FORM-I

FOR

PROPOSED EXPANSION OF PESTICIDES, PESTICIDE INTERMEDIATES & CHEMICALS UNIT IN EXISTING UNIT

OF

M/s. HEMANI INDUSTRIES LIMITED (UNIT-III)

PLOT NO. CH – 5, GIDC ESTATE, DAHEJ, TAL. VAGRA,

DIST: BHARUCH – 392130, GUJARAT

APPENDIX I

(See paragraph - 6)

FORM 1

(I) Basic Information

Sr. No.	Item	Details
1.	Name of the Project/s	Hemani Industries Limited (Unit-III)
2.	S. No. in the Schedule	A-5(b)
3.	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number of wells to be drilled	Proposed Additional: 1242 MT/Month After Expansion: 1862 MT/Month Total plot area: 52,432.22 m^2 No bore well to be drilled within the premises.
4.	New/Expansion/Modernization	Expansion
5.	Existing capacity/area etc.	Capacity: 620 MT/Month Total Plot Area: 52,432.22 m^2
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	GIDC Estate, Dahej, Tal: Vagra, Dist: Bharuch, Gujarat
	Plot/Survey/Khasra No.	Plot. No. CH-5
	Village	Dahej
	Tehsil	Vagra
	District	Bharuch
	State	Gujarat
10.	Nearest railway station/airport along with distance in kms.	Nearest Railway Station : Bharuch: 45 km Nearest Airport: Baroda: 90 km
11.	Nearest Town, city, District Headquarters along with distance in kms.	Nearest town: Bharuch : 45 km, Nearest District Head quarter: Bharuch : 45 km
12.	Village Panchayats, zilla parishad, Municipal corporation, Local body (Complete postal addresses with telephone nos. to be given)	Plot. No. CH-5, GIDC Estate, Dahej, Tal: Vagra, Di: Bharuch, Gujarat. 706-710, Reena Complex, Vidyavihar (W), Mumbai- 400 086 Ph No.: (022) 25157491, 25156988
13.	Name of the applicant	NITIN K. DAMA
14.	Registered address	Plot. No. CH-5, GIDC Estate, Dahej, Tal: Vagra, Dist: Bharuch, Gujarat.
15.	Address for correspondence:	M/s. Hemani Industries Limited (Unit-III) 706-710, Reena Complex, Vidyavihar (W), Mumbai- 400 086

		Ph No.: (022) 25157491, 25156988
	Name	NITIN K. DAMA
	Designation (Owner/Partner/CEO)	DIRECTOR
	Address	M/s. Hemani Industries Limited (Unit-III) 706-710, Reena Complex, Vidyavihar (W), Mumbai- 400 086 Ph No.: (022) 25157491, 25156988
	Pin Code	400 086
	E-Mail	*hocpl2003@yahoo.com* *aquaair_surat@hotmail.com*
	Telephone No.	(022) 25157491, 25156988 (M): 09377787999
	Fax No.	(022) 25134483
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. (a) The Forest (Conservation) Act, 1980? (b) The Wildlife (Protection) Act, 1972? (c) The C.R.Z Notification, 1991?	Not applicable, as the project is located in 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? (a) Name of the Court (b) Case No. (c) Orders/directions of the Court, if any and its relevance with the proposed project.	No

- *Capacity corresponding to sectoral activity (such as production capacity for manufacturing, mining lease area and production capacity for mineral production, area for mineral exploration, length for linear transport infrastructure, generation capacity for power generation etc.,)*

(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 there of with approximate quantities frates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase intensity of land use (with respect to local land use plan)	No	Proposed project site is within the Dahej Industrial Estate (GIDC, Gujarat).
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?	Yes	The project site is located on level ground, which does not require any major land filling for area grading work.
1.4	Pre-construction investigations e.g. bore Houses, soil testing?	Yes	For detail Please refer **Annexure – II**
1.5	Construction works?	Yes	For detail Please refer **Annexure – III**
1.6	Demolition works?	No	
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations	Yes	For detail Please refer **Annexure – III**
1.9	Underground works mining or tunneling?	No	
1.10	Reclamation works?	No	
1.11	Dredging?	No	
1.12	Off shore structures?	No	
1.13	Production and manufacturing processes?	Yes	For detail Please refer **Annexure -IV**
1.14	Facilities for storage of goods or materials?	Yes	Areas for storage tank farm, raw materials and finished products will be developed for the proposed expansion project
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	For detail please refer **Annexure – V & VI.**

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 transport infrastructure including new or altered routes and stations, ports, 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, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No	
1.22	Stream crossings?	No	
1.23	Abstraction or transfers of water form ground or surface waters?	No	
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	Transportation of personnel or raw material and products will be primarily by road only.
1.26	Long-term dismantling or decommissioning or restoration works?	No	
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	
1.28	Influx of people to an area either temporarily or permanently?	No	
1.29	Introduction of alien species?	No	
1.30	Loss of native species or 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 frates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	No	
2.2	Water (expected source & competing users) unit: KLD	Yes	(Existing water requirement = 1300 KL/day + Additional water requirement = 800 KL/day) = Total water requirement = 2100 KL/day shall be met through GIDC water supply. GIDC water supply authority is ready to supply additional required water to M/s. Hemani Intermediates Private Limited. For detail please refer **Annexure – VII**
2.3	Minerals (MT)	No	
2.4	Construction material – stone, aggregates, and / soil (expected source – MT)	Yes	Construction materials, like steel, cement, crushed stones, sand, rubble, etc. required for the project shall be procured from the local market.
2.5	Forests and timber (source – MT)	No	
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)	Yes	For detail please refer **Annexure – VII**
2.7	Any other natural resources (use appropriate standard units)	No	

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

Sr. No.	Information/Checklist confirmation	Yes/ No	Details there of (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	For detail please refer **Annexure –VIII.**
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	
3.3	Affect the welfare of people e.g. by changing living conditions?	No	

3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.	No	
3.5	Any other causes	No	

3- **Production of solid wastes during construction or operation or decommissioning (MT/month)**

Sr. No.	Information/Checklist confirmation	Yes/ No	Details there of (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 – VI**
4.4	Other industrial process wastes	Yes	Please refer **Annexure – VI**
4.5	Surplus product	No	
4.6	Sewage sludge or other sludge from effluent treatment	Yes	Please refer **Annexure – VI**
4.7	Construction or demolition wastes	No	
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	Yes	Please refer **Annexure – VI**

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

Sr. No.	Information/Checklist confirmation	Yes/ No	Details there of (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	For details Please refer **Annexure – IX**
5.2	Emissions from production processes	Yes	For details Please refer **Annexure – IX**
5.3	Emissions from materials handling storage or transport	Yes	For details Please refer **Annexure – IX**
5.4	Emissions from construction activities including plant and equipment	No	
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 information data with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	Noise level at different locations in the plant is enclosed as **Annexure – X**
6.2	From industrial or similar processes	Yes	Please refer **Annexure – X**
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	Yes	Please refer **Annexure – X**
6.7	From any other sources	No	

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 there of (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	Yes	For details please refer **Annexure – VIII & Annexure – XI**
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	Yes	The final treated effluent will be discharged through GIDC sewer line to deep sea.
7.3	By deposition of pollutants emitted to air into the and or into water	No	
7.4	From any other sources	No	
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No	

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

Sr. No.	Information/Checklist confirmation	Yes/ No	Details there of (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	For detail please refer **Annexure – XI**
8.2	From any other causes	No	
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 there of (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting. Utilities, ancillary development or development stimulated by the project which could have impact on the environment e.g. • Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) • housing development • extractive industry • supply industry • other	Yes	For detail please refer **Annexure – XII**
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	
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	No	

3- **Environmental Sensitivity**

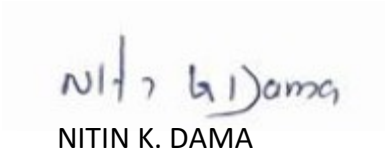
Sr. No.	Areas	Name/ Identity	Aerial distance (within 15km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	-	Proposed project site is within the existing premises in Dahej Industrial Estate (GIDC, Gujarat).
2	Areas which important for are or sensitive Ecol logical reasons – Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Narmada River	Narmada River: 3.0 km (approx.) South East from Project Site
3	Area used by protected, important or sensitive Species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	-	-

4	Inland, coastal, marine or underground waters	-	No inland, costal or marine within 15 km from the proposed project
5	State, National boundaries	-	N.A.
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	-	Public transportation
7	Defense installations	-	N.A.
8	Densely populated or built-up area	Dahej	Dahej is around 1.5 km (approx.) North East from the project site.
9	Area occupied by sensitive man-made land uses Hospitals, schools, places of worship, community facilities)	No	
10	Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)	No	
11	Areas already subjected to pollution environmental damage. (those where existing legal environmental standards are	-	NA
12	Areas 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)	-	NA

IV). Proposed Terms of Reference for EIA studies: NA

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: 01.04.2019
Place: Dahej



NITIN K. DAMA
(DIRECTOR)
M/s. HEMANI INDUSTRIES LIMITED (UNIT-III)
PLOT NO. CH – 5, GIDC ESTATE, DAHEJ, TAL. VAGRA,
DIST: BHARUCH – 392130, GUJARAT Block No.

NOTE:

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

2. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden thereon (at the stage of EC).

