrolyzed to MPB in presence of Water and Sulphuric acid. Crude MEG so obtained is purified by distillation and recycled to MBBA preparation. The crude MPB is sent for final Purification.
MPB Distillation / Purification:-
The crude MPB is subjected to high vacuum distillation and pure MPB is obtained, which is packed as Finished Product.

CHEMICAL REACTION

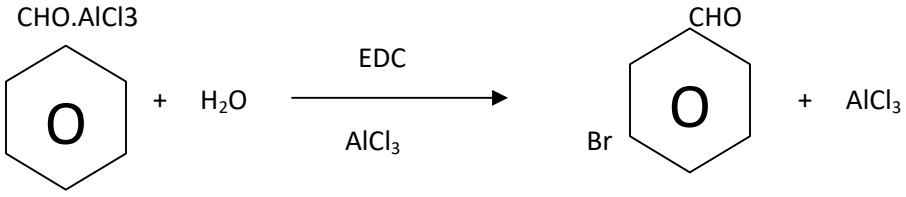
1. BROMINATION :



Benzaldehyde

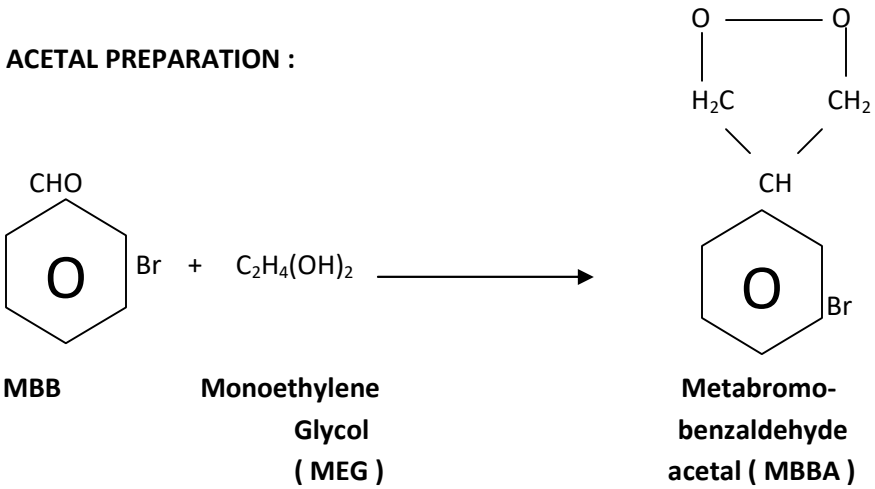
Metabromo-Benzaldehyde
Aluminium Chloride

2. DROWNING :



Metabromo-
Benzaldehyde
(MBB)

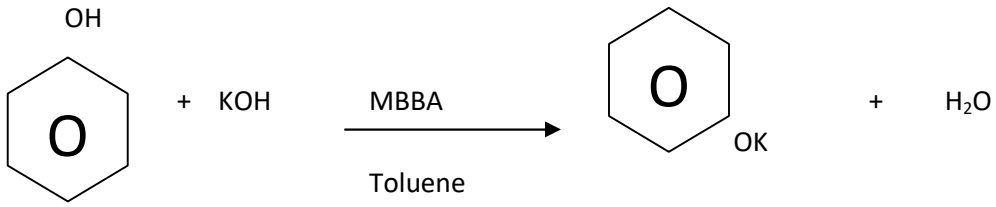
3. ACETAL PREPARATION :



MBB **Monoethylene Glycol (MEG)**

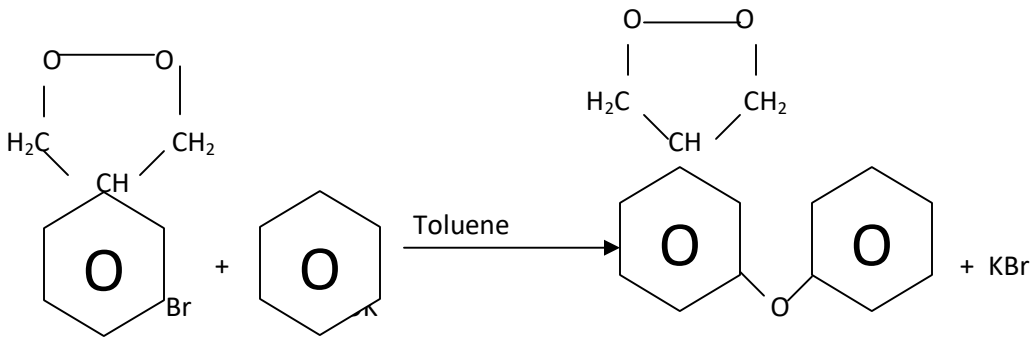
Metabromo-benzaldehyde acetal (MBBA)

4. K – PHENATE PREPARATION :



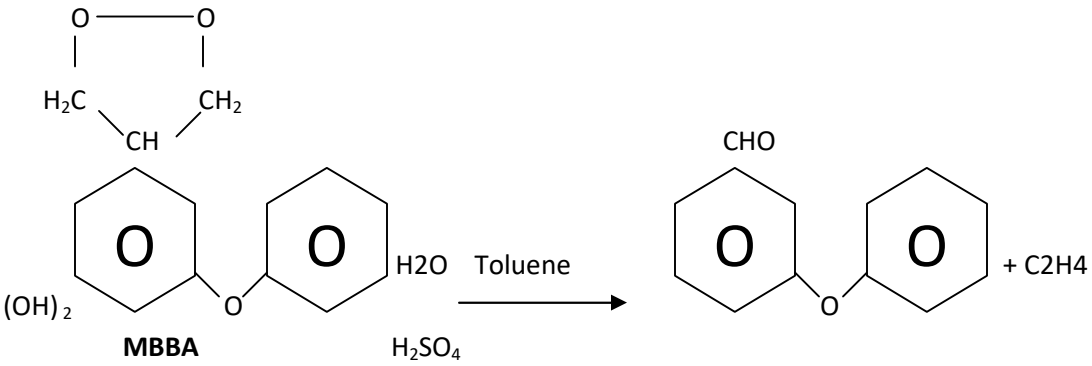
Phenol **Potassium Hydroxide** **Potassium Phenoxide**

5. CONDENSATION :



MBBA Potassium Phenoxide **Metaphenoxy Benzaldehyde** **Acetal (MBBA)**

6. HYDROLYSIS :

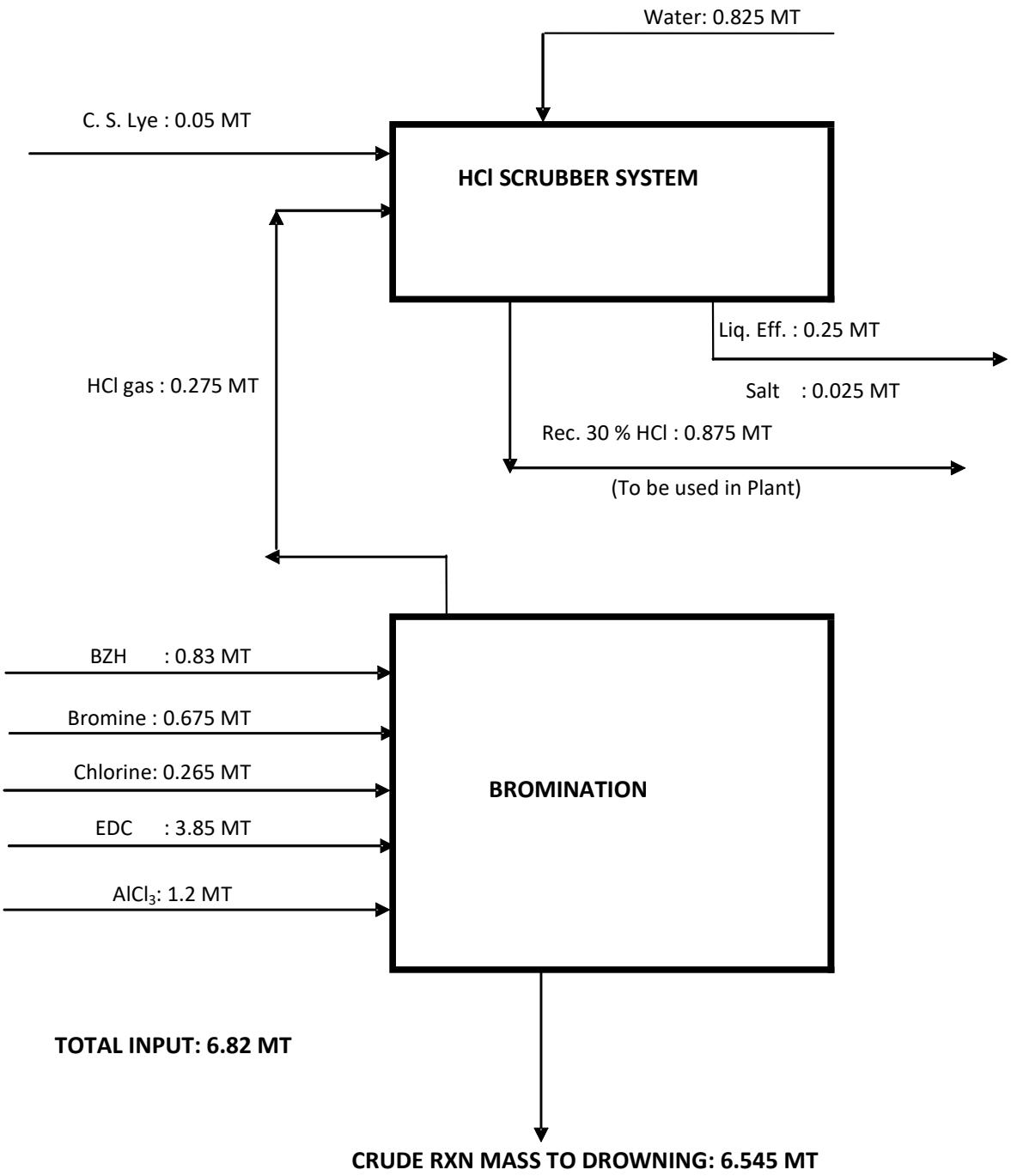


MBBA

Metaphenoxybenzaldehyde (MPB)

MASS BALANCE

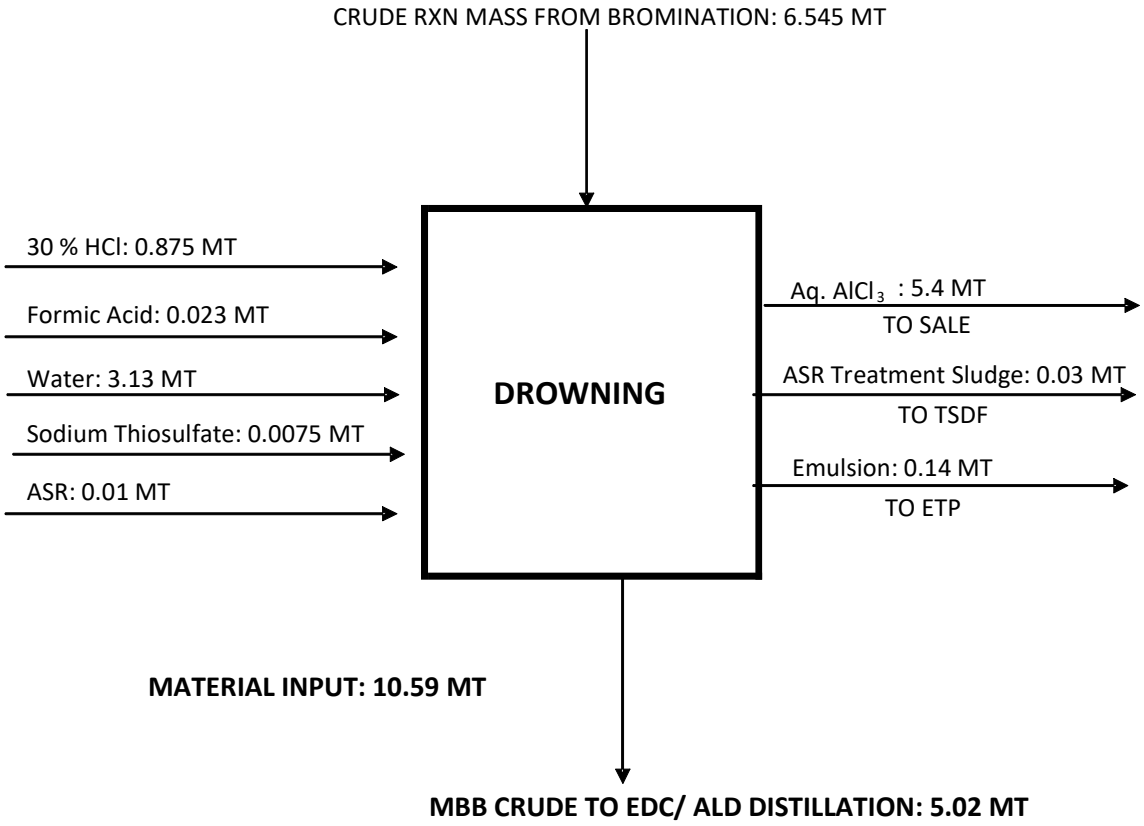
STAGE: 1



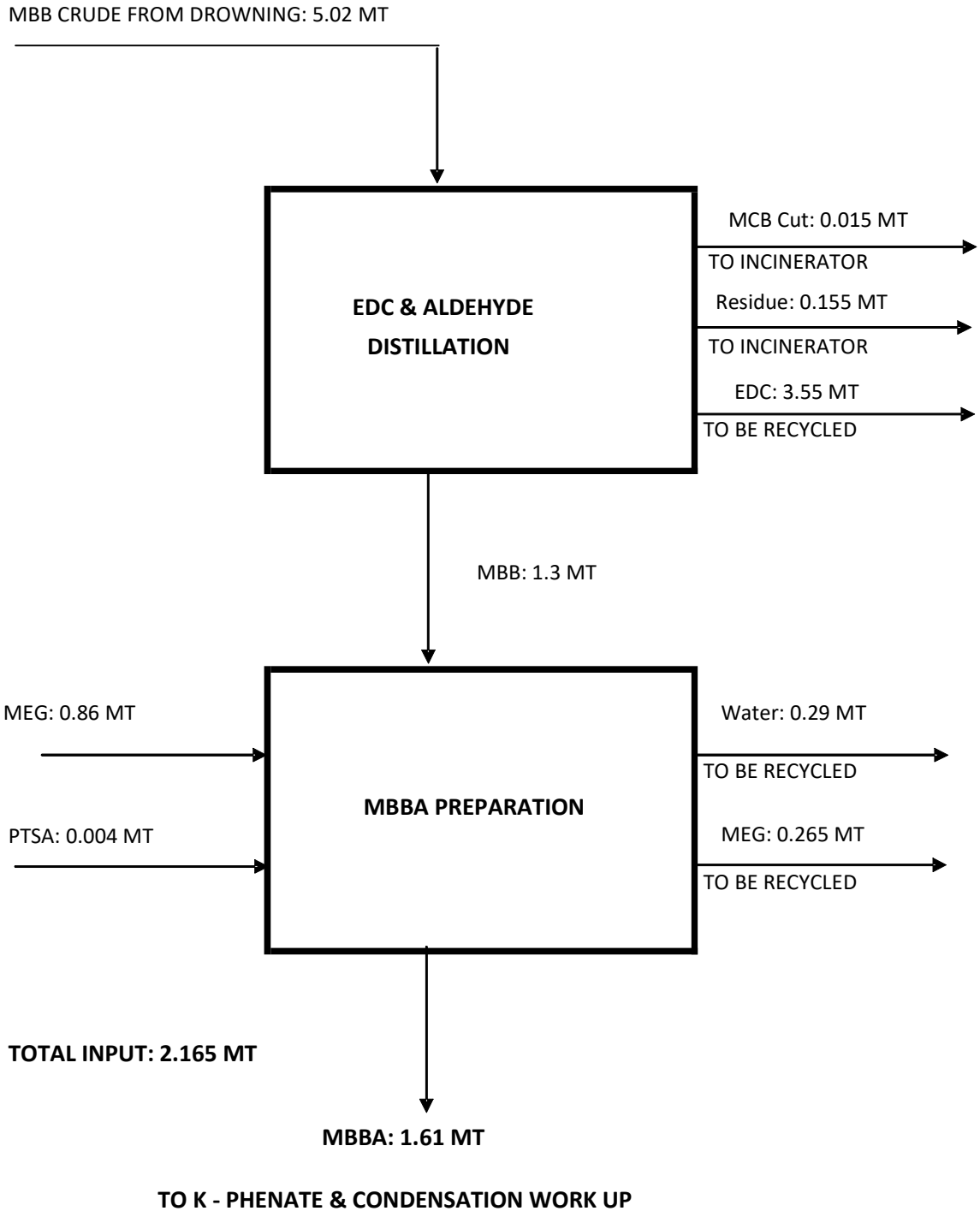
TOTAL INPUT: 6.82 MT

CRUDE RXN MASS TO DROWNING: 6.545 MT

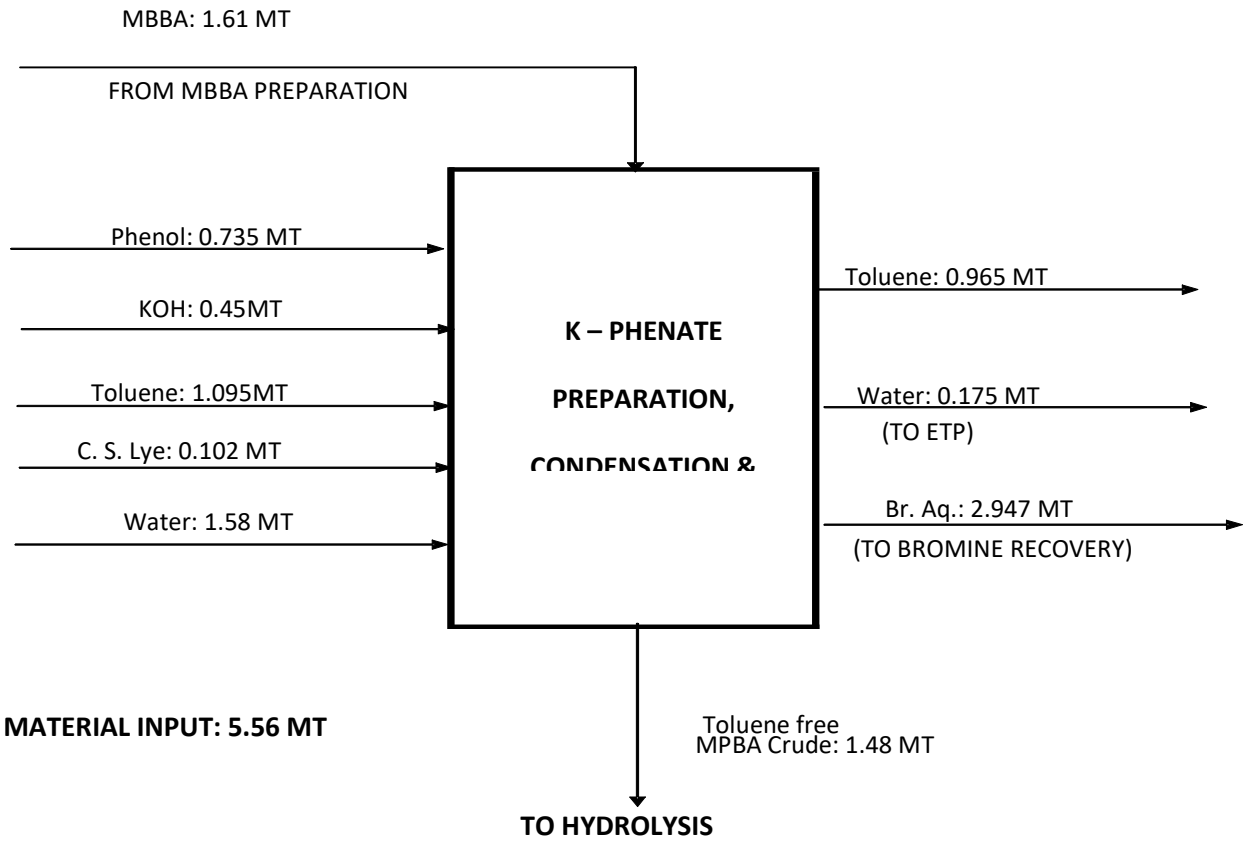
STAGE: 2


CRUDE RXN MASS FROM BROMINATION: 6.545 MT
30 % HCl: 0.875 MT
Formic Acid: 0.023 MT
Water: 3.13 MT
Sodium Thiosulfate: 0.0075 MT
ASR: 0.01 MT
DROWNING
Aq. AlCl3 : 5.4 MT
TO SALE
ASR Treatment Sludge: 0.03 MT
TO TSDF
Emulsion: 0.14 MT
TO ETP
MATERIAL INPUT: 10.59 MT
MBB CRUDE TO EDC/ ALD DISTILLATION: 5.02 MT

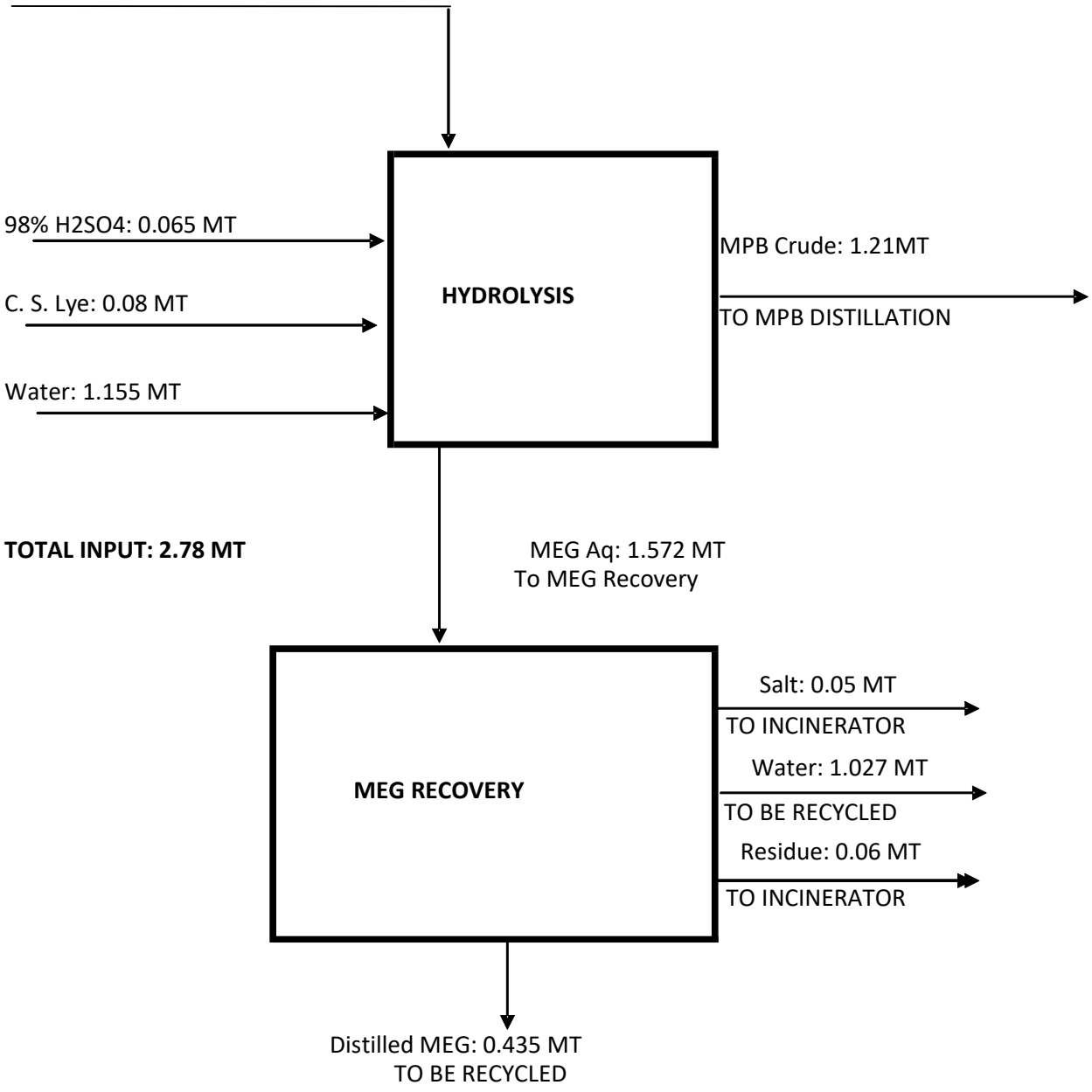
STAGE: 3


MBB CRUDE FROM DROWNING: 5.02 MT
EDC & ALDEHYDE DISTILLATION
MCB Cut: 0.015 MT
TO INCINERATOR
Residue: 0.155 MT
TO INCINERATOR
EDC: 3.55 MT
TO BE RECYCLED
MBB: 1.3 MT
MEG: 0.86 MT
PTSA: 0.004 MT
MBBA PREPARATION
Water: 0.29 MT
TO BE RECYCLED
MEG: 0.265 MT
TO BE RECYCLED
TOTAL INPUT: 2.165 MT
MBBA: 1.61 MT
TO K - PHENATE & CONDENSATION WORK UP

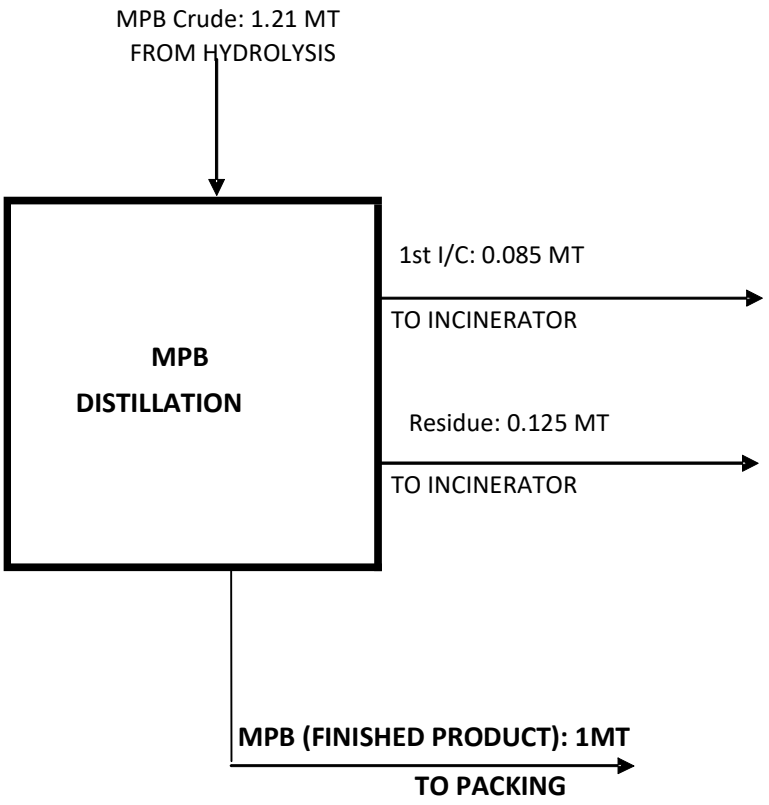
STAGE: 4


MBBA: 1.61 MT
FROM MBBA PREPARATION
Phenol: 0.735 MT
KOH: 0.45MT
Toluene: 1.095MT
C. S. Lye: 0.102 MT
Water: 1.58 MT
K – PHENATE
PREPARATION,
CONDENSATION &
Toluene: 0.965 MT
Water: 0.175 MT
(TO ETP)
Br. Aq.: 2.947 MT
(TO BROMINE RECOVERY)
MATERIAL INPUT: 5.56 MT
Toluene free
MPBA Crude: 1.48 MT
TO HYDROLYSIS

STAGE: 5


98% H2SO4: 0.065 MT
C. S. Lye: 0.08 MT
Water: 1.155 MT
HYDROLYSIS
MPB Crude: 1.21MT
TO MPB DISTILLATION
TOTAL INPUT: 2.78 MT
MEG Aq: 1.572 MT
To MEG Recovery
MEG RECOVERY
Salt: 0.05 MT
TO INCINERATOR
Water: 1.027 MT
TO BE RECYCLED
Residue: 0.06 MT
TO INCINERATOR
Distilled MEG: 0.435 MT
TO BE RECYCLED

STAGE: 6


MPB Crude: 1.21 MT
FROM HYDROLYSIS
MPB
DISTILLATION
1st I/C: 0.085 MT
TO INCINERATOR
Residue: 0.125 MT
TO INCINERATOR
MPB (FINISHED PRODUCT): 1MT
TO PACKING

2) META BROMO NITROBENZENE (ORGANIC INTERMEDIATE) (EXISTING)

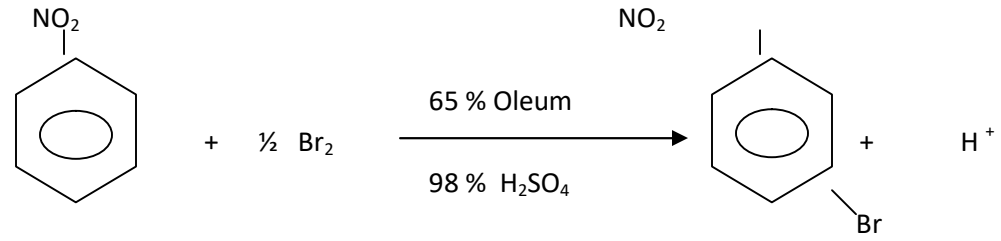
PROCESS DESCRIPTION

Nitrobenzene is mixed with 65% Oleum and 98% H_2SO_4 and chilled down, and then liquid bromine is added drop wise. After Bromine addition is over, the reaction mass is stirred for a few hours. Measured quantity of water is added and the mass is extracted with the suitable solvent.

The extract is distilled and pure solvent is recovered and also pure unreacted nitrobenzene is recovered; then pure 3- BNB (≈ 98%) is distilled and kept in molten condition. The molten mass is drowned in water and crystallized. The wet crystals are filtered / centrifuged and then dried. The dried mass is 98 % 3-BNB, which is packed in 25 kg / 50 kg bags.

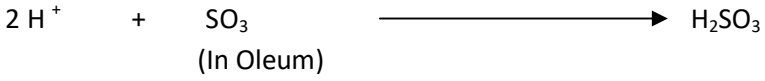
CHEMICAL REACTION

REACTION – 1



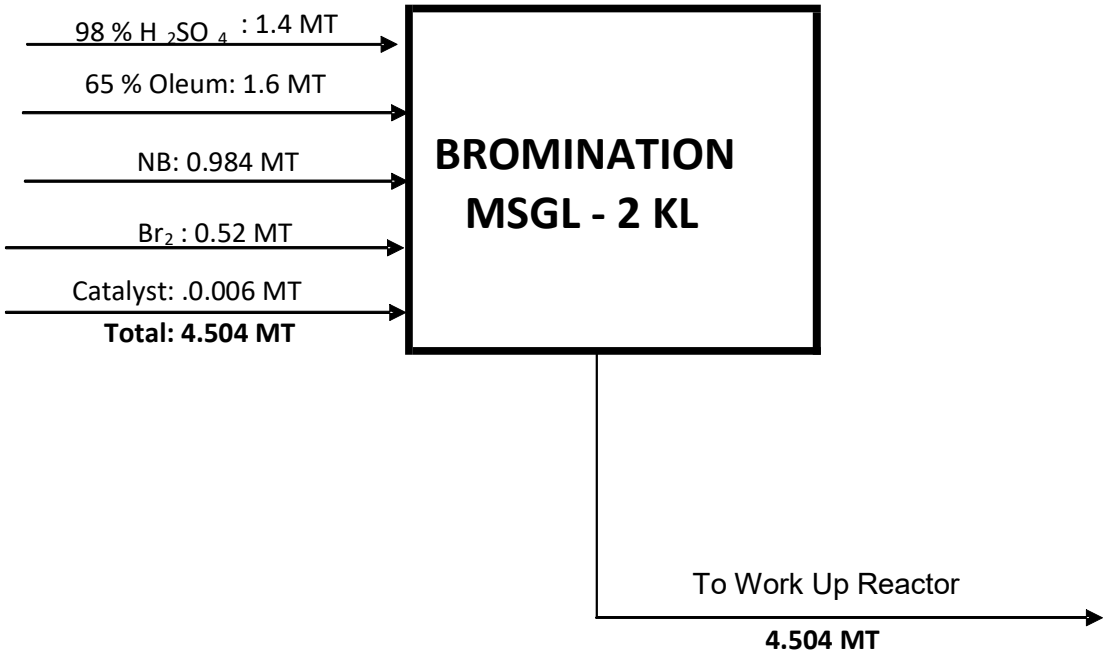
Nitrobenzene **3 – Bromonitrobenzene**

REACTION – 2

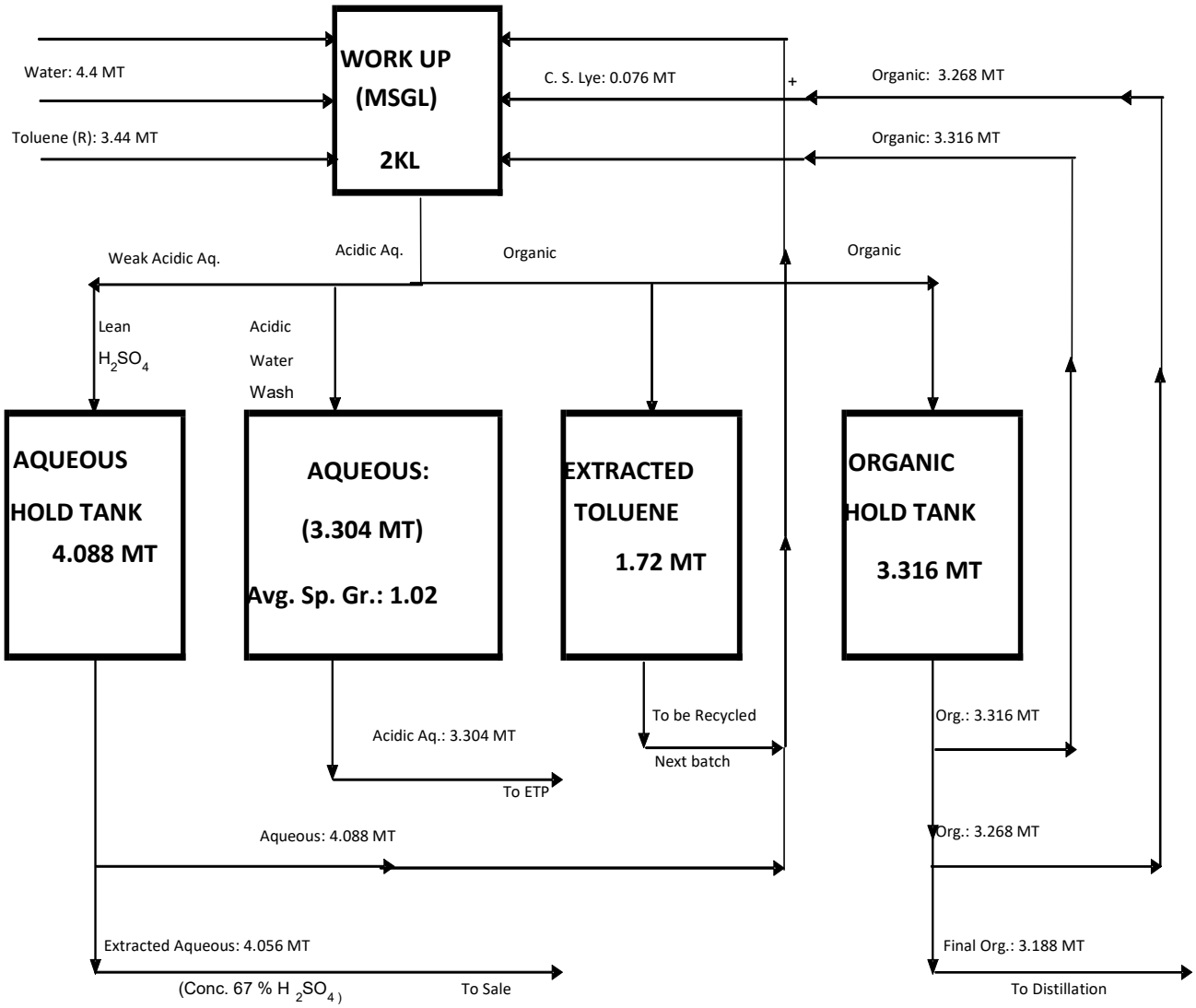


MASS BALANCE

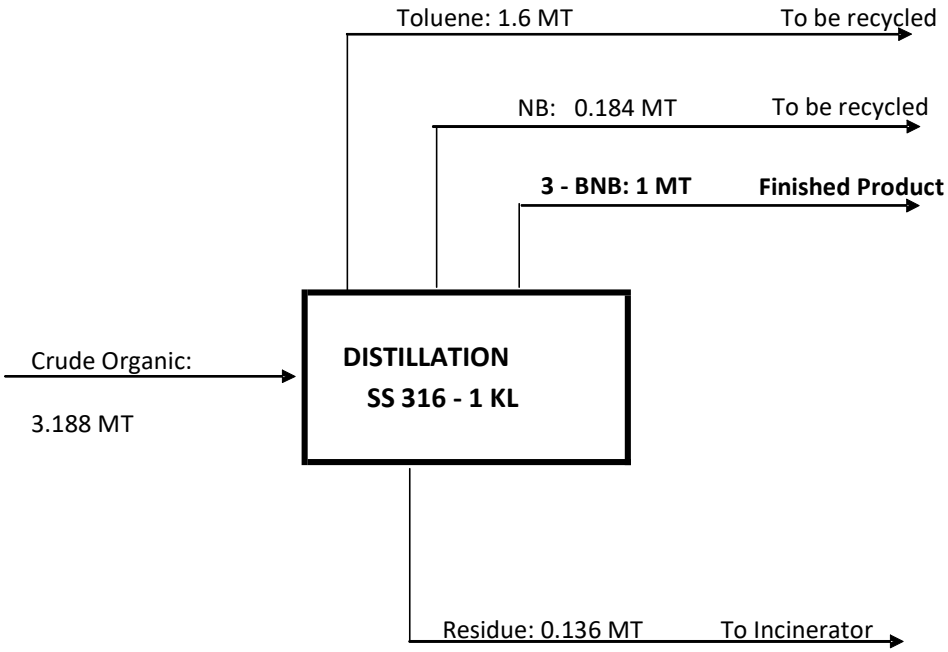
STAGE: 1



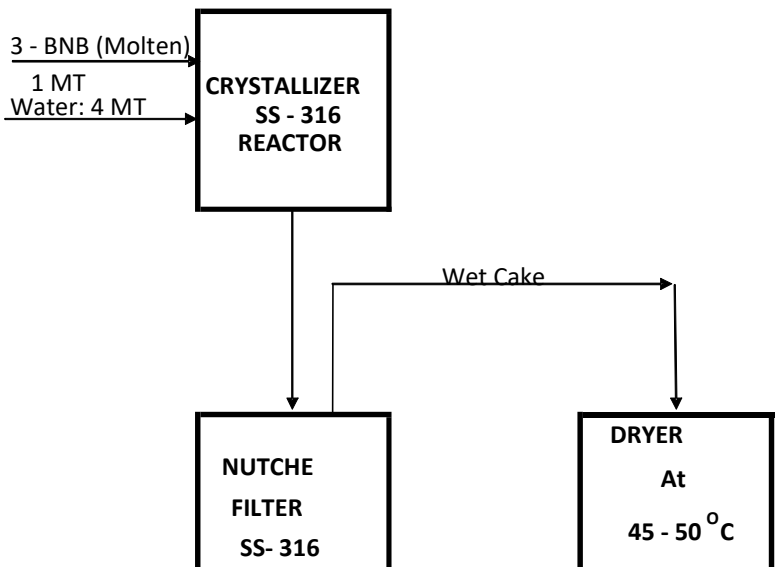
STAGE: 2


WORK UP
(MSGL)
2KL
Water: 4.4 MT
Toluene (R): 3.44 MT
C. S. Lye: 0.076 MT
Organic: 3.268 MT
Organic: 3.316 MT
Weak Acidic Aq.
Acidic Aq.
Organic
Organic
Lean
H_2SO_4
Acidic
Water
Wash
AQUEOUS
HOLD TANK
4.088 MT
AQUEOUS:
(3.304 MT)
Avg. Sp. Gr.: 1.02
EXTRACTED
TOLUENE
1.72 MT
ORGANIC
HOLD TANK
3.316 MT
Acidic Aq.: 3.304 MT
To ETP
To be Recycled
Next batch
Org.: 3.316 MT
Aqueous: 4.088 MT
Org.: 3.268 MT
Extracted Aqueous: 4.056 MT
(Conc. 67 % H_2SO_4)
To Sale
Final Org.: 3.188 MT
To Distillation

STAGE: 3



STAGE: 4



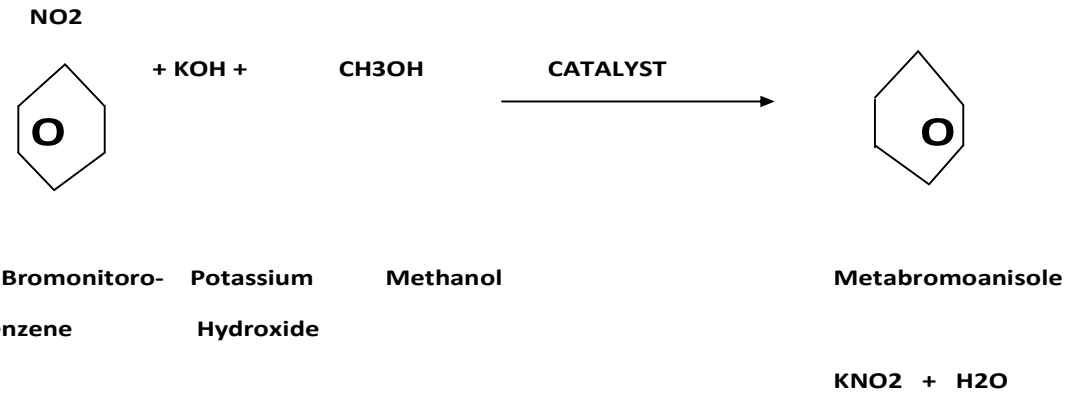
3) **META BROMO ANISOLE (ORGANIC INTERMEDIATE) (EXISTING)**

PROCESS DESCRIPTION

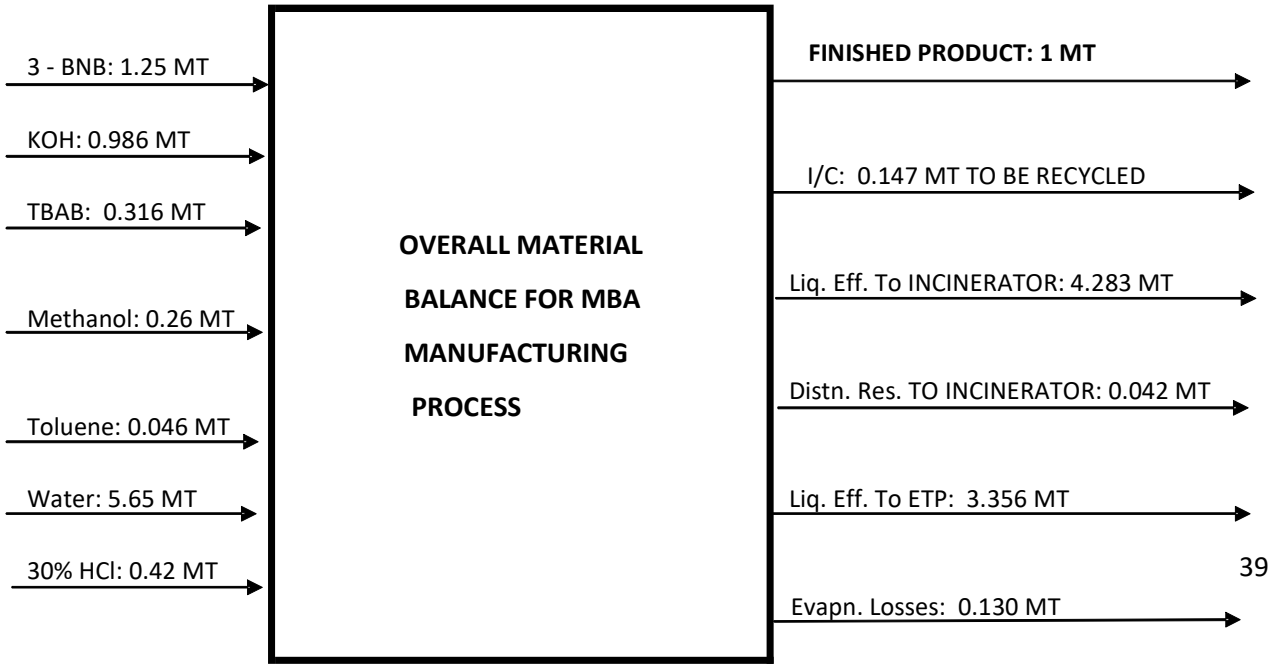
3- BNB is dissolved in toluene at ambient temperature and then catalyst and KOH are charged .To the resulting slurry, the Methanol is added slowly. The reaction mass is then washed with water to remove water soluble salts. The organic layer is again washed dilute HCl and then with water. The organic mass is subjected to distillation and pure toluene is recovered initially, and then pure MBA is distilled, stored and packed .The purity of MBA by GC is ≥ 99 %.

CHEMICAL REACTION

MBA –PROCESS CHEMISTRY



MASS BALANCE



4) LAMBDA CYHALOTHRIN or DELTAMETHRIN (PESTICIDE) (EXISTING)

A. LAMBDA CYHALOTHRIN

MANUFACTURING PROCESS

The process for the manufacturing of λ – Cyhalothrin is divided into the following steps:

1. ACID CHLORIDE PREPARATION

λ – Cyhalothric acid is reacted with Thionyl Chloride in presence of n-Hexane (as solvent) at low temperature over a period of time .The SO_2 and HCl gas are liberated slowly as the reaction progresses; and , first HCl gas is scrubbed in water and then SO_2 is scrubbed by NaOH solution. The resulting 30 % HCl solution and also Sodium Bisulfite are obtained in the scrubbing system .After the reaction, Hexane is distilled off and recycled back to the next batch. The resulting Acid Chloride is sent for the Condensation step.

2. CONDENSATION & WORK – UP

In the solution of water and Sodium Cyanide, MPB and Acid Chloride are added at low temperature. After the addition, the reaction mass is cooled at low temperature for the fixed period. Then phase separation carried out and the organic phase washed with hypo & alkali solution. The organic phase is subjected to distillation at low temperature to remove Hexane which is recycled. Hexane – free reaction mass which is Crude λ – Cyhalothrin is sent for the Epimerisation step. The aqueous phase is sent for Cyanide Effluent Treatment.

3. EPIMERISATION & IPA RECOVERY

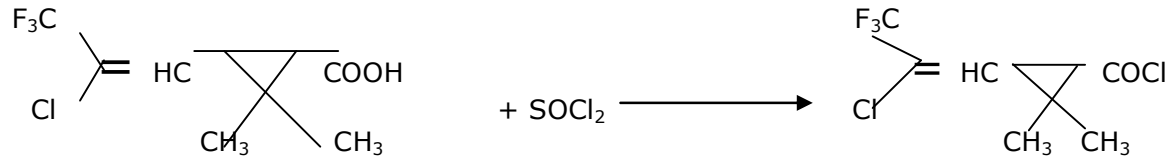
The crude λ – Cyhalothrin is washed with IPA and DIIPA in presence of solvent. Then again washed with acidic water .The phases are separated .The IPA & Hexane are recovered and the reaction mass sent for crystallization.

4. CRYSTALLIZATION

THE EPIMERIZED MASS IS EXTRACTED WITH THE SOLVENT AND THEN DRIED. THE DRIED MASS WHICH IS Λ – CYHALOTHRIN IS PACKED.