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

LIST OF ANNEXURES

SR. NO.	NAME OF ANNEXURE
I.	List of Products with their Production Capacity
II.	Layout Map of the Plant
III.	Brief Manufacturing Process Description
IV.	Details of Water Consumption Waste water Generation and Treatment
V.	Details of Hazardous /Solid Waste Generation, Handling and Disposal
VI.	Details of Stacks and Vents
VII.	Details of Hazardous Chemicals Storage & Handling
VIII.	Fuel, Energy Requirement & Details Of Captive Power Plant
IX.	Socio-economic Impacts
X.	Proposed Terms of Reference for EIA studies
XI.	Membership Certificate for Common Solid Waste Disposal Facility

ANNEXURE-I

LIST OF PRODUCTS ALONG WITH PRODUCTION CAPACITY

SR. NO.	NAME	TYPE OF PRODUCT	EXISTING CAPACITY (MT/MONTH)	PROPOSED ADDITIONAL CAPACITY (MT/MONTH)	TOTAL CAPACITY AFTER EXPANSION (MT/MONTH)
1.	m-Phenoxy Benzaldehyde (MPBAD)	Organic Intermediate	300	00	300
2.	m-Bromo Nitrobenzene	Organic Intermediate	80	20	100
3.	m-Bromo Anisole	Organic Intermediate	50	50	100
4.	Lambda-Cyhalothrin	Pesticide	40 (Lambda-Cyhalothrin or Metamitron Tech.)	10 (Lambda-Cyhalothrin)	50
	or Deltamethrin Tech.		00	12	12
5.	DV-Acid Chloride/ CMAC	Pesticide Intermediate	00	200	200
6.	Cypermethrin Tech.	Pesticide	00	150	150
7.	Alphamethrin Tech./ Permethrin Tech.	Pesticide	00	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[1]	Inorganic Intermediate	0	100	100
11.	Acid chlorides like valeoryl chloride, Phenyl acetyl chloride[2]	Inorganic Intermediate	0	100	100
		TOTAL	**0**	**650**	**650**
		GRAND TOTAL	**470**	**1242**	**1862**

SR. NO.	NAME	TYPE OF PRODUCT	EXISTING CAPACITY (MT/MONTH)	PROPOSED ADDITIONAL CAPACITY (MT/MONTH)	TOTAL CAPACITY AFTER EXPANSION (MT/MONTH)
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 25%	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

Note:-

1. Sulphur chloride is included as intermediate product. It is salable in rubber and agrochemical industries.

2. Acid chlorides are included due to production of Thionyl Chloride. Acid Chlorides may be produced.

LIST OF RAW MATERIALS (EXISTING)

1.	**Meta Phenoxy Benzaldehyde (Organic Intermediate)**	
	C.S.Lye	34.8
	BZH	124.5
	Bromine	101.25
	Chlorine	39.75
	EDC	577.5
	AlCl3	180
	HCl	131.25
	Formic Acid	3.45
	Na2SO4	1.125
	ASR	1.5
	MEG	1.29
	PTSA	0.6
	Phenol	110.25
	KOH	67.5
	Toluene	164.25
	H2SO4	9.75
2.	**Meta Bromo Nitrobenzene (Organic Intermediate)**	
	H2SO4	84
	Oleum	96
	Nitro Benzene	59.04
	Bromine	31.2
	Catalyst	0.36
	Toluene	206.4
3.	**Meta Bromo Anisole (Organic Intermediate)**	
	3 – Bromo Nitrobenzene	43.75
	KOH	34.51
	Tetra butyl Ammonium Bromide	11.06
	Methanol	9.1
	Toluene	1.61
	30 % HCl	14.7
4.	**Lambda Cyhalothrin (Pesticide)**	
	C. S. Lye	12.76
	Lambda Cyhalothric Acid	14.56
	Thionyl Chloride (TC)	7.76
	D M Formamide (DMF)	0.06
	Hexane	135.84
	NaCN	4
	TEBA (Catalyst)	0.28
	Soda Ash	0.28
	MPB	11.14
	Acid Chloride	15.28
	Hypo Soln.	21.42

	NaOH	21.42
	IPA	73.5
	Di – isopropyl amine	2.66
	HCl	3.8
	Acidic Aqueous	56.46

LIST OF RAW MATERIALS (PROPOSED)

SR. NO.	RAW MATERIALS	QUANTITY (MT/MONTH)
1.	**Meta Phenoxy Benzaldehyde (Organic Intermediate)**	
	C.S.Lye	69.6
	BZH	249
	Bromine	202.5
	Chlorine	79.5
	EDC	1155
	$AlCl_3$	360
	HCl	262.5
	Formic Acid	6.9
	Na_2SO_4	2.25
	ASR	3
	MEG	2.58
	PTSA	1.2
	Phenol	220.5
	KOH	135
	Toluene	328.5
	H_2SO_4	19.5
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 Cyhalathrin (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

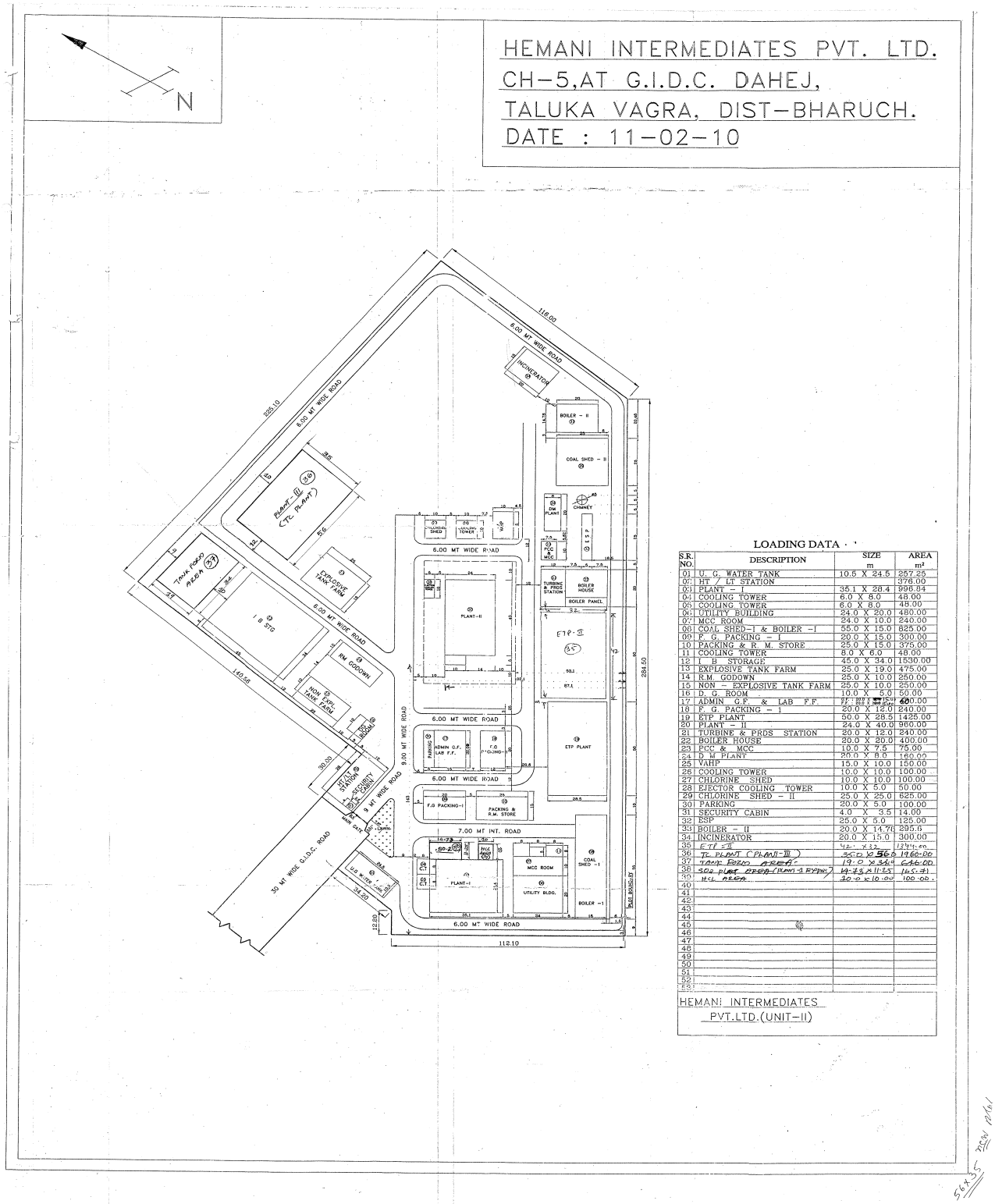
SR. NO.	RAW MATERIALS	QUANTITY (MT/MONTH)
	Acid Chloride	30.56
	Hypo Soln.	42.84
	NaOH	42.84
	IPA	147
	Di – isopropyl amine	5.32
	HCl	7.6
	Acidic Aqueous	112.92
4. B	**Deltamethrin**	
	RR CMA	12.684
	CS Flakes	7.848
	CS LYE	41.208
	EP HCl	1.284
	HCl	34.668
	MDC	43.08
	AlCl3	12.24
	Br2	67.608
	Benzene	30.18
	FeCl3	0.66
	Sodium Thio Sulphate	0.924
	MeOH	10.872
	SBC	0.792
	H2SO4	10.644
	Toluene	12.876
	DMF	0.228
	TC	4.944
	MPBD	5.856
	NaCN	2.616
	Soda Ash	0.348
	Hypo	9.492
	TEA	6.336
	IPA	11.988
5.	**DV Acid Chloride**	
	Forcut	76
	Acrylonitrile	100
	CTC	310
	Acetonitrile	4.4
	Catalyst	2
	DEA HCl	2.2
	DMF	6
	TC	334.6
	C. Lye	1406.1
	n-Hexane	1828
	IB	118.8
	TEA	166.8
	1% Soda Soln.	102

SR. NO.	RAW MATERIALS	QUANTITY (MT/MONTH)
	Catalyst (BF3)	2
	Caustic (100%)	194.5
	H_2SO_4	239.8
6.	**Cypermethrin**	
	NaCN	21
	Catalyst	1.5
	Soda Ash	1.5
	CMAC	87.6
	MPBD	72
	n-Hexane	29.7
7. A	**Alphamethrin**	
	Cypermethrin	125
	Tri Ethylamine	30
	n-Hexane	60.9
7. B	**Permethrin**	
	DV Acid Chloride (CMAC)	15.5
	M P B A L Meta Phenoxy Benzyl Alcohol	13.0
7. C	**Acephate**	
	DMPAT	57.5
	MDC	18.7
	DMS	7.5
	H2SO4 98%	1.25
	Acetic Anhydride	38.7
	20% Ammonium Hydroxide	32.25
	Ethyl Acetate	15
	By-Product	
	44.92% Ammonium Acetate	89.7
	Organic Waste for Incineration	3
8. A	**Metamitron**	
	MENDELONITRILE	137.7
	ETHANOL	142
	TOLUENE	204.4
	TC	95.1
	HCL	47.8
	Sodium Hypo chloride	1001.5
	CS LYE	15.1
	TEBA	5.7
	Sodium bisulfite	2.1
	AMMONIA	30
	HH 80%	152
	ETHYL ACETATE	91.8

SR. NO.	RAW MATERIALS	QUANTITY (MT/MONTH)
	SODIUM ACETATE	12
8. B	**Glyphosate**	
	Di ethanolamine	83.4
	Caustic Lye 47%	132.6
	HCl 30%	190.4
	Formaldehyde	23.5
	Carbon	500
	Sulphuric Acid	34.5
	PCl3	107.5
9.	**Thionyl Chloride**	
	Sulphur Dioxide	121.5
	Chlorine	201.2
	Sulphur mono chloride	127.4
10.	**Sulphur Mono Choride**	
	Sulphur	47.4
	Chlorine	52.6
11.	**Acid Choride**	
	Acid	55
	Thionyl chloride	70

ANNEXURE-II

LAYOUT MAP OF THE PLANT



LOADING DATA

S.R. NO.	DESCRIPTION	SIZE m	AREA m²
01	U. G. WATER TANK	10.5 X 24.5	257.25
02	HT / LT STATION		376.00
03	PLANT - I	35.1 X 28.4	996.84
04	COOLING TOWER	6.0 X 8.0	48.00
05	COOLING TOWER	6.0 X 8.0	48.00
06	UTILITY BUILDING	24.0 X 20.0	480.00
07	MCC ROOM	24.0 X 10.0	240.00
08	COAL SHED-I & BOILER -I	55.0 X 15.0	825.00
09	F. G. PACKING - I	20.0 X 15.0	300.00
10	PACKING & R. M. STORE	25.0 X 15.0	375.00
11	COOLING TOWER	8.0 X 6.0	48.00
12	L. B. STORAGE	45.0 X 34.0	1530.00
13	EXPLOSIVE TANK FARM	25.0 X 19.0	475.00
14	R.M. GODOWN	25.0 X 10.0	250.00
15	NON - EXPLOSIVE TANK FARM	25.0 X 10.0	250.00
16	D. G. ROOM	10.0 X 5.0	50.00
17	ADMIN G.F. & LAB F.F.	77.[illegible] X [illegible]	400.00
18	F. G. PACKING - 1	20.0 X 12.0	240.00
19	ETP PLANT	50.0 X 28.5	1425.00
20	PLANT - II	24.0 X 40.0	960.00
21	TURBINE & PRDS STATION	20.0 X 12.0	240.00
22	BOILER HOUSE	20.0 X 20.0	400.00
23	PCC & MCC	10.0 X 7.5	75.00
24	D M PLANT	20.0 X 8.0	160.00
25	VAHP	15.0 X 10.0	150.00
26	COOLING TOWER	10.0 X 10.0	100.00
27	CHLORINE SHED	10.0 X 10.0	100.00
28	EJECTOR COOLING TOWER	10.0 X 5.0	50.00
29	CHLORINE SHED - II	25.0 X 25.0	625.00
30	PARKING	20.0 X 5.0	100.00
31	SECURITY CABIN	4.0 X 3.5	14.00
32	ESP	25.0 X 5.0	125.00
33	BOILER - II	20.0 X 14.76	295.6
34	INCINERATOR	20.0 X 15.0	300.00
35	ETP-II	42.[illegible] X 32	1344.00
36	TC PLANT (PLANT-III)	56.0 X 35.0	1960.00
37	TANK FARM AREA	19.0 X 34.0	646.00
38	SO2 PLANT AREA (PLANT-I EXPN.)	14.75 X 11.55	165.71
39	HCL AREA	30.0 X 10.00	100.00
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
51			
52			
53			

HEMANI INTERMEDIATES
PVT.LTD.(UNIT-II)

ANNEXURE-III

BRIEF MANUFACTURING PROCESS DESCRIPTION

1. META PHENOXY BENZALDEHYDE (ORGANIC INTERMEDIATE) (EXISTING)

MANUFACTURING PROCESS

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:-

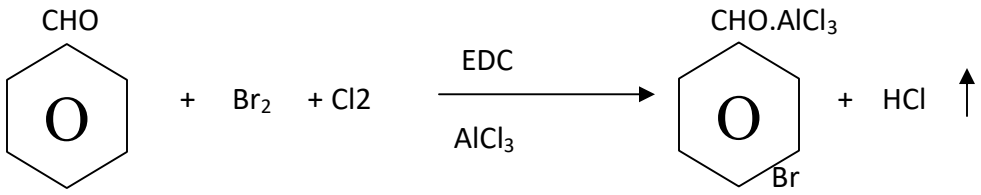
MPBA is hydrolyzed to MPB in presence of Water and Sulphuric acid. Crude MEG so obtained is purified by distillation and recycled to MBBA preparation. The crude MPB is sent for final Purification.

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

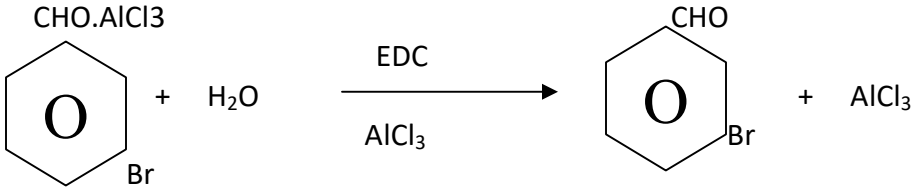
1. **BROMINATION :**



Benzaldehyde

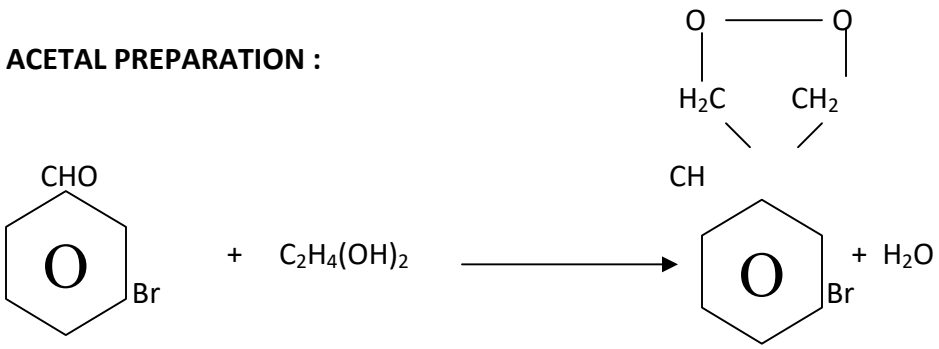
Metabromo-Benzaldehyde
Aluminium Chloride
Chloride

2. **DROWNING :**



Metabromo-Benzaldehyde (MBB)

3. **ACETAL PREPARATION :**

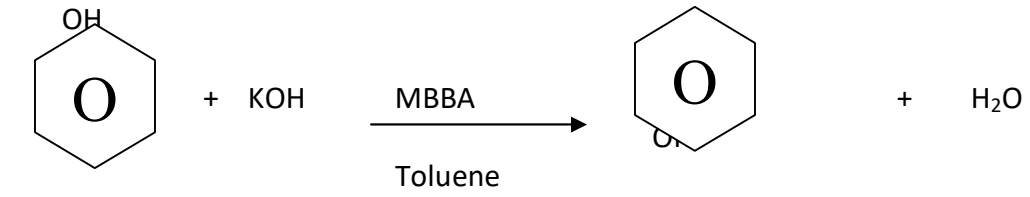


MBB

Monoethylene Glycol (MEG)

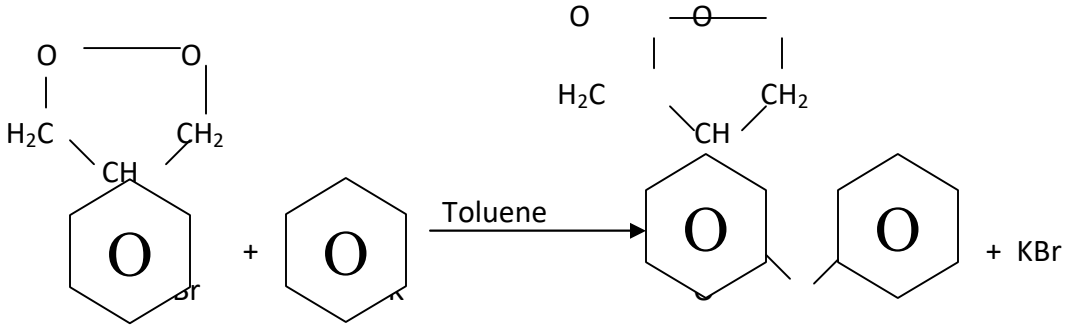
Metabromo-benzaldehyde acetal (MBBA)

4. K – PHENATE PREPARATION :



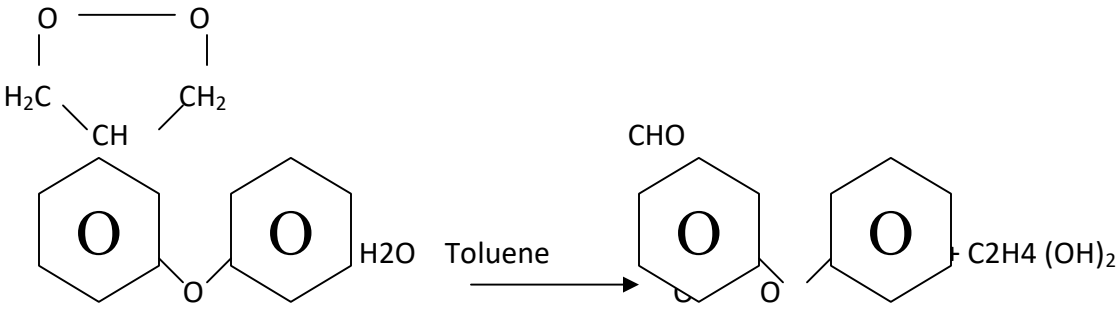
Phenol **Potassium Hydroxide** **Potassium Phenoxide**