CHEMICAL REACTION

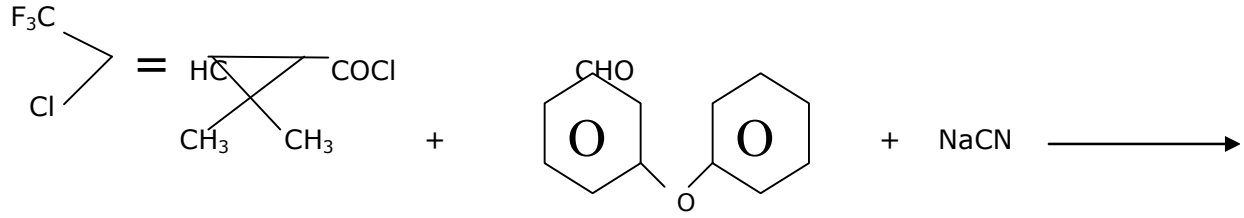
ACID CHLORIDE PREPARATION



λ – Cyhalothric Acid **Thionyl Chloride** **λ – Cyhalothric Chloride**

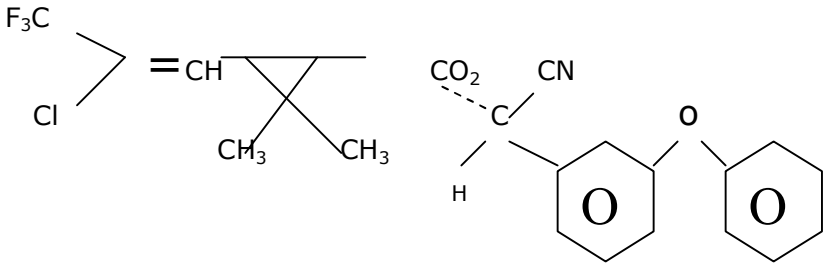
+ SO_2 + HCL

CONDENSATION

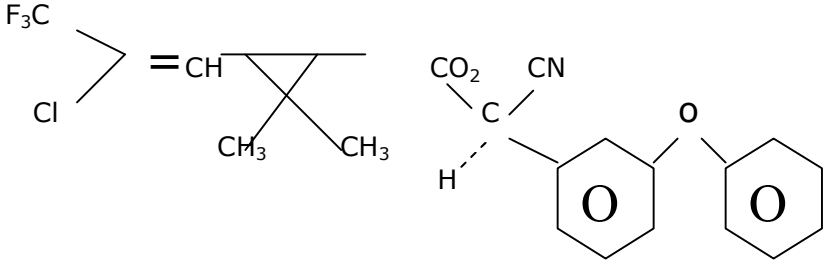


λ – Cyhalothric Chloride **MPB**

(S) (Z) – (IS) – Cis



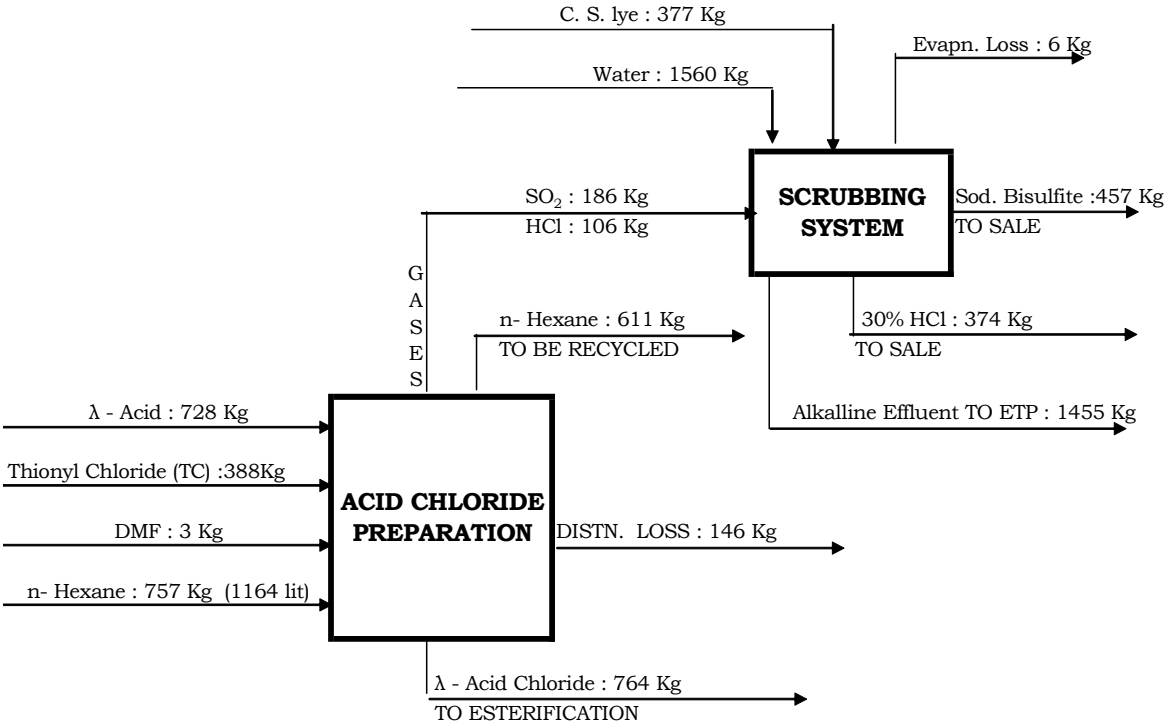
(R) (Z) – (IS) – Cis



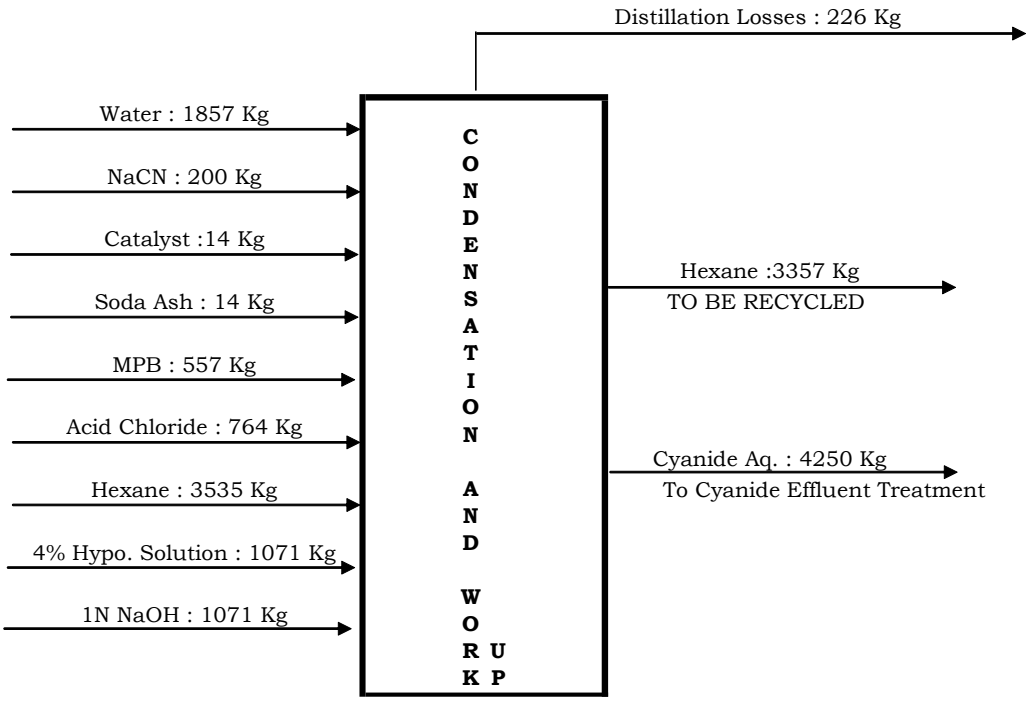
MASS BALANCE

STAGE: 1

1. ACID CHLORIDE PREPARATION :-

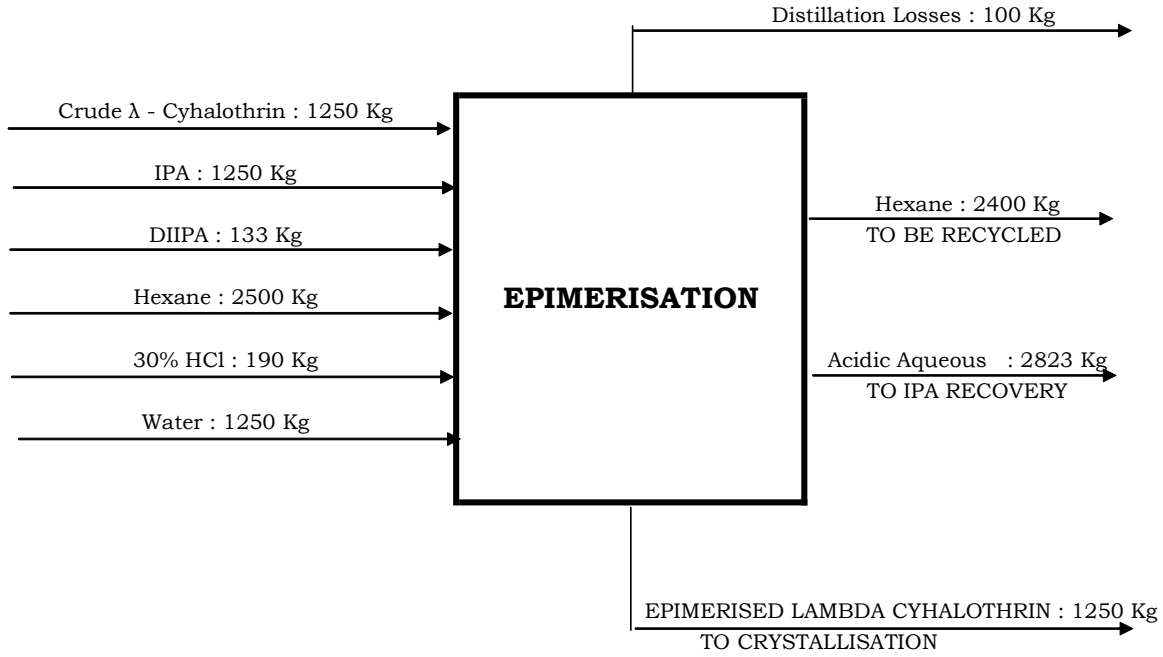


STAGE: 2



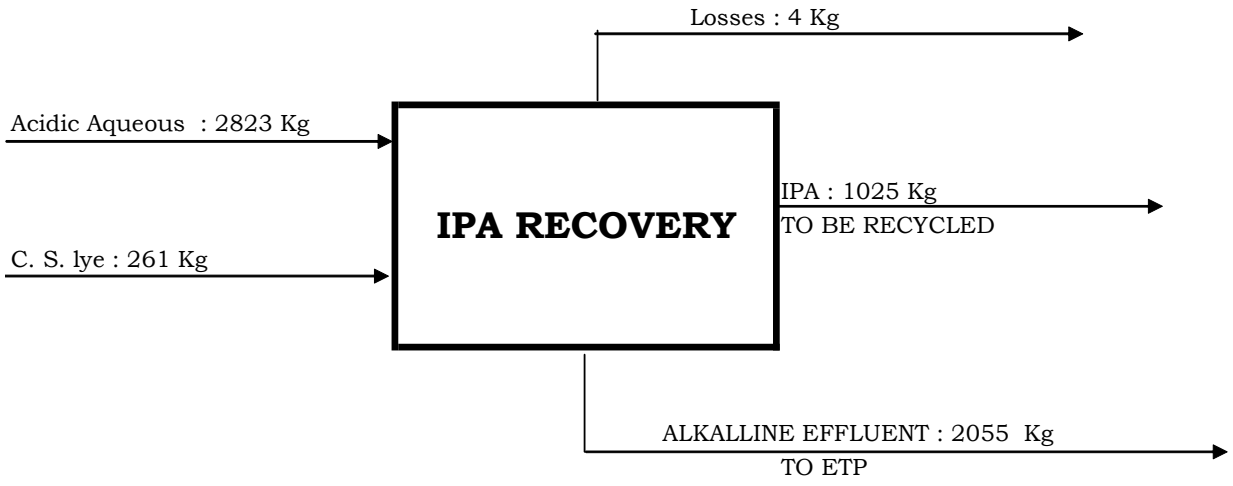
STAGE: 3

3. EPIMERISATION :-



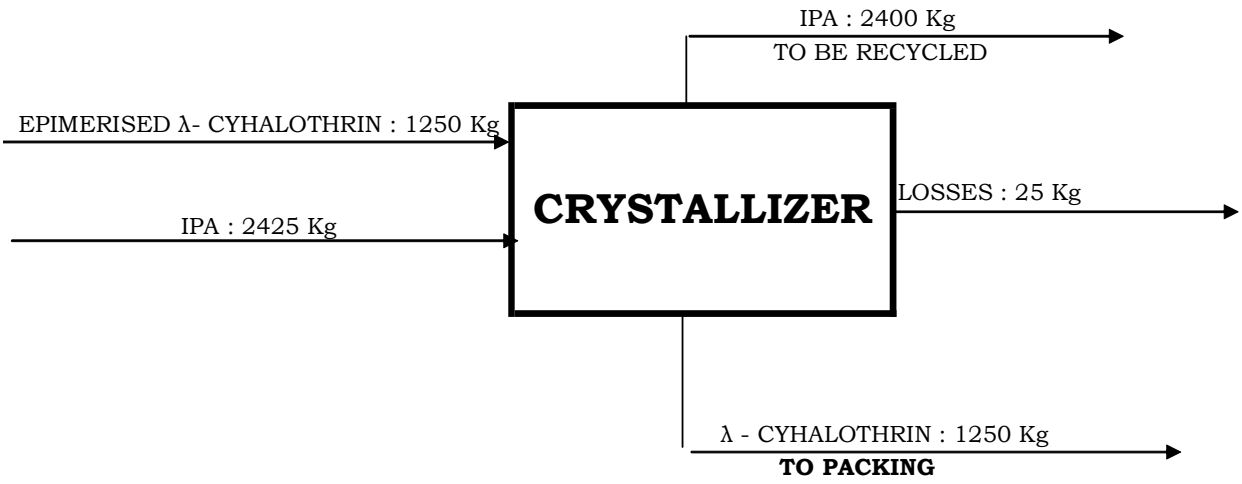
STAGE: 4

4. IPA RECOVERY :-



STAGE: 5

5. CRYSTALLIZATION :-



B. DELTAMETHRIN

PROCESS DESCRIPTION

Step I: Resolution of Mix CMA to RR CMA

Mix CMA [SS CMA and RR CMA] is converted to its sodium salt along with Catalyst EPH. The RR CMA sodium salt along with EPH precipitates under alkaline condition, while SS CMA remains soluble in the aqueous medium. The precipitates are filtered and wash with water. The filtrates are collected and worked up for recovery of SS CMA [**Ref - 2]**.

The solids [wet cake of RR CMA Sodium salt along with EPH] is further taken in solvent MDC along with water and acidified to pH 2 by HCl solution. The RR CMA gets extracted in MDC while EPH in aqueous medium. The layers are separated. The aqueous [main separation] is collected separately for catalyst recovery and recycle **[Ref - 1]**. The Organic layer is further washed with water and taken for further process. The washing water is taken to ETP.

Ref - 1: Recovery of Catalyst

The main aqueous layer obtained from acidification of RR CMA sodium is further adjusted for its pH to 3.5 - 4.0 by NaOH and is directly recycled as Catalyst with necessary make up.

Ref - 2: Recovery of SS CMA

The highly alkaline aqueous filtrates from step I is taken along with Solvent MDC and acidified by HCl solution. The SS CMA thus formed is extracted in MDC. The layers are separated. The acidic aqueous layer is taken for treatment, while organic layer is further subjected to MDC distillation [initially under atmospheric condition followed by vacuum recovery]. The residual molten mass is SS CMA and is used for Cypermethrin manufacturing.

Step II: Bromination of RR CMA

The organic mass consisting of RR CMA obtained from previous step is subjected to Bromination with HBr generated from HBR system **[Ref - 3].** Bromination of RR CMA results into unsaturated bromo RR CMA. Unsaturated RR CMA is further Dehydrohalogenated by treatment with Sodium Hydroxide to give saturated Brom RR CMA sodium, which in turn is further acidified to obtain saturated Brom RR CMA.

The Organic mass is subjected to distillation for removal [and recycle] of solvent leaving purer Bromo RR CMA as distillation residual.

Ref - 3: HBr generation and its work up

Benzene is brominated with Bromine using Ferric Chloride as catalyst. The HBr generated in passed to Bromination set up of unsaturated RR CMA as shown above. The bromo benzene obtained is further purified by distillation for recovering of benzene which is recycled. The pure cut of Bromobenzene is sold out as it is a by-product.

Step III: Preparation of Bromo RR CMAC from Brom RR CMA

The Bromo RR CMA obtained from previous step is taken along with Toluene as solvent and DMF as catalyst and is chlorinated by aid of Thionyl chloride, which yields Bromo RR CMAC and HCl and SO2 as off gas which are scrubbed in water and dilute alkali respectively and are by-product.

Step IV: Preparation of Deltamethrin from Bromo RR CMAC

Bromo RR CMAC is reacted with Meta-Phenoxy Benzaldehyde and Sodium Cyanide in Toluene to give Deltamethrin. The reaction mass is subjected to layer separation and washing with water. The aqueous layer obtained is detoxified with Hypo solution **[Ref - 5]**. The washed organic mass obtained is subjected for Toluene recovery by distillation leaving crude Deltamethrin as residual mass.

The crude Deltamethrin obtained is further epimerized in Isopropyl Alcohol along with Triethyl Alcohol. The epimerized product is filtered and washed with Isopropyl alcohol. The filtrate is collected for recovery of Isopropyl alcohol **[Ref - 4]**. The wet cake obtained is further recyrstallized in Isopropyl Alcohol to obtain purified Deltamethrin. In this case also the filtrate obtained is taken for Isopropyl; recovery **[Ref - 4]**.

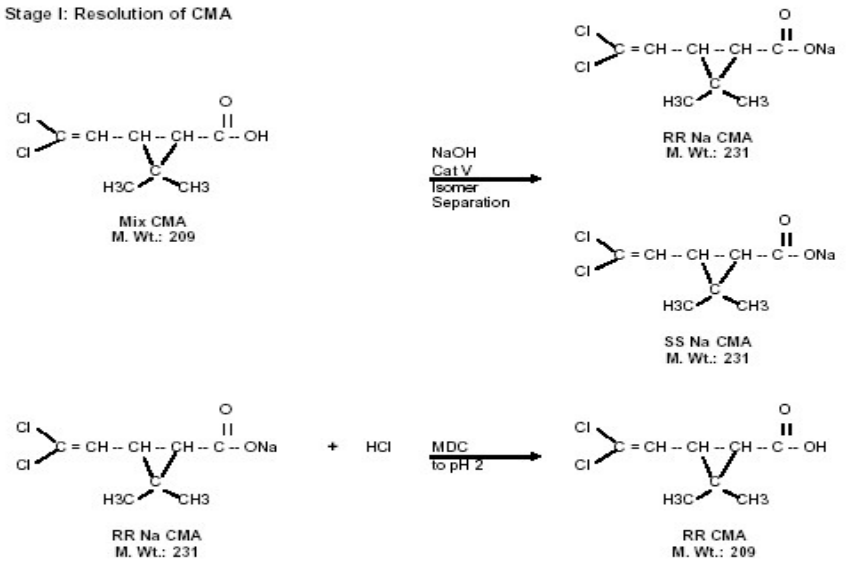
Ref - 4: Isopropyl Recovery

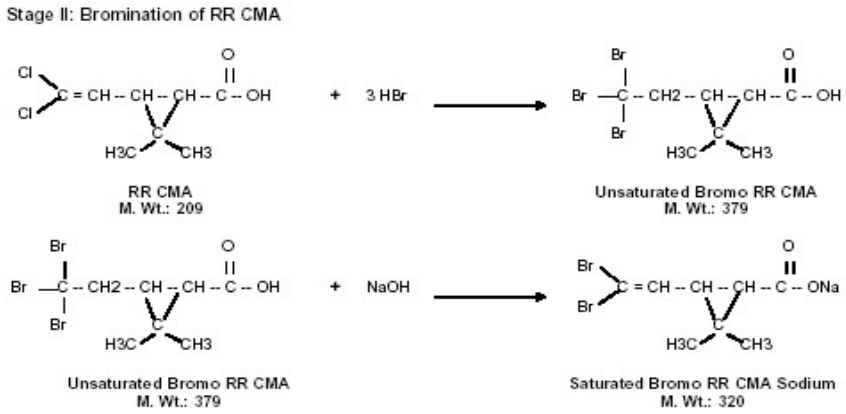
All the filtrate obtained [IPA filtrate] are taken collectively and subjected to distillation under slightly acidic condition. The residual obtained is sent for incineration.

Ref - 5: Detoxification of Deltamethrin Aqueous stream

TOTAL AQUEOUS MASS OBTAINED FROM DELTAMETHRIN REACTION STREAM IS COLLECTIVELY DE-TOXIFIED USING HYPO SOLUTION.

CHEMICAL REACTION

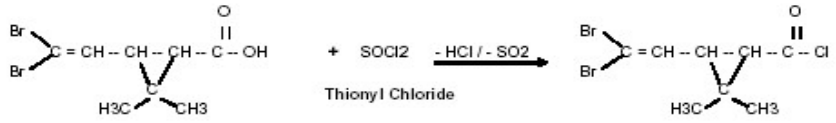




Bromo RR CMA Sodium
M. Wt.: 320

Bromo RR CMA
M. Wt.: 298

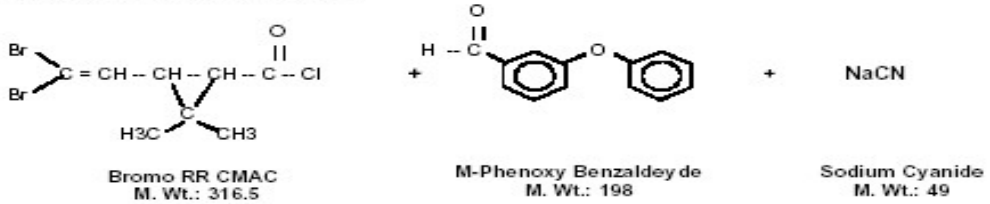
Stage III: Bromo RR CMAC preparation



Bromo RR CMA
M. Wt.: 298

Bromo RR CMAC
M. Wt.: 316.5

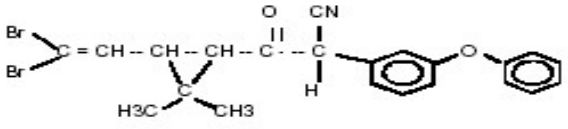
Stage IV: Deltamethrin Preparation



Bromo RR CMAC
M. Wt.: 316.5

M-Phenoxy Benzaldeyde
M. Wt.: 198

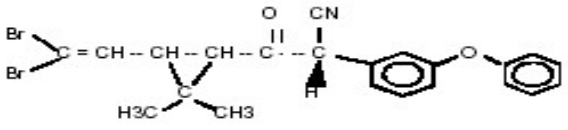
Sodium Cyanide
M. Wt.: 49



Deltamethrin
M. Wt.: 505.28

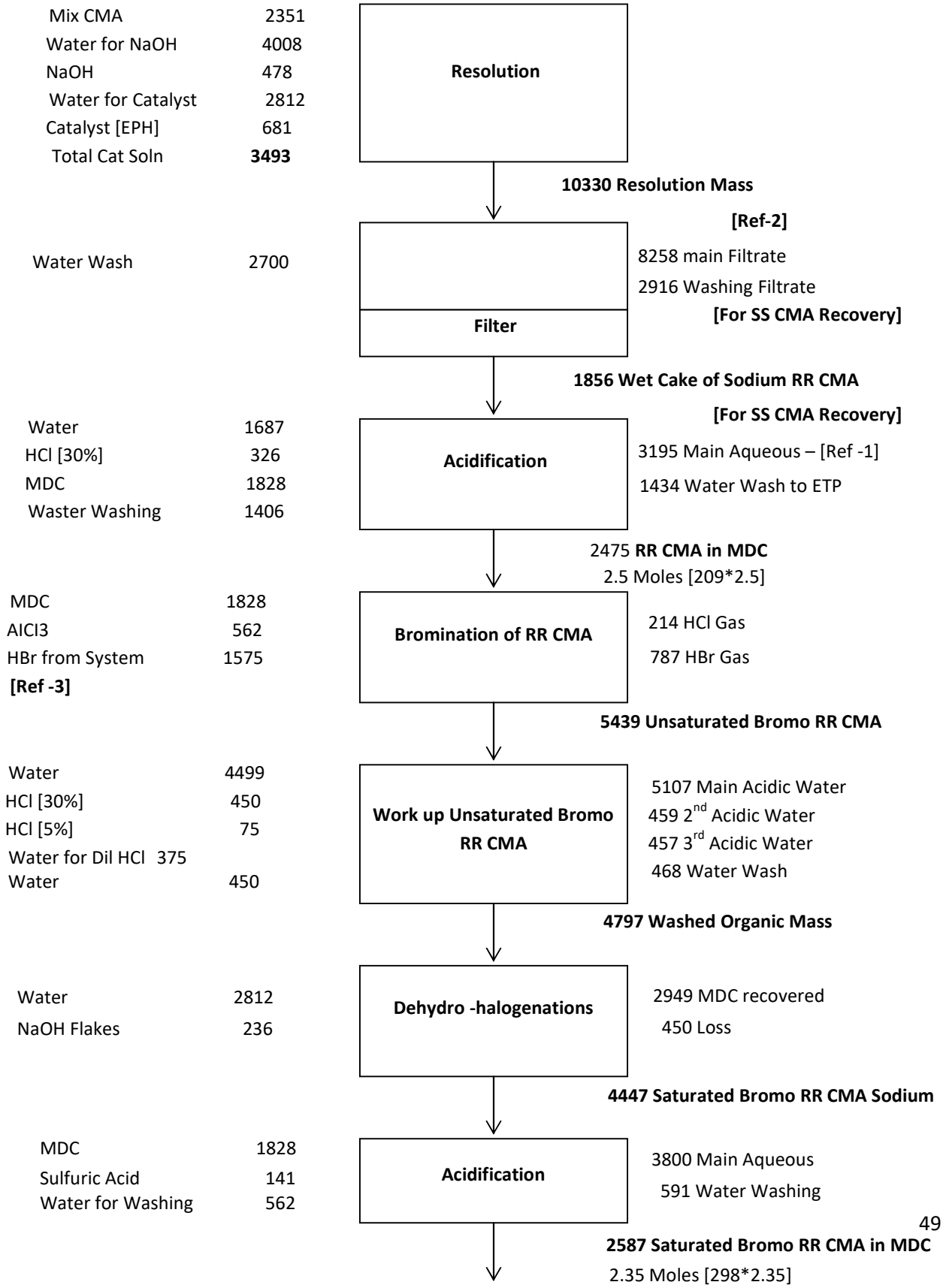
Epimerization in IPA / TEA

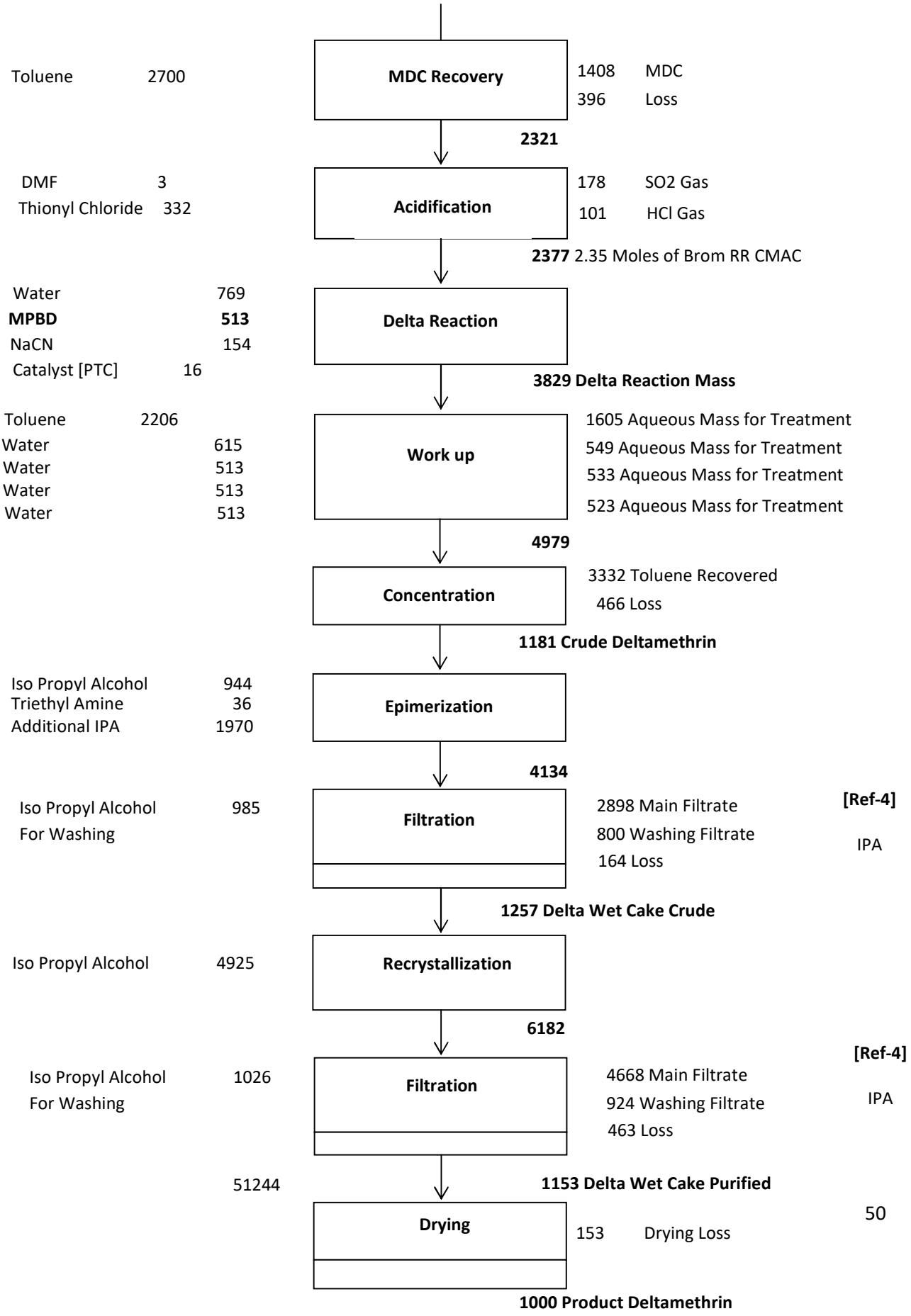
Stage V: Epimeraization of Deltamethrin



Deltamethrin
M. Wt.: 505.28

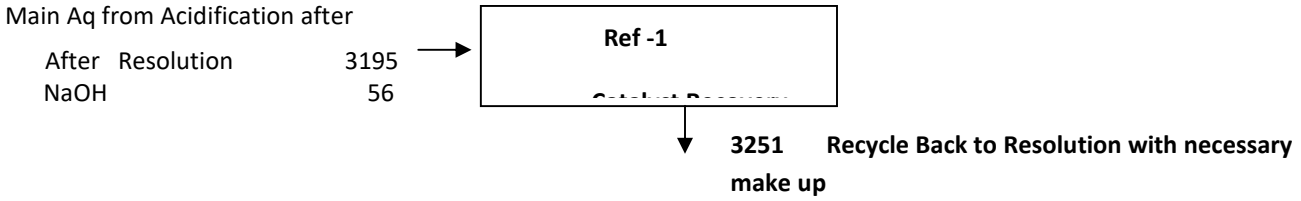
MASS BALANCE



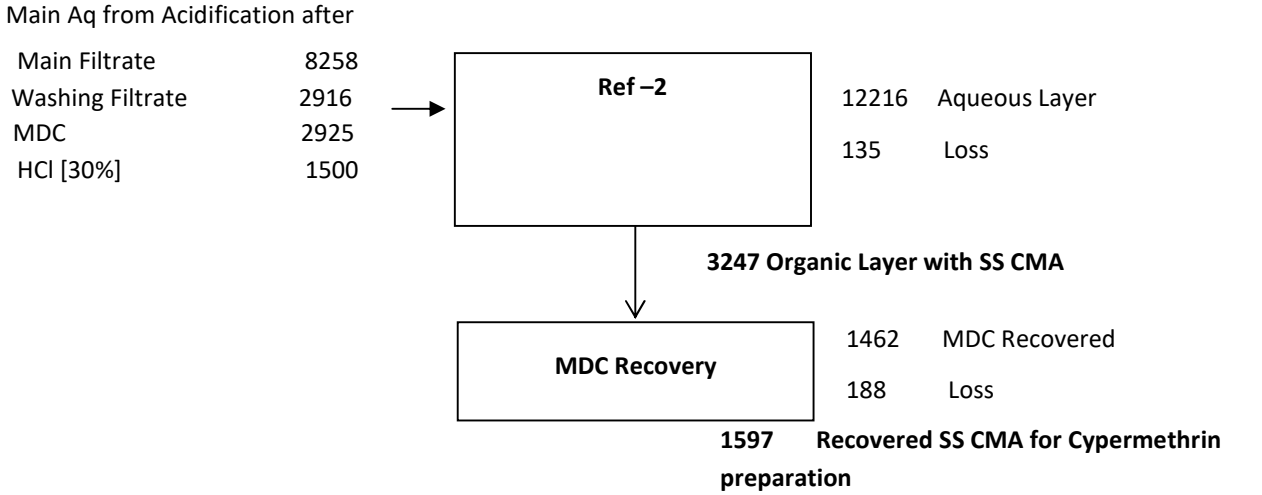

Toluene 2700
MDC Recovery
1408 MDC
396 Loss
2321
DMF 3
Thionyl Chloride 332
Acidification
178 SO2 Gas
101 HCl Gas
2377 2.35 Moles of Brom RR CMAC
Water 769
MPBD 513
NaCN 154
Catalyst [PTC] 16
Delta Reaction
3829 Delta Reaction Mass
Toluene 2206
Water 615
Water 513
Water 513
Water 513
Work up
1605 Aqueous Mass for Treatment
549 Aqueous Mass for Treatment
533 Aqueous Mass for Treatment
523 Aqueous Mass for Treatment
4979
Concentration
3332 Toluene Recovered
466 Loss
1181 Crude Deltamethrin
Iso Propyl Alcohol 944
Triethyl Amine 36
Additional IPA 1970
Epimerization
4134
Iso Propyl Alcohol 985
For Washing
Filtration
2898 Main Filtrate
800 Washing Filtrate
164 Loss
[Ref-4]
IPA
1257 Delta Wet Cake Crude
Iso Propyl Alcohol 4925
Recrystallization
6182
Iso Propyl Alcohol 1026
For Washing
Filtration
4668 Main Filtrate
924 Washing Filtrate
463 Loss
[Ref-4]
IPA
51244
1153 Delta Wet Cake Purified
Drying
153 Drying Loss
50
1000 Product Deltamethrin

Sub Process Flow

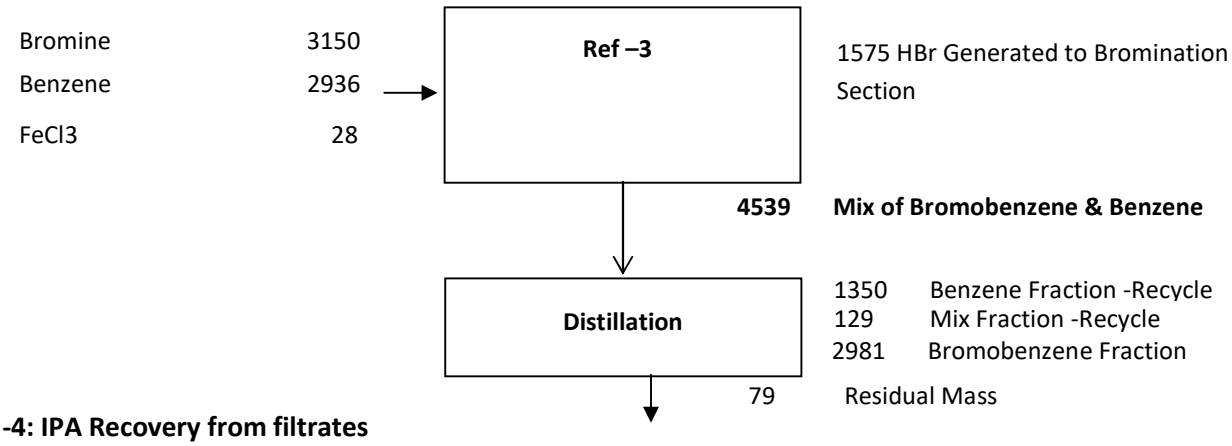
Ref -1: Catalyst Recovery and Recycle



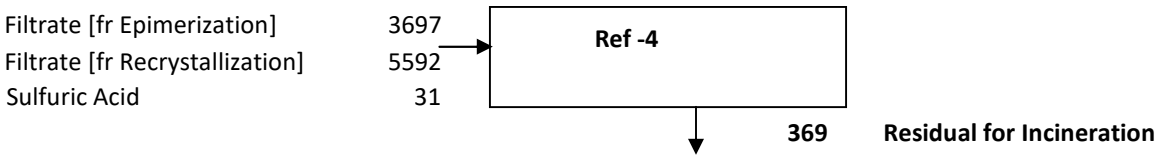
Ref -2: Recovery of SS CMA from aqueous Mass obtained from Resolution



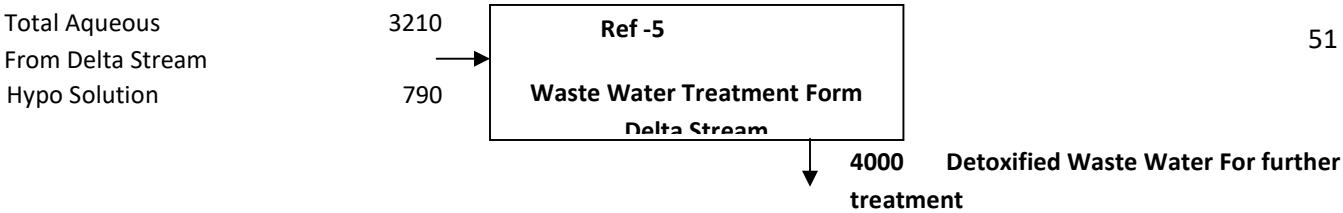
Ref -3: Bromination [HBr generation System]



Ref -4: IPA Recovery from filtrates



Ref -5: Detoxification of waste Water Streams consisting of NaCN



5) DV-ACID CHLORIDE (CMAC)

MANUFACTURING PROCESS

STAGE: 1 PREPARATION OF TETRA CHLORO BUTYRO NITRILE (TBN)

Reaction of Carbon tetra chloride (CTC) with acrylonitrile (ACN) at 100 to 125°C in presence of cupric chloride catalyst, DEA HCl as a buffer & acetonitrile (AN) solvent gives tetra Chloro butryo nitrile (TBN). Crude TBN is washed with water to remove catalyst complex, DEA. HCl salt. Solvent AN & excess CTC is distilled out. Crude TBN is proceeded further. The purity of basic R/M CTC & CAN is above 99% where as crude TBN purity is above 97%.

STAGE: 2 PREPARATION OF TERTA CHLORO BUTYRIC ACID (TBA)

Acid hydrolysis of Crude TBN using 30% of HCl solution at 80°C gives tetra Chloro butyric Acid (TBA). After reaction TBA is separated from the bottom & dehydrated upto the moisture level of 0.1% & Ammonium chloride solution from top layer is stored in storage tank for sell. The purity of TBA is above 98%.

STAGE: 3 PREPARATION OF TETRA CHLORO BUTYRIC ACID CHLORIDE (TBAC)

Reaction of TBA with Thionyl chloride in presence of Dimethyl formamide (catalyst) at 60°C gives Tetra Chloro Butyric Acid Chloride (TBAC). During reaction HCl & SO2 gas is evolved which is scrubbed in water & Caustic solution respectively. Crude TBAC is further distilled out at high vacuum. The purity of distilled TBAC is 98%.

STAGE: 4 PREPARATION OF 2-CHLORO BUTANONE DERIVATIVE (2CB)

TBAC is reacted with isobutylene gas in presence of TEA (tri Ethyl Amine) at 70°C under 5.0 kg/cm2 pressures. n-Hexane is used as solvent. After reaction excess Isobutylene gas is recovered. The whole mass is washed with water & Tri-ethylamine hydrochloric acid is separated & further preceded for TEA recovery. The organic mass is neutralized with sodium bicarbonate & organic mass is transferred for further process.

STAGE: 5 PREPARATION OF SODIUM SALT OF CYPERMETHRIN ACID (NA-CMA)

2CB is isomerised to 4CB in presence of Boron tri fluoride etherate solution (BF3) & TEA at 120°C. 4CB is directly reacted with caustic solution gives Na-CMA. This intermediate is not getting isolated.

STAGE: 6 PREPARATION OF CYPERMETHRIN ACID (CMA)

Na-CMA is acidified with dilute Sulphuric acid at Room temperature. CMA is extracted in n-hexane. Aqueous layer (sodium sulphate solution) is sent for triple effective evaporator. Organic

mass (n-hexane +CMA) is taken for next process.

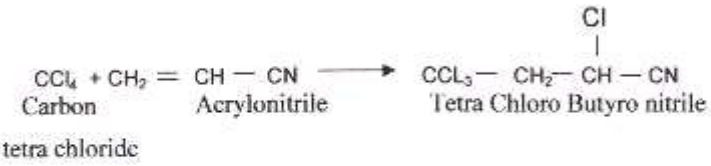
STAGE: 7 PREPARATION OF CYPERMETHRIN ACID CHLORIDE (CMAC)

N-HEXANE IS RECOVERED FROM CMA SOLUTION. CRUDE CMA IS REACTED WITH THIONYL CHLORIDE IN PRESENCE OF DMF CATALYST TO GIVE CRUDE CMAC. HCL & SO2 GAS GENERATED IS SCRUBBED IN WATER & CAUSTIC SOLUTION RESPECTIVELY. CRUDE CMAC IS DISTILLED OUT UNDER HIGH VACUUM TO GET PURE CMAC (CYPERMETHRIC ACID CHLORIDE). THE PURITY OF DISTILLED CMAC IS ABOVE 99%.

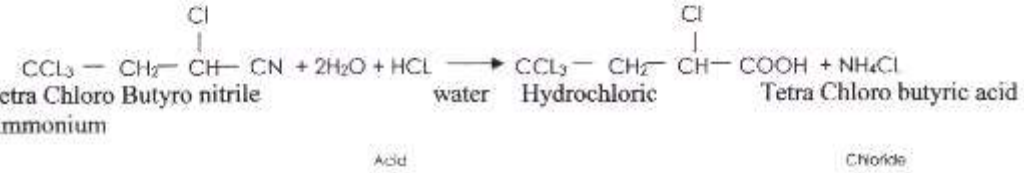
CHEMICAL REACTION

CHEMICAL REACTION OF CYPERMETHRIC ACID CHLORIDE (CMAC)

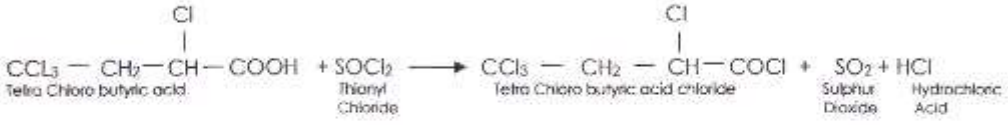
STAGE-1: - PREPARATION OF TETRA CHLORO BUTYRO NITRILE



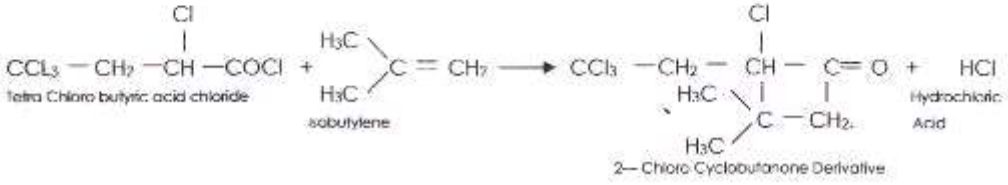
STAGE-2: - PREPARATION OF TETRA CHLORO BUTYRIC ACID



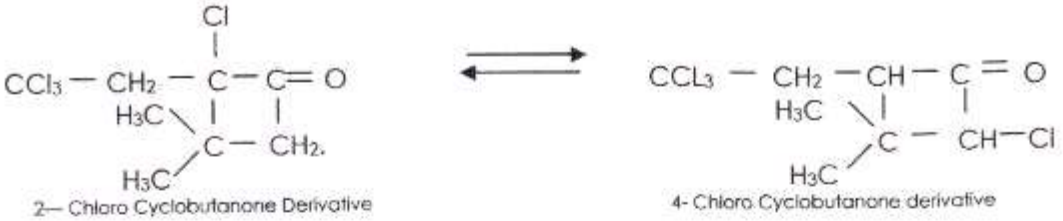
STAGE-3: - PREPARATION OF TETRA CHLORO BUTYRIC ACID CHLORIDE



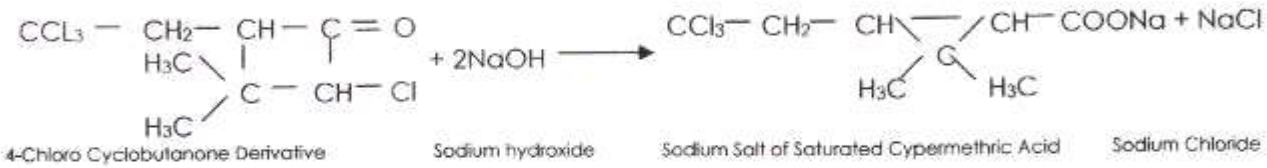
STAGE-4: - PREPARATION OF 2-CHLORO CYCLOBUTANONE DERIVATIVE



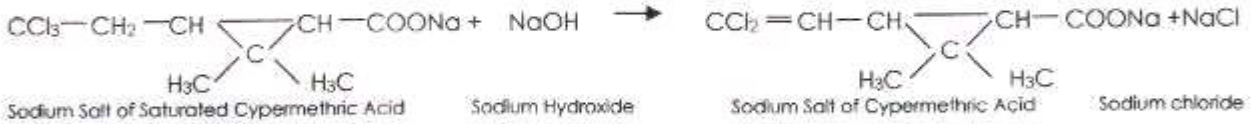
STAGE-5: - PREPARATION OF 4-CHLORO CYCLOBUTANONE DERIVATIVE



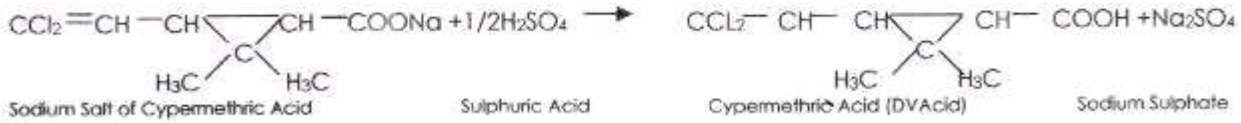
STAGE-6: - PREPARATION OF SODIUM SALT OF SATURATED CYPERMETHRIC ACID



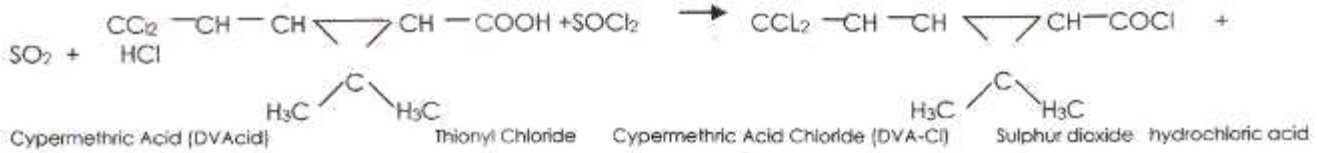
STAGE-7: - PREPARATION OF SODIUM SALT OF CYPERMETHRIC ACID



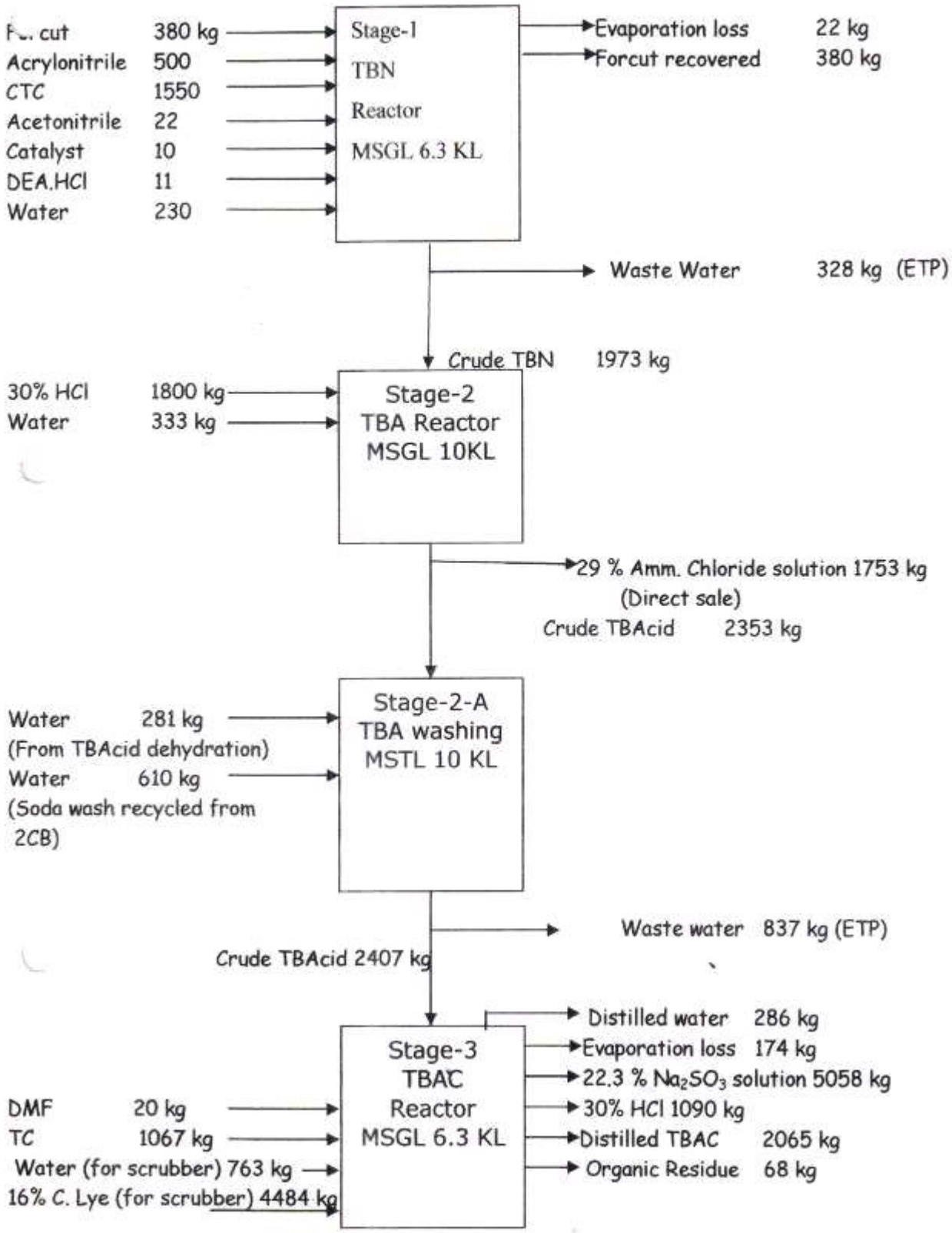
STAGE-8: - PREPARATION OF CYPERMETHRIC ACID (DVACID)

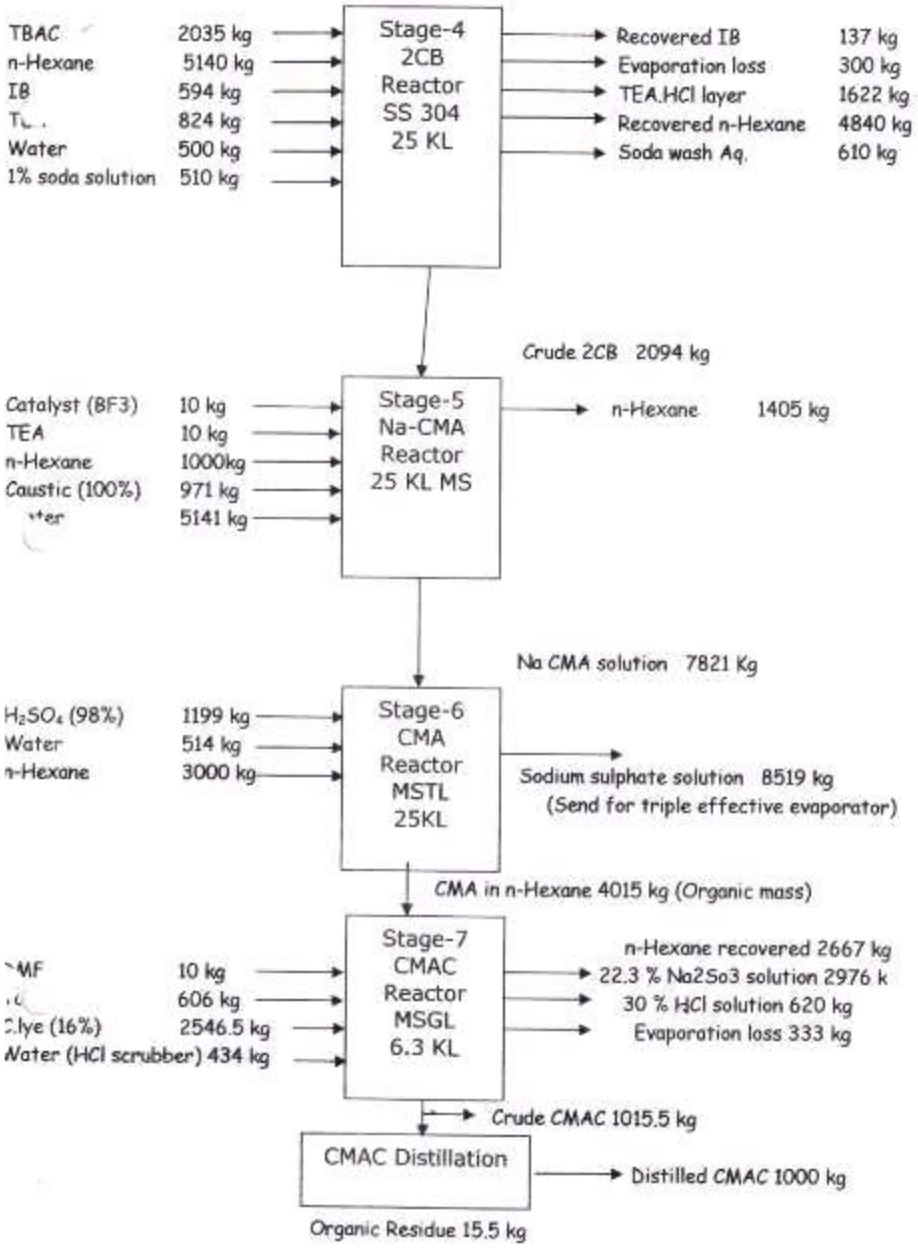


STAGE-9: - PREPARATION OF CYPERMETHRIC ACID CHLORIDE (DVACID CHLORIDE)



MASS BALANCE FOR CMAC (CYPERMETHRIC ACID CHLORIDE)




TBAC 2035 kg
n-Hexane 5140 kg
IB 594 kg
Water 500 kg
1% soda solution 510 kg
Stage-4
2CB
Reactor
SS 304
25 KL
Recovered IB 137 kg
Evaporation loss 300 kg
TEA.HCl layer 1622 kg
Recovered n-Hexane 4840 kg
Soda wash Aq. 610 kg
Crude 2CB 2094 kg
Catalyst (BF3) 10 kg
TEA 10 kg
n-Hexane 1000kg
Caustic (100%) 971 kg
5141 kg
Stage-5
Na-CMA
Reactor
25 KL MS
n-Hexane 1405 kg
Na CMA solution 7821 Kg
H2SO4 (98%) 1199 kg
Water 514 kg
n-Hexane 3000 kg
Stage-6
CMA
Reactor
MSTL
25KL
Sodium sulphate solution 8519 kg
(Send for triple effective evaporator)
CMA in n-Hexane 4015 kg (Organic mass)
10 kg
606 kg
2546.5 kg
Water (HCl scrubber) 434 kg
Stage-7
CMAC
Reactor
MSGL
6.3 KL
n-Hexane recovered 2667 kg
22.3 % Na2So3 solution 2976 k
30 % HCl solution 620 kg
Evaporation loss 333 kg
Crude CMAC 1015.5 kg
CMAC Distillation
Distilled CMAC 1000 kg
Organic Residue 15.5 kg

6) CYPERMETHRIN TECH.

MANUFACTURING PROCESS

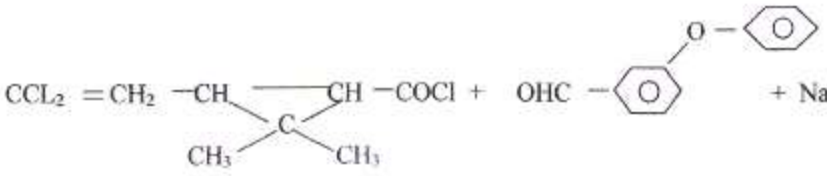
Solution of CMAC (in-house manufactured as well as procured from the market) and Meta phenoxy benzaldehyde reacts with solution of sodium cyanide in water in presence of phase transfer catalyst at 25 to 30°C to give Cypermethrin. After reaction water & cyanide layer is separated. The organic mass is washed with water to remove traces of Cyanide. Water layer contain sodium cyanide and is treated with sodium hypochlorite to destroy sodium cyanide the obtain purity of Cypermethrin is minimum 92%.