5. CONDENSATION :



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

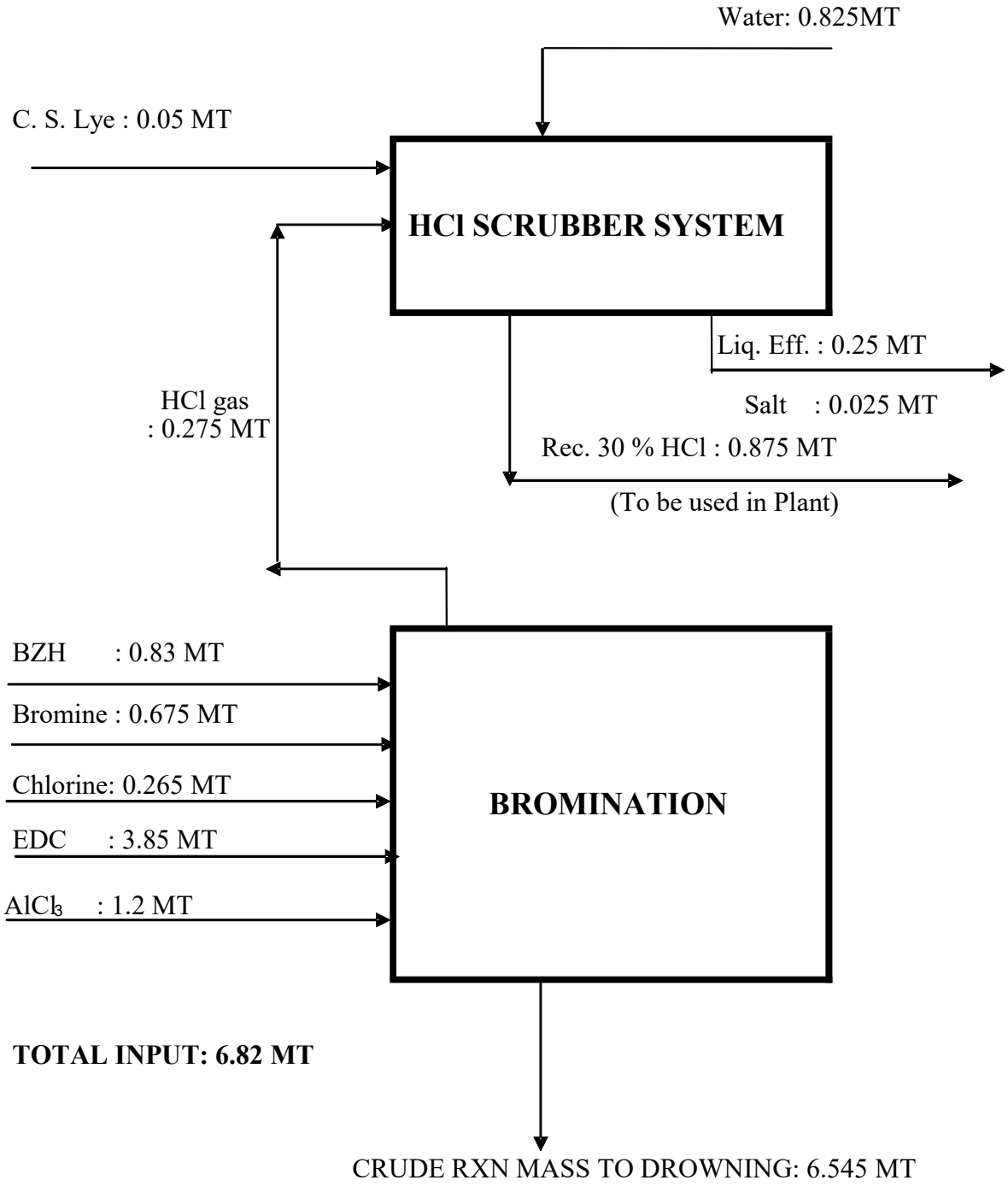
6. HYDROLYSIS :



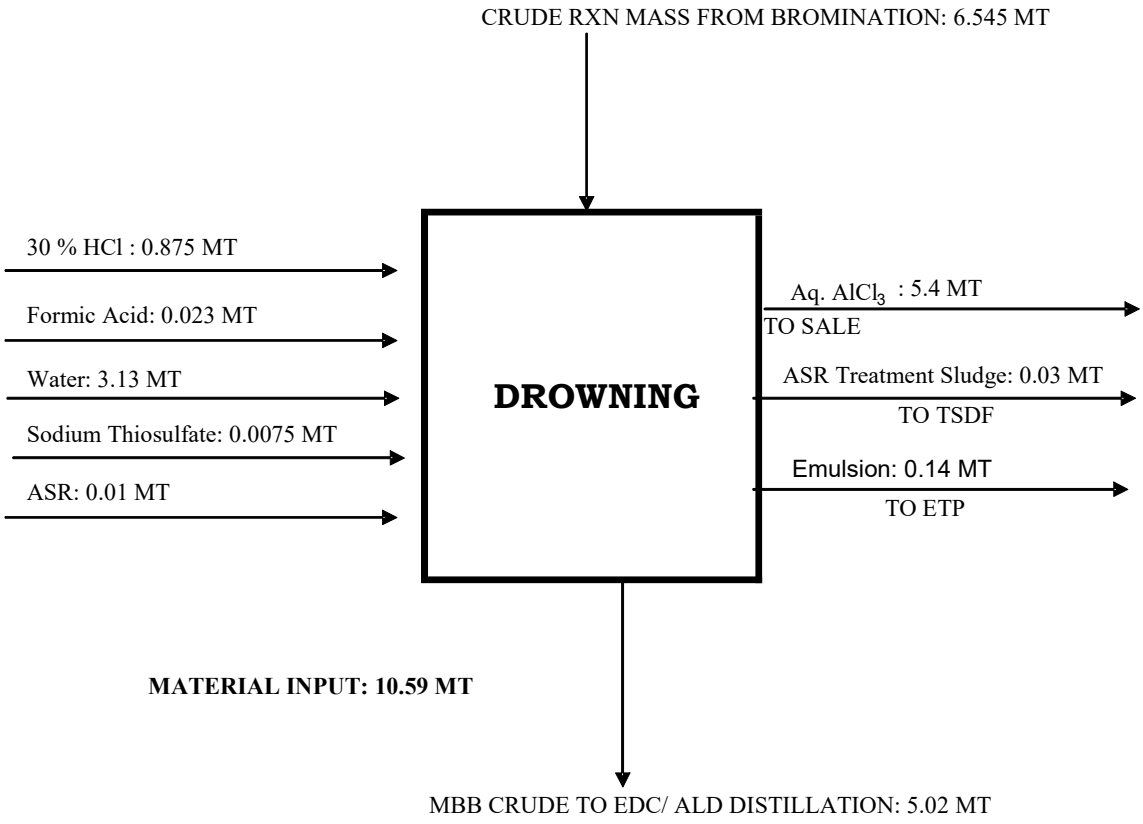
MBBA **(MPB)** **Metaphenoxybenzaldehyde**