CHEMICAL REACTION

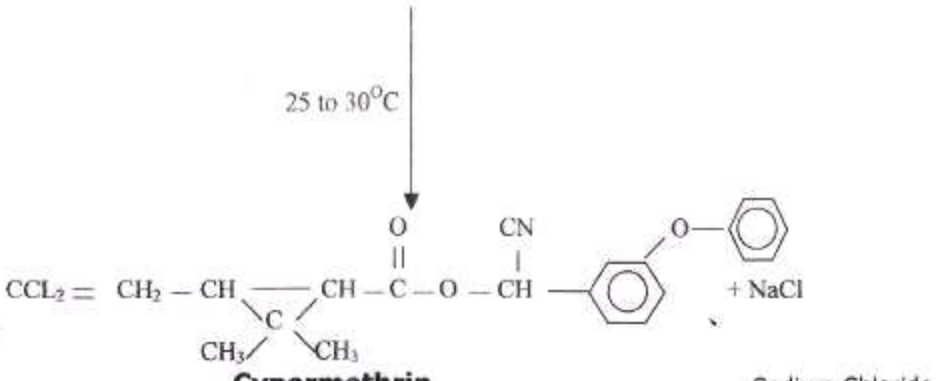
CHEMICAL REACTION OF CYPERMETHRIN

EMICAL REACTION

Preparation of Cypermethrin / Alpha Cypermethrin



Cyper methric acid chloride Meta phenoxy benzaldehyde sodium cyanide

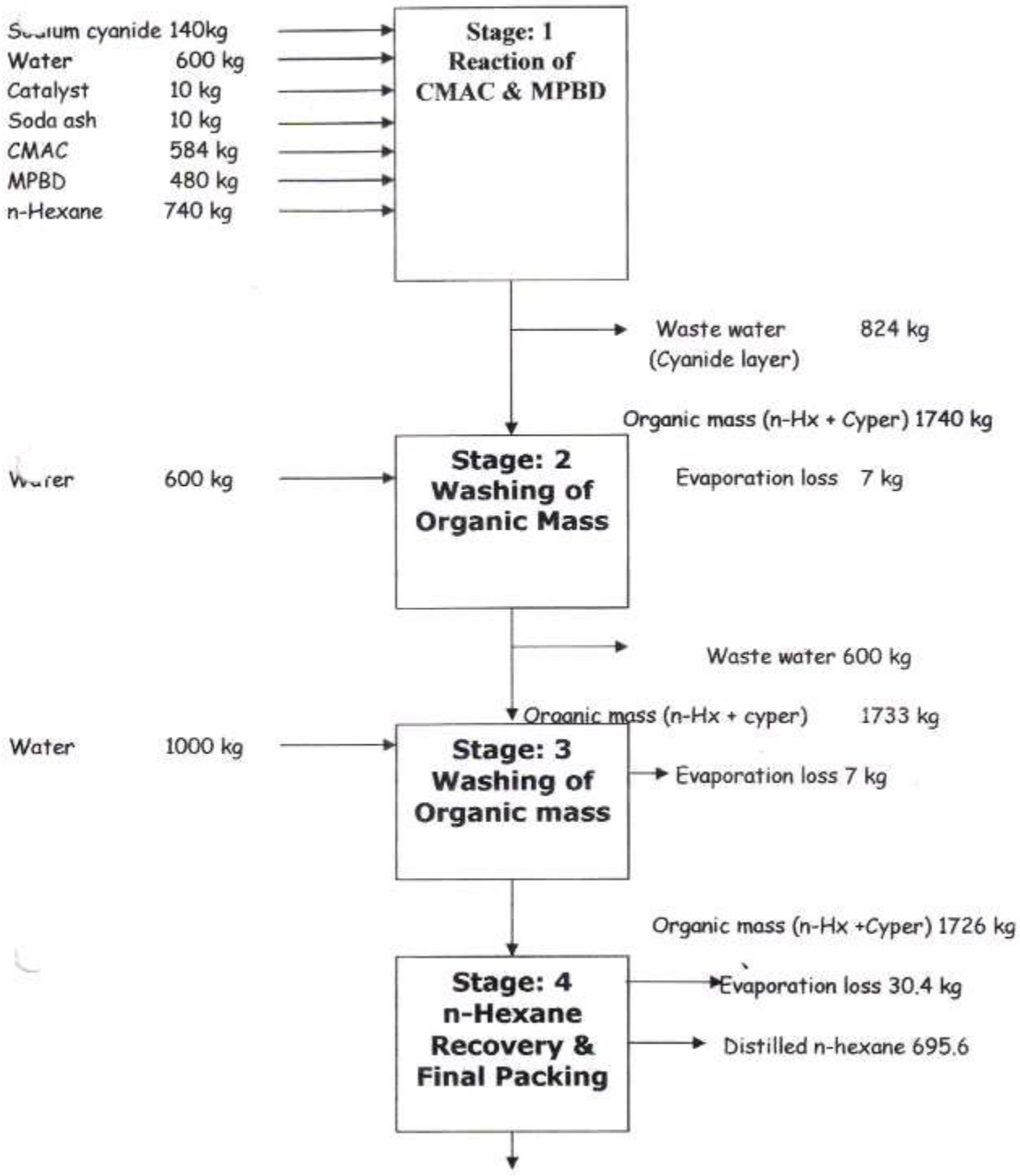


Cypermethrin Sodium Chloride

um Cyanide Sodium hypo chlorite water sodium chloride Carbon dioxide Nitrogen Sodium hydroxi

MASS BALANCE

MASS BALANCE FOR CYPERMETHRIN TECHNICAL



CYPERMETHRIN TECHNICAL PACKED 1000 KG

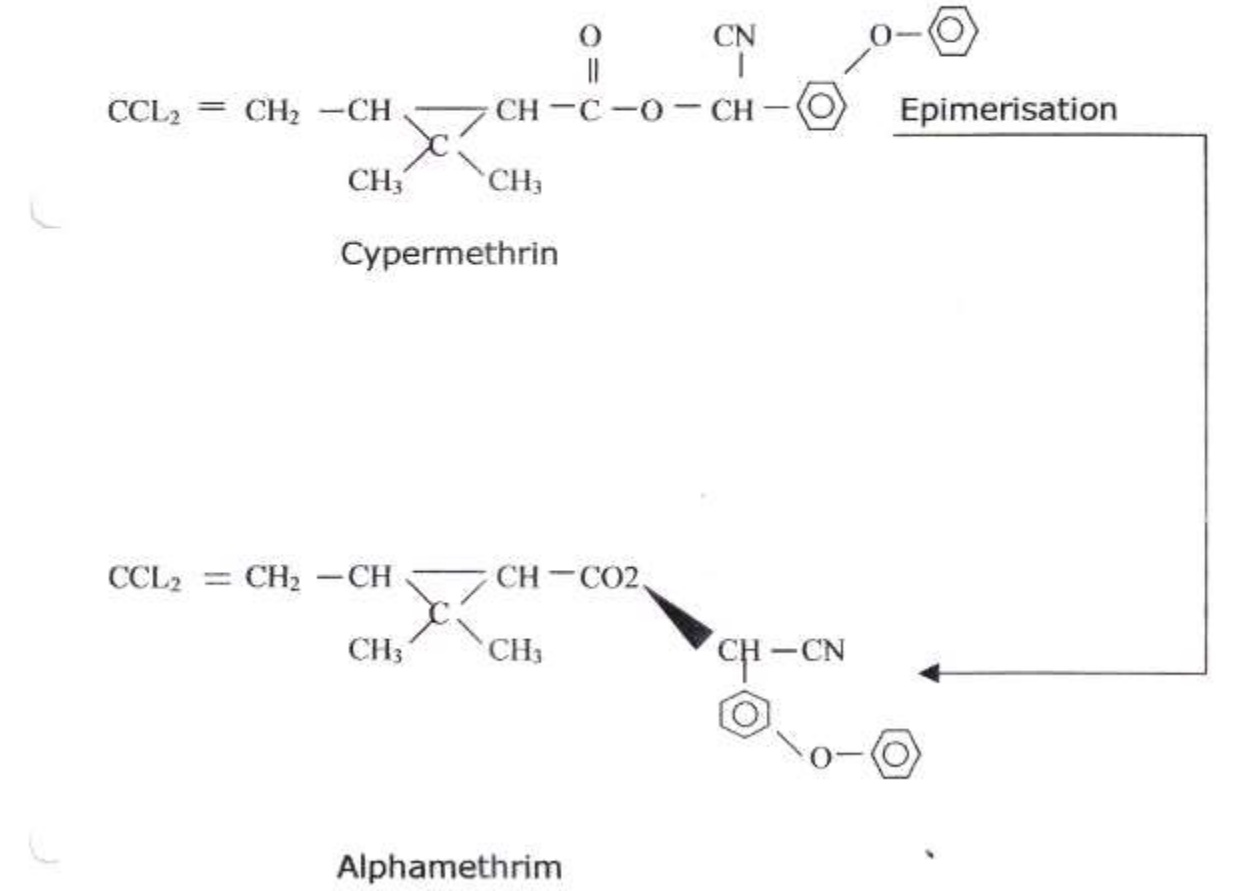
7) A. ALPHAMETHRIN

MANUFACTURING PROCESS

The Cypermethrin prepared using the above method (Manufacturing of Cypermethrin) is subjected to Eptherisation at 25°C in presence of tri Ethyl Amine in solvent n-hexane to obtain Alphamethrin. Then it is filtered & dried under vacuum. N-Hexane & TEA is recovered & recycled. The purity of Alphamethrin obtain will be minimum 95%

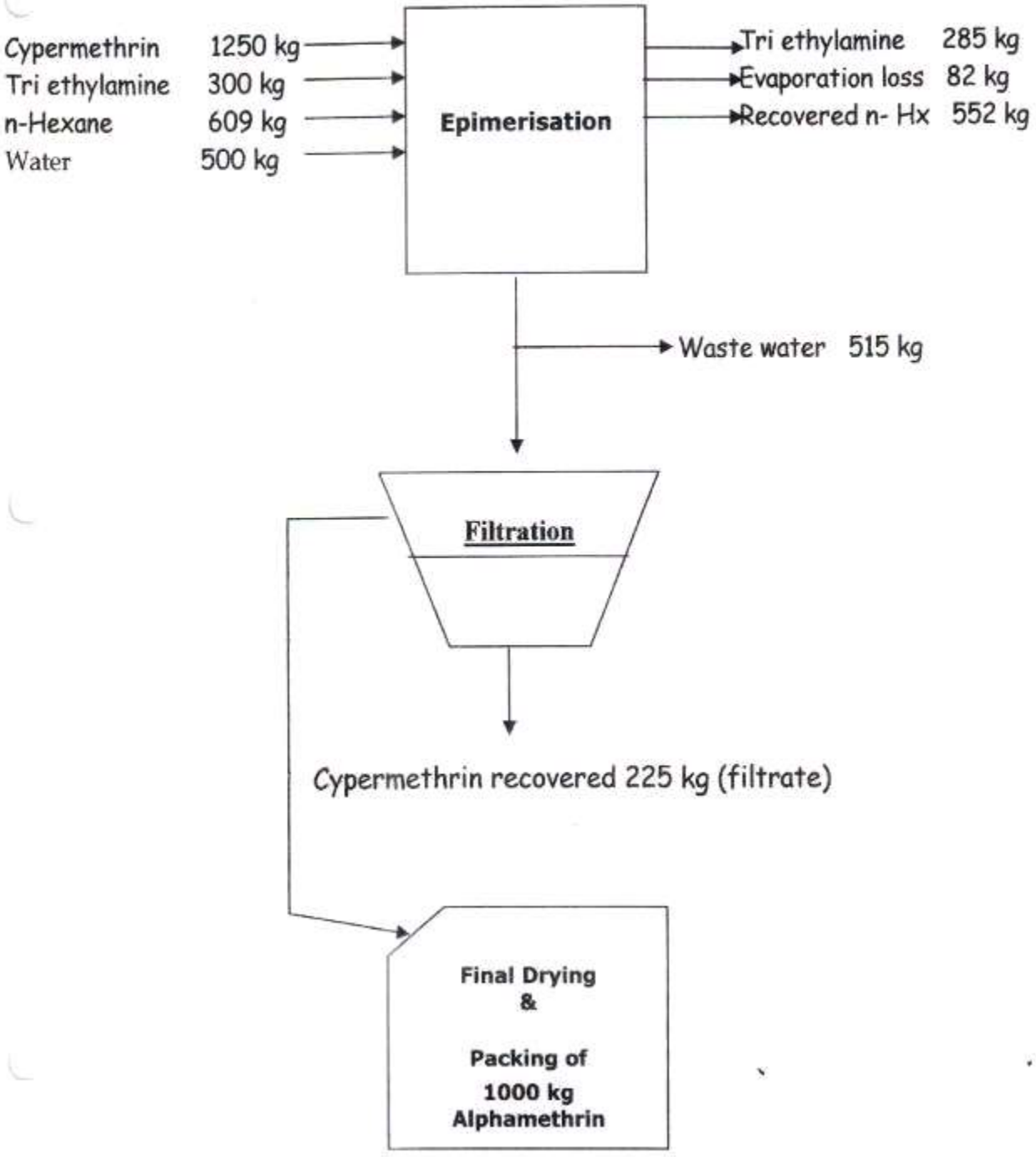
CHEMICAL REACTION

CHEMICAL REACTION OF ALPHAMETHRIN



MASS BALANCE

MASS BALANCE OF ALPHAMETHRIN TECHNICAL



8) PERMETHRIN

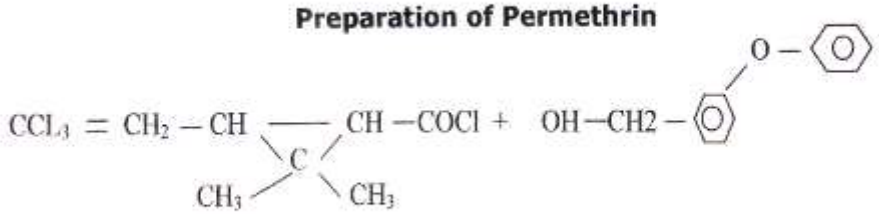
MANUFACTURING PROCESS

CMAC (Cypermethrin acid chloride) reacts with Meta phenoxy Benzyl Alcohol at 45°C to give Permethrin. The evolved HCl gas during reaction is scrubbed in water. The reaction mass is washed with water to remove the dissolved HCl gas. Permethrin is dehydrated under high vacuum to remove the traces of water. The purity of the technical product Permethrin obtained will be minimum 92%.

CHEMICAL REACTION

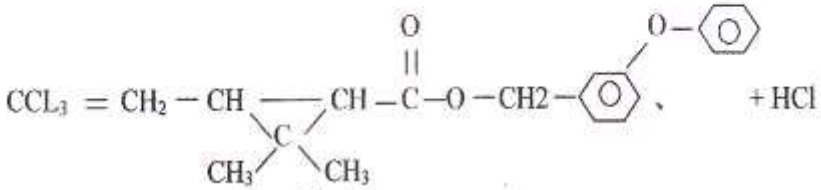
CHEMICAL REACTION

Preparation of Permethrin



Cyper methric acid chloride Meta phenoxy benzyl alcohol

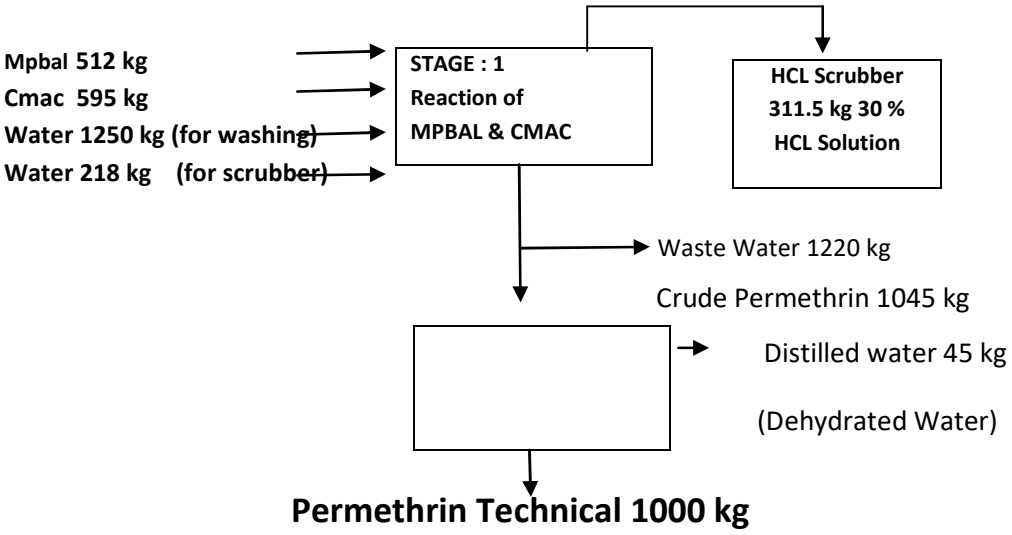
25 to 30°C



Permethrin Hydrochloric acid

MASS BALANCE

MASS BALANCE PERMETHRIN TECHNICAL



9) METAMITRON TECH. OR GLYPHOSATE TECH. OR OTHER HERBICIDES

A. METAMITRON

MANUFACTURING PROCESS

Stage – 1 Preparation of Ethyl Mandelate:-

In glass lined reactor ethanol is charged followed by Mandilonitrile. Thionyl chloride is added to form Ethyl Mandelate. HCl & SO2 generated during the reaction, Generated HCl is reacting with Mandilonitrile to form Ethyl Mandelate & Ammonium chloride. SO2 is scrubbed in 15% NaOH solution using ventury scrubber. Formed Ethyl Mandelate is further washed with water & taken for next stage. By scrubbing SO2 in NaOH we get Sodium bi sulphite as by product.

Stage -2 Preparation of Ethyl Phenyl Glyoxalate:-

In SS reactor Ethyl Mandelate is charged from stage -1 and at room temperature sodium hypochlorite is added lot wise. After addition of Hypochlorite check purity of Ethyl Phenyl Glyoxalate by GLC

Stage -3 Preparation of Acetyl Hydrazine:-

In SS reactor charge 80% Hydrazine hydrate & start addition of ethyl acetate at room temperature. After addition maintain for 2 hr. check sample for Hydrazine hydrate percent, if OK then heat the reaction mass to 90°C & distill off ethanol & water under vacuum. Then cool the mass and adjust purity of acetyl hydrazine to 50% by addition of ethanol.

Stage – 4 Preparation of Phenyl Hydrazone:-

In SS reactor charge 50 % Acetyl hydrazine and adjust pH of reaction mass to 5 – 5.2 by addition of HCl. Then start addition of Ethyl Phenyl Glyoxalate prepared in stage -2, maintain for 4 hr. then check sample for Phenyl hydrazone percentage by HPLC. If result is ok then add water and cool the mass to 18-20°C. Adjust pH of reaction mass by HCl to 3.0. Further cool to 10°C and the reaction mass in closed Nutch filter. Check sample for LOD & purity of phenyl hydrazone. Unload the material in open HDPE drums.

Stage -5 – Preparation of Phenyl Hydrazide:-

In SS reactor charge EtOH under vacuum, then charge phenyl hydrazone prepared in stage-4. Start addition of NH3 solution & send sample to QC for pH. Then start addition of 80% Hydrazine hydrate & complete in 3-4 hr & maintain for 12 hr. check sample for phenyl Hydrazide percentage by GLC. If ok then adjust pH of reaction mass to 6.8 by addition of HCl. Apply pressure & transfer the mass for further process.

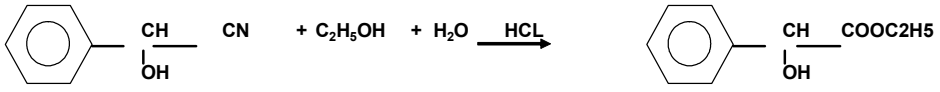
Stage-6- Preparation of Metamitron:-

In SS reactor receive material from stage -5, adjust pH 6.5 to 6.7 by HCl, and further adjust pH to 7.5 by caustic lye. Then charge sodium acetate & maintain reflux for 12 hr. check percentage of Metamitron, phenyl hydrazine. If ok then filter the mass in AGNF, wash with plain water. Unload & dry in rotary vacuum dryer. After drying if results are ok then pack in drums.

CHEMICAL REACTION

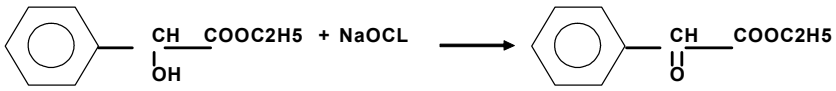
Synthesis route

A. ETHYL MENDELATE



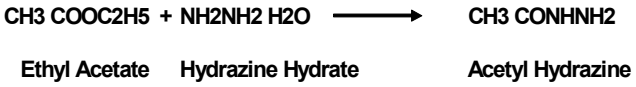
Mendelo Nitrile — Ethyl Mendelate

B. ETHYL PHENYL GLYOXALATE

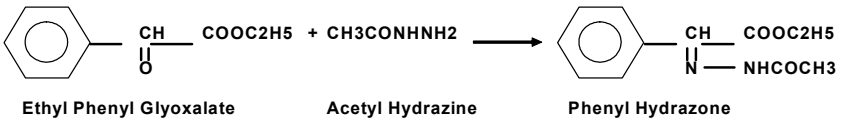


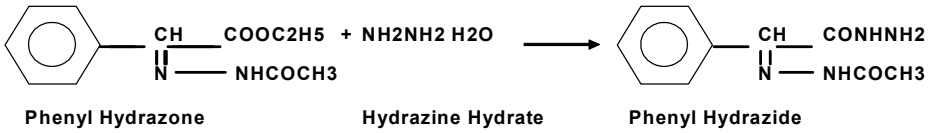
Ethyl Mendelate — Ethyl Phenyl Glyoxalate

C. ACETYL HYDRAZINE



D. PHENYL HYDRAZIDE

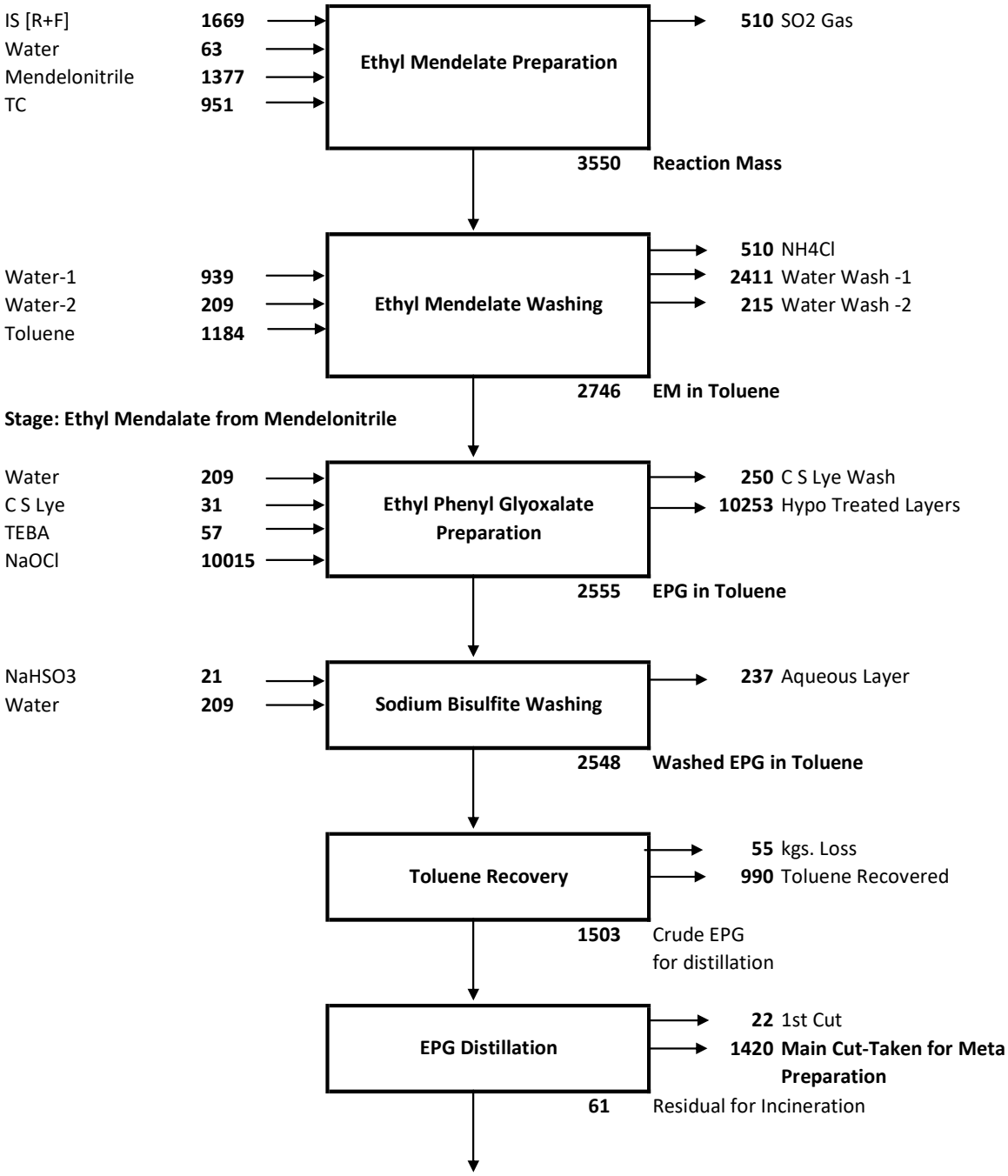




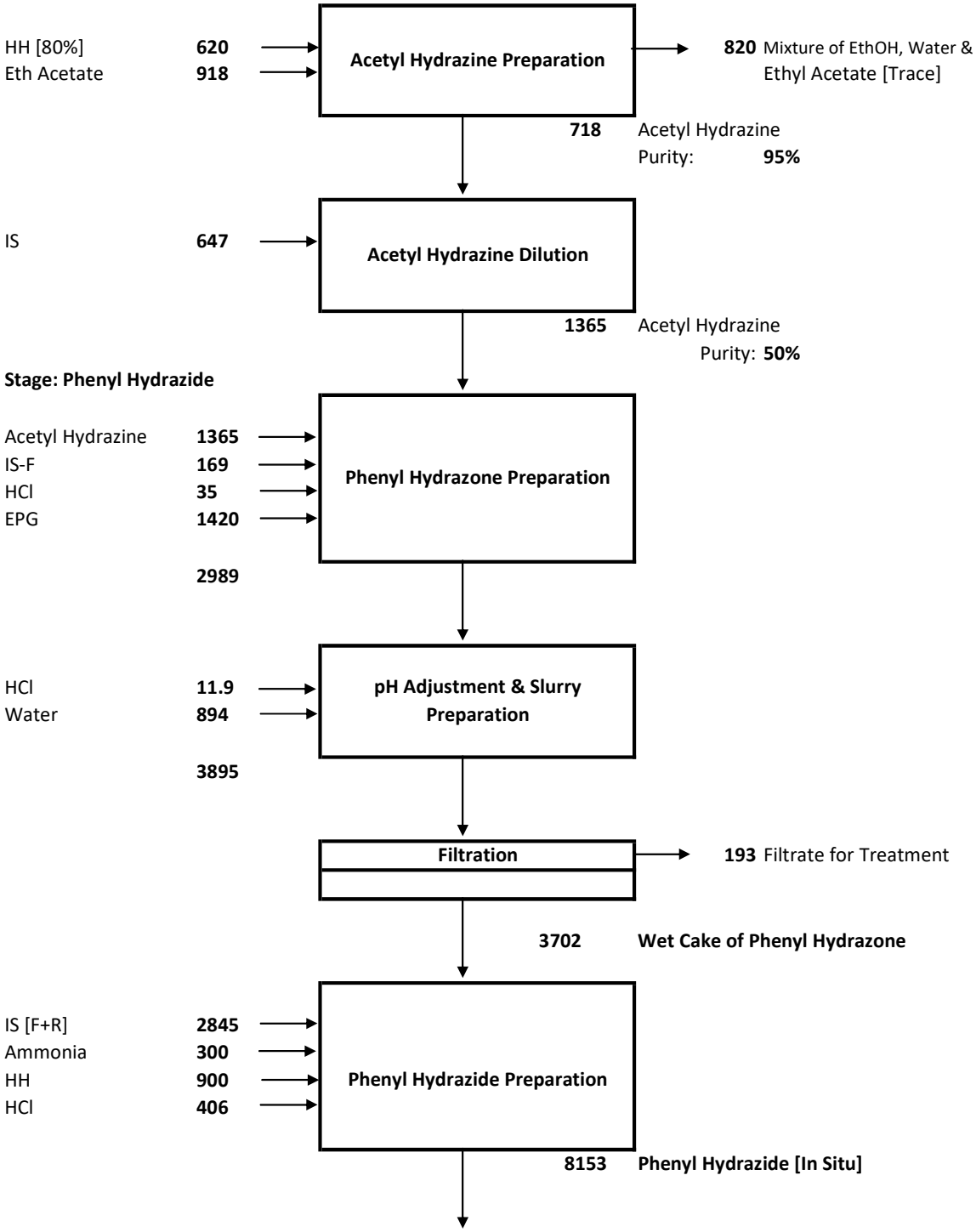
E. METAMITRON

MASS BALANCE

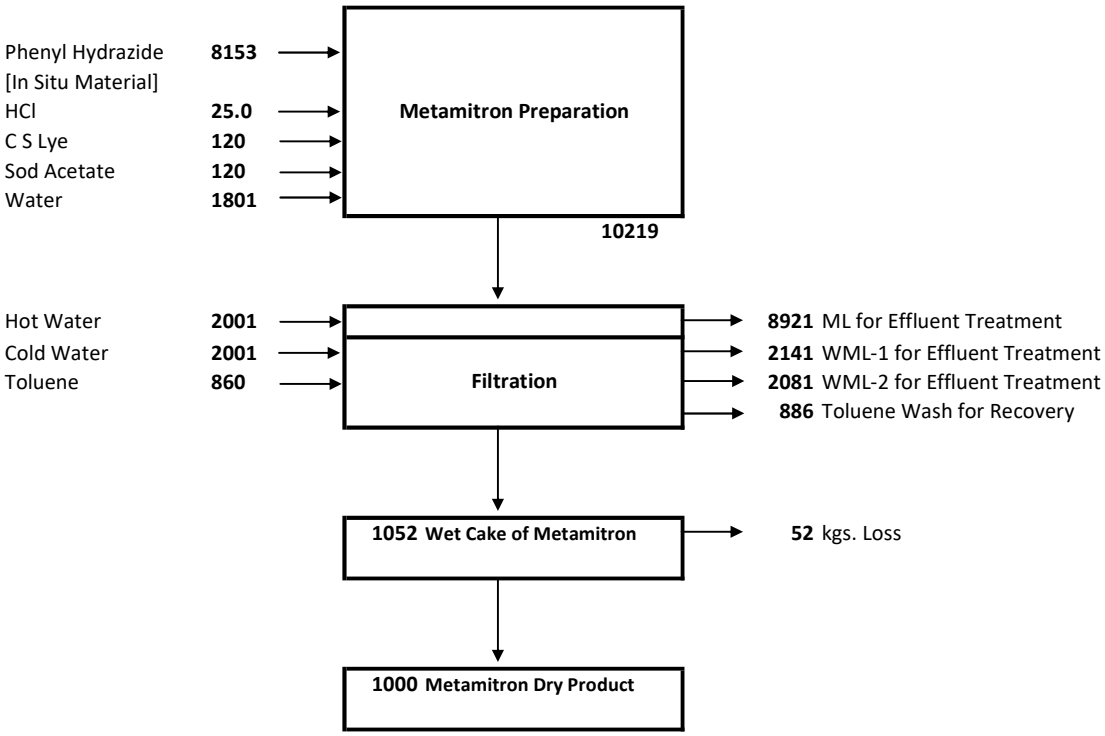
Stage: Ethyl Mendalate from Mendelonitrile



Stage: Acetyl Hydrazine



Stage: Metamitron



Incinerable mass :- 61 kgs/ton of Metamitron

By Products:-

1) Sodium Sulphite 1.250 ton of Metamitron

2) Ammonium chloride 510 kgs/ton of Metamitron

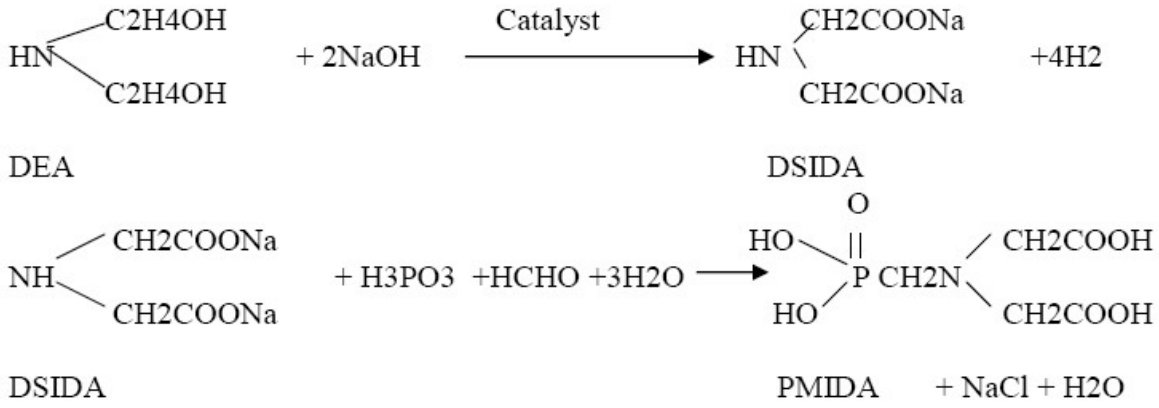
B. GLYPHOSATE ACID TECHNICAL

MANUFACTURING PROCESS

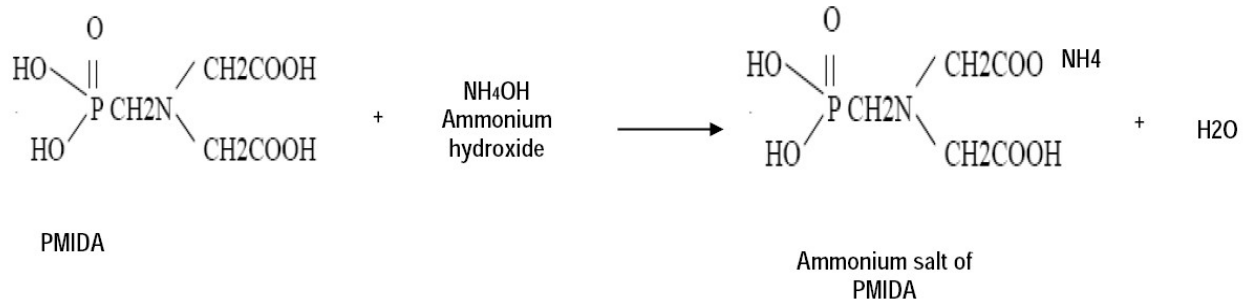
Take water, DEA, 48% caustic lye and catalyst in a pressure rector. Maintain the reaction temperature 160°C and pressure 10 kg /cm2. DSIDA (Disodium Salt of imino diacetic acid) formation taken place with total conversion of 90% hydrogen gas is vented to atmosphere through scrubber during the reaction. Catalyst in filtered at 70°C and recycled in next batch as such. Neutralize the mother liquor to pH 6.7 and, add PCl3 at 30°C and reflux at 100°C. Add formaldehyde at 100-110°C. After completion of reaction, cool the mass to 30°C and centrifuge the crystals Phosphoro methyl imino diacetic acid (PMIDA) Mother liquor is separately taken for the neutralization and evaporation. The cake is washed with water. Wet PMIDA is reacted with oxygen to produce Glyphosate acid (final product). It is dried with hot air and product is packed in bags.

CHEMICAL REACTION OF GLYPHOSATE ACID

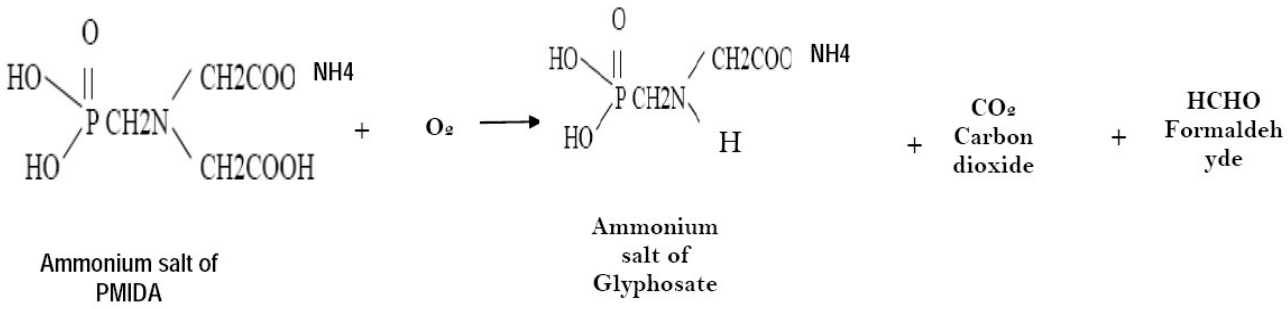
Stage-1&2 Preparation of PMIDA



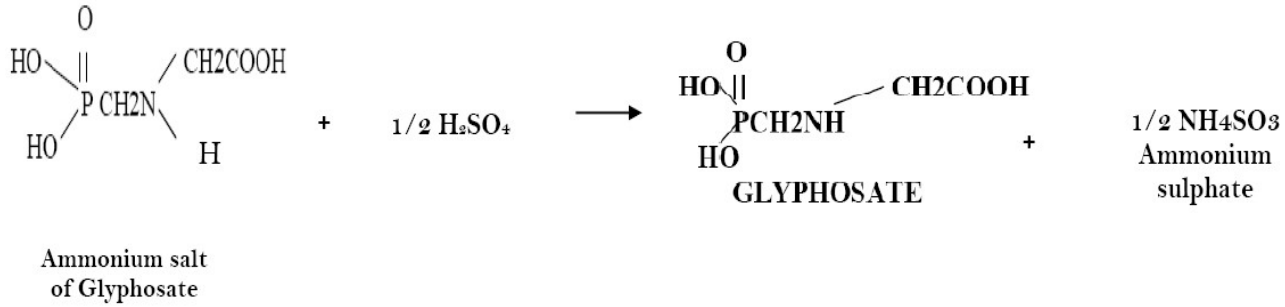
Stage-3 Preparation of Ammonium salt of PMIDA



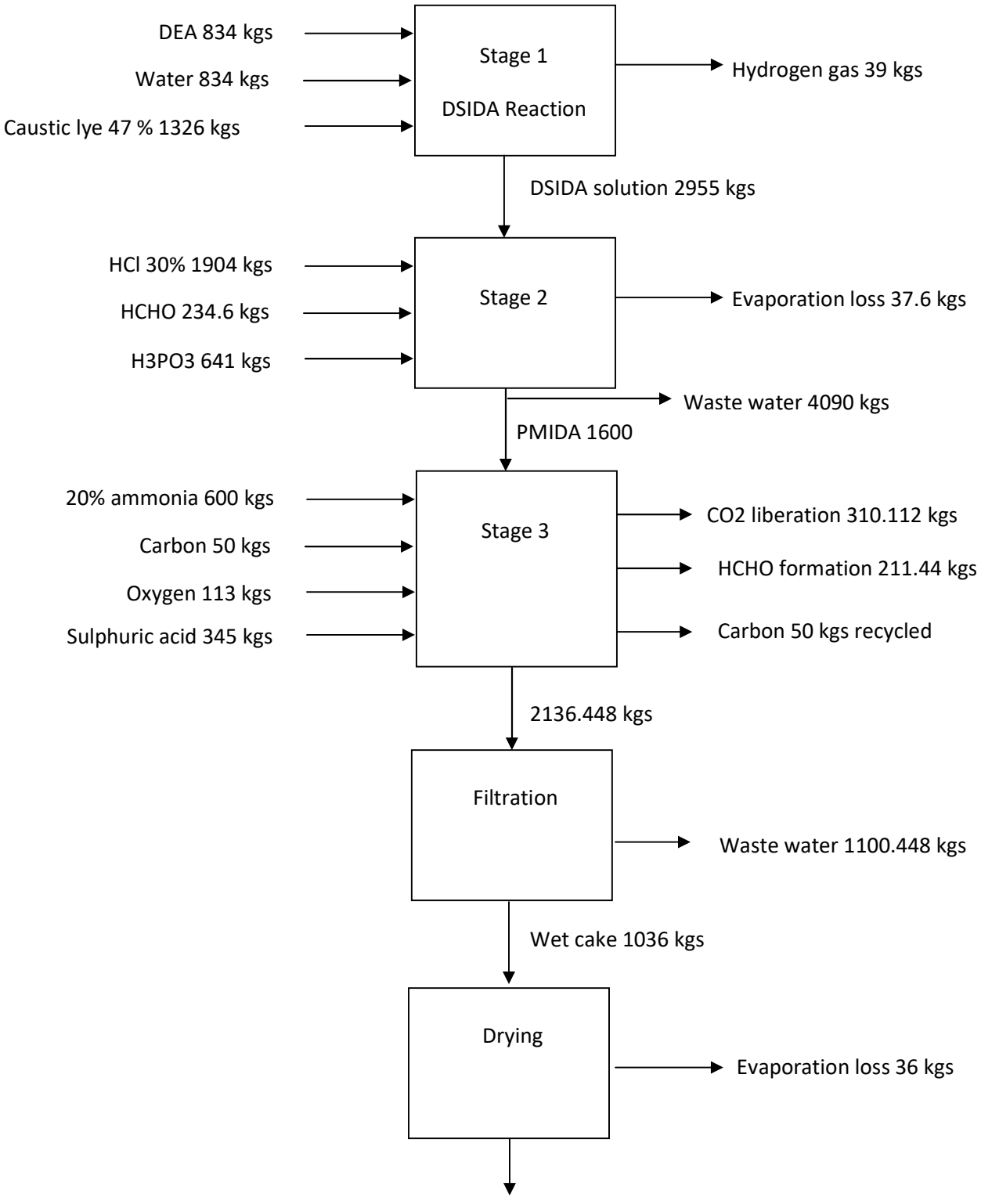
Stage-4 Oxidation of Ammonium salt of PMIDA



Stage-5 Oxidation of Ammonium salt of PMIDA



Mass Balance Of Glyphosate Technical



1. THIONYL CHLORIDE

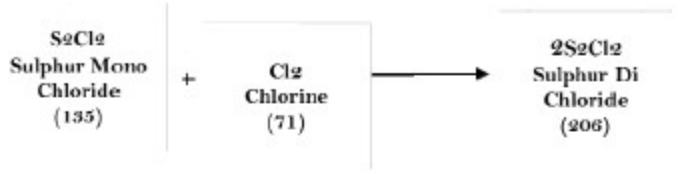
MANUFACTURING PROCESS

1. In continuous tubular reactor gaseous chlorine and gaseous sulphur dioxide are introduced through a sparger in a bottom vessel holding sulphur mono chloride maintained at desired temperature.
2. Chlorine reacts with sulphur mono chloride to form sulphur di chloride in vapour phase reaction -1. Sulphur di chloride reacts with Sulphur di chloride to form thionyl chloride.
3. Crude thionyl chloride goes out of the reactor as gas form the top. Crude thionyl chloride is condensed in series of condensers using cooling water and brine is drawn off as the top product.
4. Crude thionyl chloride contains sulphur mono chloride, sulphur di chloride, dissolved sulphur dioxide as impurity. Dissolved Sulphur Dioxide is removed by heating & sulphur di chloride is converted to sulphur mono chloride in treatment reactors working in series.
5. Treated crude thionyl chloride which now contains sulphur mono chloride as impurity is now purified in continuous distillation column.
6. Sulphur dioxide removed is recycled through gas holder in the reaction of thionyl chloride.

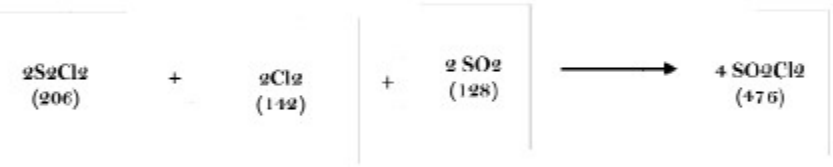
Note:

1. The process doesn't require any water as a reactant or as reaction media.
2. All impurities coming with crude product are recycled in the process.
3. No liquid effluent is generated in the process.

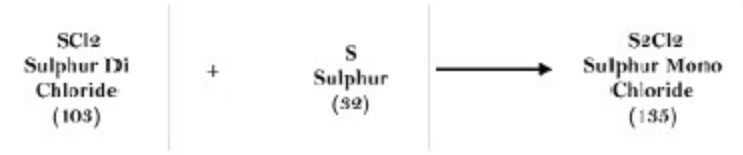
CHEMICAL REACTION



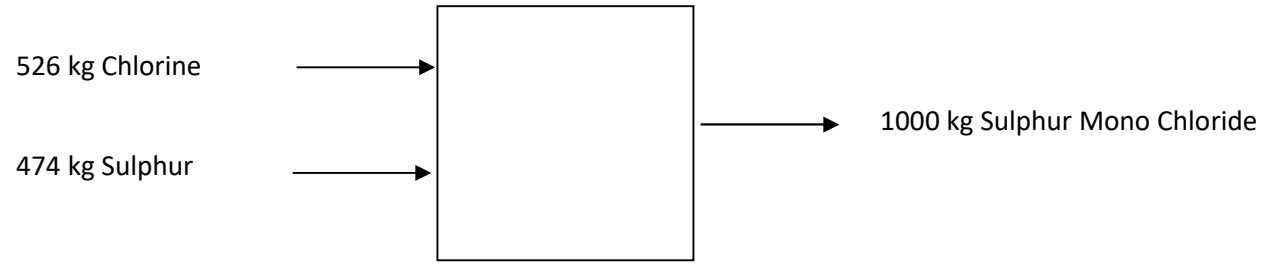
Chemical Reaction -2

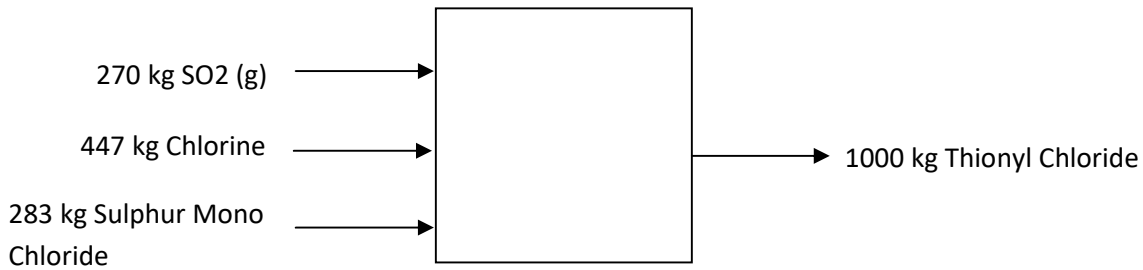


Chemical Reaction -3



MASS BALANCE OF THIONYL CHLORIDE





10) SULPHUR CHLORIDE

MANUFACTURING PROCESS

1. Gaseous Chlorine is bubbled in solution of sulphur mono chloride in a primary reactor, maintain at desired temperature by circulating cooling water in jacket. Chlorine reacts with sulphur to form sulphur mono chloride.

2. Any unreacted chlorine is coming out from primary reactor is made to bubbled through the solution of sulphur mono chloride in the secondary reactor at desired temperature by circulating cooling water in the jacket.

3. These two reactors are interchanged as primary and secondary after every batch.

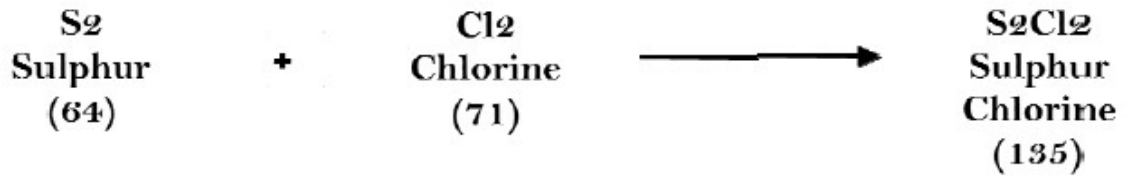
4. Unreacted chlorine coming from the secondary reactor is passed over a bed of sulphur to trap residual chlorine.

Note:

1. No water is used for reaction. No liquid or waste product is generated during the process.

2. Three stage reactions ensure that no air pollution is caused.

CHEMICAL REACTION



11) ACID CHLORIDE LIKE VALEORYL CHLORIDE, PHENYL ACETYL CHLORIDE

VALEORYL CHLORIDE

MANUFACTURING PROCESS & CHEMICAL REACTION

Valeroyl Chloride is produced by the reaction of Valeoric Acid and Thionyl Chloride in as MS GL Reactor and the reaction takes place as follows.

$CH_3 (CH_2)_3 COOH + SOCl_2 = CH_3 (CH_2)_3 COCl + SO_2 + HCl$

102 + 119 = 120.5 + 64 + 36.5

221 = 221

Valeroric Acid is charged in to the MSGL Reactor and heating is started. After the required temperature, Thionyl Chloride is added slowly in the reactor generated Hydrochloric Acid gas is absorbed in the water to Produced Hydrochloric Acids and Sulphur Dioxide is absorbed in Soda Ash Solution to produced Sodium Bi Sulphite. After complete the reaction bottom material is transferred in to Distillation Column where pure Valeoryl Chloride product is obtained.

MASS BALANCE

Per 1000 Kgs of Valeoryl Chloride:

Thionyl Chloride: 990 Kgs,

Valeoric Acid : 850 Kgs.

By Product: HCl Gas to Scrubber 302 Kgs,

By Product: SO_2 Gas to Scrubber 510 Kgs,

Crude Valeoryl Chloride: 1028 Kgs,

Distillation:

Valeroyl Chloride: 1000 Kgs.

Distillation loss: 20 Kgs.

Residue : 8 Kgs.

Qty.of RM/Month:

Thionyl Chloride: 100 MT

Valeoric Acid : 85 MT

PHENYL ACETYL CHLORIDE

MANUFACTURING PROCESS & CHEMICAL REACTION

Valeroyl Chloride is produced by the reaction of Valeoric Acid and Thionyl Chloride in as MS GL Reactor and the reaction takes place as follows.

$C_6H_5CH_2COOH + SOCl_2 = C_6H_5CH_2COCl + SO_2 + HCl$

136 + 119 = 154.5 + 64 + 36.5

255 = 255

Phenyl Acetic Acid is charged in to the MSGL Reactor and heating is started. After the required temperature, Thionyl Chloride is added slowly in the reactor generated Hydrochloric Acid gas is absorbed in the water to Produced Hydrochloric Acids and Sulphur Dioxide is absorbed in Soda Ash Solution to produced Sodium Bi Sulphite. After complete the reaction bottom material is transferred in to Distillation Column where pure Phenyl Acetyl Chloride product is obtained.

MASS BALANCE

Per 1000 Kgs of Phenyl Chloride:

Thionyl Chloride: 970 Kgs,
Valeoric Acid : 856 Kgs.
By Product: HCl Gas to Scrubber 336 Kgs,
By Product: SO_2 Gas to Scrubber 462 Kgs,
Crude Valeoryl Chloride: 1028 Kgs,
Distillation:
Valeroyl Chloride: 1000 Kgs.
Distillation loss: 20 Kgs.
Residue : 8 Kgs.
Qty.of RM/Month:
Thionyl Chloride: 97 MT

VALEORIC ACID : 86 MT

Fungicide

12) Hexaconzole (T)

Process Description:

I_VC - VP

Sr. No.	Raw Material	Qty.		Ratio	MW	Mole	M/R	Sp.gr.
1	Valeryl Chloride	1000	kgs.	1.0000	120.6	8.29	1.00	0.995
2	MDCB	1250	kgs.	1.2500	147	8.50	1.03	1.3
3	Aluminium chloride	1719	kgs.	1.7188	133.34	12.89	1.55	2.44
4	Water	5138	lits.	5.1375	18	285.42	34.42	1.0

6856

IInd
Wash 3000

Process

1 charge MDCB M/C less than 0.1 %., start stirring.
2 Then charge $AlCl_3$ U/S
3 Heat to 50 ° C
4 Start addition of VC at 50° C
5 After addition maintain for 3.0 hr.on 75-80°C.
6 Check sample for conversion of VC to VP thro' Ester.
7 After completion quinch the RM in water(4) up to 80°C
8 Stirr for 1 hr.Separate Aquious , wash organic layer with water.
9 Take organic layer for distillation.

OutPut

S.No.	Finished Product	Qty.	Ratio	MW	Mole	M/R	spgr	B.P.^{o}C	Y %
VP	Valerophenone Dist.	1800 kgs.		1.8000	231.12	7.79	0.94	1.2	96 (2 mm Hg)

Residue 70Kg

II_VP TO OXIRANE

S.No.	Raw Material	Qty.	Ratio	MW	Mole	M/R	Sp.Gr.
1	Valero Phenone (VP)	**1800** kg.		1.0000	231.12	7.79	1.00
2	Dimethyl sulfide (DMS)	2115 kg.		1.1750	62.13	34.04	4.37
3	Dimethyl Sulfate (DMSO4)	1170 kg.		0.6500	126.13	9.28	1.19
4	Potassium Hydroxide(KOH)	900 kg.		0.5000	56.1	16.04	8.02
5	PTC	18 kg.		0.0100			
6	Water	36 kg.		0.0200	18	2.00	0.26

K- SALT- Potassium Methyl Sulphate 150.2

Process

1 Charge VP,DMS,CAT PTC & Water at room temperature.
2 Add DMSO4 at R.T.
3 Slowly heat up to 40°c & Maintain for 1hr.
4 Add KOH at 40°c. in 2.0 hr.
5 Maintain for 1 hr. at 40°c.
6 Send the sample to q.c.lab for VP to Oxirane conversion.
7 VP should be < 2.0% & Oxirane should be >97.0%.
8 If results are not as per point no. 7 , maintain 1 hr. more to achieve desire results.
9 Start collection of DMS & apply heating up to 50°c.(Finally under vacuum upto 90°C.)
10 After recovery of DMS ,Send the sample to q.c.lab for vp to oxirane conversion.
11 VP should be < 2.0% & Oxirane should be >97.0%.
12 Add 1800.0 ml water filter the mass
13 Wash filtrate cake with 1800.0 ml X 2.0 water wash to organic layer
14 Give 1800.0 (pH 6.8 to 7.0)
15 Recover EDC at normal & finally under Vacuum with max temp 75°c.
16 Send sample to q.c. lab for % age of VP & Oxirane & check the qty of Oxirane.
17 Take this Oxirane to Hexa preparation.