MASS BALANCE

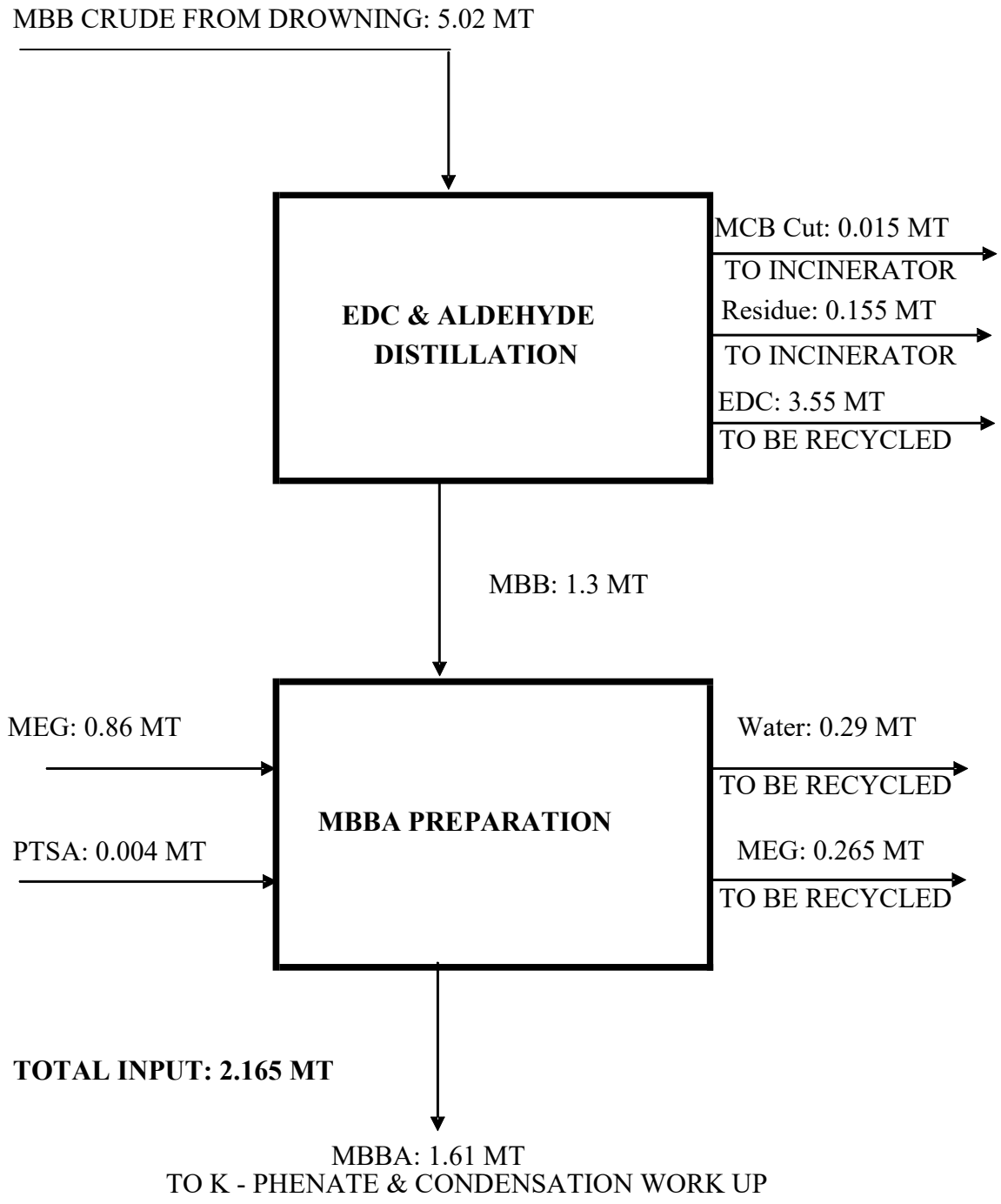
STAGE: 1



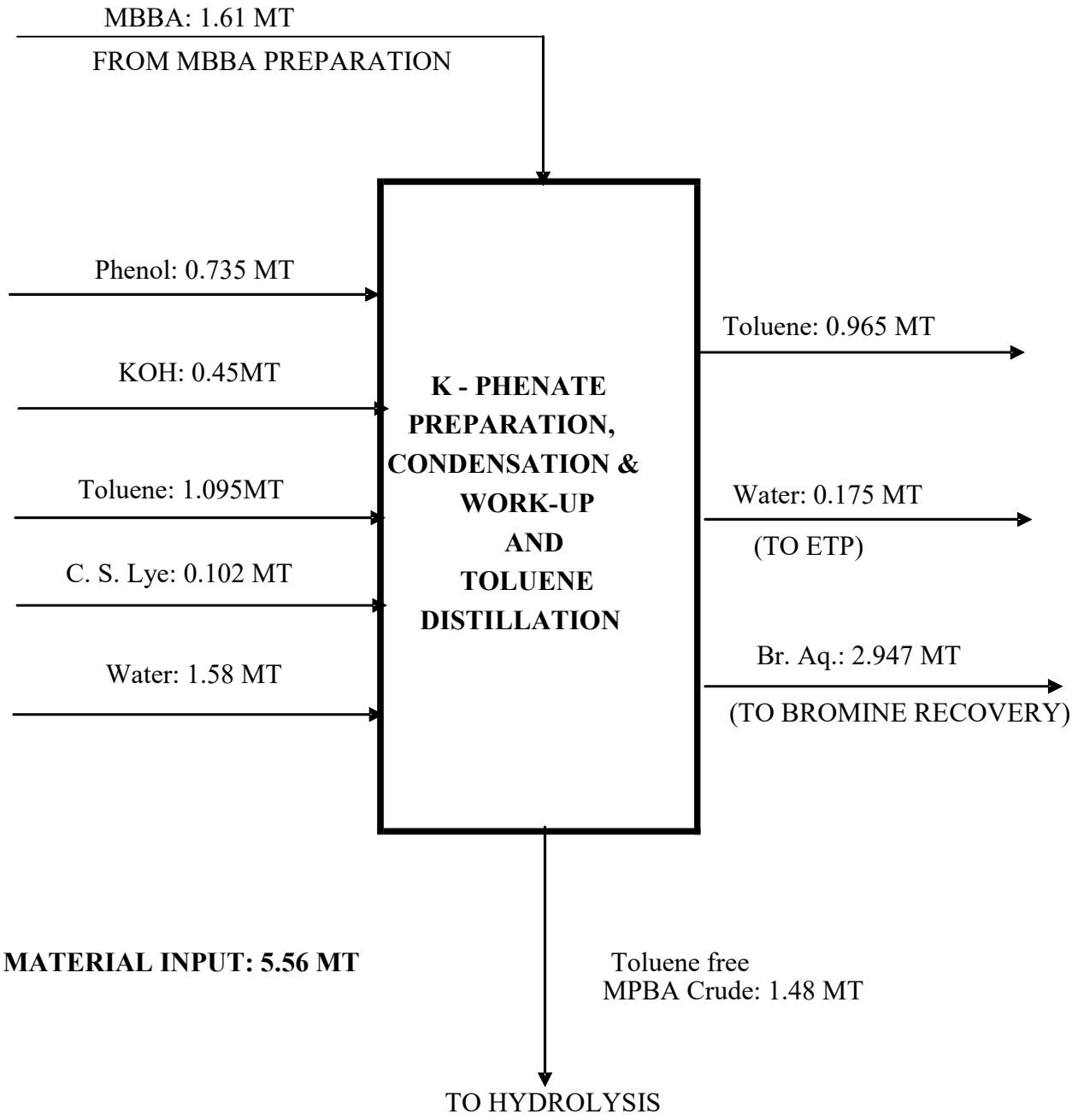
STAGE: 2


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

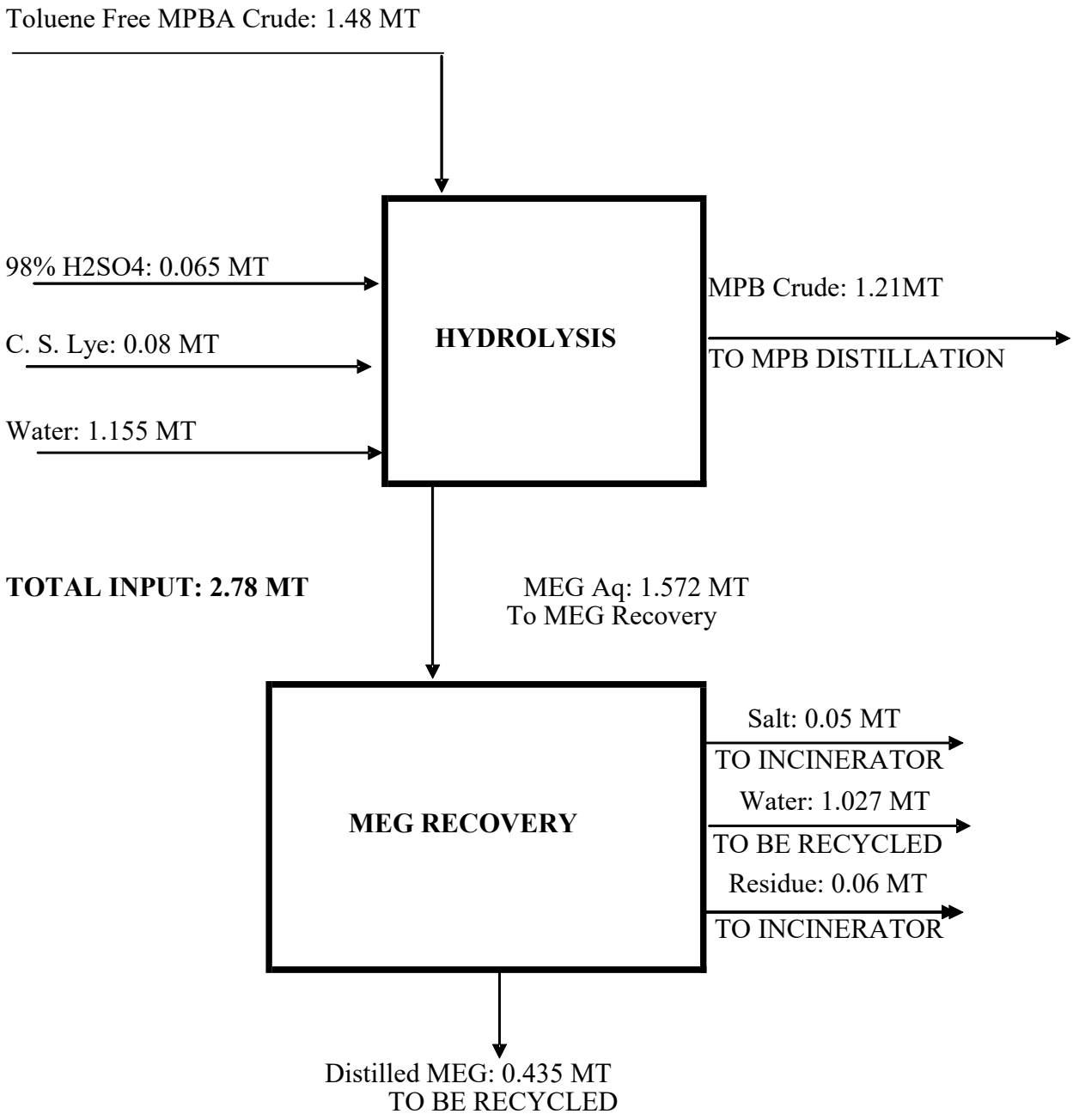
STAGE: 3


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

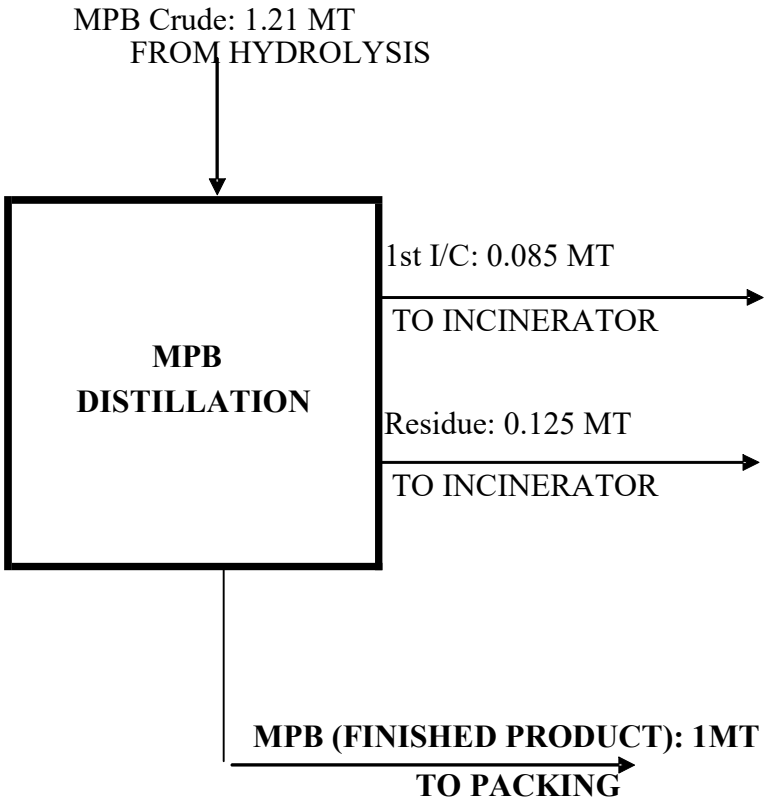
STAGE: 4


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 & WORK-UP AND TOLUENE DISTILLATION
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


Toluene Free MPBA Crude: 1.48 MT
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)

MANUFACTURING PROCESS

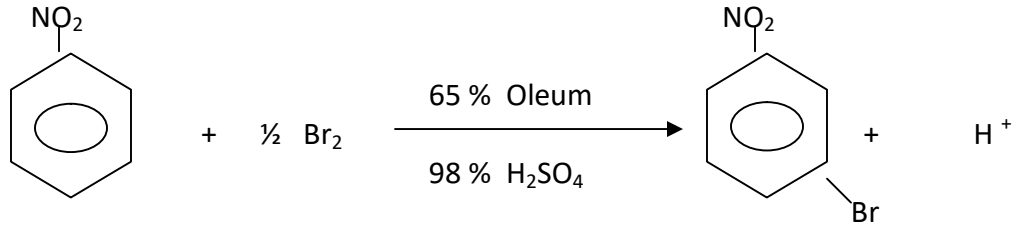
Nitrobenzene is mixed with 65% Oleum and 98% H_2SO_4 and chilled down, and then liquid bromine is added dropwise. After Bromine addition is over, the reaction mass is stirred for a few hours. Measured quantity of water is added and the mass is extracted with the suitable solvent.