Intermediate Product	Qty.	Ratio	MW	Mole
2-(2,4-Dichlorophenyl)-2-butyl-oxirane	1800 kgs.		1.0000	

III _Oxirane to Hexaconazole

S.No.	Raw Material	Qty.	Ratio	MW	Mole
1	Oxirane	1800 kg.		1	
2	1,2,4 - triazole	504 kg.		0.2800	
3	DMF	6300 lit.		3.5000	
4	NaOH	54.0 kg.		0.0300	
5	Water	2700 lit.		1.5000	
6	Methanol 90%	1800 lit.		1.0000	

Process :-

Charge 1+2+3+4 starrt agitation.

Heat to 115-120°C & maintain for 3 hrs.

Check sample for Oxirane content.if less than 0.5%

Distill off DMF under vacuum to max. temp. 98°C.

Add	900.0	lit. water, stirr, settle , separate aq.layer.
Add	900.0	lit. water, adjust pH 6 by 20% HCl, stirr, settle , separate aq.layer.

Add 900.0 lit. water, stirr, settle , separate aq.layer.

Hexa crude dehydrated under vacuum.

Add 1800.0 lit. 90% MeOH at 60°C, or drawing Hexa crude in 90% MeOH.

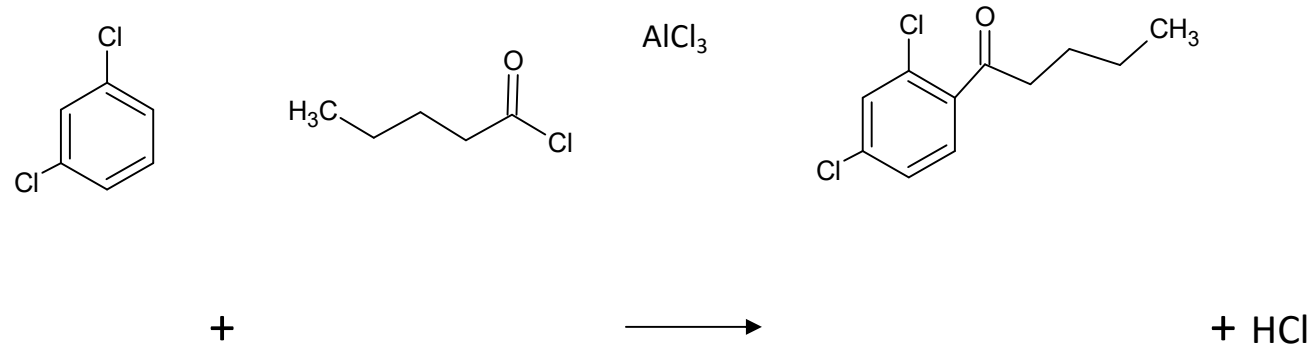
Cool, chill to 20°C , maintain for 1.0 hr. on 20°C ,filter, dry.

Finished Product	Qty.	Ratio	MW	Mole
Hexaconazole1st crop	1854 kgs.		1.0300	
Hexaconazole 2nd crop	54 kgs.		0.0300	

Chemical Reaction

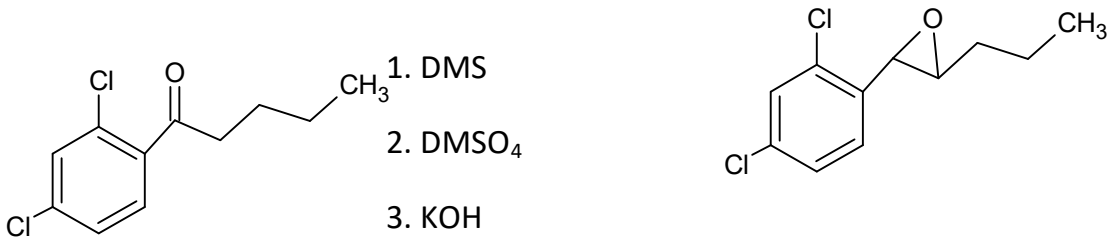
HEXACONZOLE REACTION SCHEME

Step I: VC to VP



2,4 Dichloro benzene (MDCB)	Valeroyl chloride (VC)	Valerophenone (VP)	HCl
M.W. = 147.00	M.W.= 120.57	M.W.= 231.11	M.W.= 36.5

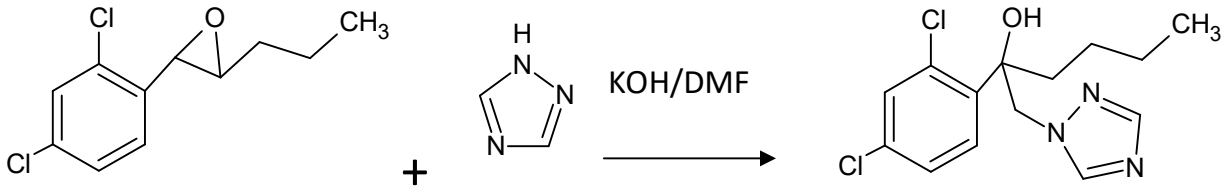
Step II: VP to Oxirane



$+ CH_3SO_4^-K^+$

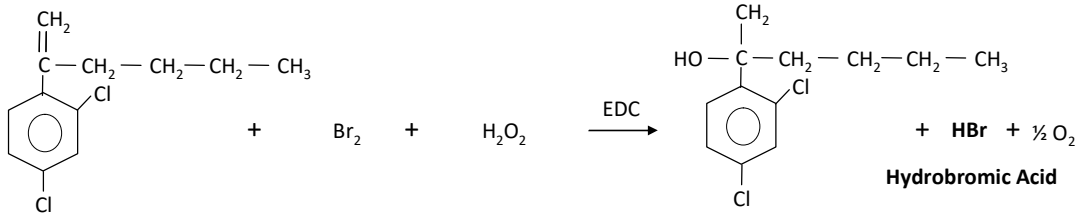
Valerophenone (VP)	Oxirane	Potassium methyl sulfate
M.W.= 231.11	M.W.= 231.11	M.W.= 150.20

Step III: Oxirane to Hexaconazole



Oxirane	1,2,4-Triazole	Hexaconazole
M.W.= 231.11	M.W.= 69.06	M.W.= 314.21

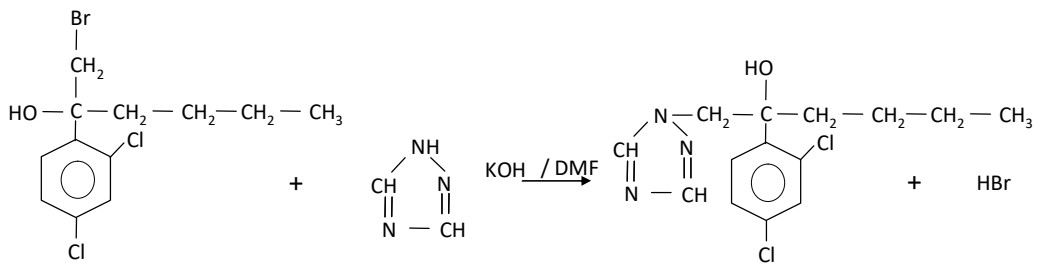
STEP:3



2-(2,4–Dichloro Phenyl)-n-hex-1-ene **Bromine** **Hydrogen Peroxide** **1-Bromo-2-(2,4-Dichlorophenyl)-hexane-2-ol** **81** **½ 16**

229 **2 x 80** **34** **326**

STEP:4



1-Bromo-2-(2,4-Dichlorophenyl)-hexane-2-ol **1,2,4-Triazole** **HEXACONAZOLE** **Hydrobromic Acid**

326 **69** **314** **81**

b) Tebuconzole (T)

Process Description:

Step -1

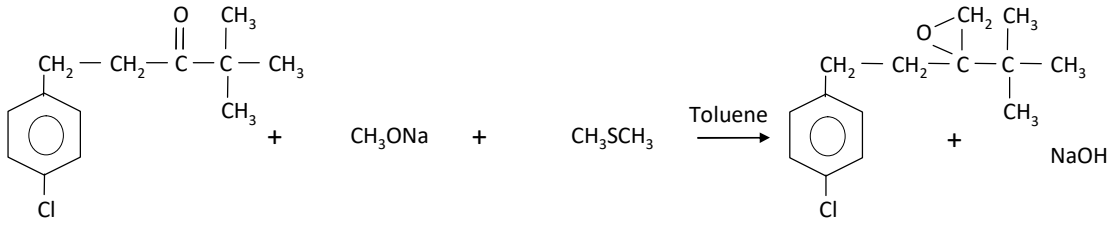
1-(4-Chlorophenyl)-4,4-Dimethyl-3-Pentanone reacted with Sodium Methoxide & Dimethyl Sulfide in presence of Toluene to get 2- [2-(4- Chlorophenyl)ethyl]-2-(1,1 – Di methyl ethyl) Oxirane.

Step -2

2- [2-(4- Chlorophenyl)ethyl]-2-(1,1 – Di methyl ethyl) Oxirane. is reacted with 1,2,4-Triazole in presence of DMF to give final product TEBUCONAZOLE

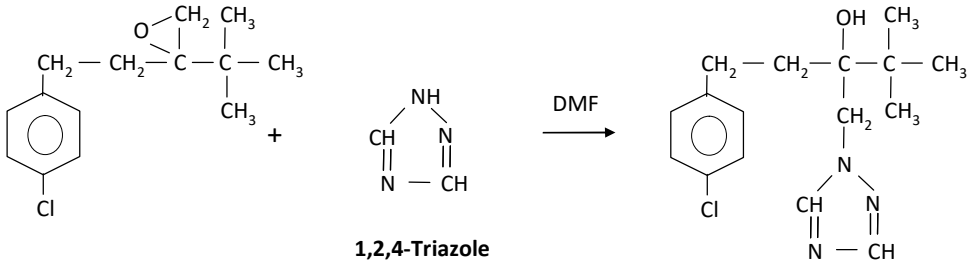
Chemical Reaction

STEP:1



1-(4-Chlorophenyl)-4,4-Dimethyl-3-Pentanone **224.5** | **Sodium Methoxide** **54** | **Dimethyl Sulfide** **62** | **Intermediate-I** **238.5** | **40.0**

STEP:2



238.5 | **1,2,4-Triazole** **69** | **TEBUCONAZOLE** **307.5**

Material Balance / Mass Balance (All Quantities are in Kg)

IN- PUT				**OUT- PUT**	
Sr No	**Raw Materials / Items**	**Kg/Batch**		**Product / By-Product**	**Qty/Batch**
1	1-(4 – Chlorophenyl) 4-4-Dimethyl -3- Pentanoate	675		Tebuconazole	1000
2	Sodium Methoxide	162		Recovered Solvent - Toluene	1360
3	Di Methyl Sulfide	186		Solvent Loss - Toluene	40
4	Solvent - Toluene	1400		Methanol	95
5	1,2,4 - Triazole	206		20 % Sodium Methyl Sulfide	1048
6	Solvent - DMF	1100		Recovered Solvent - DMF	1070
7	Water	1690		Solvent loss - DMF	30
				Aqueous Layer to ETP	768
				Distillation Residue	14
	Total	**5419**			**5419**

c) Propioconzole (T)

Process Description

Step -1

1,3-Dichloro benzene is reacted with Acetyl chloride in presence of Aluminum Chloride and Solvent - Ethylene Di Chloride to get 2,4-Dichloro Acetophenone.

Step -2

2,4-Dichloro Acetophenone further reacted with bromine in presence of Solvent - Ethylene Di Chloride to get 2,4-Dichloro Phenacyl Bromide.

Step -3

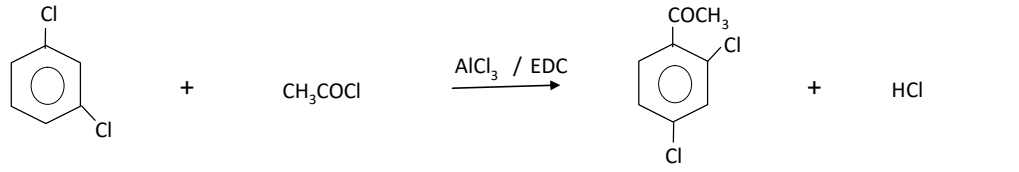
2,4-Dichloro Phenacyl bromide reacted with 1,2-Pentanediol in presence of Toluene to get 4-(2-Bromomethyl-4-Propyl-1,3-Dioxolane-2-yl)-1,3-Dichlorobenzene.

Step - 4

4-(2-Bromomethyl-4-Propyl-1,3-Dioxolane-2-yl)-1,3-Dichlorobenzene further reacted with 1,2,4-Triazole in presence of Potassium hydroxide and Solvent DMF to get final product PROPICONAZOLE.

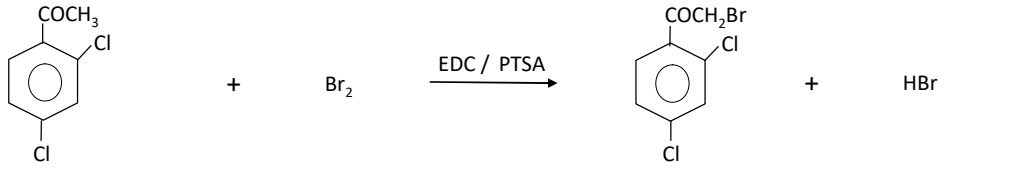
Chemical Reaction

STEP:1



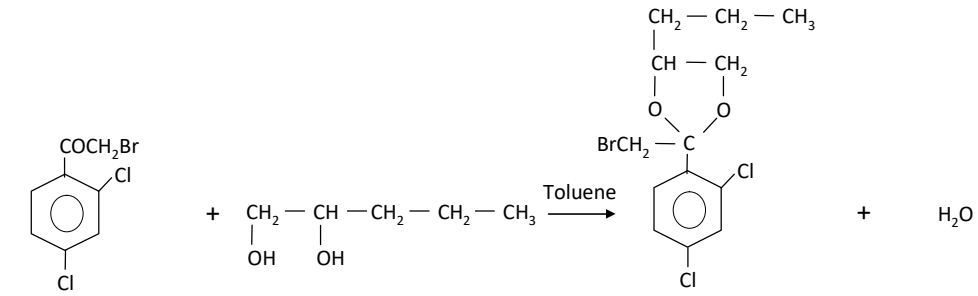
1,3 – Dichloro Benzene	Acetyl chloride	2,4 – Dichloro Acetophenone	Hydrochloric Acid
147	78.5	189	36.5

STEP:2



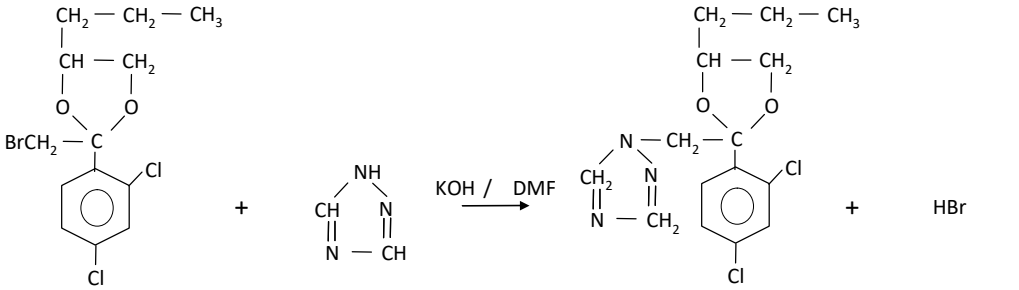
2,4 – Dichloro Acetophenone	Bromine	2,4 – Dichloro Phenacyl bromide	Hydrobromic Acid
189	2 x 80	268	81

STEP:3



2,4 – Dichloro Phenacyl bromide	1,2-Pentanediol	4-(2-Bromomethyl-4-Propyl-1,3-dioxolane-2-yl)-1,3-Dichlorobenzene	
268	104	354	18

STEP:4



4-(2-Bromomethyl-4-Propyl-1,3-dioxolane-2-yl)-1,3-Dichlorobenzene	1,2,4-Triazole	PROPICONAZOLE	Hydrobromic Acid
354	69	342	81

Material Balance / Mass Balance (All Quantities are in Kg)

IN- PUT				**OUT- PUT**	
Sr No	**Raw Materials / Items**	**Kg/Batch**		**Product / Bi Product**	**Qty/Batch**
1	1,3 Di Chloro Benzene	452		Propiconazole	1000
2	Acetyl Chloride	238		Recovered Solvent - EDC	1570
3	Alumimun Chloride	558		Solvent Loss EDC	30
4	Solvent - EDC	1600		20 % Aluminium Chloride	2786
5	Bromine	553		30 % Hydrochloride Solution	375
6	Catalyst	10		Recovered Solvent - DMF	970
7	1,2 - Butanediol	320		Solvent loss - DMF	30
8	Solvent - Toluene	1000		Potassium Bromide	390
9	Potassium Hydroxide	166		Recovered Catalyst	12
10	1,2,4 - Triazole	210		Recovered Solvent - Toluene	975
11	Solvent – Dimethyl Formamide	1000		Solvent Loss - Toluene	25
12	Water	3672		28 % Hydrobromic Acid	890
13				Aqueous Layer to ETP	712
14				Distillation Residue	14
	Total	**9779**			**9779**

Herbicide

13) Dicamba (T)

Process Description:

Step-1

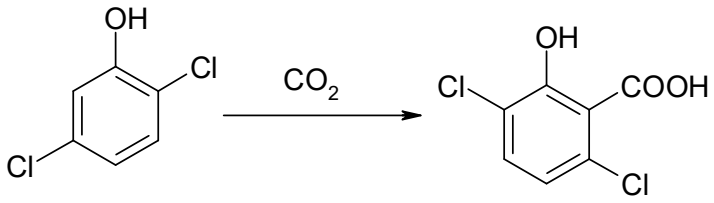
2,5-Dichloro Phenol reacts with carbon Dioxide under pressure to get 3,6-Dichloro-2-Hydroxy Benzoic Acid

Step-2

3,6- Dichloro-2-Hydroxy Benzoic Acid reacts with Dimethyl Sulphate in presence of Sodium Hydroxide to get 3,6-Diclhloro-2-Methoxy Benzoic Acid (Dicamba)

Chemical Reaction:

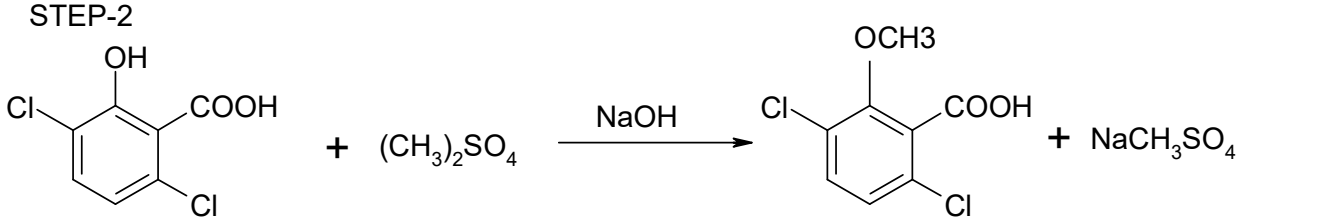
STEP-1



2,5-Dichloro Phenol
M.Wt=163

3,6-Dichloro,2-Hydroxy Benzoic Acid
M.Wt=207

STEP-2



3,6-Dichloro,2-Hydroxy Benzoic Acid
M.Wt=207

Methyl Sulfate
M.Wt=126

3,6-Dichloro,2-Hydroxy Benzoic Acid
M.Wt=233

Sodium Methyl Sulfate
M.Wt=134

Material Balance/Mass Balance (All Quantities are in Kg)

Dicamba (3,6 Dichloro-2-methoxy benzoic acid)					
IN- PUT				**OUT- PUT**	
Sr No	**Raw Materials / Items**	**Kg/Batch**		**Product / Bi Product**	**Qty/Batch**
1	2,4-dichloro phenol	820		Dicamba	1000
2	carbon dioxide	260		Recovered Solvent- Methenol	1345
3	dimehtyl sulfate	320		Solvent Loss -methenol	55
4	sodium hydroxide	205		Recovered Solvent- Toluene	1540
5	Solvent -Methenol	1400		Solvent loss - toluene	60
6	Solvent -Toluene	1600		distilalte water	110
7	Water	1100		Unreacted CO2	40
				Sodium Sulfate	740
				Aqueous Layer To E.T.P.	793
				Distillation Residue	22
	Total	**5705**		**Total**	**5705**

14) Metribuzine (T)

Process Description:

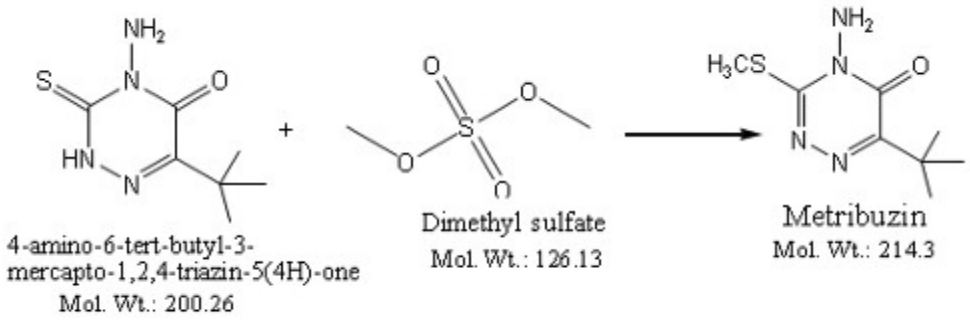
Step -1

Metribuzin is a 1,2,4-Triazinone class of herbicide. It is manufactured by the reaction of 4-Amino-6-Tert-Butyl-3-Mercapto-1,2,4-Triazin-5(4H)-one (ATMT) with Dimethyl Sulphate

<u>Step – 2</u>

Reaction of 4-Amino-6-Tert-Butyl-3-Mercapto-1,2,4-Triazin-5(4H)-one (ATMT) with Dimethyl Sulphate (DMS) in presence of Sulphuric Acid to give Metribuzine.

Chemical Reaction



Material Balance/Mass Balance (All Quantities are in Kg)

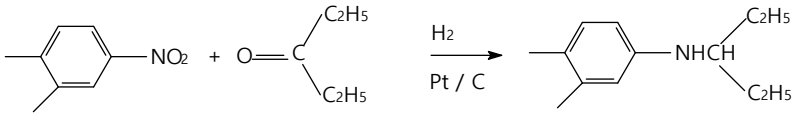
Metribuzine					
IN- PUT				**OUT- PUT**	
Sr No	**Raw Materials / Items**	**Kg/Batch**		**Product / Bi Product**	**Qty/Batch**
1	ATMT	1000		Metribuzine	1000
2	Di Methyl Sulphate	652		Sodium Sulphate	2130
3	Sulfuric Acid	1274		Organic Impurities	512
4	Soda Ash	1600		Carbon Dioxide gas	664
5	Caustic Soda Flakes	30		Aqueous Layer to ETP	4750
6	Water	4500		Distillation Residue	0
	Total	**9056**		**Total**	**9056**

15) Pendimethalin (T)

Step I: Reductive alkylation of 4 NOX

4-Nitro-1, 2-xylene (4 –NOX) is reacted with hydrogen with Pt / C as a catalyst in presence of diethylketone when N-alkyl xylidine is formed.

Chemical Reaction

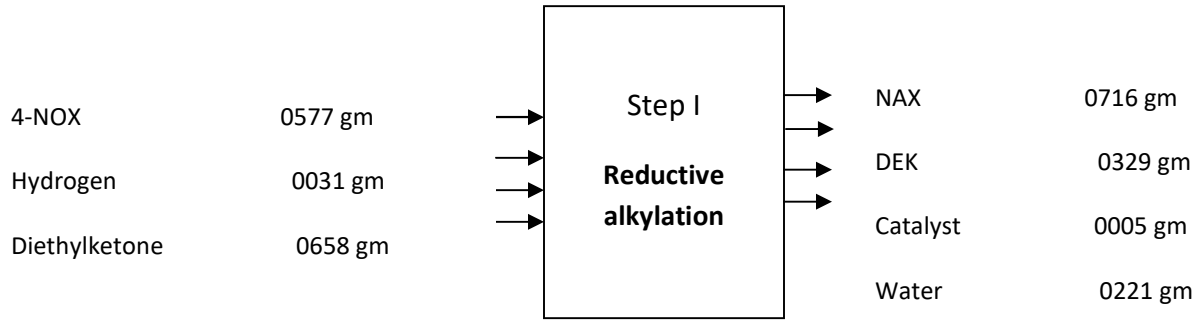


4-Nitro-1,2-xylene
M.W. 151

Di ethyl ketone
M.W.86

NAX M.W. 191

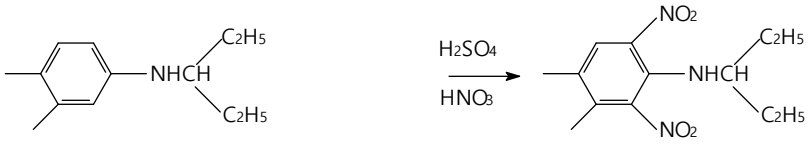
Material Balance :



Step II: Nitration of NAX

NAX is nitrated using sulfuric acid and nitric acid to PENDIMETHALINE.

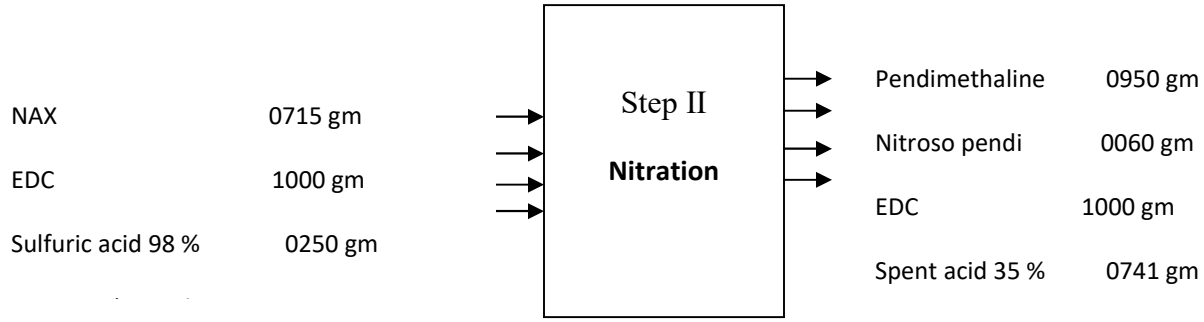
Chemical Reaction



NAX M.W. 201

Pendimethalin
M.W. 281

Material Balance :



Insecticide (T)

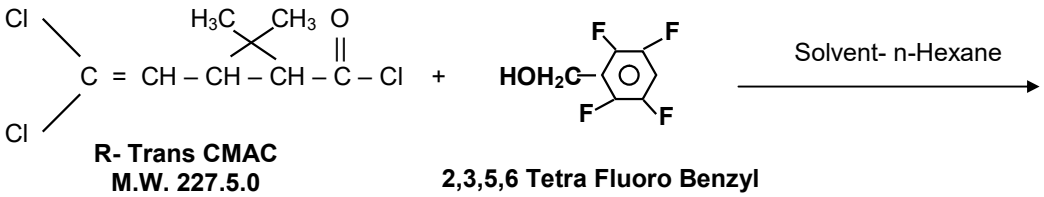
16) Transfluthrin (T)

Manufacturing Process:

2,3,5,6 - Tetra Fluoro Benzyl Alcohol is reacted with R –Trans Cypermethric Acid Chloride (R-Trans CMAC) in presence of Solvent n-Hexane to give the Tefluthrin mass. Hydrochloric acid gas is generated during the reaction which is scrubbed in water to get 30% solution of hydrochloric acid.

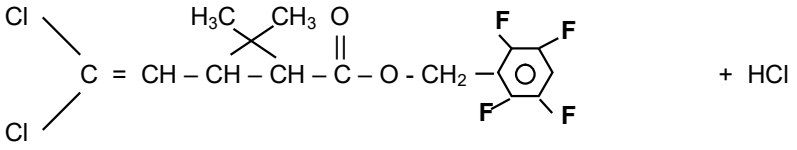
The resulting mass is then washed by Soda Ash solutions as well as water. Finally solvent is stripped off to recover it & to get the pure Transfluthrin Tech.

B) CHEMICAL REACTIONS:



R- Trans CMAC
M.W. 227.5.0

2,3,5,6 Tetra Fluoro Benzyl Alcohol M.W. 180



TRANSFLUTHRIN
M.W. 371.3

HYDROCHLORIC ACID
M.W. 36.5

Material Balance / Mass Balance (All Quantities are in Kg)

TRANSFLUTHRIN (TECH)				
IN- PUT			**OUT- PUT**	
Sr No	**Raw Materials / Items**	**Kg/Batch**	**Product / Bi Product**	**Qty/Batch**
1	2,3,5,6 Tetra Fluoro Benzyl Alcohol	500	Transfluthrin	1010
2	R- Trans Cypermethric Acid Chloride	631	Recovered Solvent - n Hexane	1950
3	Catalyst	12	Solvent Loss n - Hexane	50
4	Solvent- Hexane	2000	30 % HCl Solution	337
5	Water for HCl Solution	237	Aqueous Layer to ETP	533
6	5 % Soda Ash Solution	250		
7	Water for Washing	250		
	Total	**3880**		**3880**

17) Cyfluthrin & Beta Isomers (T)

Brief Manufacturing Process :-

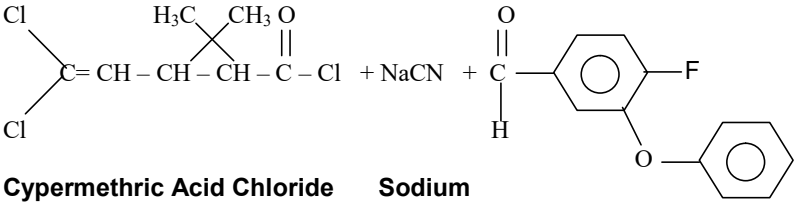
3- Phenoxy 4- Fluoro Benzaldehyde is reacted with Sodium Cyanide to form 3-Phenoxy 4- Fluoro Benzaldehyde Cyanohydrin as an intermediate. This on reaction with Cypermethric Acid Chloride (CMAC) forms the final Product Cyfluthrin. In this process n.- Hexane is used as solvent along with phase transfer Catalyst.

The reaction mass of Cyfluthrin is washed by Soda Ash solution & Water.

Finally n-Hexane is stripped off to get pure Cyfluthrin.

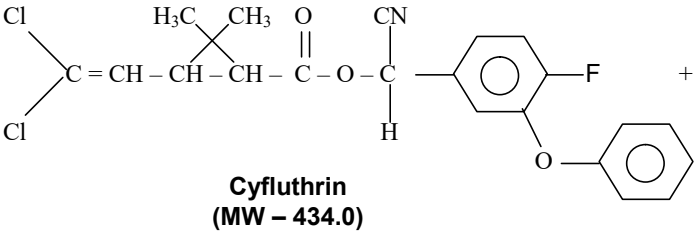
Aqueous layers which content traces of Sodium Cyanide is detoxified by the treatment of Sodium Hypochlorite 8 - 10% Solution to < 0.2 ppm Level.

B) CHEMICAL REACTIONS :-



Cypermethric Acid Chloride (MW 227.5) + **Sodium Cyanide** → **3- Phenoxy 4- Fluoro Benzaldehyde M.W.- 216.0**

N. Hexane
Catalyst



Cyfluthrin (MW – 434.0) + NaCl **Sodium Chloride M.W. -58.5**

Material Balance / Mass Balance (All Quantities are in Kg)

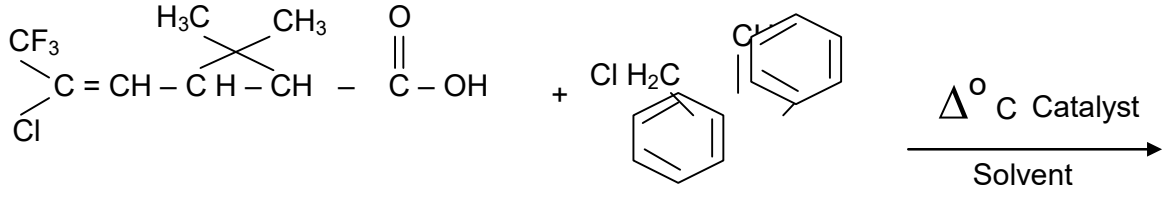
CYFLUTHRIN (TECH)					
IN- PUT				**OUT- PUT**	
Sr No	**Raw Materials / Items**	**Kg/Batch**		**Product / Bi Product**	**Qty/Batch**
1	3- Phenoxy -4- Fluoro Benzaldehyde	523		Cyfluthrin	1030
2	CMAC- Cypermethric Avid Chloride	578		Recovered Solvent – n - Hexane	2850
3	Water for Reaction	500		Solvent Loss n - Hexane	150
4	Sodium Cyanide	136		Detoxified Aqueous to ETP	3017
5	Solvent –n- Hexane	3000			
6	Catalyst	10			
7	5 % Soda Ash Solution	500			
8	5 % Acetic Acid Solution	500			
9	Water for washing	500			
10	8-10 % Sodium Hypochorite Solution	800			
	Total	**7047**			**7047**

18) Bifenthrin (T)

Brief Manufacturing Process :-

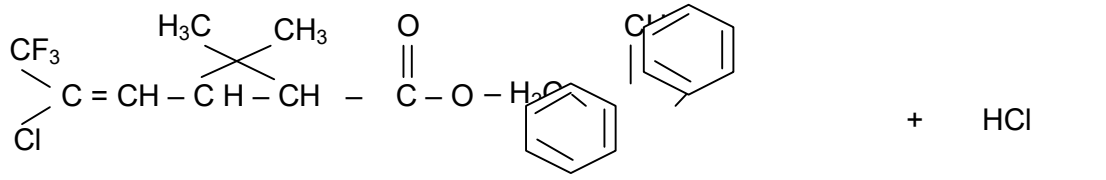
TFP Acid (Lambda Acid) is reacted with 3-Phenyl 2-Methyl Benzyl Chloride (PMBC) in presence of Solvent & catalyst to give the product Bifenthrin.

B) CHEMICAL REACTIONS :-



$C_8H_9O_2F_3Cl$
M.W. 229.5

$C_{14}H_{13}Cl$
M.W. 216.5



M.W. 36.5

$C_{22}H_{21}ClF_3O_2$
Bifenthrin
M.W. 409.5

Material Balance / Mass Balance (All Quantities are in Kg)

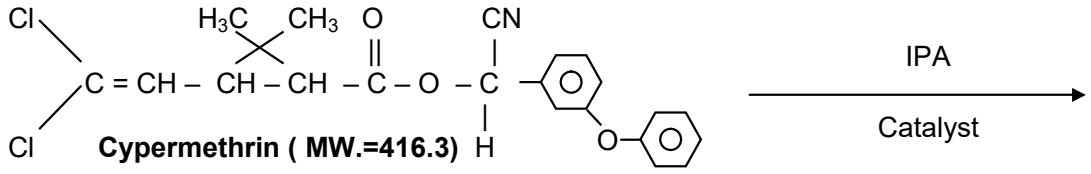
BIFENTHRIN (TECH)				
IN- PUT			**OUT- PUT**	
Sr No	**Raw Materials / Items**	**Kg/Batch**	**Product / Bi Product**	**Qty/Batch**
1	Lambda Acid	585	Bifenthrin	1030
2	3-Phenyl -2-Methyl Benzyl Chloride	558	Recovered Solvent - n Hexane	560
3	Catalyst	25	Solvent Loss n - Hexane	40
4	Solvent- Hexane	600	30 % HCl Solution	315
5	Water for HCl Solution	220	Distillation Residue	20
6	Water for Washing	500	Aqueous to ETP	523
	Total	**2488**	**Total**	**2488**

19) Cypermethrin (T) & Beta, Zeta, Theta etc Isomers (T)

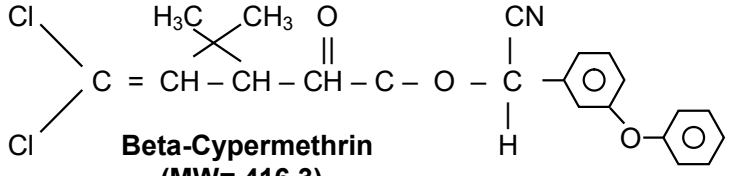
Brief manufacturing process:

Cypermethrin (Tech) of 50:50 Cis:Trans ratio of the purity >92% is treated with Epimerising Catalyst in pressure of Iso Propyl Alcohol – solvent to give Beta – Cypermethrin crude material which on recrystallisation from Iso Propyl Alcohol gives the pure product Beta – Cypermethrin

B) CHEMICAL REACTIONS:



Cypermethrin (MW.=416.3)



Beta-Cypermethrin
(MW= 416.3)

Material Balance / Mass Balance (All Quantities are in Kg)

BETA – CYPERMETHRIN (TECH)					
INPUT				**OUTPUT**	
Sr No	**Raw Materials / Items**	**Kg/Batch**		**Product / Bi Product**	**Qty/Batch**
1	Cypermethrin Tech	1430		Beta Cypermethrin	1010
2	Solvent –IPA for Reaction	1430		Recovered Solvent – IPA + Catalyst	2436
3	Catalyst - 1	143		Solvent + Catalyst Loss	252
4	Solvent –IPA for washings	1100		Cypermethrin Isomer	405
	Total	**4103**		**Total**	**4103**

20) Imidacloprid (T)

Brief manufacturing process:

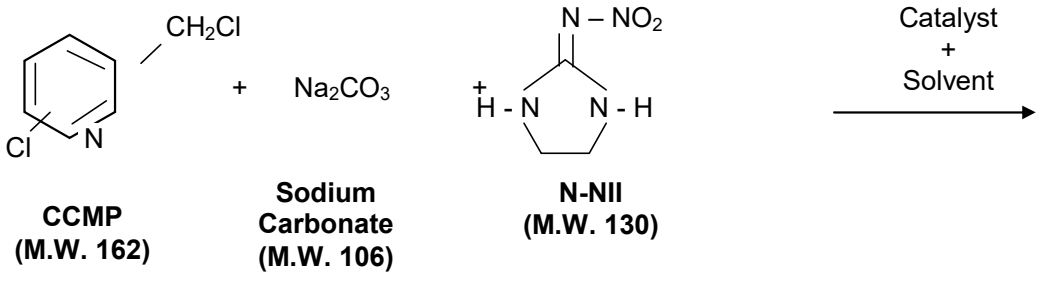
2 – Chloro, 5 – Chloromethyl Pyridine (CCMP) is reacted with N – Nitro Imino Imidazolidine (N-NII) in present of catalyst and solvent.

The Hydrochloric acid, which is formed during the reaction, is scavenged by putting Sodium carbonate as acid scavenger. The resulting mass is diluted by water & filtered to remove the salts of Sodium Chloride (NaCl) & Sodium bicarbonate.

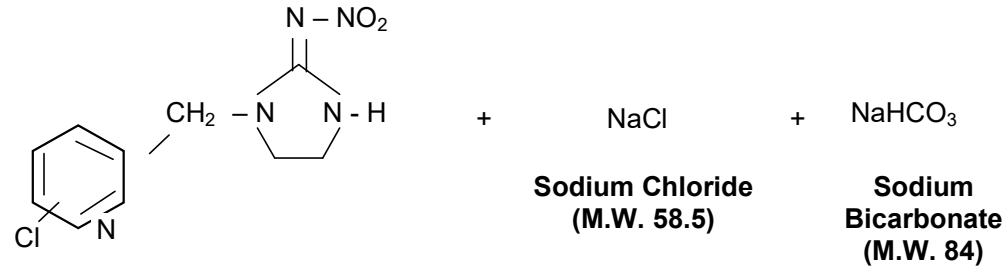
The organic mass is then treated with water and finally solvent is removed by distillation. The concentrated mass is then crystallized to get pure product – Imidacloprid (Tech)

Finally Toxic Effluent which contains traces of Pesticides is taken to Hydrolysis stage for detoxification. Where Aq. Mass is treated at high temp. by Alkali for the rapid hydrolysis of pesticides to simpler non-toxic compounds.

B) <u>CHEMICAL REACTIONS:</u>



CCMP (M.W. 162) | **Sodium Carbonate (M.W. 106)** | **N-NII (M.W. 130)**



Imidacloprid (M.W. 255.7) | **Sodium Chloride (M.W. 58.5)** | **Sodium Bicarbonate (M.W. 84)**

Material Balance / Mass Balance (All Quantities are in Kg)

IMIDACLOPRID (TECH)					
IN- PUT				**OUT- PUT**	
Sr No	**Raw Materials / Items**	**Kg/Batch**		**Product / Bi Product**	**Qty/Batch**
1	2- Chloro -5- Chloromethyl Pyridine	900		Imidacloprid	1030
2	N- Nitro N- Methyl Imidazolidine	850		Recovered Solvent DMF	2110
3	Sodium Carbonate	705		Solvent Loss DMF	90
4	Catalyst -1	10		Recovered Solvent Methanol	370
5	Solvent - DMF	2200		Solvent Loss Methanol	30
6	Water for Washings	1000		Aqueous Layer to ETP	2360
7	Caustic Lye 47 %	50		Distillation Residue	125
8	Solvent - Methanol	400			
	Total	**6115**		**Total**	**6115**

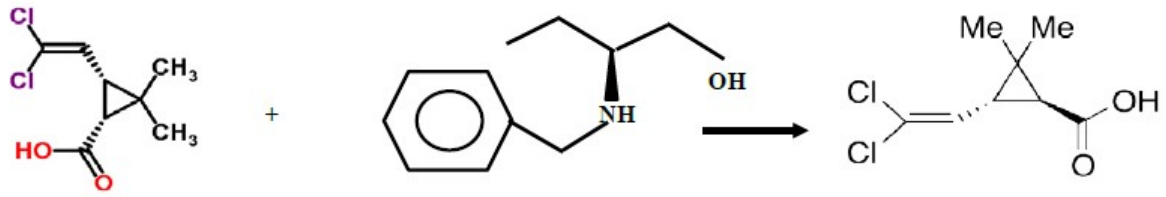
Acetamiprid:

Acetamiprid (TECH)					
IN- PUT				**OUT- PUT**	
Sr No	**Raw Materials / Items**	**Kg/Batch**		**Product / Bi Product**	**Qty/Batch**
1	N-Cyano-N-methylacetamidine	0.440		**Acetamiprid**	1.00
2	Potassium carbonate	0.620		Recovered Solvent Ethyl acetate	3.92
3	Ammonium benzyltriethylchloride	0.020		Solvent Loss Ethyl acetate	0.08
4	DMF (Dimethyl formamide)	1.00		Distillation Residue	0.20
5	2-chloro-5-chloromethyl pyridine	0.728		Effluent	3.608
6	Water for Washings	2.00			
7	Ethyl acetate	4.000			
8					
	Total	**8.808**		**Total**	**8.808**

21)1 R Trans CMA Synthetic

1. Charge water (2), then CS Lye (3) stirr for 10-15 mints.
2. Charge HT CMA (1). Stirr for 30.0 minutes check pH observed 10.1
3. Observe for clear solution.
4. Start heating. Start addition of cat soln. (4)+(5)+(6)
5. Complete addition in 6 hr. & maintain for 2 hr.
6. Cool the mass & centrifuge.
7. Give plain water wash.
8. Spin dry the cake & unload, unload the cake in HDPE drums.
9. Give sample for LOD, R-CMA, S-CMA & SOR.
10. R-CMA should be 99%+ , SOR = +38.5 to +42 (This is Cake_I)

Chemical Reaction:

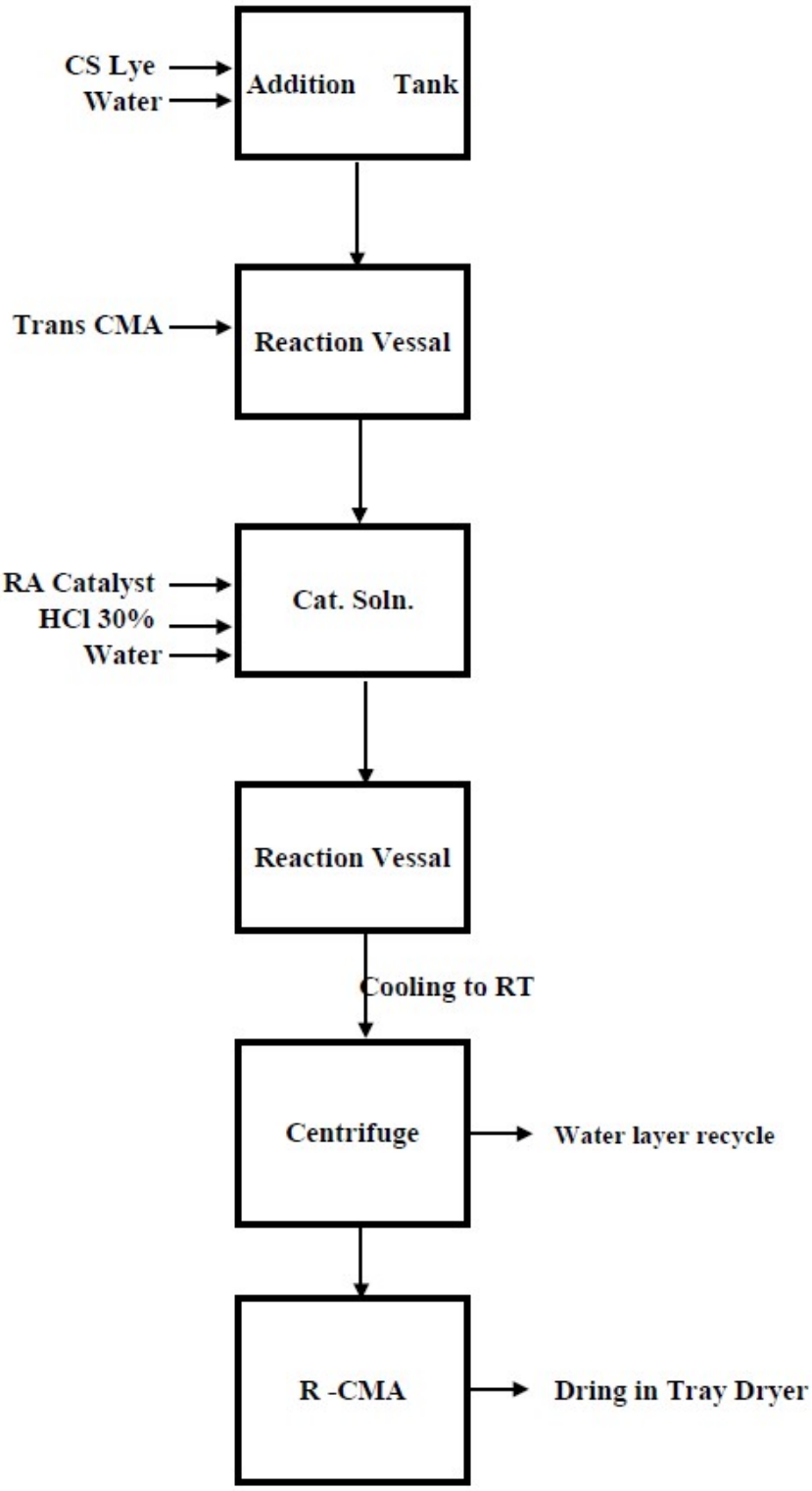


Trans CMA **RACatalyst** **1 R Trans CMA**

Mass Balance:

Sr. No.	Input	Quantity (Kg)	Output	Quantity (Kg)
1	Trans CMA	172	1 R Trans CMA	100
2	C S Lye (48%)	215	Wastewater	380
3	RA Catalyst	10	Drying Loss	190
4	HCl (30%)	108		
5	Water	165		
Total		**670**	**Total**	**670**

Process Flow Diagram: 1R CMA



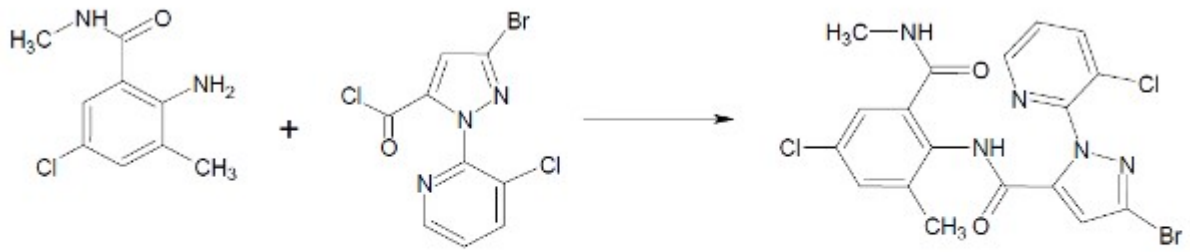
22) Chlorntraniliprole

Process Description

The desired quantities of 2-amino-5-chloro-N,3-dimethylbenzamide, Toluene, 3- bromo-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carbonyl chloride and Triethyl amine are charged in to the reactor and stirred at desired temperature until reaction is over.

Once the reaction is completed, water is added in to the reaction mass, Heat the mass up to desired temperature then layers are separated, Organic layer is cooled and the product is isolated by filtration and Solvent is recovered from ML for recycle.

Chemical Reaction:



2-amino-5-chloro-*N*,3-dimethylbenzamide

MF= $C_9H_{11}ClN_2O$
FW= 198.64944

3-bromo-1-(3-chloropyridin-2-yl)-1 *H*-pyrazole-5-carbonyl chloride

MF= $C_9H_4BrCl_2N_3O$
FW= 320.95756

Chlorantraniliprole

MF= $C_{18}H_{14}BrCl_2N_5O_2$
FW= 483.14606

Mass Balance:

Flow Diagram-Chlorantraniliprole							
Input	**kg**					**kg**	**Output**
2-amino-5-chloro-N,3-dimethylbenzamide	440	→	Reaction				
3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carbonyl chloride	706	→					
Triethyl amine	225	→					
Toluene	3150	→					
			↓				
			Filtration & Distillation		→	2992	Toluene
Water	2300	→			→	146	Residue
					→	2525	Aq. Layer
			↓				
			Drying		→	1000	**Product**
					→	158	Drying Loss
Total	**6821**					**6821**	

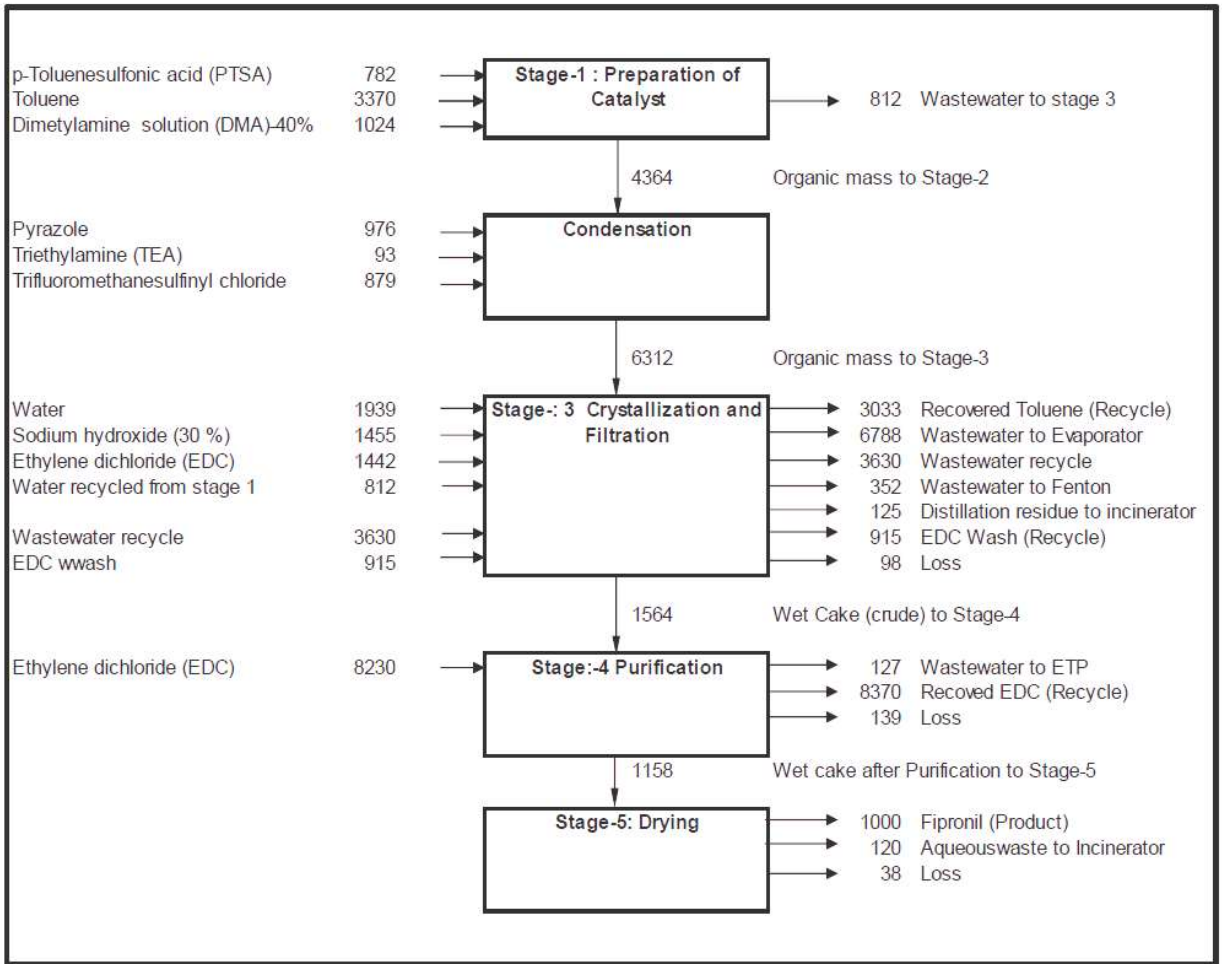
23) Fipronil

Process:

It is a single stage process in which first a suitable flask equipped with a distillation apparatus was charged with p-Toluene sulphonic acid in Toluene & DMA solution. The mixture was heated to reflux followed by addition of 5- Amino-3-cyano N-(2,6 dichloro-4- trifluoromethyl phenyl) pyrazole & Trifluoromethanesulfinyl chloride and small Qty of TEA.

After completion of reaction, mass was filtered and washed with water & EDC and dried under vacuum.

Mass Balance:



24) Quizalofop p-Tefuryl :

Process Description :

Step-1

Propionic Acid when undergoes chlorination by means of chlorine in presence of solvent EDC and catalyst gives 2-Chloro Propionic Acid

Step-2

2-Chloro Propionic Acid further reacts with tetrahydro furfuryl Methanol in presence of Solvent EDC and catalyst to give 2-Chloro tetrahydro furfuryl Methyl Propionate

Step-3

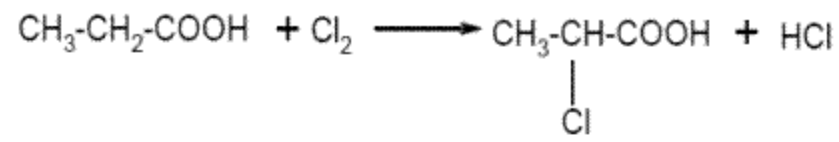
2-Chloro tetrahydro furfuryl Methyl Propionate reacts with hyroquinone it gives 2-(4-Hydroxy Phenoxy) tetrahydro furfuryl Methyl Propionate

Step-4

2-(4-Hydroxy Phenoxy) tetrahydro furfuryl Methyl Propionate finally reacts with 2,6-Dichloro Quinoxaline to give the final product in presence of solvent toluene to give the final product Quizalofop Tefuryl

Chemical Reaction :

Step-1



Propionic Acid
M.Wt=74

Chlorine
M.Wt=71

2-Chloro
PropionicAcid
M.Wt=108.5

Hydro
Chloric Acid
M.Wt=36.5

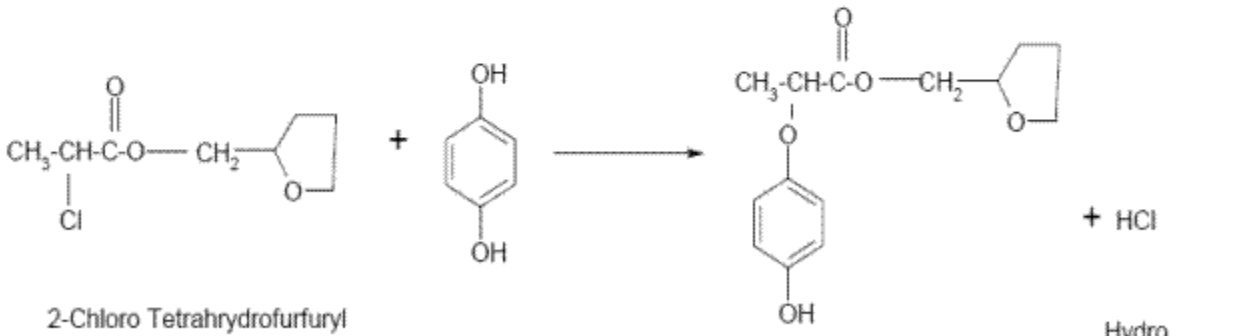
Step-2

2-Chloro
PropionicAcid
M.Wt=108.5

Tetrahrydrofurfuryl Methanol
M.Wt=102

2-Chloro Tetrahrydrofurfuryl
Methyl Propionate
M.Wt=192.5

Step-3



2-Chloro Tetrahrydrofurfuryl
Methyl Propionate
M.Wt=192.5

Hydroquinone
M.Wt=110

2-(4-Hydroxy phenoxy)
Tetrahrydrofurfuryl
Methyl Propionate
M.Wt=210

M.Wt=210

Hydro
Chloric Acid
M.Wt=36.5

Material Balance / Mass Balance of Quizalofop p-Tefuryl (All Quantities are in kg)

	IN – PUT			OUT – PUT	
Sr. No.	**Raw Materials / Items**	**Kg / Batch**		**Product / Byproduct**	**Qty. / Batch**
1)	Propionic Acid	190		Quizalofop p-Tefuryl	1010
2)	Solvent EDC	4000		Recovered Solvent - EDC	3920
3)	Catalyst	18		Solvent Loss (EDC)	80
4)	Chlorine	170		30% HCl Solution	850
5)	Tetrahydro Furfuryl Methanol	250		Water Distillate	84
6)	Hydroquinone	270		Recovered Solvent - Toluene	1950
7)	2,6 Dichloro Quinoxaline	490		Solvent Loss (Toluene)	50
8)	Solvent Toluene	2000		Aqueous Effluent to ETP	809
9)	Catalyst	15			
10)	Water	1350			
	Total	**8753**		**Total**	**8753**

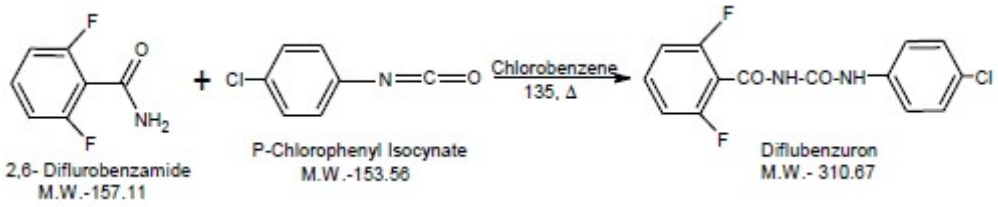
DIFLUBENZURON

Manufacturing Process:

2, 6 difluorobenzamide is mixed with 4 chloro phenyl isocyanate in presence of solvent chlorobenzene. Mixture is heated up to 135°C and cooked till completion of reaction.

The reaction mass is cooled to room temperature, filtered and dried to get Diflubenzuron technical. Solvent is recovered from ML by distillation.

Chemical Reaction:



Mass Balance:

Sr. No.	Raw Materials	Quantity (Kg)		Product	Quantity (Kg)
1)	2, 6 difluorobenzamide	510		Diflubenzuron	1000
2)	4 chloro phenyl isocyanate	560		Recover MCB	1740
3)	Mono Chlorobenzene	1800		Loss MCB	60
4)				Residue	70
	Total	**2870**		**Total**	**2870**

25) 2,5 Di Chloro Phenol

Manufacturing Process:

Step: 1

2,5 Dichloro Aniline is diazotized with Nitrosyl Sulfuric Acid (NSA) in presence of Sulfuric Acid to get diazotized mass of 2,5 Dichloro Aniline.

Step: 2

This diazotized mass is hydrolyzed in presence of water & mixed Xylene solvent to get crude product. Finally this crude product is further purified by high vacuum distillation.

Chemical Reaction:

Mass Balance:

Sr. No.	Input	Quantity Kg	Output	Quantity Kg
1	2,5 – Dichloro Aniline	980	2,5 – Dichloro Phenol	1000
2	98% Sulphuric Acid	1150	Recovered Solvent –Xylene	1920
3	Nitrosyl Sulphuric Acid	2240	Solvent Loss - Xylene	80
4	Solvent –Xylene	2000	Dilute Sulphuric Acid	3580
5	Water	2000	ETP Water	1545
6			Nitrogen Gas	215
7			Distillate Residue	30
	Total	**8370**	**Total**	**8370**

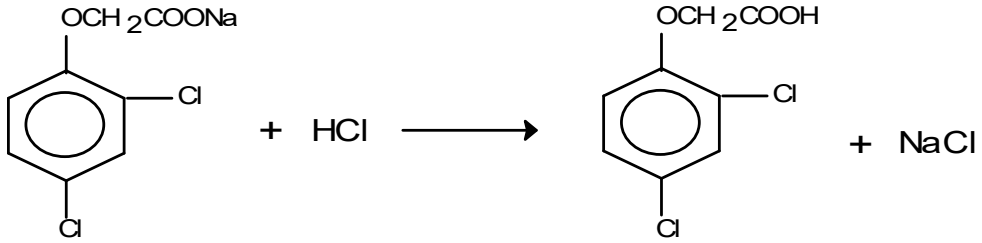
26) 2,4 Di chloro Phenoxy Acetic Acid (2,4-D ACID)

Manufacturing Process:

Water is charged to the reactor to which is added 2,4-D sodium salt under stirring, after that hydrochloric acid (30%) is charged. The reaction mass is stirred and filtered to 2,4-D acid.

Effluent: 22000 liters containing sodium chloride.

Chemical Reaction:



Mass Balance:

Sr. No.	Input	Quantity Kg	Output	Quantity Kg
1	2,4-D sodium salt	10000	2,4 Di Chloro Phenoxy Acetic Acid	8000
2	HCl (30%)	4500	ETP Water	11500
3	Water	5000		
	Total	**19500**	**Total**	**19500**

Pyraclostrobin (T) :

Process Description:

Step – 1

1, 4 Dichloro Benzene reacts with 3-Chloro Pyrazole in presence of catalyst & solvent Xylene to form Intermediate (A) as 3-Chloro 4-Chloro Phenyl Pyrazole.

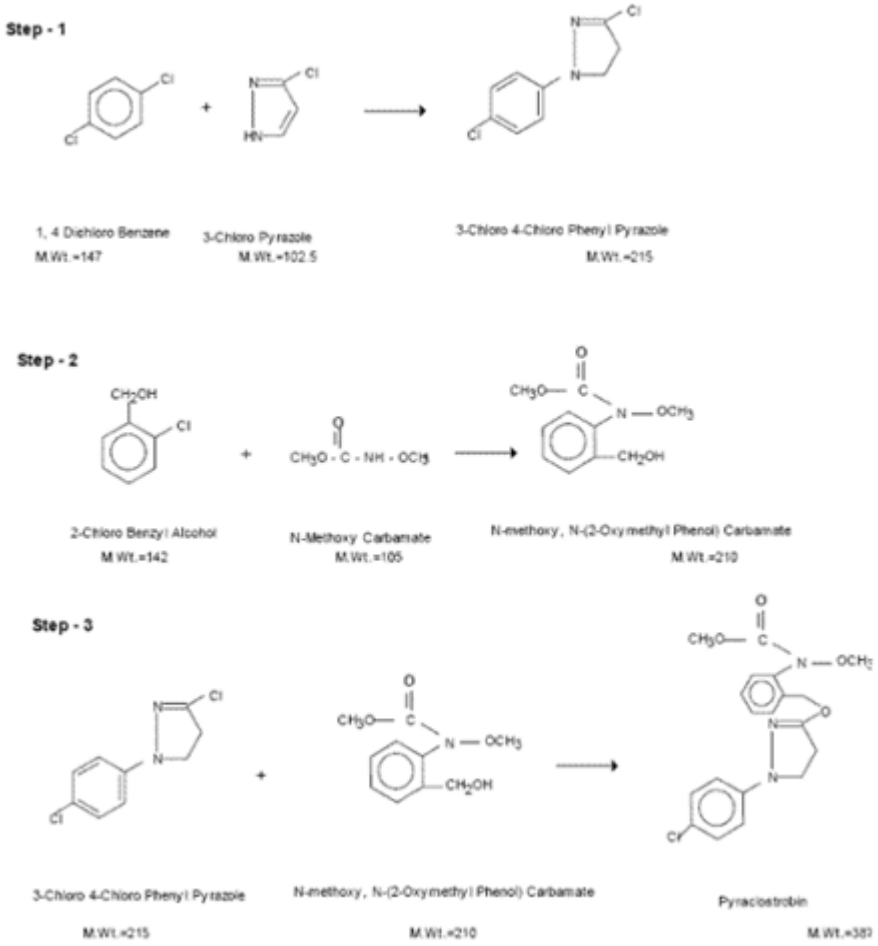
Step – 2

2-Chloro Benzyl Alcohol reacts with N-Methoxy Carbamate to form second Intermediate (B) N-methoxy, N-(2-Oxymethyl Phenol) Carbamate.

Step – 3

(A) & (B) then undergoes Condensation reaction in presence of Catalyst & Solvent Xylene gives the final product Pyraclostrobin.

Chemical Reaction:

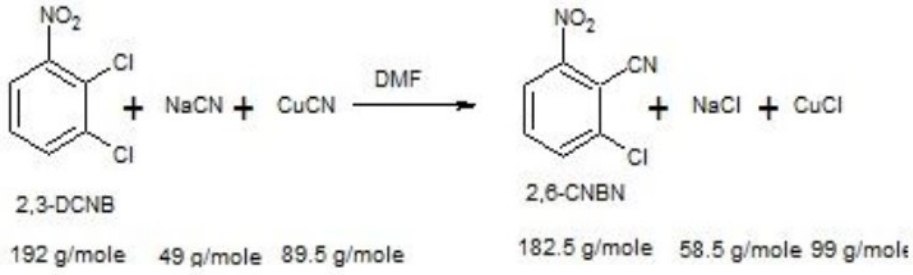


Mass Balance:

Sr. No.	Input	Quantity Kg	Output	Quantity Kg
1	1,4 Dichloro Benzene	515	Pyraclostrobin	1000
2	3 – Chloropyrazole	300	Recovered Solvent	3500
3	Solvent	3600	Solvent Loss	100
4	Catalyst	10	30% HCl Solution	1000
5	2 – Chlorobenzyl Alcohol	300	Aqueous Effluent to ETP	1005
6	N – Methoxy Carbamate	250	Distillation Residue	20
7	Water	1650		
	Total	**6625**	**Total**	**6625**

Preparation of Diclobenil
Stage-I Cynation (2,3-DCNB to 2,6 CNBN)

Reaction Chemistry :-



Procedure :

1	In SS reactor charge 2,3-Dichloronitrobenzene Sodium cyanide Copper Cyanide Dimethylformamide.
2	Start heating and raise the temperature to 170°C.
3	After achieving temperature 170°C maintain for 5-6 hr. Check sample on GC
4	After completion of reaction cool the mass
5	Recover DMF up to 125°C and no more distillate of DMF observed.
6	Cool to 120°C and release vacuum under nitrogen.
7	Slowly start addition of Monochlorobenzene (MCB) under stirring
8	Filter the mass and remove Sodium chloride and copper chloride.
9	Wash the organic mass with 5% Ammonia solution.
10	Separate organic and aqueous.
11	Organic layer washed with 10% HCl solution, Separate organic.
12	Organic washed with plain water & taken for MCB recovery, recover 80% Monochlorobenzene (MCB).
13	Cool the mass and filter. Wash cake with fresh MCB.
14	Remove the cake 2-chloro 6-nitro benzonirile (CNBN) , dry and take for next step for chlorination.

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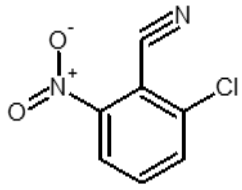
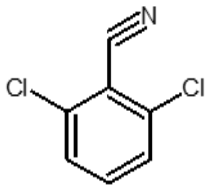
Preparation of Diclobenil
Stage-II(Denitrochlorination)

Reaction Chemistry :-



2-chloro-6-nitrobenzonitrile
(182.5)



2,6-dichlorobenzonitrile
(172)

+ NO2

Procedure:

1. Charge 2,6-CNBN (2-Chloro-6-nitro benzonirile) in SS reactor.Start heating and raise the temperature 190°C.
2. Then start purging of Chlorine gas initially slowly.
3. Purging of chlorine continue for 10 hours and then check for completion of reaction.
4. Analysed reaction mass by GC and product content should be 92-94%. If starting material is present continue chlorine purging further at that temperature till starting material < 1.0.
5. After completion of reaction cool the mass 100°C.
6. Slowly start addition of MCB under stirring and complete within half an hour.
7. Then add Charcoal and maintain the temperature at 100°C under stirring for one hour.
8. Take the mass for filtration under vacuum.
9. Then add Methanol in filtrate and again heat to 100°C and then cool to 10°C.
10. Reaction mass cooled to 10°C and filter under vacuum.
11. Wash the wet cake with Methanol (30°C) twice.
12. Unload the wet cake and kept for drying.
13. Filtrate obtained after crystallization to be set up for MCB/Methanol distillation.
14. Weigh the dry product **Diclobenil** and analyse for purity.

Raw Materials For Diclobenil Tech. (Herbicide)

S.No.	Material Name	Code No.	CAS NO.	Mol.Wt.	Appearance	Density	M.P.	B.P.	Mol. Formula	Flash point
1	2,3-Dichloronitrobenzene	RMDL-1	3209-22-1	192	Yellow crystalline solid	1.45	60-63	257-258	$C_6H_3Cl_2NO_2$	123
2	Sodium cyanide	RMDL-2	143-33-9-1	49	White solid	1.6	563.7	1496	NaCN	NA
3	Copper Cyanide	RMDL-3	544-92-3	89.6	Off white to pale yellow powder	2.92	473		CuCN	NF
4	Dimethylformamide	RMDL-4	68-12-2	73.09	Colourless liquid	0.944	-61	153	C_3H_7NO	58
5	Monochlorobenzene	RMDL-5	108-90-7	112.6	Colourless liquid	1.11	-45	131	C_6H_5Cl	29
6	Hydrochloric acid -30%	RMDL-6	7647-01-0	36.5	Colourless to yellow liquid	1.15	-50.0	85.0	HCl	NA
7	Ammonia solution	RMDL-7	1336-21-6	35.04	Colourless liquid	0.88-0.91	-57 to -91.5	37.7	NH_4OH	NA
8	Methanol	RMDL-8	67-56-1	32	Colourless liquid	0.792	-97.6	64.7	CH_3OH	11 to 12
9	Chlorine	RMDL-9	7782-50-5	71.91	Yellow compressed gas	3.2 at STP	-101.5	-34	Cl2	NA
IM	2-chloro 6-nitro benzonirile	IMDL-1	01-07-6575	182.5	Pale yellow powder	1.5	116-118	333.5	$C_7H_3ClN_2O_2$	NA
FP	Diclobenil Tech.(herbicide)	DL-Acid	1194-65-6	172.01	White Crystal	1.623	142	279	$C_7H_3Cl_2N$	126

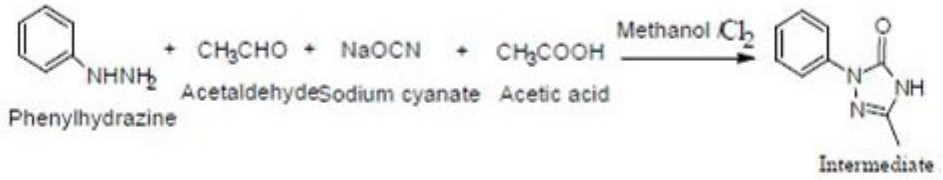
Sulfentrazone:

MANUFACTURING PROCESS

Step-1: Intermediate - I

A mixture of phenyl hydrazine, acetaldehyde, sodium cyanate and acetic acid in solvent methanol was chlorinated using chlorine gas over a period of 6 – 8 hours at 50 – 55°C. Product of this step (Intermediate I) was filtered after recovery of methanol under reduced pressure.

CHEMICAL REACTION



Phenylhydrazine Acetaldehyde Sodium cyanate Acetic acid Intermediate

MASS BALANCE:

Sr No	Input chemicals	Qty Kg	Out put chemicals	Qty /Kg
1	Phenyl hydrazine	765.0	1.Intermediate-I	1065.0
2	Acetaldehyde	376.0	2.Methanol recovered	3788.0
3	Sodium cyanate	530.0	3.Methanol loss	344.5
4	Chlorine	530.0	**Effluent:**	
5	Acetic acid	500.0	1.Aqueous effluent	4349.0
6	Methanol	4000.0	2. Scrubbed sodium hydroxide solution (containing sodium hypochlorite)	522.0
7	Water	3000.0		
8	10% sodium hydroxide solution	500.0		
			3. Drying loss	132.5
	Total	**10201.0**	**Total**	**10201.0**

ANNEXURE: 4

DETAILS OF WATER CONSUMPTION, WASTEWATER GENERATION AND TREATMANT

BREAK UP OF WATER CONSUMPTION AND WASTEWATER GENERATION

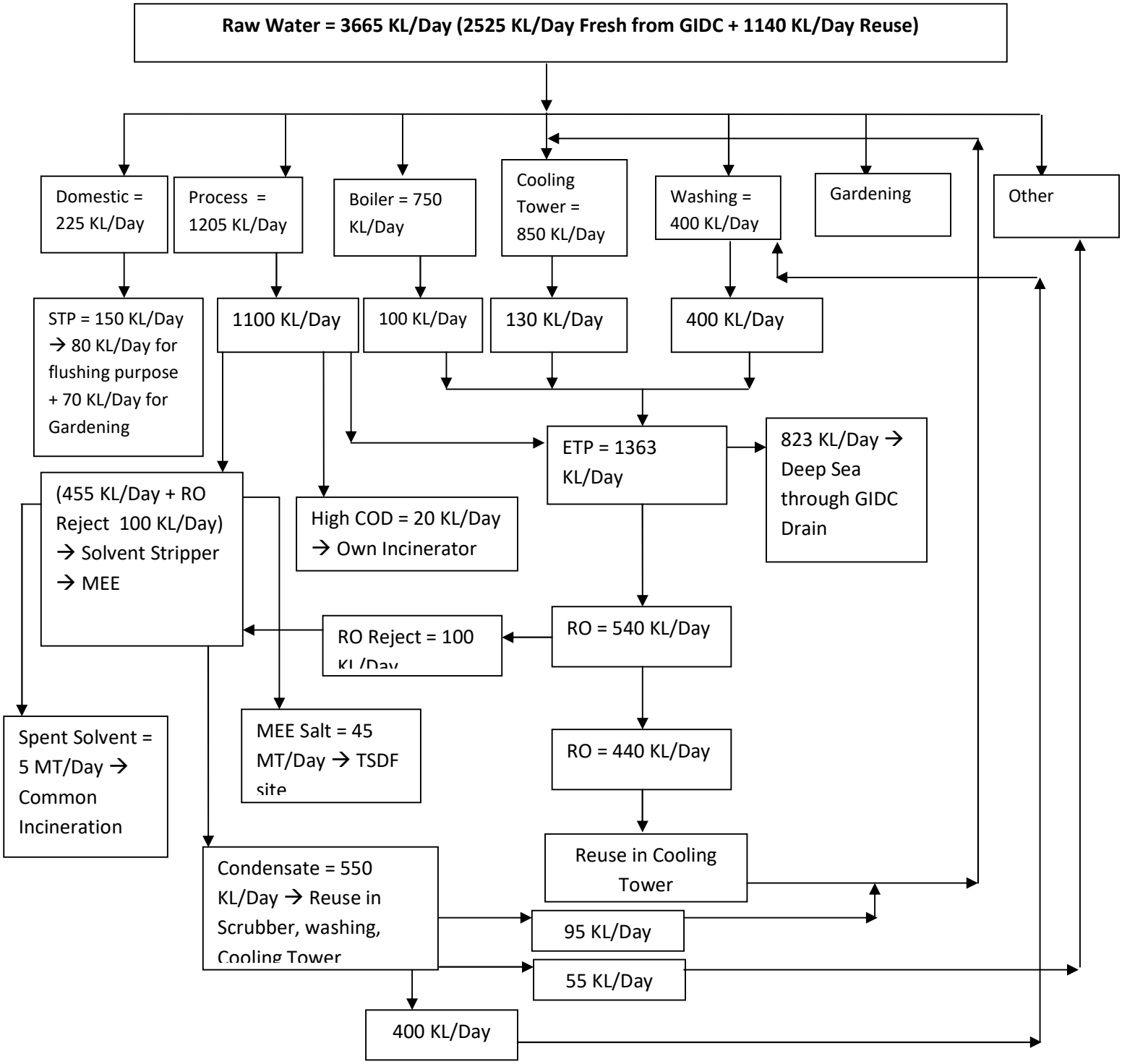
WATER CONSUMPTION:

WATER CONSUMPTION		**QUANTITY (KL/DAY)**		
		EIXSTING	**ADDITIONAL**	**TOAL AFTER EXPANSION**
Domestic		202	23	225
Industrial	Process	525	780	1305
	Washing	240	160	400
	Boiler	650	100	750
	Cooling	726	124	850
	Total (Industrial)	**2141**	**1164**	**3305**
Others		55	--	55
Gardening		53	27	80
Total Water Consumption (KL/DAY)		**2451**	**1214**	**3665**

WASTEWATER GENERATION:

WASTEWATER GENERATION		**QUANTITY (KL/DAY)**		
		EIXSTING	**ADDITIONAL**	**TOAL AFTER EXPANSION**
Domestic		145	25	150
Industrial	Process	578	630	1208
	Washing	240	160	400
	Boiler	86	14	100
	Cooling	119	11	130
	Total (Industrial)	**1023**	**815**	**1838**
Others		---	**--**	**--**
Gardening		---	**--**	**--**
Total wastewater Generation KL/DAY)		**1168**	**840**	**2008**

WATER BALANCE DIAGRAM



ANNEXURE: 5
ETP DETAILS

EXISTING

M/s. Hemani Industries Ltd. (Unit-III & IV) have Effluent treatment plant consisting of primary, secondary and tertiary treatment units. The effluent confirming the GPCB standards is disposed into deep sea through GIDC pipeline. The details of ETP are as follows.

PROCESS DESCRIPTION: ETP (EFFLUENT TREATMENT PLANT)

M/s. Hemani Industries LTD. (Unit-III & IV) have Effluent treatment plant consisting of primary, secondary, tertiary treatment and advance treatment units. The details of ETP are as follows.

Stream I (Low COD & TDS Stream)

First all non-toxic and biodegradable streams (low & medium COD& TDS) of wastewater are pass through Screen Chamber (SC-01) where floating material are removed with help of Screen (S-01). Then effluent is passed through Oil & Grease Removal Tank (OGRT-01). Automatic mechanical Oil Skimmer is provided in the OGRT to remove floating oil and grease from the wastewater to Oil & Grease Collection Tank (OGCT-01). Then effluent is collected in Collection cum Equalization tank-1 (CET-01). Mixer is provided in CET-01 to keep all suspended solids in suspension.

Then after, equalized wastewater is pumped to Neutralization Tank-1 (NT-01) where the continuous addition and stirring of Lime solution is done to maintain neutral pH of wastewater from Lime Dosing Tanks (LDT-01) as per requirement by gravity. Then after, neutralized wastewater goes to Flash Mixer-1 (FM-01) by gravity. Alum and Polyelectrolyte are dosed from Alum Dosing Tank (ADT-01) and Polyelectrolyte Dosing Tank (PEDT-01) respectively by gravity into FM-1 to carry out coagulation by using a Flash Mixer. Then after, coagulated wastewater is settled in Primary Clarifier (PCF-01). Clear supernatant from PCL is passed in Aeration Tank (AT-01)

Here, biodegradation of organic matter of the wastewater is carried out by bacteria (suspended growth) in the AT-01 and for that oxygen is supplied by 2 nos. of air blowers (B-02) through diffusers. Air blowers also keep MLSS in suspension.

Then after, wastewater goes to Secondary Clarifier-1 (SCL-01) from AT-1. Here, the suspended solids are settled. Sludge is removed from bottom of SCL-01 and pumped to AT-1 to maintain MLSS and excess activated sludge is sent to Sludge Sump (SS-01).

Clear supernatant from SCL-01 shall goes to Aeration Tank-2 (AT-02). Here biodegradation of left out organic matter of the wastewater is carried out by bacteria (suspended growth) and for that oxygen is supplied by two nos. of blowers (B-03) with help of diffusers. Then after, wastewater goes to Secondary Clarifier-2 (SCL-02) from AT-2. Here, the suspended solids are settled. Activated sludge is removed from bottom of SCL-02 and pumped to AT-02 to maintain MLSS and remaining is sent to SS. Nutrients are

added from NDTs to Aeration Tank-1& 2 for growth of Bacteria. Clear effluent is collected in of Intermediate Sump (IS-01) by gravity.

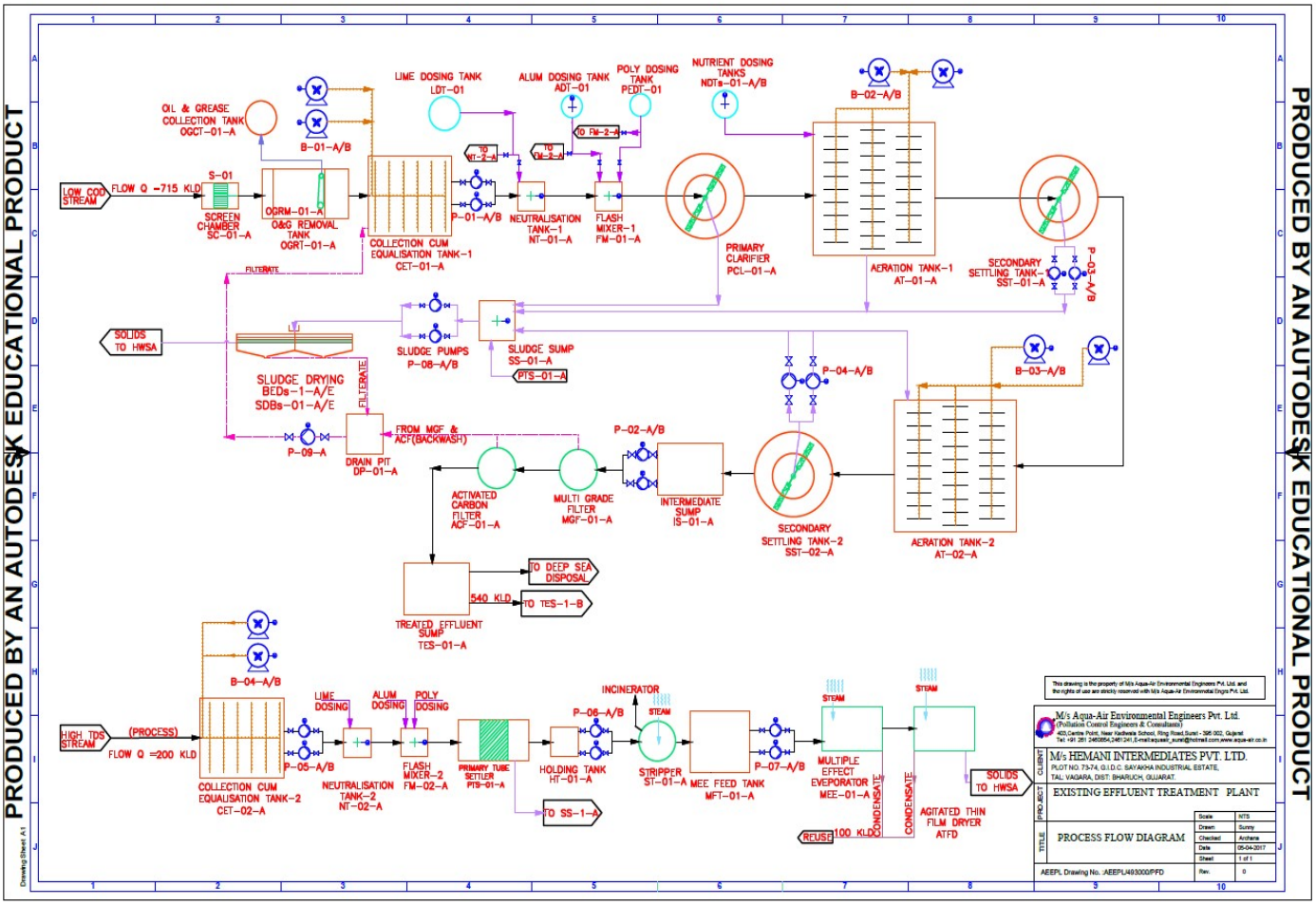
Thereafter, the wastewater is passed through Multi Grade Filter (MGF-01) to remove left out TSS and Activated Carbon Filter (ACF-01) for final effluent polishing. After tertiary treatment, effluent is collected in Treated Effluent Sump (TES-01-A) before sent to GIDC drain and ultimate disposal into deep sea.

Sludge settled in PCL-01-A and excess sludge from SCL-01-A/02-A & PTS-01-A are sent to Sludge Drying Beds(SDBs-01-A/E) where, drying is carried out before storage in HWSA and ultimate disposal to TSDF. Leachate from SDBs-01-A/B and backwash from MGF-01-A and ACF-01-A are sent back to CET-01-A for further treatment.

EXPECTED CHARACTERISTICS OF WASTEWATER BEFORE & AFTER TREATEMENT

Sr. No.	Category of Wastewater	Before Treatment	After Treatment
1	pH	3.5-6.5	6.5-8.5
2	COD (mg/L)	8,000	240
3	BOD_3 (mg/L)	3,500	100
4	SS (mg/L)	650	70
5	Ammonical Nitrogen (mg/L)	20	10

Flow Diagram:



Stream-II: High TDS

All High TDS streams of wastewater are collected in Collection cum Equalization Tank-2-A (CET-02-A). Mixer is provided to keep all suspended solids in suspension and to provide proper mixing. Then effluent is pumped to Neutralization Tank-2(NT-02-A) where Lime is added from Lime Dosing tank. Then after, effluent is sent to Flash Mixer-2 (FM-2-A) where Alum and poly are added from ADT and PDT respectively. Then after, coagulated wastewater is settled in Primary Tube Settler (PTS-01-A).

Clear effluent from PTS-1-A is collected in Holding Tank (HT-01-A) before pumped to strippers. Effluent from stripper is then collected in MEE Feed Tank (MFT-01-A) where RO reject is mixed. Then effluent is sent to Multiple Effect Evaporator (MEE-01-A) for further treatment followed by Agitated Thin Film Dryer (ATFD-01-A) for solids dewatering. Condensate from MEE is reused in scrubber, washing and cooling towers and solids from ATFD-01-A is collected and stored in HWSA for disposal in TSDF.

MEE SYSTEM

PROCESS DESCRIPTION:

Capacity: 200 KL/Day x 3 Nos.

Industry has installed Multi Effect Evaporator for the treatment of industrial effluent (as an additional facility) having capacity of 600 KL/Day. The condensate water generated from the MEE is reused in scrubber, washing & cooling tower.

Neutral effluent from Primary Treatment Plant is passed through 3 stages Evaporator System and the evaporated water is collected in an Evaporated Water Collection Tank and then recycled to plant after filtering through sand filter and carbon filter. The sludge from the evaporators is filtered through Nutsch Filter whereby solid filtered sludge is obtained and the filtrate is reused in scrubber, washing and cooling towers.

Multi stage evaporator (3 - stages) is a long tube forced circulation type evaporators where in the first effect high pressure steam of 7.0 kg/cm^2 is used to evaporate waste water. The evaporated water in the form of steam at 2.0 kg/cm^{2}g pressure is used for evaporating the effluent in the second stage at atmospheric pressure. Evaporated water from the second stage is used for evaporating waste water in the third stage under vacuum of 650- 720 mm Hg. Finally evaporated water from the third stage is condensed in the steam condenser using cooling water on other side. Condensate from all the three stages is collected in condensate receiving tanks, which is pure water and hence, reused in scrubber, washing and cooling towers. Concentrated mass from each effect is

collected in the crystallizer where, on cooling inorganic salts are precipitated along with organic contaminants. This mass is filtered in CF / Nutch filter and filtrate is reused in scrubber, washing and cooling towers .

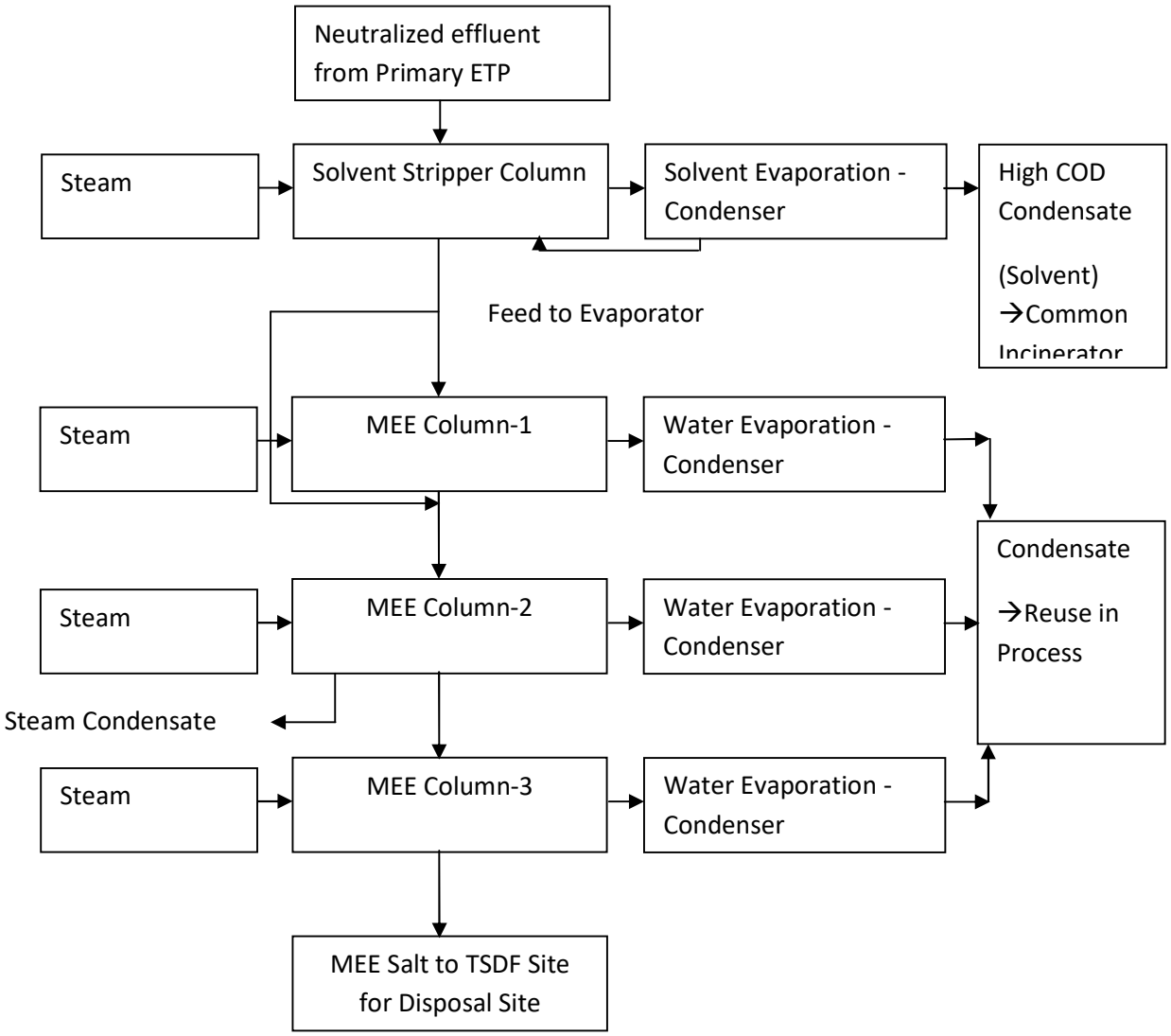
Design of MEE :

No. of Effects	:	3 (1 Falling Film + 2 Forced Circulation)
Waste Handling Capacity	:	200 m^3 / day x 3 Nos.
Feed Rate	:	10000 kg / hour (20 working hours / day)
Feed Concentration	:	10 % TDS
Feed Temperature	:	35 ^{o} C
Product Rate	:	2500 kg / hour
Product Concentration	:	40 %
Product Temperature	:	55 ^{o} C
Water Evaporation Rate	:	7500 kg / hour

EXPECTED CHARACTERISTICS OF WASTEWATER BEFORE & AFTER TREATEMENT

Sr. No.	Category of Wastewater	Before Treatment
1	pH	2-10
2	COD (mg/L)	20,000 - 25,000
3	BOD_3 (mg/L)	5,000-6,000
4	TDS (mg/L)	1,10,000
5	Ammonical Nitrogen (mg/L)	200

Flow Diagram:



Unit Dimension:

S.N.	Name of unit	Size (m x m x m)	No.	MOC/ Remark
Stream I (Low-medium COD & TDS Stream) 850 M3/Day				
1	Screen Chamber (SC-01-A)	2.8 x 1.5 x (0.05 +0.3 FB)	1	RCC M25+A/A Bk. Lining
2	Oil & Grease Removal Tank (OGRT-01-A)	4.0 x 2.0 x (2.0 LD +0.5 FB)	1	RCC M25+A/A Bk. Lining
3	Oil & Grease Collection Tank (OGRT-01-A)	x 1.5x (2.0 LD +0.7FB)	1	RCC M25 + RCC M25+A/A Bk. Lin.
4	Collection cum Equalization Tank-1 (CET-01-A)	8.5 x6.5 x (3.5 LD+0.7 FB)	1	RCC M25+A/A Bk. Lining
5	Neutralization Tank (NT-01-A)	3.0 x 3.0 x (3.5LD +0.3 FB)	1	RCC M25+A/A Bk. Lining
6	Flash Mixer-1 (FM-01-A)	2.9 x 2.9 x (3.3 LD +0.5 FB)	1	RCC M25
7	Primary Clarifier (PCL-01-A)	8.0 dia x (3.5 SWD + 0.5 FB)	1	RCC M25
8	Aeration Tank-1 (AT-01-A)	24.0 x 16.0 x (6.0 LD +0.5 FB)	1	RCC M25
9	Secondary Clarifier-1 (SCL-01-A)	8.5 dia x (3.0 SWD +0.5 FB)	1	RCC M25
10	Aeration Tank-2 (AT-02-A)	20.0 x 15.5 x (5.5 LD +0.5 FB)	1	RCC M25
11	Secondary Clarifier (SCL-02-A)	8.0 dia x (3.0 SWD +0.5 FB)	1	RCC M25
12	Intermediate Sump (IS-01-A)	5.5 m x 5.5 m x (3.0 m + 0.5)	1	RCC M25
13	Multi Grade Filter(MGF-01-A)	35 m3/hr	1	MSEP
14	Activated Carbon Filter (ACF-01-A)	35 m3/hr	1	MSEP

15	Treated Effluent Sump (TES-01-A)	7.0 x4.5 x (3.0 LD+0.5 FB)	1	RCC M25
16	Lime Dosing Tank (LDT-01)	2000 lit	1	HDPE
17	Alum Dosing Tank (ADT-01)	1500 lit	1	HDPE
18	Poly Dosing Tank (PDT-01)	1000 lit	1	HDPE
19	Nutrient Dosing Tank (NDT-01)	1000 lit	2	HDPE
20	Sludge Drying Beds(SDBs-01-A/E)	6.0 m x 6.0 m	5	Brk. Maso. With PCC Bedding
21	Collection cum Equalization Tank-2 (CET-02-A)	4.0 x 3.0 x (2.5 LD+ 0.5 FB)	2	RCC M25+A/A Bk. Lining
22	Neutralization Tank (NT-02-A)	2.0 x 2.0 x (2.5 LD +0.5 FB)	1	RCC M25+A/A Bk. Lining
23	Flash Mixer-2 (FM-02-A)	1.5 x 1.5 (2.5 LD+ 0.7 FB)	1	RCC M25
24	Primary Tube Settler(PTS-01-A)	4.0 x 2.5 x (2.0 LD+1.0 HB+ 0.5 FB)	1	RCC M25
25	Holding Tank (HT-01-A)	6.0 x 4.0 x (3.0 LD+ 0.5 FB)	1	RCC M25
26	Strippers (ST-01-A)	200 M3/D	1	SS316L
27	MEE Feed Tank (MFT-01-A)	7.5 x 4.0 x (3.0 LD+ 0.5 FB)	1	RCC M25
28	Multi Effect Evaporator (MEE-01-A) with Agitated Thin Film Dryer (ATFD-01-A)	200 M3/D	1	SS316L

Stream-III: High COD

All High COD streams of wastewater are collected in Collection cum Equalization Tank-3 (CET-03). Then effluent is pumped to Neutralization tank-03 (NT-03) where caustic/Acid are added from Caustic/Acid Dosing tanks as per requirement to maintain neutral pH of waste water. Then after, neutralized wastewater is sent to Flash Mixer-03 (FM-03) where Alum and poly are added from Alum Dosing Tank and Poly Dosing Tank respectively. Then after, coagulated wastewater is settled in Primary Tube Settler-03 (PTS-03). Sludge settles in PTS-03 is sent to Sludge sump (SS-03) and then pumped to Filter Press (FP) for dewatering. Neutralized effluent is incinerated in own incinerator.

INCINERATOR SYSTEM

PROCESS DESCRIPTION:

PRIMARY COMBUSTION CHAMBER

The drums containing wastes as well as the organic waste are incinerated into Primary Combustion Chamber having dual fuel burner (LDO). The organic vapors as well as flue gas are released from primary Combustion chamber between 150-450 ^{0} C. The temperature of the drums is in the range of 450-750 ^{0} C.

SECONDARY COMBUSTION CHAMBER

The organic vapors and the flue gas are drawn into Secondary Combustion Chamber, which has main gas burner and dual fuel burner (LDO & NG). The chamber is maintained at sufficiently high temperature in the range of 900-1200 ^{0} C for complete oxidation of organic/flue gas. i.e complete incineration.

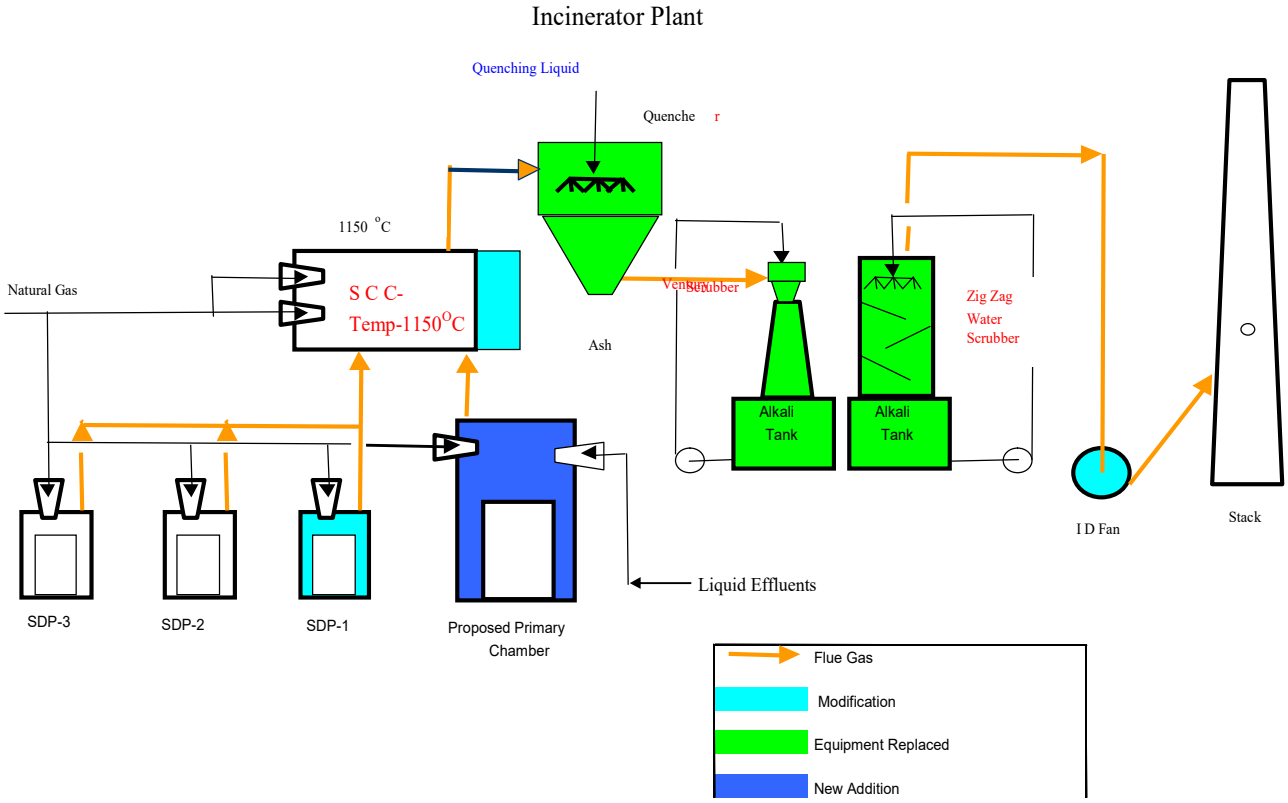
These hot gases are passed through spray quencher where water is sprayed as cooling agent to cool down the hot gases from 1200 ^{0}C to 150 ^{0}C temperature. The cooling water is sprayed through three spray nozzles. Flue gases are further cooled by mixing atmospheric air through dilution air damper before passing through scrubbing system.

SCRUBBING SYSTEM

The flue gases are pass through ventury scrubber, which contains 10% Caustic Solution under re-circulation as a scrubbing media. After scrubbing through ventury scrubber, the flue gases are pass through a Zigzag scrubber for further scrubbing. This zigzag scrubber has 10% Caustic Solution as a scrubbing media. After scrubbing, the gases are pass through a demister pad of SS-316 wire mesh to eliminate moisture droplets present in the gas.

CHIMNEY

The clean gases are sent to the atmosphere through chimney of height 30 meters with the help of ID Fan. The ID Fan sucks all the gases coming from Incineration System and maintains negative suction throughout the system.



EXPECTED CHARACTERISTICS OF WASTEWATER BEFORE & AFTER TREATEMENT

Sr. No.	Category of Wastewater	Before Treatment
1	pH	2-10
2	COD (mg/L)	1,50,000 - 1,75,000
3	BOD_3 (mg/L)	10,000
4	TDS (mg/L)	90,000
5	Ammonical Nitrogen (mg/L)	400

Proposed:

M/s. Hemani Industries Ltd. (Unit-III & IV) shall have an Effluent treatment plant consisting of primary, secondary, tertiary treatment and advance treatment units. The details of ETP are as follows.

Stream I (Low COD & TDS Stream)

First all non-toxic and biodegradable streams (low & medium COD& TDS) of wastewater shall pass through Screen Chamber (SC-01-B) where floating material shall be removed with help of Screen (S-01-B). Then effluent shall be passed through Oil & Grease Removal Tank (OGRT-01-B). Automatic mechanical Oil Skimmer shall be provided in the OGRT to remove floating oil and grease from the wastewater to Oil & Grease Collection Tank (OGCT-01-B). Then effluent shall be collected in Collection cum Equalization tank-1 (CET-01-B). Pipe grid is provided at bottom of the CET-01 to keep all suspended solids in suspension and to provide proper mixing. 2 nos. of Air Blowers (1W+1 stand-by) shall supply air through to pipe grid.

Then after, equalized wastewater shall be pumped to Neutralization Tank-1 (NT-01-B) where the continuous addition and stirring of Lime solution is done to maintain neutral pH of wastewater from Lime Dosing Tanks (LDT-01-B) as per requirement by gravity. Then after, neutralized wastewater shall go to Flash Mixer-1 (FM-01-B) by gravity. Alum and Polyelectrolyte shall be dosed from Alum Dosing Tank (ADT-01) and Polyelectrolyte Dosing Tank (PEDT-01-B) respectively by gravity into FM-1-B to carry out coagulation by using a Flash Mixer. Then after, coagulated wastewater shall be settled in Primary Clarifier (PCF-01-B). Clear supernatant from PCL shall be passed in Aeration Tank (AT-01-B)

Here, biodegradation of organic matter of the wastewater shall be carried out by bacteria (suspended growth) in the AT-01 and for that oxygen shall be supplied by 2 nos. of air blowers (B-02-B) through diffusers. Air blowers also keep MLSS in suspension.

Then after, wastewater shall go to Secondary Clarifier-1 (SCL-01-B) from AT-1-B. Here, the suspended solids shall be settled. Sludge shall be removed from bottom of SCL-01-B and pumped to AT-1-B to maintain MLSS and excess activated sludge shall be sent to Sludge Sump (SS-01-B).

Clear supernatant from SCL-01-B shall go to Aeration Tank-2 (AT-02-B). Here biodegradation of left out organic matter of the wastewater shall be carried out by bacteria (suspended growth) and for that oxygen shall be supplied by two nos. of blowers (B-03-C/D) with help of diffusers. Then after, wastewater shall go to Secondary Clarifier-2 (SCL-02-B) from AT-2-B. Here, the suspended solids shall be settled. Activated sludge shall be removed from bottom of SCL-02-B and pumped to AT-02-B to maintain MLSS and remaining will be sent to SS. Nutrients will be added from NDTs to Aeration Tank-1-B & 2-B for growth of Bacteria. Clear effluent is the collected in of Intermediate Sump (IS-01-B) by gravity.

Thereafter, the wastewater shall be passed through Multi Grade Filter (MGF-01-B) to remove left out TSS and Activated Carbon Filter (ACF-01-B) for final effluent polishing. After tertiary treatment, effluent shall be collected in Treated Effluent Sump (TES-01-B) and effluent from TES-01-A also

collected before treat RO units (RO-1 & 2). RO permeates from RO-1 and RO-2 shall be sent to High pressure RO (HPRO-1) for further treatment. RO-1 & RO-2 permeates shall be collected in RO Permeate Tank (ROPT-01) and then reuse in process. RO reject shall be collected in High Pressure RO Tank (HPRO-01). HP RO reject shall be sent to ME Feed Tank (MFT-01-B) for further treatment and HPRO-01 permeate shall be collected in ROPT-01. Treated water from ROPT-01 tank shall be reuse in boiler, cooling and in washing.

Sludge settled in PCL-01-B and excess sludge from SCL-01-B/02-B & PTS-01-B shall be collected in Sludge Sump then sludge shall be pumped to Centrifuge (CFG-01) where, dewatering shall be carried out before storage in HWSA and ultimate disposal to TSDF. Leachate from CFG-01 and backwash from MGF-01-B and ACF-01-B shall be collected in Drain Pit and pumped back to CET-01-B for further treatment.