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.

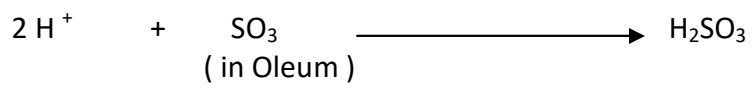
CHEMICAL REACTION

REACTION – 1 :-



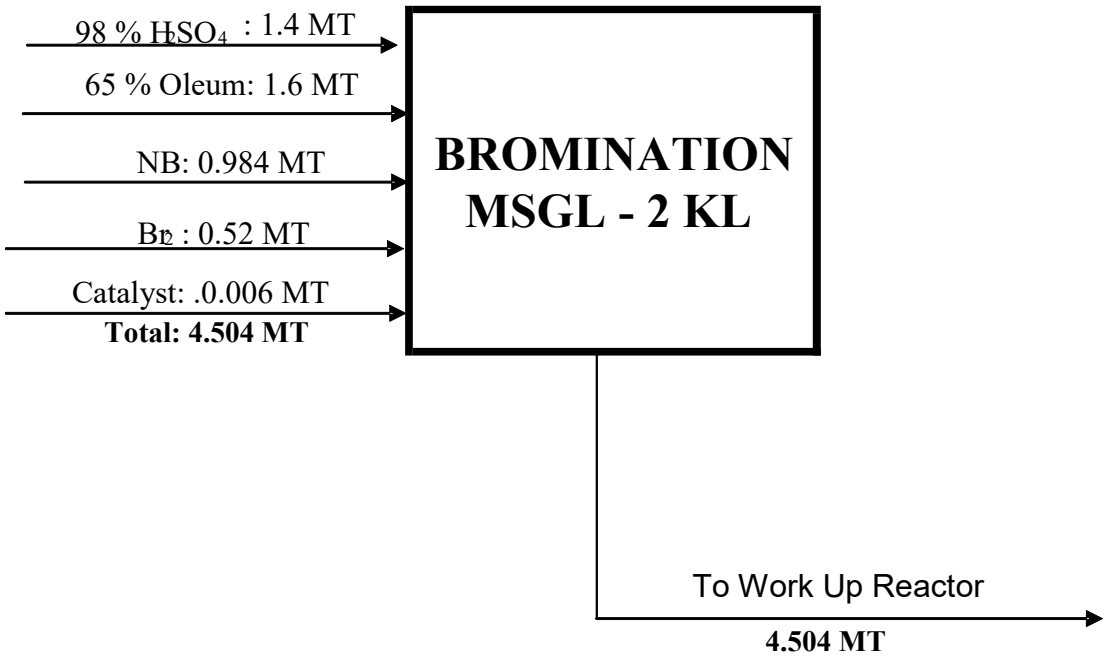
Nitrobenzene **3 – Bromonitrobenzene**

REACTION – 2 :-

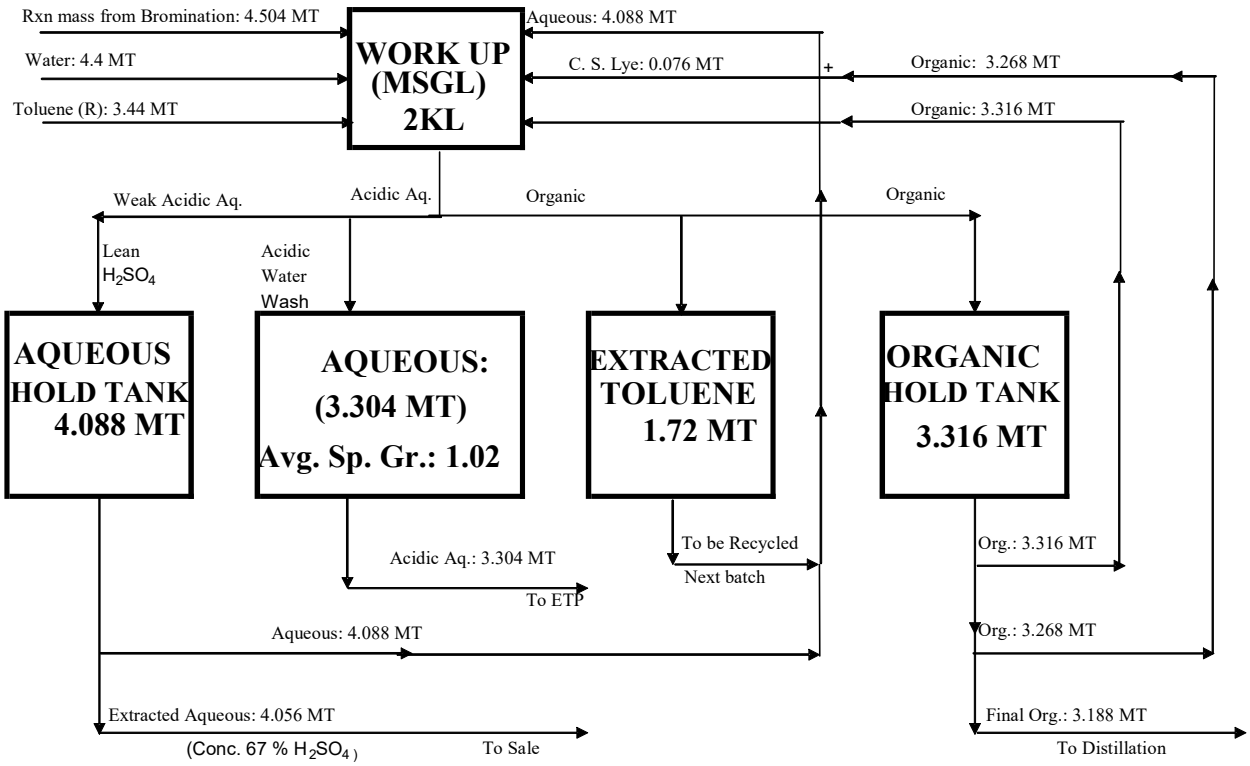


MASS BALANCE

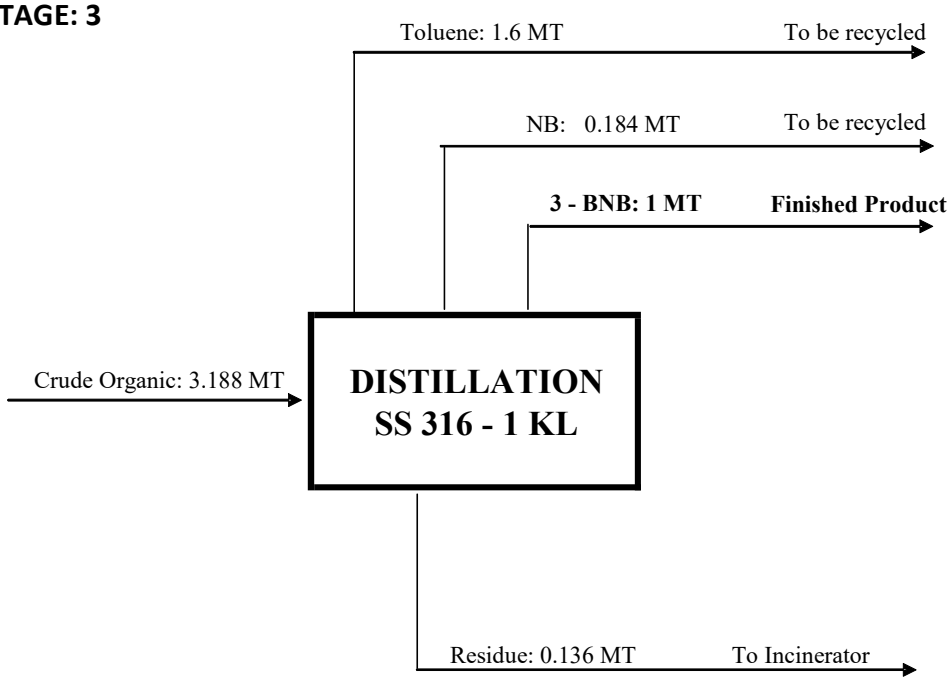
STAGE: 1



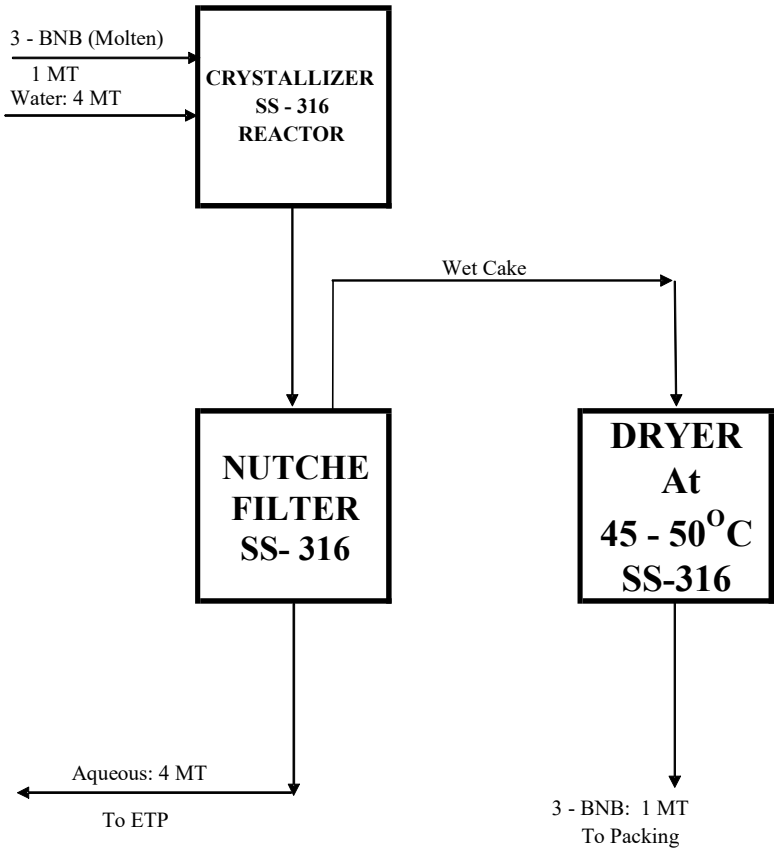
STAGE: 2



STAGE: 3



STAGE: 4

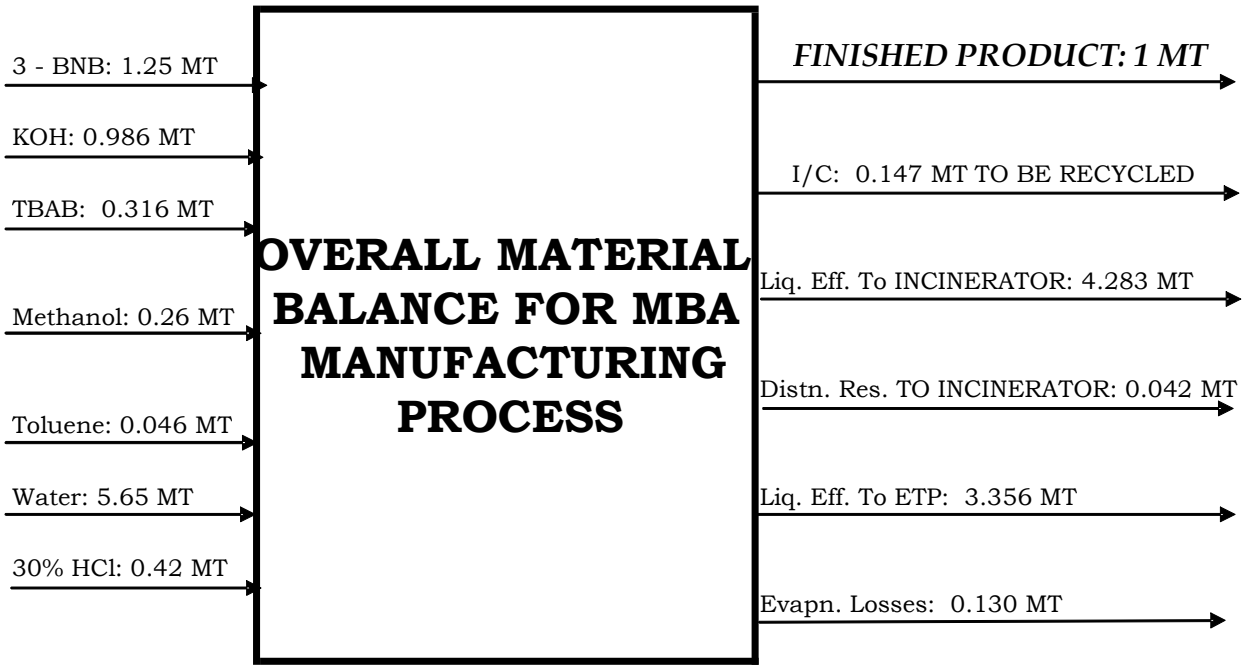


3. META BROMO ANISOLE (Organic Intermediate) (Existing)

MANUFACTURING PROCESS

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 %.

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. <u>ACID CHLORIDE PREPARATION</u> :

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. <u>CONDENSATION & WORK – UP :</u>

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. <u>EPIMERISATION & IPA RECOVERY :</u>

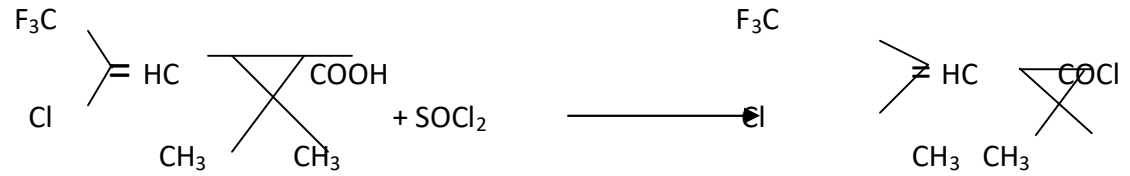
The crude λ – Cyhalothrin is washed with IPA and DIIPA in presence of solvent.Then again washed with acidic water .The phases are separated .The IPA & Hexane are recovered and the reaction mass sent for crystallization.

4. <u>CRYSTALLIZATION :</u>

The epimerized mass is extracted with the solvent and then dried. The dried mass which is **λ – CYHALOTHRIN** is packed.