Stream II (High TDS stream)

All High TDS streams of wastewater shall be collected in Collection cum Equalization Tank-2 (CET-02-B). Pipe grid is provided at bottom of the CET-02-B to keep all suspended solids in suspension and to provide proper mixing. 2 nos. of Air Blowers (1W+1 stand-by) shall supply air through to pipe grid. Then effluent shall be pumped to Neutralization Tank-2(NT-02-B) where Lime shall be added from Lime Dosing tank. Then after, effluent shall have sent to Flash Mixer-2 (FM-02-B) where Alum and poly shall be added from ADT and PDT respectively. Then after, coagulated wastewater shall be settled in Primary Tube Settler (PTS-01-B).

Clear effluent from PTS shall be collected in Holding Tank (HT-01-B) before pumped to strippers. Effluent from stripper and HPRO-01 shall be then collected in MEE Feed Tank (MFT-01-B) where RO reject shall be mixed. Then effluent shall be sent to Multiple Effect Evaporator (MEE-01-B) for further treatment followed by Agitated Thin Film Dryer (ATFD-01-B) for solids dewatering. Condensate from MEE shall reuse in washing and utilities and solids from ATFD-01-B shall be collected and stored in HWSA for disposal in TSDF.

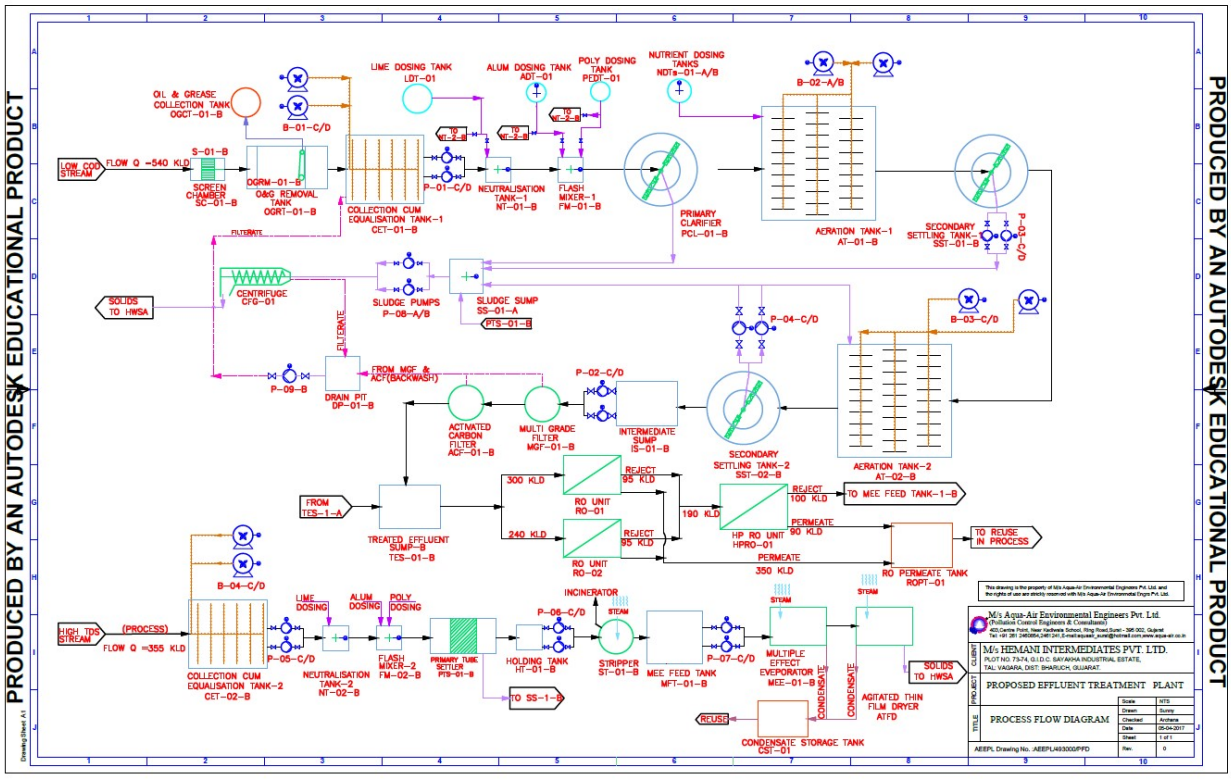
SIZE OF TANKS (Stream I & II) (PROPOSED)

S.N.	Name of unit	Size (m x m x m)	No.	MOC/ Remark
Stream I (Low-medium COD & TDS Stream) 540 M3/D				
1	Screen Chamber (SC-01-B)	2.5 x 1.5 x (0.05 +0.3 FB)	1	RCC M25+A/A Bk. Lining
2	Oil & Grease Removal Tank (OGRT-01-B)	3.0 x 1.5 x (1.5 LD +0.5 FB)	1	RCC M25+A/A Bk. Lining
3	Oil & Grease Collection Tank (OGRT-01-B)	1.5 x 1.0 x (1.0 LD +0.7FB)	1	RCC M25 + RCC M25+A/A Bk. Lin.
4	Collection cum Equalization Tank-1 (CET-01-B)	7.0 x6.5 x (3.0 LD+0.7 FB)	1	RCC M25+A/A Bk. Lining
5	Neutralization Tank (NT-01-B)	2.2 x 2.2 x (3.0LD +0.3 FB)	1	RCC M25+A/A Bk. Lining
6	Flash Mixer-1 (FM-01-B)	2.2 x 2.2 x (2.8 LD +0.5 FB)	1	RCC M25
7	Primary Clarifier (PCL-01-B)	7.0 dia x (3.0 SWD + 0.5 FB)	1	RCC M25
8	Aeration Tank-1 (AT-01-B)	22.0 x 15.0 x (5.5 LD +0.5 FB)	1	RCC M25
9	Secondary Clarifier-1 (SCL-01-B)	7.5 dia x (3.0 SWD +0.5 FB)	1	RCC M25
10	Aeration Tank-2 (AT-02-B)	18.0 x 14.0 x (5.0 LD +0.5 FB)	1	RCC M25
11	Secondary Clarifier (SCL-02-B)	7.0 dia x (3.0 SWD +0.5 FB)	1	RCC M25
12	Intermediate Sump (IS-01-B)	4.5 m x 4.5 m x (3.0 m + 0.5)	1	RCC M25
13	Multi Grade Filter(MGF-01-B)	25 m3/hr	1	MSEP
14	Activated Carbon Filter (ACF-01-B)	25 m3/hr	1	MSEP
15	RO Feed Tank (ROFT-01)	6.0 x4.0 x (2.5 LD+0.5 FB)	1	RCC M25

16	RO-1 & RO-2	270 m3/D (Each)	2	Std.
17	High Pressure RO (HPRO-01)	190 m3/D	1	Std.
18	RO Permeate Tank (ROPT-01)	10.0 x 6.0 (3.0+0.5)	1	RCC M25
19	Lime Dosing Tank (LDT-01)	1500 lit	1	HDPE
20	Alum Dosing Tank (ADT-01)	1000 lit	1	HDPE
21	Poly Dosing Tank (PDT-01)	1000 lit	1	HDPE
22	Nutrient Dosing Tank (NDTs-01-A/B)	1000 lit	2	HDPE
23	Sludge Sump (SS-01-B)	3.0 m x 3.0 m x (3.0 m + 0.5)	2	RCC M25
24	Centrifuge (CFG-01)	80 M^3	2	Brk. Maso. With PCC Bedding
Stream II (High TDS stream) 255 m3/D+100 m3/D RO Reject				
25	Collection cum Equalization Tank-2 (CET-02)	5.0 x 3.5 x (3.0 LD+ 0.5 FB)	2	RCC M25+A/A Bk. Lining
26	Neutralization Tank (NT-01)	2.5 x 2.5 x (3.0 LD +0.5 FB)	1	RCC M25+A/A Bk. Lining
27	Flash Mixer-2 (FM-02)	2.0 x 2.0 (2.8 LD+ 0.7 FB)	1	RCC M25
28	Primary Tube Settler(PTS-01)	4.5 x 3.0 x (2.5 LD+1.0 HB+ 0.5 FB)	1	RCC M25
29	Holding Tank (HT-01)	7.0 x 5.0 x (3.5 LD+ 0.5 FB)	1	RCC M25
30	Strippers (ST-01)	255 M3/D	1	SS316L
31	MEE Feed Tank (MFT-01)	8.5 x 5.0 x (3.5 LD+ 0.5 FB)	1	RCC M25
32	Multi Effect Evaporator (MEE-01) with Agitated Thin Film Dryer (ATFD-01)	355 M3/D	1	SS316L

RCC M25 = REINFORCED CEMENT CONCRETE (M 25 GRADE)
PCC = PLAIN CEMENT CONCRETE
MSEP = MILD STEEL EPOXY PAINTED

Flow Diagram:



Details of STP:

DETAILS OF SEWAGE TREATMENT PLANT

First all non-toxic and biodegradable streams of sewage shall be passed through Screen Chamber(SC-01) where Screen (S-01) is provided to remove floating material from sewage. Then effluent shall be passed through Oil & Grease Removal Trap (OGRT). Floating oil and grease from the wastewater shall be removed manually and collected in O & G Collection tank (OGCT) from it. Then after, the sewage is collected in Collection Tank (CT-01). Then sewage shall be pump to Moving Bed Bio-Reactor (MBBR) with help of submersible pump (P-01).

In MBBR tank dissolved organics are removed with the help of bacteria in presence of oxygen provided by centrifugal blower through diffused aeration system. MBBR tank is loaded with special media which inhibits attached bacterial growth. Due to this attached growth, the quantity of sludge generation is very little and the treatment is more effective in a very less retention time. This treated sewage shall be transferred to Tube Settler (TS), where Sludge settles in TS shall be sludge is discarded in sludge drying beds (SDB) for drying. Leachate from SDBs is sent back to Collection tank for treatment and dry sludge is used as manure.

The treated sewage shall be then collect in Intermediate Sump (IS) where for disinfection of sewage, Sodium Hypochlorite shall be added from Sodium Hypochlorite Dosing Tank with help of Dosing Pump.

This treated water shall be pump to Dual Media filter (DMF) with help of Centrifugal pump(P-02). This treated water pass through Dual Media filter (DMF) to ensure total removal of suspended particles and for polishing treatment. Treated water is then collected in Treated Water Sump (TWS) having capacity of one-day storage, before used for irrigation.

SIZE OF TANKS

S.N.	Name of unit	Size (m x m x m) L x B x (LD+FB)	No.	MOC/ Remark
STP (150 KLD)				
1	Screen Chamber (SC)	3.5 x1.0 x (0.05 LD+0.3 FB)	1	RCC M25
2	Oil & Grease Removal Trap (OGRT)	4.0 x 1.0x (1.2 LD+0.5 FB)	1	RCC M25
3	Collection Tank (CT)	4.0 x 3.0 x (2.8LD+0.7 FB)	1	RCC M25
4	Moving Beds Bio-Rector (MBBR)	4.0 x2.5 x (4.0 LD + 0.3 HB+ 0.3 FB)	1	MSFRP
5	Tube Settler (TS)	3.0 x2.5 x (2.5 LD + 0.5 HB+ 0.3 FB)	1	MSFRP
6	Intermediate Sump (IS)	2.5 x2.0 x (3.0 LD + 0.3 HB+ 0.5 FB)	1	MSFRP
7	Dual media filter(DMF)	7 m3/hr	1	FRP
8	Treated Water Sump(TWS)	5.0 x 5.0 x (3.0 LD+0.5 FB)	1	RCC M25
9	sludge drying beds (SDB)	4.0 x 3.0	2	Brick Mos. With PCC bedding
10	O & G Collection Tank (OGCT)	500 lit	1	HDPE
11	Sodium Hypo Dosing Tank(SHDT)	750 Lit	1	HDPE

ANNEXURE: 6

DETAILS OF HAZARDOUS WASTES:

SR. NO.	SOURCE OF WASTE	CATEGORY	QUANTITY (MT/ MONTH)			MODE OF DISPOSAL
			EXISTING	ADDITIONAL	TOTAL	
1	ETP Sludge	35.3	420	200	620	Collection, Storage, Transportation & sent to common TSDF of M/s. SEPPL, Kutch or M/s. BEIL, Ankleshwar.
2	Date Expired & Off-Specification products	29.3	20	-	20	Collection, Storage, Transportation & sent to on-site incinerator or common Incinerator of M/s. SEPPL, Kutch or M/s. BEIL, Ankleshwar or co-processing in cement industries or RSPL, Panoli.
3	Incinerable Liquid Waste	29.1	350	250	600	
4	Distillation Residue	20.3	380	130	510	
5	Used Oil	5.1	200 Ltrs	400 Ltrs	600 Ltrs	Collection, Storage, Transportation & sell to registered reprocessors / reuse as lubricant.
6.	Discarded Containers/ Bags	33.1	4,500 Nos	4,500 Nos	9,000 Nos	Collection, Storage, Decontamination, Detoxification, Transportation & sell to GPCB authorized vendors.
7.	Incineration Ash	37.2	15	--	15	Collection, Storage, Transportation & sent to common TSDF of M/s. BEIL, Ankleshwar or M/s. SEPPL, Kutch.
8	Fly Ash	37.2	4,340	5,660	10,000	Collection, Storage, Transportation & sell to brick manufactures.
9	Salts of Multiple Effect Evaporator	35.3	600	750	1,350	Collection, Storage, Transportation & sent to common TSDF of M/s. SEPPL,

						Kutch or M/s. BEIL, Ankleshwar.
10	Organic Residue	29.1	00	200	200	Collection, Storage, Transportation & sent to on-site incinerator or common Incinerator of M/s. SEPPL, Kutch or M/s. BEIL, Ankleshwar or co-processing in cement industries or RSPL, Panoli.
11	30% HCl	29.6	263.75	2219.25	2483	Collection, Storage, Transportation & sell to GPCB authorized end user.
12	Sodium Sulfite (80% wet cake)	--	1,000.25	4,229.75	5,230	
13	Ammonium Chloride (75-80% wet cake)	--	425	4,495	4,920	
14	Ammonium Chloride (20-25% Solution)	--	1,500	--	1,500	
15	KCl (20-25% Solution)	--	1,610	940	2,550	
16	Spent Sulphuric Acid (55%)	29.6	700	405	1,105	
17	Sodium Sulphate Solution (30% to 35%)	--	2,000	5,240	7,240	
18	Potassium Bromide	--	--	215	215	
19	HBr	29.6	--	6301	6301	
20	Cupric Chloride Solution	--	85	65	150	
21	Cuprous Hydroxide	--	--	100	100	
	Sodium Bisulfite	--	--	550	550	

ANNEXURE: 7

DETAILS OF FLUE & PROCESS GAS EMISSION

Flue Gas Emission

SN.	STACK ATTACHED TO	CONTROL MEASURES	HEIGHT (M)	AIR EMISSION	
				POLLUTANT	PERMISSIBLE LIMIT
Flue Gas Stacks					
1.	Boiler-1	Bag Filter	50	SPM SO_2 NOx	150 mg/nm^3 100 ppm 50 ppm
2.	Boiler-2	Bag Filter	50	SPM SO_2 NOx	150 mg/nm^3 100 ppm 50 ppm
3	Incinerator (fuel used LDO = 5 KL/month)	Multi cyclone separator	30	SPM SO_2 NOx HC CO HCl Cl_2	150 mg/nm3 100 mg/nm3 50 mg/nm3 15 mg/nm3 150 mg/nm3 20 mg/nm3 9 mg/nm3
4.	Thermic fluid Heater (fuel used FO = 15 KL/month)	--	12	SPM SO_2 NOx	150 mg/nm^3 100 ppm 50 ppm
5.	Thermic Fluid Heater & Boiler (8 T/hrs)	ESP	50		
6.	D.G. Set (1010 KVA x 3 Nos.)	--	11		
Proposed					
7.	Boiler-3 (8 MT/Hr)	ESP	50	SPM SO_2 NOx	150 mg/nm^3 100 ppm 50 ppm
8.	Boiler-4 (10 MT/Hr)	ESP	50	SPM SO_2 NOx	150 mg/nm^3 100 ppm 50 ppm
9.	Thermic Fluid Heater (12 Lac KCal/Hr.)	ESP	50		
10.	D.G. Set additional (1010 KVA x 5 Nos.)	--	11		

Details of Process Vent

Sr. No.	Stack attached to	Stack Height	Air Pollution Control System	Parameter	Permissible Limit
Existing					
1	CMAC Plant	15 m	Alkali Scrubber	HCl Cl2 SO2	20 mg/Nm^3 9 mg/Nm^3
2	MBD Plant	15 m	Alkali Scrubber	HCl Cl2 HBr	20 mg/Nm^3 9 mg/Nm^3 5 mg/Nm^3
3	Herbicide	12 m	Two Stage Water Alkali Scrubber	HCl SO2 HBR	20 mg/Nm^3 40 mg/Nm^3 5 mg/Nm^3
4	Fungicide	12 m	Two Stage Water Alkali Scrubber	HCl SO2	20 mg/Nm^3 40 mg/Nm^3
5	Insecticide	12 m	Two Stage Water Alkali Scrubber	HCl SO2	20 mg/Nm^3 40 mg/Nm^3
Proposed					
6.	Process Vent	12 m	Two Stage Scrubber	NH3	175 mg/Nm^3
7.	Process Vent	12 m	Two Stage Scrubber	SO2	40 mg/Nm^3

ANNEXURE: 8

DETAILS HAZARDOUS CHEMICAL STORAGE FACILITY

SR. NO.	NAME OF HAZARDOUS SUBSTANCE	NO. OF STORAGE TANK	TOTAL QUANTITY	PLACE OF STORAGE	CONTROL MEASURES PROVIDED
1	Sulphuric Acid	2	20 KL	Tank Farm Area	1. Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes.
2	Oleum 23%	1	20 KL	Tank Farm Area	1. Store at ambient temperatures with venting open. Protect containers against physical damage and water. 2. Handling should occur in a chemical fume hood. 3. Workers employed in mfr, handling or use of sulfuric acid should wear suitable personal protective equipment, including chem. goggles, face screens, gloves, neoprene or PVC boots and acid-resistant trousers, legs of which should fall over boots.
3	Caustic Lye	1	20 KL	Tank Farm Area	1. Store at ambient temperatures with venting open. Protect containers against physical damage and water. 2. Handling should occur in a chemical fume hood.
4	35 % Hydrochloric Acid	2	20 KL	Tank Farm Area	1. Safeguard containers against mechanical injury. 2. Emergency eyewash fountains and safety showers should be available in the immediate vicinity of potential exposure. Do not puncture or incinerate containers. 3. Wear appropriate chemical protective clothing.

SR. NO.	NAME OF HAZARDOUS SUBSTANCE	NO. OF STORAGE TANK	TOTAL QUANTITY	PLACE OF STORAGE	CONTROL MEASURES PROVIDED
5	Thinoyl Chloride	3	35*3 MT	Tank Farm Area	Store in a cool, dry, area away from incompatible substances. Respiratory Protection equipment Fire Fighting Equipment, Flame proof electrical equipment., No manual handling
6	Phenol	2	20 KL	Tank Farm Area	2. Store in a cool, dry, under ground storage area away from incompatible substances. Flammables-area. Respiratory Protection equipment Fire Fighting Equipment, Flame proof electrical equipment.
7	Toluene	1	20 KL	Tank Farm Area	Store in a, dry well-ventilated location, away from any area where the fire hazard may be acute. If the exposure limit is exceeded and engineering controls are not feasible, a full face piece respirator with organic vapor cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest above flash point, vapor-air mixtures are explosive within flammable limits noted above.
8	EDC	1	20 KL	Tank Farm Area	1. Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container, Wear appropriate protective eyeglasses or chemical safety goggles., Respiratory Protection equipment Fire Fighting Equipment, Flame proof electrical equipment., No manual handling
9	N-Hexane	1	20 KL	Tank Farm Area	2. Store in a cool, dry, under ground storage area away from incompatible substances. Flammables-area. Respiratory

SR. NO.	NAME OF HAZARDOUS SUBSTANCE	NO. OF STORAGE TANK	TOTAL QUANTITY	PLACE OF STORAGE	CONTROL MEASURES PROVIDED
					Protection equipment Fire Fighting Equipment, Flame proof electrical equipment., No manual handling
10	IPA	1	20 KL	Tank Farm Area	3. Store in a cool, dry place. Store in a tightly closed container, Respiratory Protection equipment Fire Fighting Equipment, Flame proof electrical equipment., No manual handling
11	Nitrobenzene	1	10 KL	Tank Farm Area	4. Store in underground storage tank, dry, well-ventilated area away from incompatible substances. Flammables-area. Keep containers tightly closed. Stable under normal temperatures and pressures
12	SO_2 Gas	1	25 KL	Tank Farm Area	Store in a cool, dry, area away from incompatible substances. Respiratory Protection equipment Fire Fighting Equipment, Flame proof electrical equipment., No manual handling
13	Bromine	5 KL	5 KL x 1 Nos Tank	Isolated Tank	Bromine will be stored in Iso-container in separate storage area and transported in Iso-container.
14	Methanol	20 KL	10 KL x 2 Nos Tank	U/G Tank MS	1. Flame proof plant, pumping transfer, close process, etc. 2. Double Static earthing 3. Dyke wall 4. Tanker unloading procedure. 5. SCBA sets available.
15	Dimethyl Formamide	20 KL	10 KL x 2 Nos Tank	U/G Tank MS	
16	Hydrogen	2 MT	Cylinder	Cylinder	6. Flame proof plant, pumping transfer, close process, etc. 7. Jumper clips on flanges 8. Fire extinguishers 9. Fencing and No Smoking and prohibited area. 10. Tanker unloading procedure. 11. Flame arrestor provided on vent line of the tank

SR. NO.	NAME OF HAZARDOUS SUBSTANCE	NO. OF STORAGE TANK	TOTAL QUANTITY	PLACE OF STORAGE	CONTROL MEASURES PROVIDED
					12. Hydrant system
17	Nitric Acid	50 KL	25 KL x 2 Nos Tank	MS A/G Tank	13. Safety Showers provided 14. Caution note provided 15. Dyke wall provided 16. Level gauge provided. 17. Double drain valve provided 18. Scrubber provided Required PPEs provided to all employees

ANNEXURE 9

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 labors 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

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 – 10

PROPOSED DRAFT TERMS OF REFERENCE:

1. Project Description

1. Justification of project.
2. Promoters and their back ground
3. Project site location along with site map of 5 km area and site details providing various industries, surface water bodies, forests etc.
4. Project cost
5. Project location and Plant layout.
6. Water source and utilization including proposed water balance.
7. Product spectrum (proposed products along with production capacity) and process
8. List of hazardous chemicals.
9. Mass balance of each product
10. Storage and Transportation of raw materials and products.

2. Description of the Environment and Baseline Data Collection

1. Micrometeorological data for wind speed, direction, temperature, humidity and rainfall in 5 km area.
2. Existing environmental status Vis a Vis air, water, noise, soil in 5 km area from the project site. For SPM, RSPM, SO_2, NOx.
3. Ground water quality at 5 locations within 5 km.
4. Complete water balance

3. Socio Economic Data

1. Existing socio-economic status, land use pattern and infrastructure facilities available in the study area were surveyed.

4. Impacts Identification And Mitigatory Measures

1. Identification of impacting activities from the proposed project during construction and operational phase.
2. Impact on air and mitigation measures including green belt
3. Impact on water environment and mitigation measures
4. Soil pollution source and mitigation measures
5. Noise generation and control.
6. Solid waste quantification and disposal.

5. Environmental Management Plan

1. Details of pollution control measures
2. Environment management team
3. Proposed schedule for environmental monitoring including post project

6. Risk Assessment

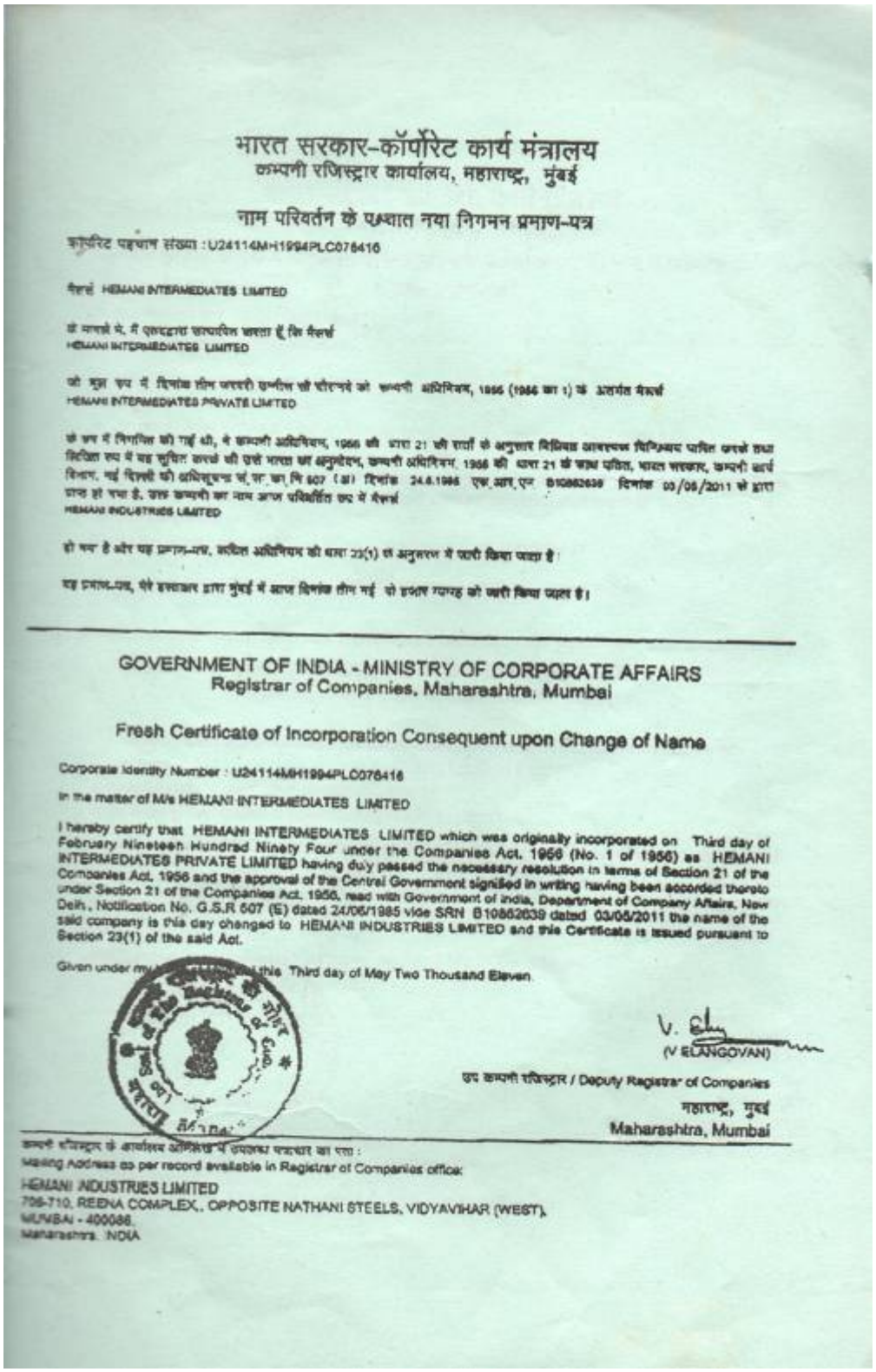
1. Objectives and methodology of risk assessment

2. Details on storage facilities
3. Process safety, transportation, fire fighting systems, safety features and emergency capabilities to be adopted.
4. Identification of hazards
5. Consequence analysis through occurrence & evaluation of incidents
6. Disaster Management Plan.

7. **Information for Control of Fugitive Emissions**
8. **Post Project Monitoring Plan for Air, Water, Soil and Noise.**
9. **Information on Rain Water Harvesting**
10. **Green Belt Development plan**

Annexure -11

Memorandum for name changed from "Hemani Intermediates P. Ltd." to "Hemani Industries Ltd.



भारत सरकार-कॉर्पोरेट कार्य मंत्रालय
कम्पनी रजिस्ट्रार कार्यालय, महाराष्ट्र, मुंबई

नाम परिवर्तन के पश्चात नया निगमन प्रमाण-पत्र

कॉर्पोरेट पहचान संख्या : U24114MH1994PLC078416

मैसर्स HEMANI INTERMEDIATES LIMITED

से मालूम हो, मैं एतद्द्वारा प्रमाणित करता हूँ कि मैसर्स
HEMANI INTERMEDIATES LIMITED

जो मूल रूप में दिनांक तीन फरवरी उन्नीस सौ चौरानवे को कम्पनी अधिनियम, 1956 (1956 का 1) के अंतर्गत मैसर्स
HEMANI INTERMEDIATES PRIVATE LIMITED

के रूप में निगमित की गई थी, ने कम्पनी अधिनियम, 1956 की धारा 21 की शर्तों के अनुसार विशिष्ट आवश्यक विनिश्चय पारित करके तथा विहित रूप में यह सूचित करके की उसे भारत सरकार अनुमोदन, कम्पनी अधिनियम, 1956 की धारा 21 के तहत पारित, भारत सरकार, कम्पनी कार्य विभाग, नई दिल्ली की अधिसूचना सं. का. नि 607 (अ) दिनांक 24.6.1995 एस.आर.एन B10862639 दिनांक 03/05/2011 से द्वारा प्राप्त हो चुका है, उक्त कम्पनी का नाम अब परिवर्तित रूप में मैसर्स
HEMANI INDUSTRIES LIMITED

हो चुका है और यह प्रमाण-पत्र, संशोधित अधिनियम की धारा 23(1) के अनुसरण में जारी किया जाता है।

यह प्रमाण-पत्र, मेरे हस्ताक्षर द्वारा मुंबई में आज दिनांक तीन मई दो हजार ग्यारह को जारी किया जाता है।

GOVERNMENT OF INDIA - MINISTRY OF CORPORATE AFFAIRS
Registrar of Companies, Maharashtra, Mumbai

Fresh Certificate of Incorporation Consequent upon Change of Name

Corporate Identity Number : U24114MH1994PLC078416

In the matter of M/s HEMANI INTERMEDIATES LIMITED

I hereby certify that HEMANI INTERMEDIATES LIMITED which was originally incorporated on Third day of February Nineteen Hundred Ninety Four under the Companies Act, 1956 (No. 1 of 1956) as HEMANI INTERMEDIATES PRIVATE LIMITED having duly passed the necessary resolution in terms of Section 21 of the Companies Act, 1956 and the approval of the Central Government signified in writing having been accorded thereto under Section 21 of the Companies Act, 1956, read with Government of India, Department of Company Affairs, New Delhi., Notification No. G.S.R 607 (E) dated 24/06/1995 vide SRN B10862639 dated 03/05/2011 the name of the said company is this day changed to HEMANI INDUSTRIES LIMITED and this Certificate is issued pursuant to Section 23(1) of the said Act.

Given under my [illegible] this Third day of May Two Thousand Eleven.

V. Elan
(V ELANGOVAN)
उप कम्पनी रजिस्ट्रार / Deputy Registrar of Companies
महाराष्ट्र, मुंबई
Maharashtra, Mumbai

कम्पनी रजिस्ट्रार के कार्यालय अभिलेख में उपलब्ध पत्राचार का पता :
Mailing Address as per record available in Registrar of Companies office:

HEMANI INDUSTRIES LIMITED
706-710, REENA COMPLEX, OPPOSITE NATHANI STEELS, VIDYAVIHAR (WEST),
MUMBAI - 400086,
Maharashtra, INDIA

भारत सरकार–कॉर्पोरेट कार्य मंत्रालय
कम्पनी रजिस्ट्रार कार्यालय, महाराष्ट्र, मुंबई

लिमिटेड कम्पनी के रुप में परिवर्तित होने के परिणामस्वरुप, कम्पनी के नाम में परिवर्तन का नया निगमन प्रमाण–पत्र

कॉर्पोरेट पहचान संख्या : U24114MH1994PLC076416

मैसर्स HEMANI INTERMEDIATES PRIVATE LIMITED

के मामले में, मैं एतद्द्वारा सत्यापित करता हूँ कि मैसर्स

HEMANI INTERMEDIATES PRIVATE LIMITED

जो मूल रुप में दिनांक तीन फरवरी उन्नीस सौ चौरानवें को कम्पनी अधिनियम, 1956 (1956 का 1) के अंतर्गत मैसर्स

hemani intermediates private limited.

के रुप में निगमित की गई थी, और उसके द्वारा कम्पनी अधिनियम,1956 की धारा 44 के साथ पठित धारा 31/21 की शर्तों के अनुसार विधिवत आवश्यक विनिश्चय दिनांक 07/03/2011 को पारित किया है, उक्त कम्पनी का नाम परिवर्तित होकर आज मैसर्स

HEMANI INTERMEDIATES LIMITED

हो गया है तथा यह प्रमाण–पत्र उक्त अधिनियम की धारा 23(1) के अनुसरण में जारी किया जा रहा है।

यह प्रमाण–पत्र, मेरे हस्ताक्षर से आज दिनांक पंद्रह अप्रेल दो हजार ग्यारह को मुंबई नगर में जारी किया जाता है।

GOVERNMENT OF INDIA - MINISTRY OF CORPORATE AFFAIRS
Registrar of Companies, Maharashtra, Mumbai

Fresh Certificate of Incorporation Consequent upon Change of Name on Conversion to Public Limited Company

Corporate Identity Number : U24114MH1994PLC076416

In the matter of M/s HEMANI INTERMEDIATES PRIVATE LIMITED

I hereby certify that HEMANI INTERMEDIATES PRIVATE LIMITED which was originally incorporated on Third day of February Nineteen Hundred Ninety Four under the Companies Act, 1956 (No. 1 of 1956) as hemani intermediates private limited. having duly passed the necessary resolution on 07/03/2011 in terms of Section 31/21 read with Section 44 of the Companies Act, 1956; the name of the said company is this day changed to HEMANI INTERMEDIATES LIMITED and this Certificate is issued pursuant to Section 23(1) of the said Act.

Given under my hand at Mumbai this Fifteenth day of April Two Thousand Eleven.

(V ELANGOVAN)
उप कम्पनी रजिस्ट्रार / Deputy Registrar of Companies
महाराष्ट्र, मुंबई
Maharashtra, Mumbai

कम्पनी रजिस्ट्रार के कार्यालय अभिलेख में उपलब्ध पत्राचार का पता :
Mailing Address as per record available in Registrar of Companies office:

HEMANI INTERMEDIATES LIMITED
706-710, REENA COMPLEX,, OPPOSITE NATHANI STEELS, VIDYAVIHAR (WEST),
MUMBAI - 400086,
Maharashtra, INDIA

भारत सरकार-कॉर्पोरेट कार्य मंत्रालय
कम्पनी रजिस्ट्रार कार्यालय, महाराष्ट्र, मुंबई

कम्पनी अधिनियम, 1956 की धारा 18 (1) (क)

उद्देश्य-खंडों में परिवर्तन की पुष्टि हेतु विशेष विनिश्चय के पंजीकरण का प्रमाण-पत्र

कॉर्पोरेट पहचान संख्या : U24114MH1994PTC076416

मैसर्स HEMANI INTERMEDIATES PRIVATE LIMITED

के अंशधारकों ने दिनांक 07/03/2011 को आयोजित की गई वार्षिक / असाधारण बैठक में एक विशेष विनिश्चय पारित करके कम्पनी अधिनियम,1956 (1956 का 1) की धारा 18 (1) का अनुपालन करते हुए अपने संगम-ज्ञापन के प्रावधानों में परिवर्तन कर लिया है।

मैं, एतद्द्वारा सत्यापित करता हूँ कि उक्त विशेष विनिश्चय की प्रतिलिपि, यथा परिवर्तित संगम-ज्ञापन के साथ, आज पंजीकृत कर ली गई है।

मेरे हस्ताक्षर द्वारा मुंबई में यह प्रमाण-पत्र, आज दिनांक इकतीस मार्च दो हजार ग्यारह को जारी किया जाता है।

GOVERNMENT OF INDIA - MINISTRY OF CORPORATE AFFAIRS
Registrar of Companies, Maharashtra, Mumbai

SECTION 18(1)(A) OF THE COMPANIES ACT, 1956

Certificate of Registration of the Special Resolution Confirming Alteration of Object Clause(s)

Corporate Identity Number : U24114MH1994PTC076416

The share holders of M/s HEMANI INTERMEDIATES PRIVATE LIMITED having passed Special Resolution in the Annual/Extra Ordinary General Meeting held on 07/03/2011 altered the provisions of its Memorandum of Association with respect to its objects and complied with the Section (18)(1) of the Companies Act, 1956 (No. 1 of 1956).

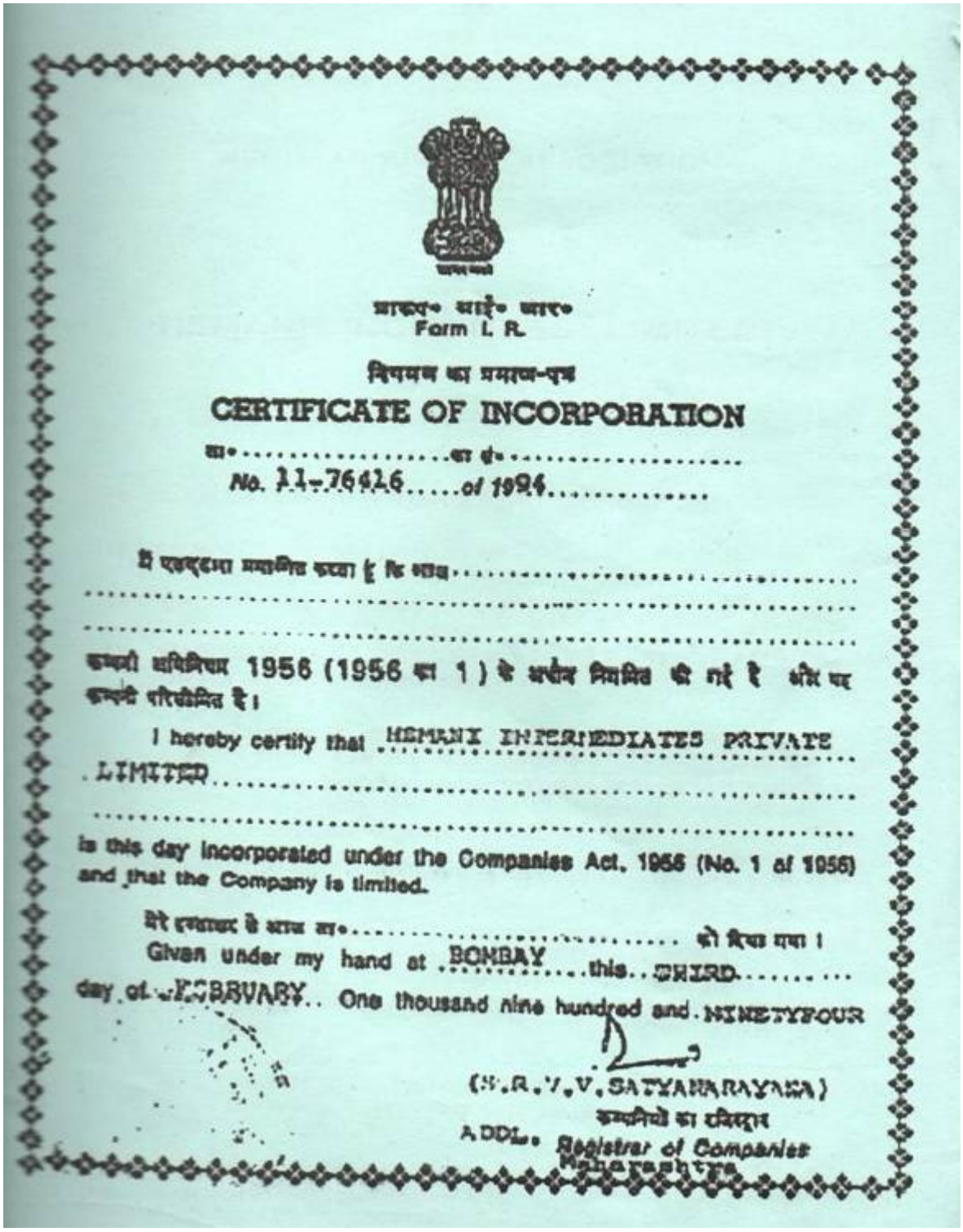
I hereby certify that the said Special Resolution together with the copy of the Memorandum of Association as altered has this day been registered.

Given under my hand at Mumbai this Thirty First day of March Two Thousand Eleven.

(V ELANGOVAN)

उप कम्पनी रजिस्ट्रार / Deputy Registrar of Companies
महाराष्ट्र, मुंबई
Maharashtra, Mumbai

कम्पनी रजिस्ट्रार के कार्यालय अभिलेख में उपलब्ध पत्राचार का पता :
Mailing Address as per record available in Registrar of Companies office:
HEMANI INTERMEDIATES PRIVATE LIMITED
706-710, REENA COMPLEX,, OPPOSITE NATHANI STEELS, VIDYAVIHAR (WEST),
MUMBAI - 400086,
Maharashtra, INDIA



आर० आई० आर०
Form I. R.

निगमन का प्रमाण-पत्र

CERTIFICATE OF INCORPORATION

सं०.....का पृ०.....
No. 11-76416.....of 1994.....

मैं एतद्द्वारा प्रमाणित करता हूं कि आज.....
.....
.....

कम्पनी अधिनियम 1956 (1956 का 1) के अधीन निगमित की गई है और यह कम्पनी परिसीमित है।

I hereby certify that HEMANI INTERMEDIATES PRIVATE LIMITED.....
.....
.....

is this day incorporated under the Companies Act, 1956 (No. 1 of 1956) and that the Company is limited.

मेरे हस्ताक्षर से आज सं०..... को दिया गया।
Given under my hand at BOMBAY.....this..THIRD.....
day of FEBRUARY.. One thousand nine hundred and NINETYFOUR

(S.R.V.V.SATYANARAYANA)
कम्पनियों का रजिस्ट्रार
ADDL. Registrar of Companies
Maharashtra

THE COMPANIES ACT, 1956

COMPANY LIMITED BY SHARES

MEMORANDUM OF ASSOCIATION

OF

HEMANI INDUSTRIES LIMITED*

I. The name of the Company is ***HEMANI INDUSTRIES LIMITED.***

II. The Registered Office of the Company will be situated in the State of Maharashtra.

III. The Objects for which the Company is established are:

(A) MAIN OBJECTS OF THE COMPANY TO BE PURSUED BY THE COMPANY ON ITS INCORPORATION ARE :

1**. To carry on in India or elsewhere the business of manufacturing, buying, distributing, selling, importing, exporting, commission agent, consultants and otherwise dealing in all kinds of chemicals, organic and inorganic, dyes and dye intermediates, pigments and pigment intermediates, pesticide intermediates, pesticides technical, insecticides technical, fungicides technical, herbicide technical, weedicides technical and its intermediates plus formulations in branded and unbranded segments, pharmaceuticals, pharmaceutical intermediates, pharmaceutical formulations, Aromatic chemicals performing and flavouring chemicals and cosmetics.

(B) OBJECTS INCIDENTAL OR ANCILLARY TO THE ATTAINMENT OF THE MAIN OBJECTS :

2. To carry on the business of importers, exporters, dealers, resellers, jobworkers, fabricators of chemical plants.

Name change vide Special Resolution passed at Extra Ordinary General Meeting held on 18-04-2011
Amended vide Special Resolution passed at Extra Ordinary General Meeting held on 07-03-2011

3. To give technical and managerial know-how for manufacturing and setting plants for producing dyes, dye intermediate, chemicals, pigments, pigment intermediates and pharmaceutical products.

4. To Purchase takeover or otherwise acquire or undertake the whole any part of business in respect of all or any kind of materials, goods, and articles mentioned above.

5. To acquire by purchase, contract, concession, license, lease or otherwise any land, mines, quarries, buildings, factories, workshops, godowns for raising for sale and for manufacturing purpose of the Company.

6. To enter into any arrangement with any Government or authorities supreme, Municipal, Port Trust, Railways, district Local Boards, Civil and Military authorities or otherwise that may seem conducive to the company's main objects and to obtain from any such concessions which the Company may think it desirable to obtain and to carry out, exercise and comply with any such arrangements, rights, privileges and concessions.

7. To purchase, take on lease, in exchange, hire or otherwise acquire any immovable or movable property and any rights or privileges which the Company may think necessary or convenient with reference to any of these objects and capable of being profitably dealt with in connection with any of the Company"s property or rights for the time being.

8. To purchase or otherwise acquire and undertake to carry on the whole or any part of the business, property and liabilities of any person, corporation or companies for carrying on any business which this Company is authorized to carry on or possessed of property suitable for the purpose of this Company.

9. To remunerate Directors, Managing Directors, staff and employees of the Company and others, out of, or in proportion to the returns of profits of the Company or in such other manner as the Company may deem fit.

10. To enter into partnership or any arrangement for sharing profits, amalgamation, union of interests, reciprocal concession, joint venture or co-operation with any person, firm or company carrying on or engaged in, carrying on or about to carry on or engage a business or transaction which this Company is authorized to carry on and to take or otherwise acquire and hold shares, stocks, or securities of any other company and to sell, hold, reissue with or without guarantee or otherwise deal with such shares or securities.

11. To lend money, either with or without security and generally to such persons as have got dealings with the Company and upon such terms and conditions as the company may think fit. The Company shall not do any Banking business as defined under the Banking Regulation Act, 1949.

12. To apply for, purchase or otherwise acquire any patents, inventions, licences, concession and the like conferring any exclusive or limited right to use any secret or other information as to any invention which

may seem capable of being used for any purposes of the Company and to use, exercise, develop or grant licences in respect of or otherwise turn to account the property, rights or information so acquired.

13. To sell or dispose of the undertaking of the Company or any part thereof at such time and for such consideration as the Company may think fit and in particular for shares, debentures or securities of any other company having objects, altogether or in part similar to those of this Company. To give on hire or lease the whole or part of the undertaking of the company or any of the assets which the company for the time being cannot effectively use.

14. To adopt such means of making known the business of the Company as may seem expedient and in Particular by advertising in the press, by circulars, bills, posters, or by purchase and exhibition of works of art or interest, by publication of books and periodicals and by granting prizes, rewards and donations.

15. To promote any company or companies having similar objects for the purposes of acquiring all or any of the property, rights and liabilities of that Company.

16. To borrow or raise or secure the payment of money from any Government, Semi-Government or other Financial Institution or Banks or from any other sources in such manner as the Company shall think fit and in particular by the issue of debentures or debenture-stocks, perpetual or otherwise charged upon all or any of the Company's property (both present and future), including its uncalled capital and to purchase, redeem and pay off any securities, subject to provisions of Section 58A and R.B.I. objectives.

17. To invest and deal with the moneys of the Company not immediately required upon such securities and in such manner as may from time to time determined.

18. To draw, make, accept, discount, execute and issue Bills of Exchange, Promissory Notes, and securities of all kinds and descriptions, Bills of lading, Warrants, debentures and other negotiable or transferable instruments and securities. To open various kinds of account or accounts with any bank or banks and operate them.

19. To sell, improve, manage, develop, exchange, lease, mortgage, discharge of, turn to account or otherwise deal with all or any part of the property and rights of the Company.

20. To appoint agents and constitute agencies of the Company in India and elsewhere.

21. To pay all or any costs, charges and expenses preliminary and incidental to the promotion, formation and registration of the Company and to pay the salary, Wages and other expenses for the establishment of the Company and to remunerate any person which the Directors may deem fit.

22. To do above things in any part of the world as principals, contractors, sub-contractors, trustees, agents or otherwise and either alone or in conjunction with others and to do all such things as are incidental or conducive to the attainment of the above objects or any of them.

23. To grant pensions, allowances, gratuities and bonuses to officers, agents, employees, or ex-employees of the company, its predecessors in business or in the independents of such employees.

24. To give guarantee for the performance or discharge of any obligations, liabilities, duties or the payments of money by any persons, firms and companies or Government of State and to give, indemnity of all kinds.

25. To distribute any of the property of the Company among the members in specie or in kind in event of winding up subject to the provisions of the Companies Act, of 1956.

26. To establish, provide maintain, conduct or otherwise subsidise research laboratories, experimental stations, workshops, for scientific and technical researches, experiments, and tests of all kinds and to promote studies and research, both scientific and technical researches, experiments, and tests of all kinds and to promote studies and research, both scientific and technical investigation and invention by providing, subsidizing, endowing or assisting laboratories, libraries, training colleges, schools and other institutions for training lectures, meetings and conferences and by providing the remuneration of scientific or technical professors, or teachers and by providing for the award for exhibitions, scholarships, prizes, grants and parasaries to students or otherwise and generally to encourage, promote and regard studies, researches, investigations, experiments, tests and inventions of any kind that may be considered likely to assist any business which the Company is authorized to carry on.

27. To support, subscribe, or contribute from time to time to any charitable, benevolent object of a public or private character, to grant stipends and scholarship for studies in India and abroad and to establish support or aid in the establishment and support of Associations, Institutions, Clubs, Societies, Funds, Trusts and conveniences, to provident pension, loan or other funds for the benefit of the officers, agents, staff, employees and ex-employees of the Company.

(C) OTHER OBJECTS :

28. To carry on the business of manufacturers, importers, exporters, distributors, agents and dealers in all kind of masala, spice grams, cereals, other food products and tinned food products of all kind.

29. To carry on the business of manufacturers, importers, exporters, distributors, agents and dealers in all kind of plastics in all its forms and varieties and generally in Thermo Plastics, Reinforced Plastics, PVC Flexible and rigid sheets, Leather Cloth, Industrial and decorative sheets and laminates, plastic moulded goods and accessories, Chemicals polythelene, polyvinylchloride, polystyrene, Phenol-

Formaldehyde, Urea-Formaldehyde, Melamine, Resins, Cellulose, Acrylic sheets, tubings, moulds machinery and products and bye-products of all or any of the above items and all other allied or connected items.

30. To carry on the business of manufacturers, importers, exporters, distributors, agents and dealers in iron and steel and all kinds of automobile parts and accessories, electronics goods electrical goods and accessories and spare parts and allied lines.

31. To carry on the business of manufacturers, importers, exporters, distributors, agents and dealers in all kind of machinery tools and equipments, garments, textile fabrics and yarn of all varieties and article made thereof, glass, ceramics, paper, stationery, cutlery and the products and bye-products of all or any of the above items and all other allied and connected items and generally to do business as stockists and commission agents and brokers.

32. To carry on the business of epoxy coating of all kinds of steel items and other materials.

IV. The liability of the members is limited.

V. (a*) The Authorised Share Capital of the Company is Rs. 15,00,00,000/- (Rupees Fifteen Crores Only) divided into 1,50,00,000 (One Crore Fifty Lacs) Equity Shares of Rs. 10/- (Rupees Ten only) each with power to increase or reduce the capital of the Company and to sub-divide the shares in capital for time being to several classes and attach hereto respectively preferential qualities or special rights or condition as may be determined by or in accordance with regulations of the Company and to vary them subject to the Companies Act, 1956.

(b**) The paid up capital shall be minimum of Rs. 5,00,000/- (Rupees Five Lakhs only).

★ ★

- Increase of Authorised Share Capital from Rs. 5,00,000/- to Rs. 30,00,000/- vide Ordinary Resolution passed at the Extra Ordinary General Meeting held on 09-06-1994
- Increase of Authorised Share Capital from Rs. 30,00,000/- to Rs. 50,00,000/- vide Ordinary Resolution passed at the Extra Ordinary General Meeting held on 26-04-2001
- Increase of Authorised Share Capital from Rs. 50,00,000/- to Rs. 75,00,000/- vide Ordinary Resolution passed at the Extra Ordinary General Meeting held on 28-06-2002
- Increase of Authorised Share Capital from Rs. 75,00,000/- to Rs. 1,00,00,000/- vide Ordinary Resolution passed at the Extra Ordinary General Meeting held on 08-07-2003
- Increase of Authorised Share Capital from Rs. 1,00,00,000/- to Rs. 1,50,00,000/- vide Ordinary Resolution passed at the Extra Ordinary General Meeting held on 20-09-2007
- Increase of Authorised Share Capital from Rs. 1,50,00,000/- to Rs. 15,00,00,000/- vide Special Resolution passed at the Extra Ordinary General Meeting held on 14-02-2011
- Insertion of Clause V (b) of Memorandum of Association vide Special Resolution passed in the Extra Ordinary General Meeting held on 06-06-2006
- Amended vide Special Resolution that the Paid up Capital shall be minimum of Rs. 5,00,000/- passed in the Extra Ordinary General Meeting held on 07-03-2011

We the several persons whose names and addresses are hereunder subscribed, are desirous of being formed into a Company in pursuance of the ***MEMORANDUM OF ASSOCIATION*** and we respectively agree to take the number of shares in the Capital of the Company set opposite to our respective names :

Signature, Name, Address, Description and Occupation of each Subscriber	No. of Equity Shares taken by each Subscriber	Signature of Witness and his Name, Address, Description & Occupation
M. S. DAMA **MOHAN DAMA** S/o. SUNDERJI DAMA 206, Surat Sadan, Surat Street, Bombay – 400 009. **BUSINESS**	10 (TEN)	Sd/- **HAREEN PAREKH** S/o. INDULAL PAREKH 507, Surat Sadan, Surat Street, Bombay – 400 009. **CHARTERED ACCOUNTANT**
K. S. DAMA **KARSHANDAS DAMA** S/o. SUNDERJIT DAMA 206, Surat Sadan, Surat Street, Bombay – 400 009.	10 (TEN)	
TOTAL	**20** **(Twenty)**	

Bombay, Dated this, **18th** day of **January, 1994**

Annexure- 12
Plot allotment letters of GIDC for both units
Plot No. CH-5

Plot No. E-362

GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION

(A Govt. of Gujarat Undertaking)
Office of the Executive Engineer, GIDC
1st Floor, Narmada Commercial Complex,
M.G. Road, PanchBatti, Bharuch-392001
Phone: (02642)242432/242442
FAX:(02642)241902
Email ID : gidcbharuch@rediffmail.com

No. GIDC/EE/BRH/Drainage Contribution/ 1268 Date: 21/08/2015.

To,
M/s Hemani Industries Limited,
Plot No. E-362,
GIDC, Dahej-I / II / III,

Sub: - Consented Effluent Quantity
Ref:-

Dear Sir,

M/s Hemani Industries Limited have been allotted the plot no. E-362 in Dahej-I / II / III Industrial Estate admeasuring - Sq. mt. The license agreement has been executed on dated -. M/s. Hemani Industries Ltd. have applied to GIDC seeking the confirmation for the discharge of the treated effluent as per the GPCB norms into GIDC Effluent Collection Network. The quantity of the treated effluent to be discharged in to GIDC Effluent collection Network to be mentioned in the application as follows:

Sr no	Year	Quantity of the treated Effluent to be discharged in GIDC Drain in KL per day
1	2015-16	
2	2016-17	
3	2017-18	

GIDC is pleased to give the confirmation for discharging the Treated Effluent subject to payment of the Capital Contribution Charges within 30 days of issue of the demand note failing which GIDC shall not accommodate discharge of the effluent into the GIDC Effluent Collection Network. GIDC reserves the right to revise the quantity of the treated effluent quantity without prior consent. The industry shall undertake to recycle/ reduce the quantity of effluent. The quantity of effluent finalized by GPCB's consent shall be binding to the industry. Any excess payment made shall be adjusted against the other dues of GIDC or shall be refunded back as per the policy of GIDC. The industry will have to abide by the Gujarat Industrial Development Corporation Drainage Regulations. If the industry books excess quantity and the effluent is not received as per the plan GIDC reserves the right to cancel / revise the quantity of the effluent without assigning any reasons thereof.

Annexure -13

EC Copy of Plot No. CH-5

F. No. J-11011/583/2010- IA II (I)
Government of India
Ministry of Environment and Forests
(I.A. Division)

Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi – 110 003

E-mail : ahuja.rai@nic.in
Telefax : 011: 2436 3973
Dated 30th August, 2012

To,
Shri Nitin K. Dama, Director
M/s Hemani Intermediates Private Limited
706-710, Reena Coplex,Vidyavihar (W)
Mumbai - 400 086, Maharashtra

E-mail: hocpl2003@yahoo.com ; aquaairsurat@hotmail.com ; Fax No.022-25134483

Subject: Expansion of Pesticides Manufacturing Plant (620 MTPM to 1862 MTPM) at Plot No.CH-5, GIDC Industrial Estate, Dahej, Taluka Vagra, District Bharuch, Gujarat by M/s Hemani Intermediates Private Limited– Environmental Clearance reg.

Ref. : Your letter no. nil dated 7th June, 2011.

Sir,

Kindly refer your letter dated 7th June, 2011 alongwith project documents including Form I, Terms of References, Pre-feasibility Report, EIA/EMP Report and subsequent submission of additional information vide letter dated 9th June, 2011, 30th June, 2011, 17th October, 2011, 27th December, 2011, 2nd March, 2012 and 12th March, 2012 regarding above mentioned project.

2.0 The Ministry of Environment and Forests has examined the application. It is noted that proposal is for expansion of Pesticides Manufacturing Plant (620 MTPM to 1862 MTPM) at Plot No.CH-5, GIDC Industrial Estate, Dahej, Taluka Vagra, District Bharuch, Gujarat by M/s Hemani Intermediates Private Limited. Plant will be operated for 330 days. Total project area is 52,432.22 m^2. Narmada River is flowing at 1.8 km. Total project cost is Rs. 50.00 Crores. Following products will be manufactured:

S. N.	Name	Type of Product	Existing Capacity (MTPM)	Proposed Additional Capacity (MTPM)	Total Capacity after Expansion (MTPM)
1.	m-Phenoxy Benzaldehyde (MPBAD)	Organic Intermediate	300	--	300
2.	m-Bromo Nitrobenzene	Organic Intermediate	80	20	100
3.	m-Bromo Anisole	Organic Intermediate	50	50	100
4.	Lambda-Cyhalothrin	Pesticide (Lambda-Cyhalothrin or	40 (Lambda-Cychlothri	10	50

		Metamitron Tech)	n)		
	Or Deltameethrin Tech		0	12	12
5.	DV-Acid Chloride/CMAC	Pesticide Intermediate		200	200
6.	Cypermethrin Tech.	Pesticide		150	150
7.	Alphamethrin Tech./Permethrin Tech.	Pesticide		100	100
	Or Acephate Tech.		0	100	100
8.	Metamitron Tech./Glyphosate Tech.	Pesticide	0	100	100
	Or Other Herbicides				
TOTAL			**470**	**742**	**1212**
9.	Thionyl Chloride	Inorganic Intermediate	0	450	450
10	Sulphur Chloride	Inorganic Intermediate	0	100	100
11	Acid Chlorides like Valeoryl Chloride, Phenyl Acetyl Chloride	Inorganic Intermediate	0	100	100
TOTAL			**0**	**650**	**650**
GRAND TOTAL			**0**	**1392**	**1862**
12	CPP	Power generation	1.5 MW	--	1.5 MW
	BY-PRODUCTS				
13	30% HCl	By product	9.75	4.0	13.75
14	Sodium Sulfite 80% (wet cake)	By product	400	5.25	405.25
15	Ammonium Chloride 75-80% wet cake /20% Solution	By product	100/425	--	100/425
16	Cupric Chloride Solution	By product	85	--	85
17	Alluminium Chloride Solution	By product	750	750	1500
18	KCL Solution 20%	By product	375	375	750
19	Spent Sulphuric Acid 55%	By product	360	240	600
20	Bromobenzene	By product	--	54.5	54.5
21	HBr	By product	--	18.9	18.9

3.0 Bag filter alongwith stack of adequate height will be provided to coal fired boiler. Adequate scrubbing system will be provided to the process vents to control process emissions viz. SO_2, HCl, H_2S and Cl_2. In order to control odour, outlet of process vents will be connected to the incinerator. Total fresh water requirement from GIDC water supply will be increased from 1300 m^3/day to 2100 m^3/day after expansion. Industrial wastewater generation after expansion will be 921 m^3/day and segregated into high COD/organic waste, high COD/TDS and low COD/TDS effluent streams. High COD/organic waste/ toxic aqueous effluent will be incinerated. High COD/TDS effluent stream will be passed through stripper and evaporated through MEE. Low COD/TDS effluent stream will be treated in effluent treatment plant (ETP) and treated effluent will be discharged to deep sea through a GIDC conveyance pipeline after conforming to the standards prescribed for the effluent discharge and obtaining permission from the GPCB. Incinerator will be designed as per CPCB guidelines. Incinerated ash, ETP sludge and MEE residue salt will be sent to treatment storage disposal facility (TSDF) for hazardous waste. Organic process waste and spent carbon will be incinerated. Waste oil/spent oil will be sold to registered recyclers/re-processors. Fly ash will be sent to brick manufacturers/cement kiln.

4.0 Public hearing was exempted as per section 7 (i), (iii) Stage (3), Para (i)(b) of EIA Notification, 2006.

5.0 All units producing technical grade pesticides are listed at S.N. 5(b) under category 'A' and appraised at Central level.

6.0 The proposal was considered by the Expert Appraisal Committee (Industry-2) in its 18th, 26th, 31st and 33rd meetings held during 20th-21st January, 2011, 17th–18th August, 2011, 12th -13th January, 2012 and 21st-22nd March, 2012 respectively. The Committee recommended the proposal for environmental clearance.

7.0 Based on the information submitted by the project proponent, the Ministry of Environment and Forests hereby accords environmental clearance to above project under the provisions of EIA Notification dated 14th September 2006, subject to the compliance of the following Specific and General Conditions:

A. SPECIFIC CONDITIONS:

i) All the specific conditions and general conditions specified in the environmental clearance letter accorded vide Ministry's letter no. J-11011/442/2008-IA.II (I) dated 25th October, 2008 shall be implemented.

ii) As proposed, Company shall install online stack monitoring system, HC detectors, LDR system, smoke detector alongwith alarm system in the existing unit. All pollution control and monitoring equipments shall be installed, tested and interlocked with the process. Company shall not start operation of the expansion unit unless the pollution control equipments are ready and running. SPCB shall grant 'Consent to Operate' after ensuring that all the mentioned pollution control equipments have been installed.

iii) National Emission Standards for Pesticide Manufacturing and Formulation Industry issued by the Ministry vide G.S.R. 46(E) dated 3rd February, 2006 and amended time to time shall be followed by the unit.

iv) Bag filter alongwith stack of adequate height shall be provided to coal fired boiler to control particulate emissions within 50 mg/Nm^3.

v) Adequate scrubbing arrangement should be provided to process vents to control SO_2, HCl, H_2S, Cl_2 etc. The scrubbing solution shall be sent to effluent treatment plant (ETP) for treatment. Efficiency of scrubber shall be monitored regularly and maintained properly. Scrubbers vent shall be provided with on-line detection and alarm system to indicate higher than permissible value of controlled parameters. At no time, the emission levels shall go beyond the prescribed standards. The system shall be interlocked with the pollution control equipments so that in case of any increase in pollutants beyond permissible limits, plant shall be automatically stopped. Stack monitoring shall be done regularly and report shall be submitted to Gujarat Pollution Control Board (GPCB) and the Ministry's regional office at Bhopal.

vi) In order to control odour, outlet of process vents shall be connected to the incinerator.

vii) The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November, 2009 shall be followed by the unit.

viii) In plant control measures for checking fugitive emissions from all the vulnerable sources shall be provided. Fugitive emissions shall be controlled by providing closed storage, closed handling & conveyance of chemicals/materials, multi cyclone separator and water sprinkling system. Dust suppression system including water sprinkling system shall be provided at loading and unloading areas to control dust

emissions. Fugitive emissions in the work zone environment, product, raw materials storage area etc. shall be regularly monitored and records maintained. The emissions shall conform to the limits stipulated by the GPCB.

ix) For further control of fugitive emissions, following steps shall be followed :

i. Closed handling system shall be provided for chemicals.

ii. Reflux condenser shall be provided over reactor.

iii. System of leak detection and repair of pump/pipeline based on preventive maintenance.

iv. The acids shall be taken from storage tanks to reactors through closed pipeline. Storage tanks shall be vented through trap receiver and condenser operated on chilled water.

v. Cathodic protection shall be provided to the underground solvent storage tanks.

x) A proper Leak Detection And Repair (LDAR) Program for pesticide industry shall be prepared and implemented as per CPCB guidelines. Focus shall be given for prevention of fugitive emissions for which preventive maintenance of pumps, valves, pipelines are required. Proper maintenance of mechanical seals of pumps and valves shall be given. A preventive maintenance schedule for each unit shall be prepared and adhered to.

xi) Continuous monitoring system for VOCs and chlorine shall be installed at all important places/areas. Effective measures shall be taken immediately, when monitoring results indicate above the permissible limits. All necessary steps shall be taken for monitoring of chlorine and Bromine in the proposed plant.

xii) Proper hood alongwith suction facility and scrubbing arrangement shall be provided in the chlorine storage area. Alarm for chlorine leakage if any in the liquid chlorine storage area shall be provided alongwith automatic start of the scrubbing system.

xiii) The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution.

xiv) The company shall upload the status of compliance of the stipulated environmental clearance conditions, including results of monitored data on its website and shall update the same periodically. It shall simultaneously be sent to the Regional office of MOEF, the respective Zonal office of CPCB and the GPCB. The levels of PM_{10}, SO_2, NO_x, VOCs, Cl_2, HCl, HBr, CO and HC (Methane and Non-methane) in ambient air and emissions from the stacks shall be monitored and/ displayed at a convenient location near the main gate of the company and at important public places.

xv) Chilled brine circulation system shall be provided to condensate solvent vapors and reduce solvent losses. It shall be ensured that solvent recovery should not be less than 95%.

xvi) Solvent management shall be carried out as follows :

i. Reactor shall be connected to chilled brine condenser system

ii. Reactor and solvent handling pump shall have mechanical seals to prevent leakages.

iii. The condensers shall be provided with sufficient HTA and residence time so as to achieve more than 95% recovery

iv. Solvents shall be stored in a separate space specified with all safety measures.

P. Thakur

v. Proper earthing shall be provided in all the electrical equipment wherever solvent handling is done.

vi. Entire plant shall be flame proof. The solvent storage tanks should be provided with breather valve to prevent losses.

xvii) Total fresh water requirement from GIDC water supply shall not exceed to 2100 m^3/day after expansion and prior permission shall be obtained from the concerned department. No ground water shall be used.

xviii) As proposed, Industrial wastewater generation shall not exceed 921 m^3/day. Effluent shall be segregated into High COD, High TDS and low COD/TDS effluent streams. High COD effluent /mother liquor shall be incinerated. High TDS effluent shall be passed through stripper followed by MEE. Condensate shall reused/recycled within factory premises. Low COD/TDS effluent shall be treated in ETP comprising primary, secondary and tertiary treatment facility. Cyanide effluent stream shall be treated separately. Treated effluent from ETP shall be discharged into deep sea through a GIDC sewer after conforming to the standards prescribed for the effluent discharge and obtaining permission from the GPCB. Domestic sewage shall be treated in aeration tank of the ETP. No process effluent shall be discharged in and around the project site. Water quality of treated effluent shall be monitored regularly and monitoring report shall be submitted to the GPCB. Water quality of treated effluent shall be monitored regularly.

xix) Treated effluent shall be passed through guard pond. Online continuous pH meter, TOC analyzer and flow meter shall be installed to monitor the treated water quality.

xx) Process effluent/any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through guard pond.

xxi) Incinerator comprising primary and secondary chamber shall be designed as per CPCB guidelines. SO_2, NOx, HCl and CO emissions shall be monitored in the stack regularly.

xxii) Hazardous chemicals shall be stored in tanks in tank farms, drums, carboys etc. Flame arresters shall be provided on tank farm. Solvent transfer shall be by pumps.

xxiii) The company shall obtain Authorization for collection, storage and disposal of hazardous waste under the Hazardous Waste (Management, Handling and Trans-Boundary Movement) Rules, 2008 and amended as on date for management of Hazardous wastes and prior permission from GPCB shall be obtained for disposal of solid / hazardous waste in the TSDF. Measures shall be taken for fire fighting facilities in case of emergency. Membership of TSDF for hazardous waste disposal shall be obtained.

xxiv) As proposed, ETP sludge, incineration ash and evaporation residue shall be sent to TSDF site. High calorific value waste such as spent organic shall be sent to cement factory/incinerated.

xxv) The Company shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 11989 *as* amended in October, 1994 and January, 2000. All Transportation of Hazardous Chemicals shall be *as per* the Motor Vehicle Act (MVA), 1989.

xxvi) Bromine shall be transferred in iso tanks through GPS fitted truck.

xxvii) The company shall undertake following waste minimization measures :-

a. Metering and control of quantities of active ingredients to minimize waste.

b. Reuse of by-products from the process as raw materials or as raw material substitutes in other processes.

c. Use of automated filling to minimize spillage.

d. Use of Close Feed system into batch reactors.

e. Venting equipment through vapour recovery system.

f. Use of high pressure hoses for equipment clearing to reduce wastewater generation.

xxviii) The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Fire fighting system shall be as per the norms.

xxix) Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.

xxx) Green belt shall be developed at least in 33 % of the plant area in and around the plant premises to mitigate the effects of fugitive emissions all around the plant as per the CPCB guidelines in consultation with DFO. Thick greenbelt with suitable plant species shall be developed around the proposed pesticide unit to mitigate the odour problem. Selection of plant species shall be as per the CPCB guidelines.

xxxi) The company shall make the arrangement for protection of possible fire and explosion hazards during manufacturing process in material handling.

xxxii) Provision shall be made for the housing for the construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile sewage treatment plant, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structure to be removed after the completion of the project. All the construction wastes shall be managed so that there is no impact on the surrounding environment.

B. GENERAL CONDITIONS:

i. The project authorities shall strictly adhere to the stipulations made by the Gujarat Pollution Control Board.

ii. No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.

iii. The locations of ambient air quality monitoring stations shall be decided in consultation with the Gujarat Pollution Control Board (GPCB) and it shall be ensured that at least one station is installed in the upwind and downwind direction as well as where maximum ground level concentrations are anticipated.

iv. The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).

v. The Company shall harvest rainwater from the roof-tops of the buildings and storm water drains to recharge the ground water and use the same water for the process activities of the project to conserve fresh water.

P. Ahuja

vi. During transfer of materials, spillages shall be avoided and garland drains be constructed to avoid mixing of accidental spillages with domestic wastewater and storm water drains.

vii. Usage of Personnel Protection Equipments by all employees/ workers shall be ensured.

viii. Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre-employment and routine periodical medical examinations for all employees shall be undertaken on regular basis. Training to all employees on handling of chemicals shall be imparted.

ix. The company shall also comply with all the environmental protection measures and safeguards proposed in the project report submitted to the Ministry. All the recommendations made in the EIA/EMP in respect of environmental management, risk mitigation measures and public hearing relating to the project shall be implemented.

x. The company shall undertake CSR activities and all relevant measures for improving the socio-economic conditions of the surrounding area.

xi. The company shall undertake eco-developmental measures including community welfare measures in the project area for the overall improvement of the environment.

xii. A separate Environmental Management Cell equipped with full fledged laboratory facilities shall be set up to carry out the Environmental Management and Monitoring functions.

xiii. The company shall earmark sufficient funds for recurring cost per annum to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so earmarked for environment management/ pollution control measures shall not be diverted for any other purpose.

xiv. A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zila Parisad/Municipal Corporation, Urban local Body and the local NGO, if any, from who suggestions/ representations, if any, were received while processing the proposal.

xv. The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF, the respective Zonal Office of CPCB and the Gujarat Pollution Control Board. A copy of Environmental Clearance and six monthly compliance status report shall be posted on the website of the company.

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

P. Thujam

vi. During transfer of materials, spillages shall be avoided and garland drains be constructed to avoid mixing of accidental spillages with domestic wastewater and storm water drains.

vii. Usage of Personnel Protection Equipments by all employees/ workers shall be ensured.

viii. Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre-employment and routine periodical medical examinations for all employees shall be undertaken on regular basis. Training to all employees on handling of chemicals shall be imparted.

ix. The company shall also comply with all the environmental protection measures and safeguards proposed in the project report submitted to the Ministry. All the recommendations made in the EIA/EMP in respect of environmental management, risk mitigation measures and public hearing relating to the project shall be implemented.

x. The company shall undertake CSR activities and all relevant measures for improving the socio-economic conditions of the surrounding area.

xi. The company shall undertake eco-developmental measures including community welfare measures in the project area for the overall improvement of the environment.

xii. A separate Environmental Management Cell equipped with full fledged laboratory facilities shall be set up to carry out the Environmental Management and Monitoring functions.

xiii. The company shall earmark sufficient funds for recurring cost per annum to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so earmarked for environment management/ pollution control measures shall not be diverted for any other purpose.

xiv. A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zila Parisad/Municipal Corporation, Urban local Body and the local NGO, if any, from who suggestions/ representations, if any, were received while processing the proposal.

xv. The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF, the respective Zonal Office of CPCB and the Gujarat Pollution Control Board. A copy of Environmental Clearance and six monthly compliance status report shall be posted on the website of the company.

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

P. Thujam

xvii. The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB/Committee and may also be seen at Website of the Ministry at http://envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the concerned Regional Office of the Ministry.

xviii. The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project.

8.0 The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

9.0 The Ministry reserves the right to stipulate additional conditions, if found necessary. The company in a time bound manner will implement these conditions.

10.0 The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, Air (Prevention &. Control of Water Pollution) Act, 1981, the Environment (Protection) Act, 1986 Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008 and the Public Liability Insurance Act, 1991 along with their amendments and rules.

P. Ahujarai

(Dr. P L Ahujarai)
Director

Copy to :-

1. The Principal Secretary, Forests & Environment Department, Government of Gujarat, Sachivalaya, 8th Floor, Gandhi Nagar - 382 010, Gujarat.
2. The Chief Conservator of Forests (Western Zone), Ministry of Environment & Forests, Regional Office, E-5, Arera Colony, Link Road -3, Bhopal -462 016, M.P.
3. The Chairman, Central Pollution Control Board Parivesh Bhavan, CBD-cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
4. The Chairman, Gujarat State Pollution Control Board, Paryavaran Bhawan, Sector 10 A, Gandhi Nagar-382 043, Gujarat.
5. Monitoring Cell, Ministry of Environment and Forests, Paryavaran Bhavan, CGO Complex, New Delhi.
6. Adviser, IA II(I), Ministry of Environment and Forests, Paryavaran Bhavan, CGO Complex, New Delhi.
7. Guard File/Monitoring File/Record File.

/

(Dr. P L Ahujarai)
Director

MoM/EC copy of unit-4

18.5.9	**Pesticide Manufacturing Plant (900 MT/Month) at Plot No. E-362 , GIDC Estate, Dahej-I, Tal: Vagra, Dist. Bharuch – 392 130, Gujarat by M/s. Hemani Intermediates Pvt. Ltd. (Unit-IV) (**IA/GJ/IND/26202/2013; J-11011/378/2013- IA II (I)**)** The project proponent and the accredited consultant M/s Aqua-Air Environmental Engineers P. Ltd., Surat made a detailed presentation on the proposal and informed that: i. The proposal is for setting up of Pesticide Manufacturing Plant (900 MT/Month) at Plot No. E-362 , GIDC Estate, Dahej-I, Tal: Vagra, Dist. Bharuch – 392 130, Gujarat by M/s. Hemani Intermediates Pvt. Ltd. (Unit-IV). ii. All Pesticides industry and pesticide specific intermediates (excluding formulations) Units producing technical grade pesticides are listed at S.N. 5(b) of Schedule of Environmental Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC). iii. The proposal was considered by EAC in its 16th meeting held on 20-21st February, 2014 for TOR. TOR has been issued vide Ministry's letter dated 23rd April, 2014. iv. The proposal was earlier considered for EC by the EAC (Industry-2) in its meeting held during 20th-21st, July, 2015 and 13th meeting of EAC held on 26-

27th September, 2016.

v. The List of Products Along With Production Capacity is as below:

Sr. No.	Name of the Products	Quantity in MT/Month
		Proposed
1. Fungicides		
a)	Hexaconzole (T)	300
b)	Tebuconzole (T)	
c)	Propioconzole (T)	
2. Herbicides		
a)	Dicamba (T)	300
b)	Metribuzine (T)	
c)	Pendimethalin (T)	
3. Insecticides		
a)	Transfluthrin (T)	300
b)	Cyfluthrin & Beta Isomers (T)	
c)	Bifenthrin (T)	
d)	Cypermethrin (T) & Beta/Zeta/Theta Isomers (T)	
e)	Imidacloprid (T)	
Total		**900**

vi. List of By-Products and their capacity is as below:

Sr.No.	Name of the Products	Quantity in MT/Month Proposed
1.	HCl (32%)	250
2.	Sodium Sulphate Solution (30% to 35%)	2000
3.	Aluminum Chloride (25%)	1000
4.	Potassium Chloride Solution	860
5.	H_2SO_4 (70%)	100
6.	Sodium Sulfite Solution (20%)	600

vii. The total Project Cost for proposed project is Rs. 15 Crores. Capital cost of air & water pollution control system and environmental monitoring equipments will be Rs. 2.5 Crore. Recurring cost of air & water pollution control system and environmental monitoring equipments will be Rs. 1.10 Crore/annum. The total Plot Area is 9705m². No reserve National park/sanctuary/eco-sensitive area are located within 10 km distance from the project site. Narmada River is flowing at a distance of 3.5 Km.

viii. Daily water consumption shall be 366 m³/ day and daily wastewater

generation shall be 139 m^3/ day (119 m^3/day: Industrial & 20 m^3/day: Domestic). Water requirement for the proposed project shall be met through GIDC water supply. GIDC water supply authority is ready to supply the required water to M/s. Hemani Intermediates Pvt. Ltd. (Unit-IV). Wastewater from Industrial Operations will be treated in effluent treatment plant. The final treated effluent (69 m^3/day) will be discharged through GIDC pipeline line to deep sea. And MEE Condensate (50 m^3/day) will be resued in plant premises.

ix. The PP has informed the EAC that the ambient air quality (AAQ) monitoring was carried out at 7 locations during March to May, 2014. The baseline data indicates the average ranges of concentrations as:- PM_{10} (55 µg/m^3 – 85 µg/m^3), $PM_{2.5}$ (32 µg/m^3– 49 µg/m^3), SO_2 (13 ug/m^3–29 ug/m^3), NOx (16 µg/m^3–38 µg/m^3) and O_3(11 µg/m^3 -15 µg/m^3). AAQ modeling study for point source emissions indicates that the maximum incremental ground level concentrations (GLCs) after the proposed project are within the National Ambient Air Quality Standards (NAAQS).

x. The fuel and source of fuel are; Coal for Boiler: 35 MT/day, LDO: 10 KL/Day and Diesel: 50 Liters/Hr (Emergency).

xi. Treated effluent will be disposed into deep sea through GIDC Drainage pipeline. High COD effluent will be sent to MEE plant.

xii. Alkali scrubber will be provided to control process emissions viz. HCl, Cl2 and SO2. ESP alongwith 50 m stack height will be provided to coal fired boiler (20 TPH). DG set (1000 KVA) will be installed.

xiii. ETP sludge will be sent to TSDF. Process sludge from $CaCl_2$ will be sold to agriculture use. Used oil/spent oil and spent catalyst will be sent to Authorized reprocessors. Fly ash to be sent to brick manufacturers.

EAC has deliberated on the proposal. EAC has noted the PP has submitted all the queries raised by EAC during the previous meetings along with valid documents. EAC has deliberated on the revised EIA report. EAC has also noted that, as the PP has submitted EIA/EMP report in time, the AAQ data is valid. EAC has also considered the revised product table as per the NOC. It is noted that Public hearing was exempted as the project is located in the notified industrial area. It is observed that the AAQ are within National Ambient Air Quality Standards.

After detailed deliberations the EAC recommended the proposal for grant of Environmental Clearance subject to following specific conditions and other general conditions.

A. Specific Conditions:

i) National Emission Standards for Pesticide Manufacturing and Formulation Industry issued by the Ministry vide G.S.R. 46(E) dated 3rd February, 2006 and amended time to time shall be followed by the unit.

ii) Imported coal (with sulphur content less than 5 %)/briquettes/natural gas shall be used as fuel.

iii) Adequate stack height shall be provided to gas fired boiler to control particulate emissions.

iv) Two stage water scrubber followed by alkali scrubber shall be provided to process vent to control process emissions viz. HCl, SO2, Cl2, NOx, HBr. Acidic scrubber shall be provided to process vent to control process emissions viz.

	NH3 & HC. The scrubbed water should be sent to ETP for further treatment. Efficiency of scrubber shall be monitored regularly and maintained properly. Scrubbers vent shall be provided with on-line detection and alarm system to indicate higher than permissible value of controlled parameters. At no time, the emission levels shall go beyond the prescribed standards. The system should be interlocked with the pollution control equipment so that in case of any increase in pollutants beyond permissible limits, plant should be automatically stopped. v) In plant control measures for checking fugitive emissions from all the vulnerable sources shall be provided. Fugitive emissions shall be controlled by providing closed storage, closed handling & conveyance of chemicals/materials, multi cyclone separator and water sprinkling system. Dust suppression system including water sprinkling system shall be provided at loading and unloading areas to control dust emissions. Fugitive emissions in the work zone environment, product, raw materials storage area etc. shall be regularly monitored and records maintained. vi) A proper Leak Detection and Repair (LDAR) Program for pesticide industry shall be prepared and implemented as per CPCB guidelines. Focus shall be given for prevention of fugitive emissions for which preventive maintenance of pumps, valves, pipelines are required. Proper maintenance of mechanical seals of pumps and valves shall be given. A preventive maintenance schedule for each unit shall be prepared and adhered to. vii) Company shall take all the measures in order to protect the machineries and equipment for pesticide producing unit from ageing. viii) Continuous monitoring system for chlorine, HCl, Cl_2 as well as VOCs shall be installed at all important places/areas. Effective measures shall be taken immediately, when monitoring results indicate above the permissible limits. Alarm for chlorine leakage if any in the liquid chlorine storage area is provided alongwith automatic start of the scrubbing system. ix) The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution. x) Solvent management shall be carried out as follows : (a). Chilled brine circulation system shall be provided to condensate solvent vapors and reduce solvent losses. It shall be ensured that solvent recovery should not be less than 95%. (b). Reactor and solvent handling pump shall have mechanical seals to prevent leakages. (c). The condensers shall be provided with sufficient HTA and residence time so as to achieve more than 95% recovery (d). Solvents shall be stored in a separate space specified with all safety measures. (e). Proper earthing shall be provided in all the electrical equipment wherever solvent handling is done. (f). Entire plant shall be flame proof. The solvent storage tanks should be provided with breather valve to prevent losses. xi) Total water requirement from GIDC water supply shall not exceed 366 m^3/ day and prior permission should be obtained from the competent authority. xii) Industrial effluent generation shall not exceed 139 m^3/day. As proposed, wastewater will be segregated at source and treated based on its

		characteristics viz High COD & High TDS and Low COD & Low TDS. High COD & High TDS effluents will be sent to MEE followed by RO while Low COD & Low TDS effluents will be treated in ETP followed by RO. The treated wastewater shall be discharged to Common Effluent Treatment Plant (CETP) for final treatment.
	xiii)	Process effluent/any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through guard pond.
	xiv)	Hazardous chemicals shall be stored in tanks in tank farms, drums, carboys etc. Flame arresters shall be provided on tank farm. Solvent transfer shall be by pumps.
	xv)	The company shall obtain Authorization for collection, storage and disposal of hazardous waste under the Hazardous Waste (Management, Handling and Trans-Boundary Movement) Rules, 2008 and amended as on date for management of Hazardous wastes and prior permission from MPCB shall be obtained for disposal of solid / hazardous waste in the TSDF. Measures shall be taken for fire fighting facilities in case of emergency. Membership of TSDF for hazardous waste disposal shall be obtained.
	xvi)	ETP sludge, inorganic waste shall be sent to TSDF site. High calorific value waste such as spent organic shall be sent to cement factory/incinerated.
	xvii)	The Company shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 *as* amended in October, 1994 and January, 2000. All Transportation of Hazardous Chemicals shall be as per the Motor Vehicle Act (MVA), 1989.
	xviii)	The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Fire fighting system shall be as per the norms.
	xix)	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
	xx)	Green belt should be developed as proposed in and around the plant premises to mitigate the effects of fugitive emissions all around the plant as per the CPCB guidelines in consultation with DFO. Selection of plant species should be as per the CPCB guidelines.
	xxi)	An Environment Cell will be set up and a regular environmental manager having PG qualification in environmental sciences/environmental engineering to be appointed for looking after the environmental management practices in the plant.
	xxii)	One Environmental Manager having post graduate qualification in environmental sciences/ Environmental engineering.
	xxiii)	At least 2.5 % of the total cost of the project shall be earmarked towards the Enterprise Social Commitment and item-wise details along with time bound action plan shall be prepared and submitted to the Ministry's Regional Office at Bhopal. Implementation of such program shall be ensured accordingly in a time bound manner
	xxiv)	All the recommendations made in the risk assessment report should be satisfactorily implemented.
	xxv)	The unit shall adhere to Zero Liquid Discharge (ZLD).
	xxvi)	Continuous online (24 x7) monitoring to be installed for flow measurement and measurement of pollutants within the treatment unit. Data to be uploaded on company's website and provided to the respective RO of MEF&CC, CPCB and SPCB.

Annexure – 14

CTE of Unit-4 (Plot No. E-362)

GPCB

GUJARAT POLLUTION CONTROL BOARD

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

By R.P.A.D

Consent to Establish (CTE)
(CTE No –80457)

NO: GPCB/ BRCH-B/CTE - 256/ ID-44626 /
TO,
M/s. HEMANI INTERMEDIATES PVT LTD (UNIT-IV)
PLOT NO: E-362,
GIDC, DAHEJ-I,
TAL: VAGRA,
DIST: BHARUCH.

SUB: Consent to Establish (CTE) under Section 25 of Water Act 1974 and Section 21 of Air Act 1981.
REF: Your CTE application vide inward Id No:-86370 dated: 16/10/2014.

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 **Consent to Establish (CTE)** for setting up of an industrial plant/activities by **M/s. HEMANI INTERMEDIATES PVT LTD (UNIT-IV)** at **PLOT NO: E-362, GIDC, DAHEJ-I, TAL: VAGRA, DIST: BHARUCH** for the manufacturing of the following items.

The Validity period of the order will be Five years from date of issue, i.e. up to 15/10/2019.

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

Sr. no.	Name of Product	Quantity (MT/Month)
1.	**Fungicide**	
a)	Hexaconzole (T)	300
b)	Tebuconzole (T)	
c)	Propioconzole (T)	
2.	**Herbicide**	
a)	Dicamba (T)	300
b)	Metribuzine (T)	
c)	Pendimethalin (T)	
3.	**Insecticide**	
a)	Transfluthrin (T)	300
b)	Cyfluthrin & Beta Isomers (T)	
c)	Bifenthrin (T)	
d)	Cypermethrin (T) & Beta/Zeta/Theta Isomers (T)	
e)	Imidaclopcid	
	TOTAL	900

Page 1 of 9

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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.

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/issued.

2.3 Unit shall strictly comply/fulfill with Coal Handling Guideline and Fly Ash Notification.

2.4 Unit shall strictly comply/fulfill with draft guideline for the management of the spent solvent

2.5 Unit shall submit time bound Action Plan for achieving Zero Liquid Discharge and shall achieve ZLD within stipulated reasonable time being a Pesticide products manufacturing unit.. The action plan shall be submitted prior to making of CCA Application.

3. CONDITIONS UNDER WATER ACT:-

3.1 The quantity of total water consumption shall not exceed **406 KL/day.** (Break up as below)
 a) Domestic - **25 KL/day**
 b) Industrial - **366 KL/day**
 c) Gardening/Green belt - **15 KL/day.**

3.2 The quantity of total waste water generation shall not exceed **139 KL/day.** (Break up as below)
 a) Domestic - **20 KL/day**
 b) Industrial - **119 KL/day**

3.3 The quantity of the industrial effluent from the manufacturing process and other ancillary industrial operations shall be **119 KL/day** and the quantity of domestic waste water (sewage) shall not exceed **20 KL/day.**

3.4 **50 KL/day** of concentrated /high TDS stream of industrial effluent from process shall be the evaporation system, condensate from MEE shall be recycled back to process/scrubber etc. The generating solids after settlers, nutch filters and centrifuged shall be disposed off at approved TSDF site.

3.5 **69 KL/day** of biological industrial effluent shall be sent to ETP for primary, secondary and tertiary treatment. After treatment the treated effluent shall be sent for disposal into GIDC underground drainage-Dahej Vilayat Pipeline/Common Disposal System up to the sea.

3.6 The Effluent treatment plant consisting of the following treatment units shall be installed.
 i) Collection cum Equalization Tanks (CETs)
 ii) Neutralization Tank (NT)
 iii) Flesh Mixer (FM)
 iv) Flocculator (FL)
 v) LIME Dosing Tank (LDT)
 vi) Alum Dosing Tank (ADT)
 vii) Polyelectrolyte Dosing Tank (PEDT)

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viii) Nutrient Dosing Tank (NDT)
ix) Primary Clarifier (PCL)
x) Aeration Tank 1 (AT-1)
xi) Aeration Tank 1 (AT-2)
xii) Secondary Clarifier (SCL)
xiii) Intermediate Sump (IS)
xiv) Pressure sand Filter (PSF)
xv) Activated Carbon Filter (ACF)
xvi) Treated Effluent Sumps (TES)
xvii) Sludge Sump (SS)
xviii) Filter Press (FP)

3.7 The quality of treated effluent shall conform to the following standards prior to disposal GIDC Sewer Line - Dahej Vilayat Pipeline/Common Disposal System up to the sea.

PARAMETERS	PERMISSIBLE LIMIT
pH	5.5 to 9.0
Temperature	Shall not exceed 5 C above the receiving water temperature
Colour (pt.co. scale) in units	All efforts shall be made to remove colour and unpleasant odour as far as practicable.
Suspended Solids	100 mg/l
Oil and Grease	20 mg/l
Phenolic Compounds	5 mg/l
Cyanides	0.2 mg/l
Fluorides	15 mg/l
Sulphides	5 mg/l
Ammoniacal Nitrogen	50 mg/l
Arsenic	0.2 mg/l
Total Chromium	2 mg/l
Hexavelent Chromium	1 mg/l
Copper	3 mg/l
Lead	2 mg/l
Mercury	0.01 mg/l
Nickel	5 mg/l
Zinc	15 mg/l
Cadmium	2 mg/l
BOD (3 days at 27° C)	100 mg/l
COD	250 mg/l
Insecticide/Pesticides	Absent
Selenium	0.05 mg/l
Boron	2 mg/l
Manganese	2 mg/l

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GPCB

Bio-assay test	90 % Survival of fish after 96 hours in 100 % effluent.

3.8 The effluent conforming to the above standards shall be discharged into GIDC Sewer Line - Dahej Vilayat Pipeline/Common Disposal System up to the sea for final disposal at NIO designated point.

3.9 Sewage shall be treated separately and reuse/recycle.

3.10 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.

3.11 SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS UNDER WATER ACT:-

3.11.1 Applicant shall be a member of Dahej CETP as & when come up and sent its industrial waste water, if required.

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

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

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

3.11.5 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.

3.11.6 Applicant shall ensured & undertake on Rs. 100 stamp paper that it has one & only one outlet in GIDC U/G drain.

3.11.7 The GIDC drainage connection from units final out let to nearest sump of GIDC Sewer Line - Dahej Vilayat Pipeline/Common Disposal System up to the sea shall be completed & commissioned before applying for CCA further unit shall submit GIDC permission letter pertaining to same.

3.11.8 Name of the unit & technical relevant details shall be prominently written /printed on mouth of pipeline opening in to GIDC U/G drain & shall be made visible to inspecting officials.

4. CONDITIONS UNDER AIR ACT:-

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

Sr. No.	Name of Fuel	Quantity
1	Coal	35 MT/day
2	LDO	10 KL/day
3	HSD	50 L/hr

4.2 The applicant shall install & operate a comprehensive adequate air pollution control measures in order to achieve prescribed below.

GUJARAT POLLUTION CONTROL BOARD
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GPCB

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

Sr No.	Stack attached to	Stack height in (M)	Air Pollution Control system	Parameter	Permissible Limit
1.	Thermic Fluid Heater & Boiler (8 MTHrs)	50	ESP	Particulate matter SO2 NOx	150 mg/Nm^3 100 ppm 50 ppm
2	D.G.Sets (1000 KVA)	11	-	-	-
3	Incinerator	30	Venturi Scrubber & Packed Scrubber	PM HCl SO_2 CO TOC Total dioxines and furans Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V and their Compounds	50 mg/Nm^3 50 mg/Nm^3 200 mg/Nm^3 100 mg/Nm^3 20 mg/Nm^3 0.1 ng TEQ/Nm^3 1.5 mg/Nm^3

4.4 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	Stack(H)	Air Pollution Control System	Parameter	Permissible Limit
1	Herbicide Plant	12 mtr.	Two Stage Water Alkali Scrubber	HCl SO2 HC HBr	20 mg/Nm^3 40 mg/Nm^3 15 mg/Nm^3 05 mg/Nm^3
2	Fungicide Plant	12 mtr.	Two Stage Water Alkali Scrubber	HCl SO2 HC HBr	20 mg/Nm^3 40 mg/Nm^3 15 mg/Nm^3 05 mg/Nm^3
3	Insecticide Plant	12 mtr.	Two Stage Water Alkali Scrubber	HCl SO2 HC HBr	20 mg/Nm^3 40 mg/Nm^3 15 mg/Nm^3 05 mg/Nm^3

4.5 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.

4.6 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 24 Hours	50 80

2.	Nitrogen Dioxide (NO_2), µg/m3	Annual 24 Hours	40 80
3.	Particulate Matter (Size less than 10 µm) OR PM10 µg/m3	Annual 24 Hours	60 100
4.	Particulate Matter (Size less than 2.5 mm) OR PM 2.5 µg/m3	Annual 24 Hours	40 60
5.	Carbon Monoxide (CO) mg/m³	8 Hours 1 Hour	02 04

*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.

4.7 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.

4.8 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.

4.9 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.

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

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

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

4.11.2 Unit shall submit action plan for VOC control and shall be achieved & maintained.

4.11.3 The applicant shall install continuous online monitoring system on the stacks for the parameters such as SO_2, NOx & PM, HCL, HC etc.

5. **CONDITIONS UNDER HAZARDOUS WASTE:-**

5.1 Applicant shall have to comply with provisions of Hazardous and other wastes (Management and Transboundary 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 Transboundary 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 Transboundary Movement) Rules, 2016, as amended from time to time.

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PARYAVARAN BHAVAN
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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.

5.6 **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.

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

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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.

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 - I 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.

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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)

For and on behalf of
Gujarat Pollution Control Board
D.M.Thaker 7/9
(D.M.Thaker)
Environmental Engineer

Annexure- 15

CCA copy of unit-3

GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN
Sector-10-A, Gandhinagar-382 021.
Website : www.gpcb.gov.in

GPCB

By R.P.A.D.

In exercise of the power conferred under section-25of the Water (Prevention and Control of Pollution)Act-1974, under section-21 of the Air (Prevention and Control of Pollution)Act-1981 and Authorization under "Hazardous Waste (Management, Handling & Transboundary Movement) Rule-2008."

And whereas Board has received consolidated application dated 02/05/2015 for the consolidated consent and authorization (CC & A) of this Board under the provisions / rules of the aforesaid Acts Consent & Authorization is hereby granted as under.

CONSENT AND AUTHORISATION:
(Under the provisions / rules of the aforesaid environmental acts)

To,
M/s. HEMANI INDUSTRIES LTD,
(OLD NAME:- HEMANI INTERMEDIATE P. LTD)
PLOT NO. CH-5, GIDC - DAHEJ,
TAL - VAGRA,
DIST-BHARUCH -392140.

1. **Consent Order No. : AWH-71059.**

2. The consent under Water Act –1974 shall be valid up to **14/07/2020.** The consent under Air Act –1981,and Authorization under Environment (Protection) Act, 1986 shall be valid up to **14/07/2020** to operate industrial plant for manufacture of the following products:

Sr. No.	Name of The Product	Quantity (MT/Month)
(A)	**Technical products.**	
1	m-Phenoxy Benzaldehyde (MPBAD)	300
2	m- Bromo Nitrobenzene	100
3	m- Bromo Anisole	100
4	Lambda-Cyhalothrin	50
	Or Deltamethrin Tech.	12
5	DV-Acid Chloride/CMAC	200
6	Cypermethrin Tech	150
7	Alphamethrin Tech/Permethrin Tech	100
8	Metamitron Tech/Glyphosate Tech	100
9	Thionyl Chloride	450
10	Sulphur chloride	100
11	Acid chlorides like valeroyl chloride.,phenyl chloride, phenyl acetyl chloride	100
	Total	**1762**

12	CPP	1.5 MW
By Product		
13	30% HCl	13.75
14	Sodium sulfite 80% (wer cake)	405.25
15	Ammonium Chloride 75-80% wet cake/20% Solution	100/425
16	Cupric Chloride Solution	85
17	Aluminium Chloride Solution 25%	1500
18	KCL Solphuric Acid 55%	750
19	Spent Sulphuric Acid 55%	600
20	Bromobenzene	54.5
21	HBr	18.9

3. **The following products shall be manufactured only by formulation:**

Sr. No	Name of The Product	Quantity (MT/Month)
(B)	**Formulation Products**	
Insecticides – Liquid Based Product		
1	Chloropyrifos 50% EC	300
2	Cypermethrin 25% EC	
3	Cypermethrin 10% EC	
4	Imidacloprid 17.8 % SL	
5	Monochrotophos 36% SL	
6	Buprofecin 25% SC	
7	Fipronil 5% SC	
8	Glyphosate (41 %) SL	
9	Alphamehtrin 10% EC	
10	Permethrin 25% EC	
11	Lamda cyaholothrin 5% EC	
Total		**300**
Herbicides		
1	Glyphosate SL	200
2	Pretilachlor 50 % EL	
3	Imazethapya 10% SL	
Total		**200**
Fungicides		
1	Hexaconazole 5 EC	200
2	Hexaconazole 5 SC	
3	Validamycin 3% L	
	Total	**200**
Total (Insecticides + Herbicides + Fungicides)		**700**

Insecticides – Solid Based Products		
1	Cartap HCl 4% granules GR	100
2	Fipronil granules GR	
3	Imidacloprid granules WG	
4	Thiomethoxam 25% WG	
5	Cartap HCl 50 SP	
6	Acephate 75% SP	
7	Acetamaprid SP	
8	Imidacloprid 70 WG	
	Total	**100**
Herbicides		
1	Metribuzin WP	100
2	Diruon WP	
	Total	**100**
Fungicides		
1	Carbendazim 12% + Mancozeb 63% WP	100
2	Tricyclazole 75% WP	
3	Carbendazim 50% WP	
4	Miclobutanil WP	
5	Copper Oxy chloride WP	
6	Mancozeb WP	
Total		**100**
Total (Insecticides + Herbicides + Fungicides)		**300**

4. **SPECIFIC CONDITIONS:-**

3.1 Applicant shall strictly comply/ fulfill the given conditions of EC issued earlier vide letter F. NO. J-11011/442/2008-1A-II(I) DATED 25/08/2008 and amended vide letter dated 17/03/2010.

3.2 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.

3.3 Applicant shall strictly comply/fulfill with all the conditions stipulated in CTE issued vide letter no GPCB/BRCH/NOC-3831/ID-12155/51576 DATED 10/05/2010 & Subsequent amendments.

3.4 Applicant shall be a member of Dahej CETP and shall send waste water except concentrated/high TDS stream to the CETP for treatment.

3.5 After commissioning of CETP applicant shall have to discharge industrial effluent except concentrated effluent stream from the process through the CETP only.

3.6 The concentrated/ high TDS waste water stream from manufacturing process if any shall be segregated & treated in evaporation system. Condensate water shall be reused to process/scrubber. The generating solids after settlers, nutches filters and centrifuges shall be disposed at nearest TSDF site.

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

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

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

3.10 Treated effluent shall be taken into effluent conveyance pipeline only after conforming to the disposal standards specified by GPCB.

3.11 Applicant shall have to comply with provisions of Hazardous Waste (Management, Handling & Transboundry Movement) Rule-2008, for all the types/categories of the generating hazardous waste, including by products/additional wastes.

3.12 In connection with the Kalpsar scheme / Yojna, as and when required / needed, the applicant shall have to shift the end disposal point (Lat.+ Long.) / outlet of the effluent along with the common disposal system of GIDC.

3.13 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.

3.14 Total control of odour nuisance from the plant premises, shall be achieved & maintained by the applicant continuously, if it is not achieved then the company has to stop the use of such chemicals.

3.15 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.

3.16 Applicant shall have to use only pure (Fresh) raw materials in their production & shall not use any type of Hazardous waste, as a raw material in the products.

3.17 Applicant shall have to provide overhead tank for sufficient capacity for storage of treated effluent prior to its discharge in to GIDC drainage line. The conveyance of treated effluent from industrial unit to the first manhole of GIDC U/G drainage system shall be pressure discharge in any case. It shall not be gravity flow.

3.18 Applicant shall ensured & undertake on Rs. 100 stamp paper that it has one & only one outlet in GIDC U/G drain.

5. **CONDITIONS UNDER WATER ACT:**

4.1 The quantity of total water consumption shall not exceed **2100 KL/day.** (Break up as below).

a) Domestic - **177 KL/day.**
b) Industrial - **1815 KL/day.**
c) Gardening - **53 KL/day.**
d) **Others – 55 Kl/Day.**

4.2 The quantity of total waste water generation shall not exceed **1046 KL/day.** (Break up as below).

a) Domestic - **125 KL/day.**

b) Industrial - **921 KL/day.**

4.3 The quantity of the industrial effluent from the manufacturing process and other ancillary Industrial operations shall not exceed **921 KL/day**, and the quantity of domestic waste Water (sewage) shall not exceed **125 KL/day**.

4.4 High COD waste streams **50 KL/day** after segregation shall be incinerated in on site incinerator with energy recovery facility. Incinerator shall meet the CPCB standards and guidelines. High TDS effluent **125 KL/day** shall be sent for evaporation in evaporator after segregation, condensate from the MEE shall be recycled back to process/scrubbers and remaining **646 KL/day** shall be sent for disposal into Dahej Vilayat Pipeline after treatment in their own ETP.

4.5 The quality of treated effluent shall conform to the following standards prior to disposal into GIDC Sewer Line - Dahej Vilayat Pipeline/Common Disposal System up to the sea.

PARAMETERS	PERMISSIBLE LIMIT
pH	6.5 to 8.5
Temperature	Shall not exceed 5° C above the receiving water temperature.
Colour & odour	All efforts shall be made to remove colour and unpleasant odour as far as practicable.
Suspended Solids	100 mg/lit for process waste water 600 mg/lit for cooling water effluent 10 % above total suspended matter of influent.
Particle Size of Suspended Solids	(a) Floatable Solids max 3 mm. (b) Settleable solids max 856 microns
Oil and Grease	10 mg/l
Fluorides	15 mg/l
Sulphides	2 mg/l
Pesticides	Absent
Ammonical Nitrogen	50 mg/l
Nitrate Nitrogen	10 mg/l
Total Kjeldahl nitrogen	100 mg/l
Free ammonia [as NH_3]	5 mg/l
Copper	3 mg/l
Zinc	15 mg/l
BOD	100 mg/l
COD	250 mg/l
Total residual chlorine	1.0 mg/l
Arsenic(as As)	0.2 mg/l

Chromium-Hexavalent Chromium-Total	0.1 mg/l 1.0 mg/l
Mercury(as Hg)	0.01 mg/l
Lead (as Pb)	0.1 mg/l
Cadmium (as Cd)	2 mg/l
Nickel(as Ni)	5 mg/l
Cyanide(as CN)	0.1 mg/l
Phenoile Compounds (as C6H5OH)	5 mg/l
Selenium [as Se]	0.05 mg/l
Manganese [as Mn]	2 mg/l
Iron [as Fe]	3 mg/l
Vanadium [as V]	0.2 mg/l
Bio-assay test	90% Survival of fish after 96 hrs in 100% effluent.

4.6 The effluent conforming to the above standards shall be discharged into GIDC Sewer Line - Dahej Vilayat Pipeline/Common Disposal System up to the sea for final disposal at NIO designated point.

4.7 Sewage shall be treated separately to conform to the following standards, shall be disposed into septic tank/soak pit system exclusively within premises.

BOD	Less than 20 mg/l
Suspended Solids	Less than 30 mg/l
Residual Chlorine	Minimum 0.5 ppm

6. **CONDITIONS UNDER THE AIR ACT:-**

5.1 Following shall be used as fuel in each of the boiler/D.G Set/CPP/TFH/Incinerator respectively.

SR. NO.	FUEL	QUANTITY
1	Natural Gas	1150 m^3/day
2	Coal Or Lignite	2250 MT/Month
3	LDO	20 KL/Month
4	Fuel Oil	15 KL/Month
5	HSD	5 KL/Month

5.2 The flue gas emission through stack attached to furnace shall conform to the following standards:-

SR. NO.	STACK ATTACHED TO	HEIGHT (M)	AIR POLLUTION CONTROL SYSTEM	AIR EMISSION	
				POLLUTANT	CONCENTRATION
1.	Boiler - 1	50	ESP	SPM SO_2 NOx	150 mg/Nm^3 100 ppm 50 ppm
2.	Boiler – 2	50	ESP	SPM SO_2 NOx	150 mg/Nm^3 100 ppm 50 ppm
3.	Incinerator (As per GPCB Guideline)	30	Venturi Scrubber followed by packed bed scrubber followed by Droplet Seperator	PM HCl SO_2 CO CO TOC HF NO_X Total dioxine and furan Cd+/h+ their Compound Hg and its compourd Sb+As+Pb+Cr+ Co+Cu+Mn+Ni +V+their compound	50 mg/Nm^3 50 mg/Nm^3 200 mg/Nm^3 100 mg/Nm^3 (30minutes) 50 mg/Nm^3 (24 Hrs) 20 mg/Nm^3 4 mg/Nm^3 400 mg/Nm^3 0.1 ngTEQ/Nm^3 0.05 mg/Nm^3 0.05 mg/Nm^3 0.05 mg/Nm^3
4.	Thermic fluid Heater	12	---	SPM SO_2 NOx	150 mg/Nm^3 100 ppm 50 ppm

5.3 The applicant shall install and operate a comprehensive adequate air pollution control measures in order to achieve prescribed standards.

5.4 The Process emission through various stacks/vent of reactors, process, vessel shall conform to the following standards:-

SR. NO.	STACK ATTACHED TO	HEIGHT (M)	AIR POLLUTION CONTROL SYSTEM	AIR EMISSION	
				POLLUTANT	CONCENTRATION
	Reactor-I	15	Caustic Scrubber	HCl	20 mg/Nm^3
				Cl_2	5 mg/Nm^3
	Reactor-II	15	Venturi Scrubber	H_2S	5 mg/Nm^3
				SO_2	40 mg/Nm^3
3.	T.C. Plant	25	Caustic Scrubber	NO_x	25 mg/Nm^3
				HC	15 mg/Nm^3

5.5 Ambient air quality within the premises of the industry shall conform to the following standards:-

PARAMETER	PERMISSIBLE LIMIT
Suspended Particulate Matter (size less than 10µm) or PM10 µg/m3**	100 microgram per cubic meter
Suspended Particulate Matter (size less than 2.5 µm) or PM 2.5 µg/m3**	60 microgram per cubic meter
Oxides Of Sulphur**	80 microgram per cubic meter
Oxides Of Nitrogen**	80 microgram per cubic meter
HCL	200 microgram per cubic meter
Cl_2	100 microgram per cubic meter
H2S	500 microgram per cubic meter
HC	160 microgram per cubic meter
Ammonia	400 microgram per cubic meter
HF	60 microgram per cubic meter
CS2	2000 microgram per cubic meter
CO	5000 microgram per cubic meter

** 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.

5.6 The applicant shall operate industrial plant / air pollution control equipment very efficiently and continuously so that the gaseous emission always conforms to the standards specified in condition no.5.2, 5.3 & 5.4 above.

5	Used Oil	5.1	200Ltrs	Collection, Storage, Transportation & Disposal by Selling to Registered Re-Processors/Reuse as lubricant.
6	Discarded Containers/Bags	33.3	1000Nos	Collection, Storage, Decontamination, Detoxification & Sale to Authorized Vendors.
7	Incinerafion Ash	36.2	7.5	Collection, Storage, Transportation, Disposal at TSDF of BEIL, Ank. & SEPPL, Kutch.
8	Salts of Multiple Effective Evaporator	34.3	300	Collection, Storage, Transportation, Disposal at TSDF of BEIL, Ank. & SEPPL, Kutch.
9	30% HCL	D2 (SCH-II)	13.75	Collection, Storage, Transportation, Disposal by Selling to Actual end User.
10	Sodium Sulfite 80% (wet cake)	17.1	405.25	Collection, Storage, Transportation, Disposal by Selling to Actual end User.
11	Ammonium Chloride 75 -80%, wet cake/ 20% solution	C1	87.5/350	Collection, Storage, Transportation, Disposal by Selling to Actual end User.
12	Cupric Chloride Solution	B3	67	Collection, Storage, Transportation, Disposal by Selling to Actual end User.
13	Aluminum Chloride Solution 25%	C15	1000	Collection, Storage, Transportation, Disposal by Selling to Actual end User.
14	KCl Solution 20%	C15	500	Collection, Storage, Transportation, Disposal by Selling to Actual end User.
15	Spent Sulphuric Acid 55%	D2(SCH-II)	225	Collection, Storage, Transportation, Disposal by Selling to Actual end User.
16	Bromo Benzene	C15	54.5	Collection, Storage, Transportation, Disposal by Selling to Actual end User.
17	HBr	C15	18.9	Collection, Storage, Transportation, Disposal by Selling to Actual end User.

6.3 The authorization is granted to operate a facility for collection, storage, within the factory premises, transportation and ultimate disposal of Hazardous wastes at TSDF of BEIL, Ank. & SEPPL, Kutch, RSPL Panoli.

6.4 The authorization shall be in force for a period up to date **14/07/2020.**

6.5 The unit shall disposed off their coal Ash by selling it to brick manufactures.

6.6 The Industry shall have to obtain all prior permissions form competent authority with reference to end /ultimate disposal of each type to waste including. NOC from concern state Authority for interstate transportations of the Hazardous Waste. as well as Authorization from respective State PCB/PCC.

6.7 The Industry shall have to comply with the specific condition of the terms and condition of Hazardous waste (M.H & TM) Rule. 2008 given in Annexure-A.

6.8 The authorization is subject to the conditions stated below and such other conditions as may be specified in the rules from time to time under the Environment (Protection) Act-1986.

6.9 The application shall have to comply with the CPCB guidelines for co processing of incinerable waste as well as the guideline of Transportation of waste .The applicant shall have to up load Records / Real time data .of the same and shall have to be displayed invariably by the unit online .on their server and Xgn.

6.10 **TERMS AND CONDITIONS OF AUTHORISATION**

6.10.1 The applicant shall comply with the provisions of the Environment (Protection) Act - 1986 and the rules made there under.

6.10.2 The authorization shall be produced for inspection at the request of an officer authorized by the Gujarat Pollution Control Board.

6.10.3 The persons authorized shall not rent, lend, sell, transfer of otherwise transport the hazardous wastes without obtaining prior permission of the Gujarat Pollution Control Board.

6.10.4 Any unauthorized change in personnel, equipment or working conditions as mentioned in the authorization order by the persons authorized shall constitute a breach of this authorization.

6.10.5 It is the duty of the authorized person to take prior permission of the Gujarat Pollution Control Board to close down the facility.

6.10.6 An application for the renewal of an authorization shall be made as laid down in rule 5 (6) (ii).

6.10.7 Industry shall have to display the relevant information with regard to hazardous waste as indicated in the Court's order in W.P. No. 657 of 1995 dated 14th October 2003.

6.10.8 Industry shall have to display on-line data outside the main factory gate with regard to and nature of hazardous chemicals being handled in the plant, including waste water and air emission and solid hazardous waste generated within the factory premises.

8. **GENERAL CONDITIONS: -**

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

7.2 Applicant shall also comply with the general conditions given in annexure I

7.3 The arrangement shall be made in each plant for drainage in such a way that all the quantity of effluent shall be taken to the central effluent treatment plant and no untreated waste water from any plant shall be discharged within the premises.

7.4 There shall be continuous flow recording devices for each plant to record the individual plant effluent going to the effluent treatment plant. There shall also be continuous flow recording devices at the inlet and outlet of the effluent treatment plant.

7.5 The Board reserves the right to review and /or revoke the consent and/ or make variations in the conditions which the Board deems fit at any later date taking into consideration the circumstances, in accordance with Section 27 of the Act.

7.6 In case of change of management the name and address of the new Directors shall immediately be intimated to the GPCB.

7.7 The consent granted shall lapse at any time if any parameters or any condition of this consent order are not complied with.

For and on behalf of
Gujarat Pollution Control Board

D.M. Thaker 27/7

(D. M. Thaker)
Environmental Engineer

NO.GPCB/BRCH-B/CCA-33(7)/ID-12155/ 322404 /Dated: 27/07/2015.

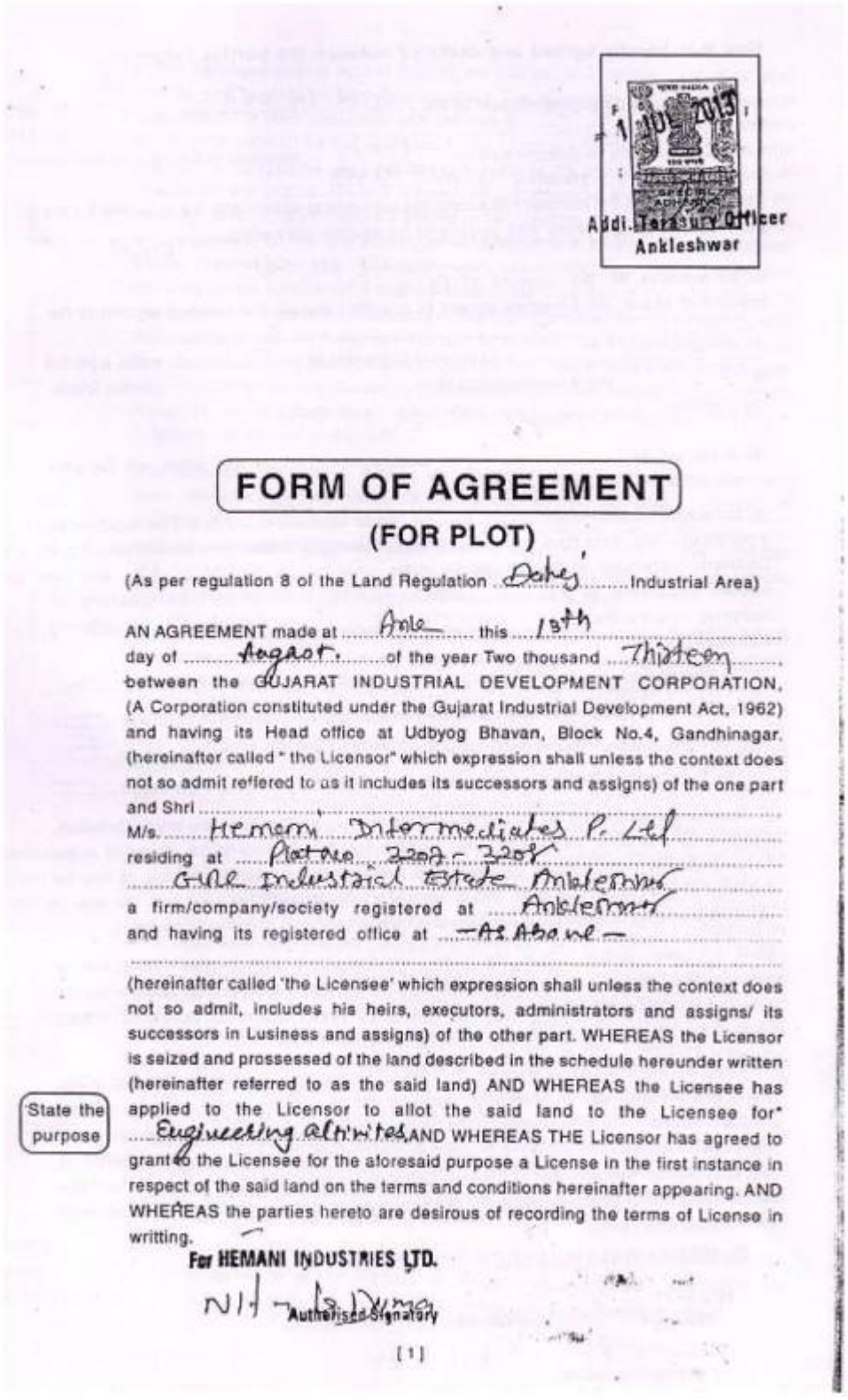
ISSUED TO:
M/s. HEMANI INDUSTRIES LTD.
(OLD NAME:- HEMANI INTERMEDIATE P. LTD)
PLOT NO. CH-5, GIDC - DAHEJ,
DAHEJ-292140,TAL. - VAGRA,
DIST-BHARUCH.

Annexure -16

Water Supply Letter

Existing water requirement in plot no. CH-5 as per consent to operate -2100 KL/Day.

Water requirement in plot no. E-362 as per GIDC Allotment letter – 1300 KL/Day



Addl. Treasury Officer
Ankleshwar

FORM OF AGREEMENT

(FOR PLOT)

(As per regulation 8 of the Land Regulation Ankleshwar Industrial Area)

AN AGREEMENT made at Ankle this 13th day of August of the year Two thousand Thirteen between the GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION, (A Corporation constituted under the Gujarat Industrial Development Act, 1962) and having its Head office at Udbyog Bhavan, Block No.4, Gandhinagar. (hereinafter called " the Licensor" which expression shall unless the context does not so admit reffered to as it includes its successors and assigns) of the one part and Shri M/s. Hemani Intermediates P. Ltd residing at Plot no. 3207 - 3208 GIDC Industrial Estate Ankleshwar a firm/company/society registered at Ankleshwar and having its registered office at -As Above-

(hereinafter called 'the Licensee' which expression shall unless the context does not so admit, includes his heirs, executors, administrators and assigns/ its successors in Lusiness and assigns) of the other part. WHEREAS the Licensor is seized and prossessed of the land described in the schedule hereunder written (hereinafter referred to as the said land) AND WHEREAS the Licensee has applied to the Licensor to allot the said land to the Licensee for* Engineering activities AND WHEREAS THE Licensor has agreed to grant to the Licensee for the aforesaid purpose a License in the first instance in respect of the said land on the terms and conditions hereinafter appearing. AND WHEREAS the parties hereto are desirous of recording the terms of License in writting.

State the purpose

For HEMANI INDUSTRIES LTD.

Authorised Signatory

[1]

Now it is hereby agreed and declared between the parties follow :

1. On the Licensee paying amount of Rs. 2,92,14,067 such amount being on amount equi. to 100% perecent of the price of the said land which is calulated at Rs 3010 per sq metre and the licensor will permit the Licensee to enter upon the said land for the purpose and on the terms and conditions hereinafter appearing.

2. In addition to the amount of Rs. 2,92,14,067 PLP mentioned above, the Licensee agrees to pay the Licensor the balance amount of Rs. ..... with interest at the rate of ..... within a period of .....years commencing from ..... in the following manner. 100% 2,92,14,067.

(a) A sum of Rs. ..... equal to..... of the price will be paid before allotment. Which is paid by you.

(b) Balalance amount of Rs. ..... equal to ..... % will be rapid within a period of 2/4/8 years from the date of allotment in 8/16/32 Quarterly Instalments. Each Quarterly Instalment of Capital will be of Rs. ..... and the interest Instalment of Rs. ..... to be paid quarterly on reducing balance Rs. ..... to be paid quartely on reducing balance.

(i) The First quartely Instalment will be paid on or belure the 10th date of the month .....

(ii) The Second quartely Instalment will be paid on or before the 10th date of the month .....

(iii) The Third quartely Instalment will be paid on or before the 10th date of the month .....

(iv) The Forth quartely Instalment will be paid on or before the 10th date of the month .....

(C) Panel Interst @ 3% over the normal rate of interest would be charged on the amount in default. The interest rate would be subject to the revision from time to time at the discretion of the Corporation and interest would be payable at such revised rate from such date as may be specified by the Corporation from time to time. The interest liablity will start from the date of agreement or after one month of the date of allotment whichever is ealrier of allotment.

(d) The Licence further agrees that he/she will pay the service charges. Nonagricultural assessment and lease rent regularly, as may be detarmined by the licensor, on failing to pay the above dues to the corporation, the Licencee will pay interest on outstanding dues of SC, NAA & LR at the rate as may be specified by the coporation from time to time.

You/The Licensee/The Lessee shall not start production activity in the allotted plot/shed unless and untill it has effectively and completely complied with the pollution control measurer required to be undertaken by you/The Licensee / The Leassee / The Leassee under any permission which may have been granted by the G.P.C.B. and if you/the Licensee/ The Leassee without complying with the pollution measure start or continue with their industrial activity you/ the Licensor/ The Leaser shall be duty bound to disconnect electricty supply and water supply of the Licensee unit even without prior notice.

For HEMANI INDUSTRIES LTD.
G.L.Dama.
Authorised Signatory

*strike off where not applicable

3. Grant of License State the purpose

4.

5. Submission of plans for approval

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regards supply
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*The licensee shall consume water for his unit at following rates from year to year.

Year	'Consumption per day (in Litres)
I	450 m³/day.
II	
III	

strike off if not applicable

Onwards.....

Even if he fails to consume water to the extent mentioned above, he shall pay the water charges for the quantity equal to 70% of the above mentioned quantity irrespective of consumption. If demand is more than 50,000 ltrs. per day, the payment for minimum charge for 70% of the above agreed quantity shall commence from the date of commencement of actual consumption of water or from the date on which the utilisation period / from the date of allotment, namely two years for plot and one year for shed is over, whichever is earlier. The water charges shall be payable at the prevailing water rate of the estate for the financial year as fixed by the Corporation from time to time and on failure to pay the minimum charges, the Licensee shall be liable to the action including termination of agreement & other steps.

Indeminity

(f) The Licensee will keep the Licensor indeminified against any and all claims for damage which may be caused to any adjoining buiding or other premises by such building of in consequance of the execution of the aforesaid works and also against all payments whatsoever which during the progress of the work may become payable or be demanded by the local authority in respect of the said work or of anything come under the authority herein contained.

Sanitation

(g) The Licencee shall observe and confirm to all rules, regulations and bye - laws of the Corporation and of the local authority concerned of any other statutory regulation in any way relating to public health, effluent treament and disposal and sanitation in force for the time being and shall provide sufficient latrine accommodation and other sanitary arrangement for the laboures and workmen employed during the construction of the building on the said land in order to keep the said land and its surroundings, clean and in good condition to the entire satisfaction of the Executive Engineer, and shall not without the consent in writing of the Executive Engineer permit any labourers or workmen to reside upon the land and in event of such consent being shall comply strickly with he terms thereof. Failure on the part of the Licensee to comply with the provision of any law regarding disposal of industrial effluent shall entitle the corporation to disconnect water supply to the Licensee and to resume the possession of land. The Licensee shall have to take drainage connection, when intimated by the Corporation, and shall have to pay all the necessary amounts towards capital amount recovery and shall have to pay regular drainage cess as fixed by the Corporation, from time to time. While taking drainage connection, the Licensee shall have to comply with all regulations contained in the "Drainage Regulations, 1990 of GIDC".

(gg) The Licensee shall comply with all laws, including Acts, Rules, Regulation or oreders passed, made or issued by the Govt. of Gujarat or by the Goverment of India from time to time, relating to the business of industry carried on by the Licensee or having a bearing on the same. (The Licensee shall in particular comply with, observe and act, according to laws, on the subject of ecology and Enviornment like the water (Preveption & Control of pollution Act. 1974) the Air Prevention & Control Pollution Act, 1981, the Water Prevention & Control of Pollution) Cess Act, 1977 and the Enviornment Protection Act, 1986. The fact of the Licensor assisting the Licensee in [illegible] providing

For MEHRAN INDUSTRIES LTD.

Annexure- 17

GIDC Letter to discharge the treated effluent into drainage line

Plot No. CH-5

GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION

(A Govt. of Gujarat Undertaking)
Office of the Executive Engineer, GIDC
1st Floor, Narmada Commercial Complex,
M.G. Road, PanchBatti, Bharuch-392001
Phone: (02642)242432/242442
FAX:(02642)241902
Email ID : gidcbharuch@rediffmail.com

No. GIDC/EE/BRH/Drainage Contribution/ 516 Date: 23/3/2015.

To,
M/s Hemani Industries Ltd.,
Plot No. CH-5/A,
GIDC, Dahej-I / II / III,

Sub: - Consented Effluent Quantity
Ref:-

Dear Sir,

M/s Hemani Industries Ltd. have been allotted the plot no. CH-5/A in Dahej-I / II / III Industrial Estate admeasuring 646.00 Sq. mt. The license agreement has been executed on dated -. M/s. Hemani Industries Ltd have applied to GIDC seeking the confirmation for the discharge of the treated effluent as per the GPCB norms into GIDC Effluent Collection Network. The quantity of the treated effluent to be discharged in to GIDC Effluent collection Network to be mentioned in the application as follows:

Sr no	Year	Quantity of the treated Effluent to be discharged in GIDC Drain in KL per day
1	2015-16	
2	2016-17	
3	2017-18	

GIDC is pleased to give the confirmation for discharging the Treated Effluent subject to payment of the Capital Contribution Charges within 30 days of issue of the demand note failing which GIDC shall not accommodate discharge of the effluent into the GIDC Effluent Collection Network. GIDC reserves the right to revise the quantity of the treated effluent quantity without prior consent. The industry shall undertake to recycle/ reduce the quantity of effluent. The quantity of effluent finalized by GPCB's consent shall be binding to the industry. Any excess payment made shall be adjusted against the other dues of GIDC or shall be refunded back as per the policy of GIDC. The industry will have to abide by the Gujarat Industrial Development Corporation Drainage Regulations. If the industry books excess quantity and the effluent is not received as per the plan GIDC reserves the right to cancel / revise the quantity of the effluent without assigning any reasons thereof.

The **Payment will be in favour of GIDC, Account No. 26050200000284, Bank of Baroda, Dahej. The ISFC Code is BARB0DAHEJX for making payments by RTGS. The amount if already paid by you will be deducted from the payable amount.**

DEMAND NOTE

Name of Industries	Plot No.	Ultimate consented Quantity of Effluent for Discharge in KL per day	Rate of Contribution Charges in Rs. per KL (April-2014 to March-2015)	Payable Amount (In Rs.)
M/S Hemani Industries Ltd.	CH-5/A	646.00	16,576.00	1,07,08,096.00

As you have been given dry. conn. for 646 KLD & you have paid contribution charges accordingly, you need not to pay anything in this account. But please confirm on paper.

Executive Engineer
GIDC, *Bharuch*

Dy. Executive Engineer
Sub Division (Drainage)
G.I.D.C. Bharuch

- The charges are towards the non-refundable Capital Contribution Charges.
- Industry shall also have to pay the Drainage Connection and drainage cess.
- In case of payment is made through RTGS, the TDS and other bank charges shall have to be added on above amount
- For any queries on demand note, you are requested to contact Shri C.V. Rajani, Deputy Executive Engineer (Drainage) Mo: 9879110098, E-mail:- gidcbharuch@rediffmail.com
- The payment must be done on or before 23-4-15.

Copy submitted with respect to:-

- Superintending Engineer(CG), GIDC, Bharuch for information pl.
- Member secretary GPCB /RO, GPCB, Bharuch with a request to assess the quantity of effluent and issue the CCA on producing the payment confirmation.
- The Dy. Executive Engineer (Drainage), GIDC, Bharuch for information.
- The Divisional Accountant, Division Office, GIDC, Bharuch for information.

Plot No. E-362

GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION

(A Govt. of Gujarat Undertaking)
Office of the Executive Engineer, GIDC
1st Floor, Narmada Commercial Complex,
M.G. Road, PanchBatti, Bharuch-392001
Phone: (02642)242432/242442
FAX:(02642)241902
Email ID : gidcbharuch@rediffmail.com

No. GIDC/EE/BRH/Drainage Contribution/ 1268 Date: 21/08/2015.

To,
M/s Hemani Industries Limited,
Plot No. E-362,
GIDC, Dahej-I / II / III,

Sub: - Consented Effluent Quantity
Ref:-

Dear Sir,

M/s Hemani Industries Limited have been allotted the plot no. E-362 in Dahej-I / II / III Industrial Estate admeasuring - Sq. mt. The license agreement has been executed on dated -. M/s. Hemani Industries Ltd. have applied to GIDC seeking the confirmation for the discharge of the treated effluent as per the GPCB norms into GIDC Effluent Collection Network. The quantity of the treated effluent to be discharged in to GIDC Effluent collection Network to be mentioned in the application as follows:

Sr no	Year	Quantity of the treated Effluent to be discharged in GIDC Drain in KL per day
1	2015-16	
2	2016-17	
3	2017-18	

GIDC is pleased to give the confirmation for discharging the Treated Effluent subject to payment of the Capital Contribution Charges within 30 days of issue of the demand note failing which GIDC shall not accommodate discharge of the effluent into the GIDC Effluent Collection Network. GIDC reserves the right to revise the quantity of the treated effluent quantity without prior consent. The industry shall undertake to recycle/ reduce the quantity of effluent. The quantity of effluent finalized by GPCB's consent shall be binding to the industry. Any excess payment made shall be adjusted against the other dues of GIDC or shall be refunded back as per the policy of GIDC. The industry will have to abide by the Gujarat Industrial Development Corporation Drainage Regulations. If the industry books excess quantity and the effluent is not received as per the plan GIDC reserves the right to cancel / revise the quantity of the effluent without assigning any reasons thereof.

Annexure -18

Membership of SEPPL, Kutchh & BEIL, Ankleshwar

SAURASHTRA ENVIRO PROJECTS PRIVATE LIMITED

Corporate Office: Detox House, Opp. Gujarat Samachar Press, Udhna Darwaja, Ring Road, Surat.
Contact Nos. : 0261 – 2351248, 2346181, 6542020; E-mail: info@sepplindia.com

Inquiry Form for Membership Enrollment

Date of Application: 07.04.2016

1	**Name of Marketing Official coordinating your inquiry at S.E.P.P.L**		
2	Name of Your Industry		HEMANI INDUSTRIES LTD.
3	Details of the Coordinating Official from your Organization	Name:	SATISH B PATEL
		Designation:	GENERAL MANGER
		Department:	EHS
		Mobile Number:	9328424018
		Email ID:	Satishpatel.patel919@gmail.com
4	Constitution of Business (Proprietary/ Partnership/Company)		company
5	Address of the Production Facility		Plot No. Ch-5 & E-362, GIDC Estate, Dahej ta. Vagra, Dist. Bharuch
6	Investment in Plant & Machinery: **(Please provide copy of latest CA certificate)**		75 core
7	Types of Waste Generated as per CC & A **(Please attach copy of CC & A)**	Type of Waste	Category / Annual Quantity (MT)
		ETP Sludge	35.3 / 800
		MEE Salt	35.3 / 2400
		Process Residue	20.3 / 6000
8	Details of person / company providing reference of M/s. Saurashtra Enviro Projects Pvt. Ltd		Mr. amit Mehta

Declaration

I/We hereby declare that all the information mentioned above is true to the best of my knowledge

For HEMANI INDUSTRIES LTD.

Authorised Signatory

(Company's Seal & Signature of Authorized Signatory)

All the above details are essential. Any incomplete details may delay the membership process

Annexure-19

Copy of application submitted in GPCB for merger of these two units

HEMANI INDUSTRIES LIMITED

UNIT -III

HEMANI

GOVT. RECOGNISED TWO STAR EXPORT HOUSE

Corporate Identity Number : U24114MH1994PLC076416

Feb. 21, 2017

To,
Mr. H. C. Solanki
(Regional Officer)
Gujarat Pollution Control Board
C-1/119/3. GIDC, Phase-II,
Narmadanagar,
Bharuch – 392 015

SUB: REQUEST TO MERGE M/S. HEMANI INTERMEDIATES PVT. LTD. (UNIT-IV) INTO M/s. HEMANI INDSTRIES LTD. (UNIT-III)

REF: 1) GPCB ID OF M/s. HEMANI INDSTRIES LTD. (UNIT-III): 12155
2) GPCB ID OF M/s. HEMANI INTERMEDIATES PVT. LTD. (UNIT-IV): 44626
3) OUR UNDERTAKING SUBMITION DATE: 17.02.2016

Dear Sir,

This has reference to above mentioned subject matter. **M/s. Hemani Industries Ltd. (Unit-III)** is operating at Plot No. CH-5, GIDC, DAHEJ-I, TAL: VAGRA, DIST: BHARCH-292140. & **M/s. Hemani Intermediates P. Ltd. (Unit-IV)** is proposed unit located at Plot No. E-362, GIDC, DAHEJ-I, TAL: VAGRA, DIST: BHARUCH.

Now, the company has decided to merge proposed unit into existing one. We have applied to GIDC for merger of Unit-III & Unit-IV. Acknowledgment letter from GIDC is attached as Annexure-I.

We have revised our layout in such a way that our proposed formulation plant shall be located on Unit-IV and other Pesticides plant shall be located on Unit-III. Undertaking for same is submitted to GPCB on dated 17.02.2017. Copy of same is attached as Annexure-II.

Revised layout plan is attached as Annexure-III.

Copy of existing CCA of M/s. Hemani Industries Ltd. (Unit-III) located at Plot No. CH-5, GIDC, DAHEJ-I, TAL: VAGRA, DIST: BHARCH-292140 is attached as Annexure-IV.

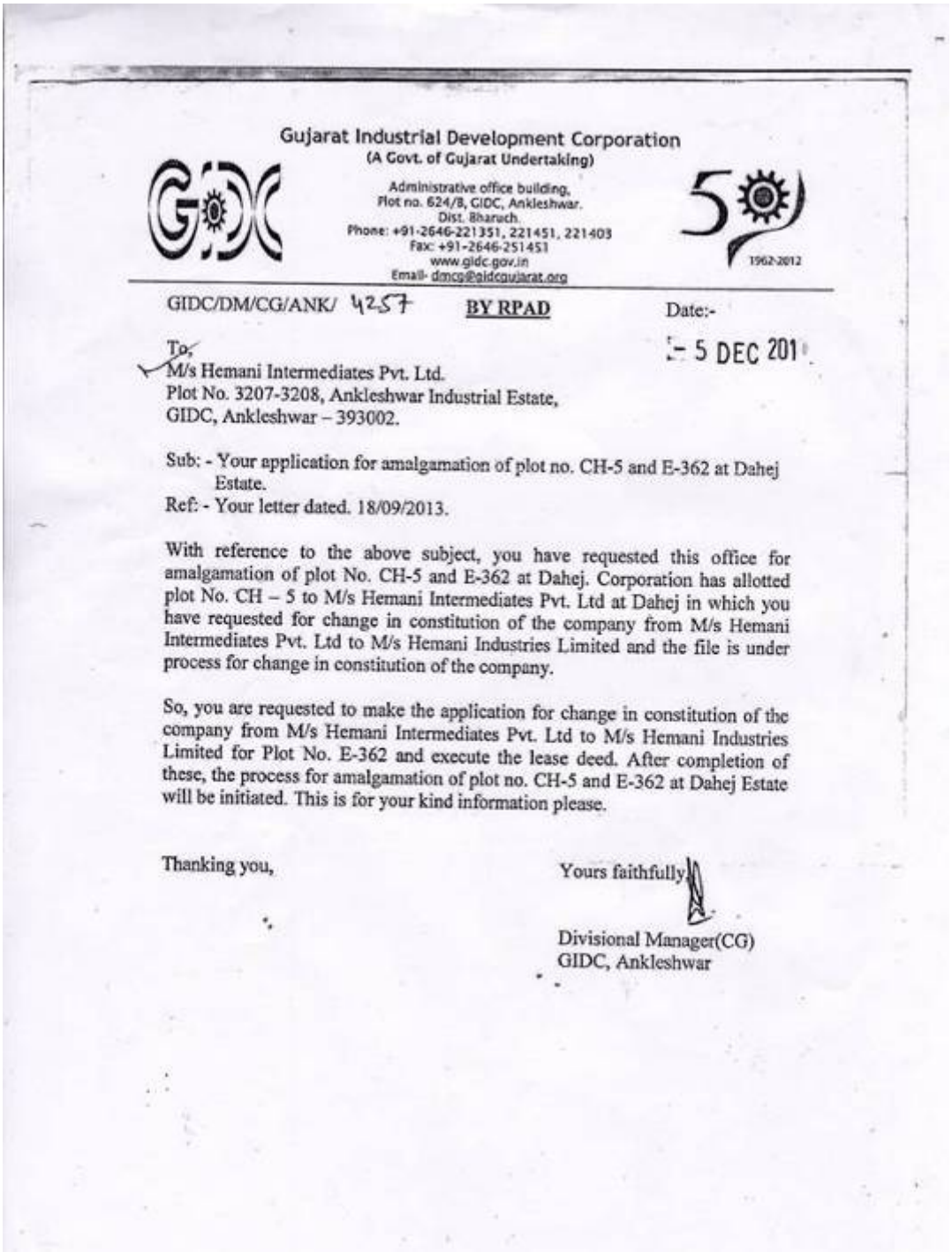
Copy of CTE of M/s. Hemani Intermediates P. Ltd. (Unit-IV) located at Plot No. E-362, GIDC, DAHEJ-I, TAL: VAGRA, DIST: BHARUCH is attached as Annexure-V.

Received
Gujarat Pollution Control Board
BHARUCH.

• **Regd. Office** : 706-710, Reena Complex, Opp. Nathani Steel, Ramdev Nagar Road Vidyavihar (W), Mumbai-400 086. INDIA
Tel.: +91-22-6140 7600, Fax: +91-22-2513 4483, 6140 7602, E-mail : hemanigroup@hotmail.com
• Plant : Unit - III, Plot No. CH-5, G.I.D.C. Industrial Estate, Dahej Vagra, Dist - Bharuch, Gujarat - 392130. INDIA
Tel.: (02641)-291111, Mob.:09377796953, E-mail:info@hemanigroup.com, Website:http://www.hemanigroup.com

Annexure-20

Copy of application submitted in GIDC for merger of these two units



Gujarat Industrial Development Corporation
(A Govt. of Gujarat Undertaking)

Administrative office building,
Plot no. 624/B, GIDC, Ankleshwar.
Dist. Bharuch.
Phone: +91-2646-221351, 221451, 221403
Fax: +91-2646-251451
www.gidc.gov.in
Email- dmcg@gidcgujarat.org

1962-2012

GIDC/DM/CG/ANK/ 4257 **BY RPAD** Date:- - 5 DEC 201

To,
M/s Hemani Intermediates Pvt. Ltd.
Plot No. 3207-3208, Ankleshwar Industrial Estate,
GIDC, Ankleshwar – 393002.

Sub: - Your application for amalgamation of plot no. CH-5 and E-362 at Dahej Estate.
Ref: - Your letter dated. 18/09/2013.

With reference to the above subject, you have requested this office for amalgamation of plot No. CH-5 and E-362 at Dahej. Corporation has allotted plot No. CH – 5 to M/s Hemani Intermediates Pvt. Ltd at Dahej in which you have requested for change in constitution of the company from M/s Hemani Intermediates Pvt. Ltd to M/s Hemani Industries Limited and the file is under process for change in constitution of the company.

So, you are requested to make the application for change in constitution of the company from M/s Hemani Intermediates Pvt. Ltd to M/s Hemani Industries Limited for Plot No. E-362 and execute the lease deed. After completion of these, the process for amalgamation of plot no. CH-5 and E-362 at Dahej Estate will be initiated. This is for your kind information please.

Thanking you,

Yours faithfully,

Divisional Manager(CG)
GIDC, Ankleshwar

Annexure -21

Bhopal office's first EC compliance report of unit-3

Monitoring the Implementation of Environmental Safeguards
Ministry of Environment & Forest
Western Region, Regional Office, Bhopal
MONITORING REPORT
PART – I
DATA SHEET

1.	Project type: River valley/ Mining/ Industry / Thermal/ Nuclear/Other (specify)	:	Industry
2.	Name of the project	:	Pesticide unit at Plot NO.CH-5, GIDC Dahej, Taluka Vagra, Distt. Bharuch, Gujarat by M/s Hemani Intermediates Pvt. Ltd. (Unit-II).
3.	Clearance letter (s)/OM No. & dated	:	J-11011/442/2008-IA.II (I) dated 25/10/2008
4.	Location: a) District (s) b) State (s) c) Location Latitude/Longitude	: : : :	 Bharuch Gujarat 21^0 43'14.56" N/ $72^0$36' 25.75" E
5.	Address for correspondence a) Address of the Concerned Project Chief Engineer (with Pin Code & telephone/ telex/ fax numbers) b) Address of the Concerned Project Chief Engineer (with Pin Code & telephone/ telex/ fax numbers)	: : :	 Shri Mohan Dama, Director, M/s Hemani Industries Limited, 706, Reena Complex, Opp. Nathani Steels, Vidyavihar (W), Mumbai – 400 086 Tel 22-6140 7600, Fax 25134483 Plot No. 3207/ A & B, Plot No. 3208/ 1 & 2, G.I.D.C. Industrial Estate, Ankleshwar – 393002 Tel.- 02646-221 706, 226 195 Fax 227554
6.	Salient features a) Of the project b) Of the EMP	: : :	Mfg of pesticides and intermediates with proper Environment Management System -do-
7.	Breakup of the project area a) Submergence area: forest & non-Forest b) Others	: : :	 52,000 Sq m in GIDC Indl. Estate Notified area
8.	Breakup of the project affected population with enumeration of those losing houses/dwelling units only agricultural land only both dwelling units & agricultural land & landless laborers/artisans: a) SC, ST/Adivasi b) Others (Please indicate whether these figures are based on any scientific and systematic survey carried out or only provisional figures, if a survey is carried out give details & year of survey)	: : :	NA - -
9.	Financial details: a) Project cost as originally planned and subsequent revised estimates and the year of price reference	: :	 Rs. 25 Cr. – Planned
	b) Allocation made for EMP with item wise and year wise break-up	:	Capital cost Rs 52.0 Cr for ETP, scrubbing system, MEE, Incinerator etc.

	ratio/IRR and the year of assessment	:	NA
	Whether © includes the cost of EMP as shown in the above	:	-
	e) Actual expenditure incurred on the project so far	:	Rs. 25 Cr.
	f) Actual expenditure incurred on the EMP so far	:	Rs 5.22 Cr capital and Rs 23.71 lakhs for O & M of EMS
10.	Forest land requirement	:	NA
	a) The status of approval for diversion of forest land for non-forestry use	:	
	b) The status of clearing felling	:	
	c) The status of CA, if any	:	
	d) Comments on the viability & sustainability of CA program in the light of actual field experience so far	:	
11.	The status of clear felling in non-forest areas (Such as submergence area or reservoir, approach Roads.), if any with quantitative information required.	:	NA
12.	Status of construction (Actual &/or planned)	:	
	a) Date of commencement	:	Details not provided
	b) Date of completion	:	September 2010
13.	Reasons for delay if the project is yet to start	:	NA
14.	Dates of site visits		
	a) The dates on which the project was monitored by the Regional Office on previous occasions, if any	:	-
	b) Date of site visits for this monitoring report	:	10/07/2012
15.	Details of correspondence with project Authorities for obtaining act on plans/information on status of compliance to safeguards other than the routine letters for logistic support for site visits). (The first monitoring report may contain the details of all the letters issued so far, but the later reports may cover only the letter issued subsequently)	:	As below

Date	Letter From RO	Date	Reply from PA
30.1.09	Status, reports & infr. on data sheet req.	16.3.09	Copies of advertisements, status & compliance submitted

PART – III

ΔPTIVE REPORT ON STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE AND ENVIRONMENTAL MANAGEMENT

O.M. No.: No. J-11011/442/2008-IA.II (I) dated 25/10/2008

SPECIFIC CONDITIONS:	
Condition No. 1:	The ETP with a capacity of 160 KLPD was installed with segregation of high TDS and Low TDS streams. The two stage MEE with a capacity 40 KLPD was also installed for treatment of high TDS stream. The salts generated for evaporator is being sent to SLF of M/s GEPIL/BHIL. Low TDS stream is treated in the ETP before discharging into GIDC drain.
Condition No. 2:	This condition pertains to GPCB. However, PA has installed ETP with primary, secondary and tertiary facilities. An additional bio-reactor of 200 KLPD is being constructed to augment capacity of existing ETP. Thus, total capacity would enhance to 300-350 KLPD.
Condition No. 3:	Scrubbing system has been installed to control the process emissions. The regular monitoring of various parameters is yet to be carried out. On-line monitors are yet to be installed. Coal fired boiler of 8 TPD and duel incinerator with two chambers with capacity of 2 MTPD solid & 10 KLPD liquid were installed.
Condition No. 4:	Scrubbing system to control HCL and Cl_2 has been installed. However, regular monitoring of incinerator stack is yet to be carried out.
Condition No. 5:	DG set has been provided with acoustic enclosure but regular monitoring of emission is yet to be carried out.
Condition No. 6:	PA has assured to abide by this condition.
Condition No. 7:	The VOCs are not monitored in ambient air.
Condition No. 8:	Chilled brine solution is provided for secondary condenser attach to recovery of solvents.
Condition No. 9:	An authorization under HWMH rules is obtain from GPCB. Solid and hazardous wastes are stored in earmarked covered area before its disposal to TSTF. The details of disposed quantity are submitted.
Condition No.10:	Fugitive emissions were not monitored.
Condition No.11:	The storage tanks for solvents have been installed as per provisions of permission granted by C.E.E.
Condition No.12:	HC detectors and LDAR system have not been installed.
Condition No.13:	Raw materials are stored in warehouses which are transferred to processing unit on day-to-day basis whereas solvents are stored in tanks which are also transferred in the barrels as per the requirement. Each unit is provided storm water channel.
Condition No.14:	The PA has assured to abide by this condition.
Condition No.15:	The PA has assured to abide by this condition Rs. 5.22 Cr. have been incurred as capital lost for implementation of EMS.
Condition No.16:	All the workers are provided medical facilities as per the Factories Act as submitted.
Condition No.17:	Adequate measures have been taken for protection of possible fire hazards. PA was directed to installed smoke detectors and alarm system in the warehouses.
Condition No.18:	Induction training to all the employees is imparted on safety and health aspects. However, the regularity is yet to be achieved as observed during the visit.
Condition No.19:	The usage of PPEs is ensured by the management.
Condition No.20:	The recommendations of CREP are yet to be implemented.

No.21:	The PA has assured to abide by this condition.
n No.22:	Rainwater harvesting measures has not been implemented.
on No.23:	Since, construction work of the project was over, the implementation of the condition could not verify. However, PA has informed that necessary infrastructure facilities were provided to the construction labors.

GENERAL CONDITIONS:

Condition No. 1:

General conditions pertaining to production, treatment of effluent & its quality, disposal of HW etc. are being complied by the proponent as per the details submitted. Year wise production (MT) details are as below:-

S. no	Year	META BROMO ANISOLE	META PHENOXY BENZALDE HYDE	META BROMO NITRO BENZENE	LAMBDA CYHALOT HRIN	Cypermethric Acid Chloride	Cypermet hrine
1	Oct.10 – Dec.10	101.2	909.1	163	82.9	4.5	2.5
2	Jan.11 – Mar.11	128.375	1036.7	173.775	102.11	0.0	1.325
3	Apr.11 – Mar.12	275.5	3251.1	422.0	191.3	0.6	0.0
4	Apr.12 – June12	97.74	846.75	164.65	90.5	-	-

Of these, Cypermethric Acid Chloride & Cyperimethric was manufactured without prior permission for which PA was served closure notice by GPCB vide letter dated 12.5.2011. The closure order was revoked vide letter dated. 22.7.11 for three months. Subsequently, inspections were carried out on 2.3.12 & 6.3.12 by GPCB and issued under 33A of the Water Act "Not meeting the prescribed Standards" vide letter dated 4.5.12. The same was revoked vide letter dated 5.6.12 by GPCB.

Moreover, monitoring of stacks, ambient air quality and its schedule, fugitive emissions and inventorization of hazardous waste are not being implemented as per the consent issued by the Board.

Condition No. 2:	The proponent has assured that no expansion or modification will be carried out without prior approval of the competent authorities.
Condition No. 3:	It was submitted that provisions of MSIHC rules are implemented. However, it was observed that measures like, escape route, assembly points, on-site emergency plan etc are yet to be implemented. *Moreover, an authorization under HWMH rules is obtained from GPCB. Solid and* hazardous wastes are stored in earmarked covered area before its disposal to TSTF. The details of disposed quantity are submitted.
Condition No. 4:	Ambient air quality is not monitored as per the condition stipulated.
Condition No. 5:	Stacks of appropriate height as per CPCB are provided to control process emissions. Scrubbed water is treated in ETP.
Condition No. 6:	The measures prescribed for Waste Minimization have not been implemented. It was submitted that process is a based on batch system and raw materials are used in measured quantity.
Condition No. 7:	An authorization under HWMH rules is obtained from GPCB. Solid and hazardous wastes are stored in earmarked covered area before its disposal to

	TSDF. The details of disposed quantity are yet to be submitted.
a No. 8:	Noise levels are not monitored as per the condition.
ion No. 9:	Environmental management cell has been constituted. Indeed, administration is made responsible for safety aspects & Head (Tech) is made responsible for ETP & environmental issues.
ondition No.10:	A few saplings have been grown as part of green belt. PA has assured to develop green belt as per requirement.
Condition No.11:	A six monthly compliance report has not been submitted regularly.
Condition No.12:	PA has submitted copies of advertisement but clause of seven days not followed.
Condition No.13:	PA has not submitted the Rs. 71.70 lakhs mere sanctioned by M/s City Bank & M/s DBS Bank respectively on Dec. 2009 & Feb. 2010 for execution of project. In addition, loan of Rs. 4 Cr. was sanctioned by M/s DBS Bank on Oct. 2010 towards working capital.
Condition No.14:	The proponent has agreed to the clause imposed by the Ministry.
Condition No.15:	The project proponent has assured to implement additional condition if imposed by the Ministry.
Condition No.16:	PA has assured to abide by the condition.
Condition No.17:	It is evident from the above that implementation of conditions stipulated under Air and Water Acts and authorization under HWMH Rules requires sincere efforts. PA has obtained policy under Public Liability Insurance Act.

End Note:-

With reference to Ministry's letter no. J-11011/442/2008-IA II (I) dated 21.6.2012, undersigned had visited the site on 10th July 2012 to verify the implementation of environmental safeguards as stipulated in environmental clearance. During the inspection, the discussion was held with the project officials and documents and reports were obtained. As mentioned above the monitoring mechanism of various parameters, as stipulated in the consent issued by Gujarat Pollution Control Board, was found weak. It was also understood from Project Proponent that they are in process of strengthening the monitoring mechanism and assured that few other conditions pertaining to rain water harvesting, waste minimization measures, development of green belt, installation of LEL detectors etc. shall be implemented shortly.

Director (S)

Annexure- 22

EC compliance report of unit-3

SR. NO.	CONDITIONS	*STATUS*
A.	**SPECIFIC CONDITIONS**	
1	Segregation & treatment of effluent & incineration	**Complied** – The ETP with a capacity of 160 KLPD was installed with segregation of high TDS and low TDS streams. The two stage MEE with a capacity of 40 KLPD was also installed for treatment of High TDS stream. The salts generated for evaporator is being sent to SLF of M/s. BEIL. Low TDS stream is treated in the ETP before discharging into GIDC drain.
2	GPCB shall not permit any new discharges till CETP/FETP meets norms	This condition pertains to Ankleshwar, Panoli & Jhagadia GIDC only and not for Dahej GIDC. However, Company has installed ETP with primary, secondary & tertiary facilities. An additional bio-reactor of 200 KLPD is being constructed to augment capacity of existing ETP. Thus total capacity would enhance to 300-350 KLPD.
3	Gaseous emissions conforming to standards	Scrubbing system has been installed to control process emissions. Coal fired boiler of 8 TPD and duel incinerator with two chambers with capacity of 2 MTPD solid & 10 KLPD liquid are installed. Company have appointed third party NABL Accredited Testing Laboratory i.e. M/s. Aqua-Air Environmental Engineers Pvt. Ltd., Surat for Regular monitoring of various parameters. Work order for the same is attached as **Annexure – 1** & Monitoring has been done and Set of Results has been attached as **Annexure – 2**. Project Environment Monitoring Plan is attached as **Annexure – 3**. Online pH meter & Flow Meter have been installed, Company is in process of purchasing Online TOC meter & Copy of Purchase Order for Online detectors is attached as **Annexure – 4**.
4	Scrubbing of emissions and treatment of scrubbed solutions in MEE	Scrubbing system to control HCl & Cl_2 has been installed. GPCB analysis report for Incinerator Stack is attached as **Annexure – 5**.

5	Dispersal of DG emission through stack as per CPCB norms	DG set has been provided with acoustic enclosure. Company have appointed third party NABL Accredited Testing Laboratory i.e. M/s. Aqua-Air Environmental Engineers Pvt. Ltd., Surat for Regular monitoring of DG set stack. Work order for the same is attached as **Annexure – 1** & Monitoring has been done and Set of Results has been attached as **Annexure – 2**. Project Environment Monitoring Plan is attached as **Annexure – 3**.
6	Implementation of standards notified for pesticide unit	Agreed to comply and assured to abide by this condition.
7	Monitoring of VOC in ambient air and submission of data	Company have appointed third party NABL Accredited Testing Laboratory i.e. M/s. Aqua-Air Environmental Engineers Pvt. Ltd., Surat for Regular monitoring of VOC in ambient air. Work order for the same is attached as **Annexure – 1** & Monitoring has been done and Set of Results has been attached as **Annexure – 2**. Project Environment Monitoring Plan is attached as **Annexure – 3**.
8	Secondary Condenser for recovery of solvents	**Complied** – Chilled brine solution is provided for secondary condenser attach to recovery of solvents.
9	Authorization under HWMH rules and its compliance	**Complied** – An authorization under HWMH rules is obtained from GPCB. Solid and hazardous wastes are stored in earmarked covered area before its disposal to TSDF. The details of disposed quantity are submitted.
10	Fugitive emissions	Company have appointed third party NABL Accredited Testing Laboratory i.e. M/s. Aqua-Air Environmental Engineers Pvt. Ltd., Surat for Regular monitoring of Fugitive Emissions. Work order for the same is attached as **Annexure – 1** & Monitoring has been done and Set of Results has been attached as **Annexure – 2**. Action Plan for Write up on Control of Fugitive emissions is attached as **Annexure – 6**.
11	Storage tanks as per conditions	**Complied** – The storage tanks for solvents have been installed as per provisions of permissions granted by C.E.E.
12	Installation of HC detectors and LDAR system	Quotation for HC detectors and LDAR system has been received and Company is in process of purchasing the same. Copy of Purchase Order is attached as **Annexure – 4**.
13	Garland drains to avoid mixing of accidental spillages	**Complied** – Raw materials are stored in warehouses which are transferred to processing unit on day-to-day basis whereas solvents are stored in tanks which are also transferred in the barrels as per the requirement. Each unit

		is provided with storm water channel.
14	Adequate measures to control of Odour nuisance	Agreed to comply and assured to abide by this condition.
15	Allocation of adequate funds	**Complied** - Company assured to abide by this condition. Rs 5.22 Cr. Have been incurred as capital lost for implementation of EMS.
16	Occupational health surveillance	**Complied** – All the workers are provided medical facilities as per the Factories Act.
17	Adequate arrangements for protection of fire hazards	Adequate measures have been taken for protection of possible fire hazards. Alarm system in the warehouses has been installed and Quotation for smoke detectors has been received and Company is in process of purchasing the same. Copy of Purchase Order is attached as **Annexure – 4**.
18	Training to employees	Induction Training to all employees is imparted on safety and health aspects. Induction training and medical examinations shall be done on Monthly basis. Pre-employment training shall be imparted to new employees also.
19	Usage of PPEs	**Complied** – The usage of PPEs is ensured by the management.
20	Recommendations of CREP	Compliance of CREP is attached as **Annexure – 7**.
21	Adoption of waste minimization and cleaner techniques	Agreed to comply and assured to abide by this condition. Write up on Waste minimization and Cleaner techniques are attached as **Annexure – 8**. Many by-products are recovered in existing scenario as a part of cleaner production and same will be followed in proposed scenario.
22	Rain water harvesting	Our Company is a pesticide industry there are many hazardous chemicals being stored and reacted here, so rain water harvesting within the premises is not suitable, but we have contacted Sarpanch of near by villages and we are in process to develop the rain water harvesting ponds in nearby villages as per their requirement and continuously develop the same for the cause of environment.
23	Infrastructure facilities to construction labor	**Complied**

GENERAL CONDITIONS		
1	Adherence to the stipulations of GPCB	We give assurance that we shall strictly follow all the conditions made by the Gujarat State Pollution Control Board and the State Government. Company have appointed third party NABL Accredited Testing Laboratory i.e. M/s. Aqua-Air Environmental Engineers Pvt. Ltd., Surat for Regular monitoring of stacks, ambient air quality, fugitive emissions, VOC in ambient air and hazardous waste. Work order for the same is attached as **Annexure – 1** & Monitoring has been done and Set of Results has been attached as **Annexure – 2**. Project Environment Monitoring Plan is attached as **Annexure – 3**.
2	No expansion or modification without prior permission	Company has assured that no expansion or modification will be carried out without prior approval of the competent authorities.
3	Compliance of MSIHC & authorization under HWMH rules.	Copy of Form – 37 is attached as **Annexure – 9** for compliance of MSIHC rules and Copy of CC&A is attached as **Annexure – 10** for compliance of HWMH rules.
4	Ambient air quality monitoring	Company have appointed third party NABL Accredited Testing Laboratory i.e. M/s. Aqua-Air Environmental Engineers Pvt. Ltd., Surat for Regular monitoring of ambient air quality. Work order for the same is attached as **Annexure – 1** & Monitoring has been done and Set of Results has been attached as **Annexure – 2**. Project Environment Monitoring Plan is attached as **Annexure – 3**.
5	Stacks of appropriate height and treatment of scrubbed water in ETP	**Complied** – Stacks of appropriate height as per CPCB are provided to control process emissions. Scrubbed water is treated in ETP.
6	Adoption of Waste Minimization measures	Provided magnetic flow meter for charging with metering pumps to minimize waste. Went gases re use for other process and made valuable products.

		Provided closed system to minimize spillage. Provided closed feed system into batch reactors. Write up on Waste minimization and Cleaner techniques are attached as **Annexure – 8**. Many by-products are recovered in existing scenario as a part of cleaner production and same will be followed in proposed scenario.
7	Authorization under HWMH rules and its compliance	**Complied** – An authorization under HWMH rules is obtained from GPCB. Solid and hazardous wastes are stored in earmarked covered area before its disposal to TSDF.
8	Noise levels	Company have appointed third party NABL Accredited Testing Laboratory i.e. M/s. Aqua-Air Environmental Engineers Pvt. Ltd., Surat for Regular monitoring of Noise levels. Work order for the same is attached as **Annexure – 1** & Monitoring has been done and Set of Results has been attached as **Annexure – 2**. Project Environment Monitoring Plan is attached as **Annexure – 3**.
9	Environment management cell	**Complied** – Environmental management cell has been constituted. Indeed administration is made responsible for safety aspects & Head (Tech) is made responsible for ETP and environmental issues.
10	33 % area under green belt	Total plot area in (m^2) – 52432.22 & Green belt area in (m^2) – 17302.63 i.e. 33% of total plot area. Photographs of the same are attached as **Annexure – 11**. Company shall be committed to develop greenbelt outside the plant premises also (i.e. roadside and nearby villages).
11	Six monthly compliance status report	Six monthly compliance status report is attached as **Annexure – 12**. Now onwards it shall be submitted regularly
12	Advertisement within seven days	**Complied** - Company has submitted copies of advertisement.
13	Details of financial closure	**Complied**
14	Ministry may revoke clearance	Company has agreed to the clause imposed by Ministry.

15	Ministry may stipulate additional conditions	Company has assured to implement additional condition if imposed by the Ministry.
16	Appeal to NEAA within 30 days	Company has assured to abide by the condition.
17	Enforcement of conditions inter-alia under Water Act 1974, Air Act 1981, EPA 1986, PLI 1991 & HWMH rules 2003	Company has obtained policy under Public Liability Insurance Act also sincere efforts are being made to implement the conditions stipulated under Air & Water Acts & authorization under HWMH rules.