CHEMICAL REACTION

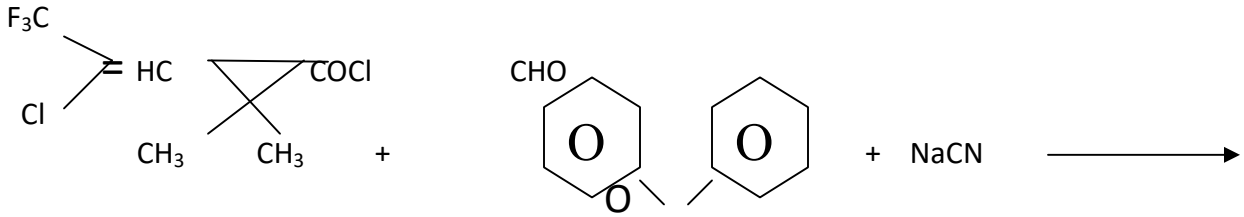
1. ***ACID CHLORIDE PREPARATION :***



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

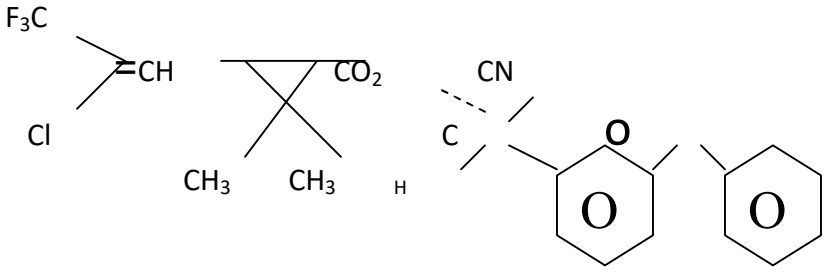
+ SO2 + HCL

2. ***CONDENSATION :***

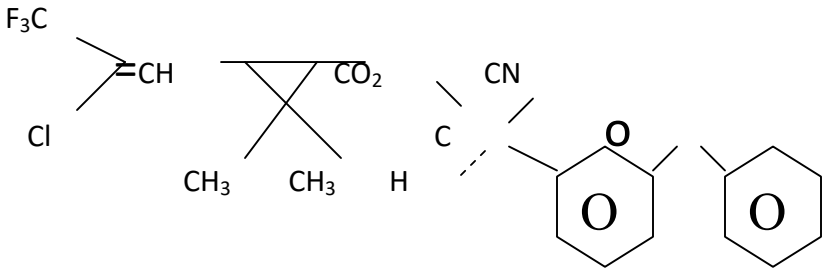


λ – Cyhalothric Chloride **MPB**

(S) (Z) – (IS) – Cis



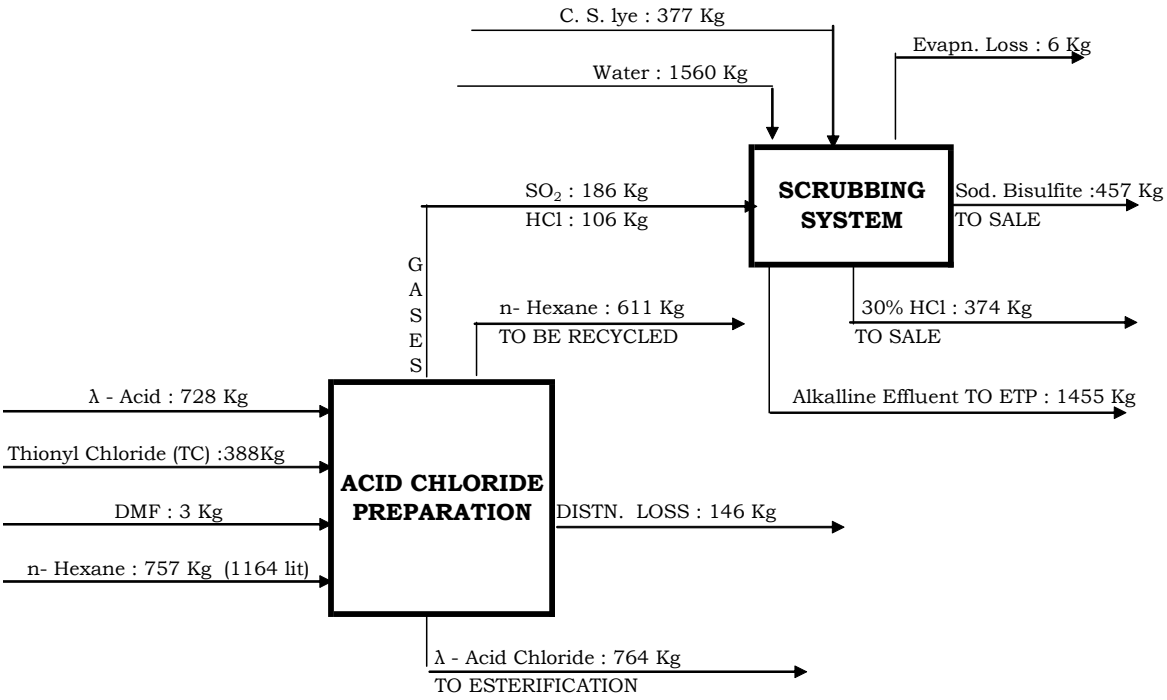
(R) (Z) – (IS) – Cis



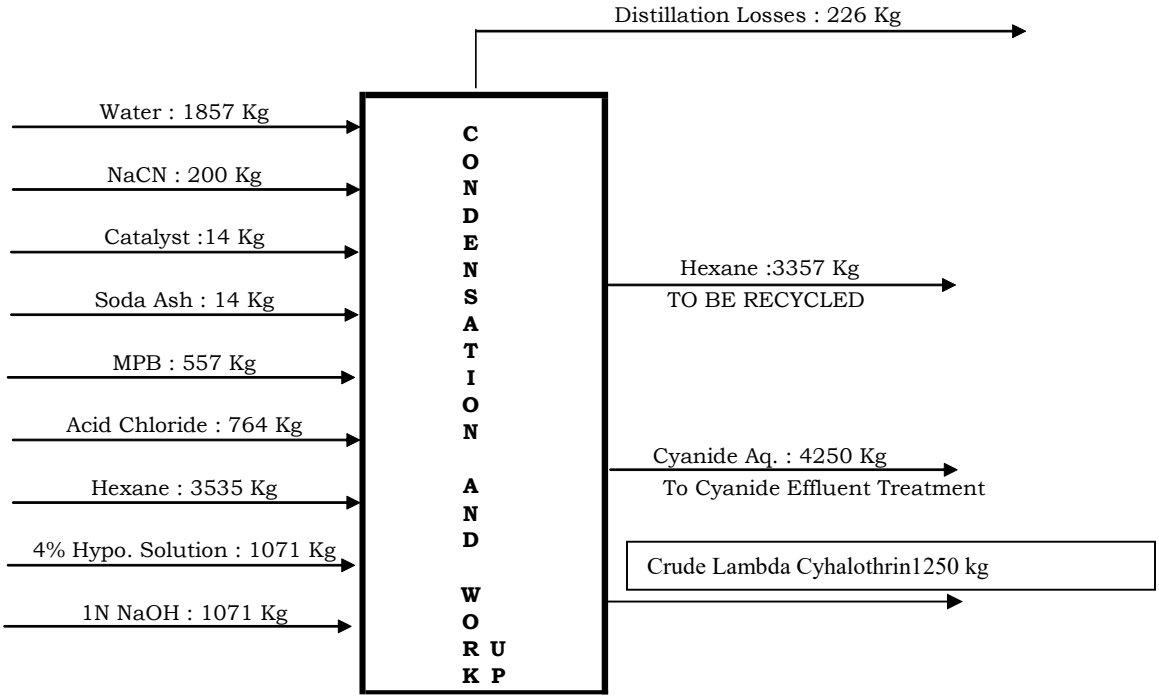
MASS BALANCE

STAGE: 1

1. ACID CHLORIDE PREPARATION :-

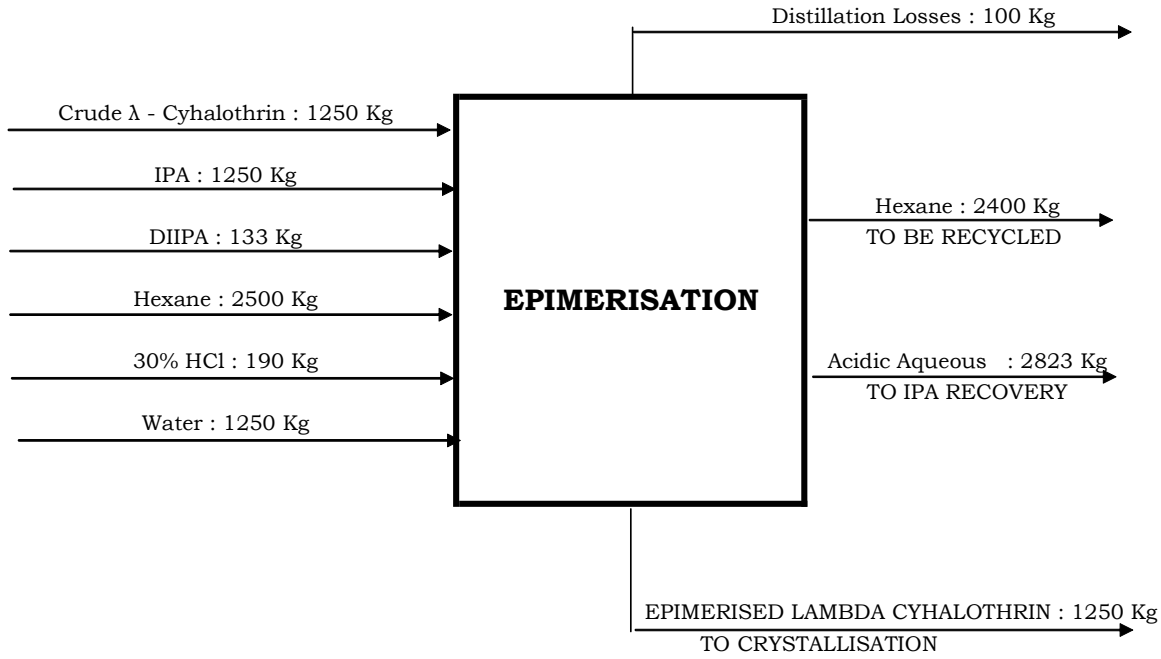


STAGE: 2



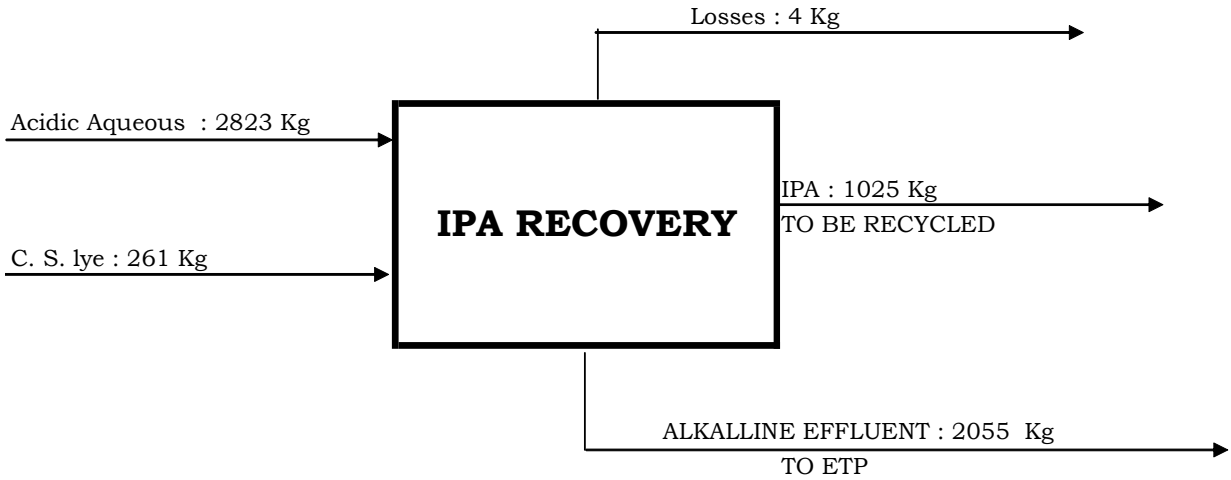
STAGE: 3

3. EPIMERISATION :-



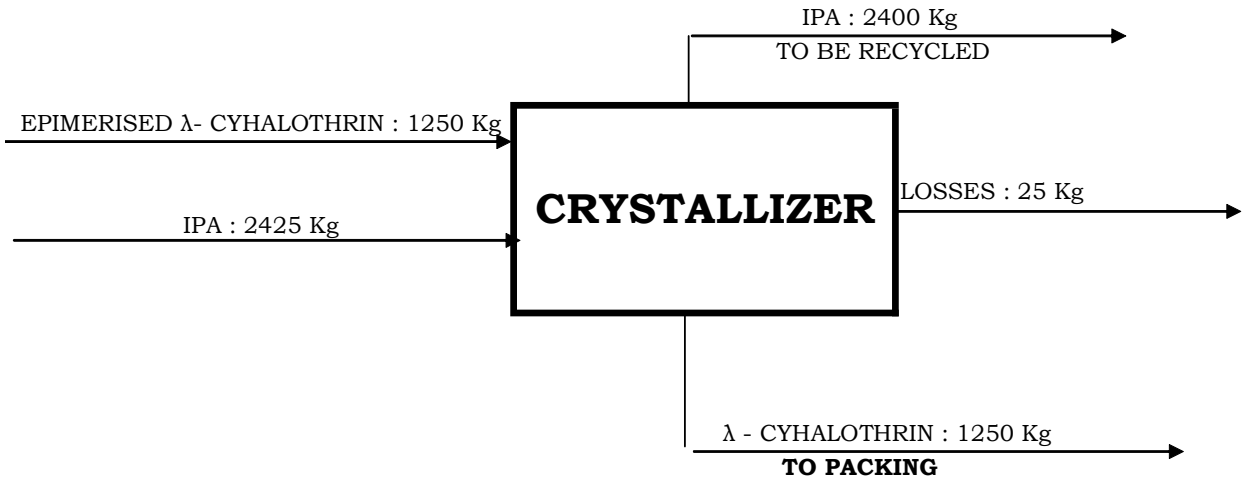
STAGE: 4

4. IPA RECOVERY :-



STAGE: 5

5. CRYSTALLIZATION :-



B. DELTAMETHRIN

MANUFACTURING PROCESS

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]**.

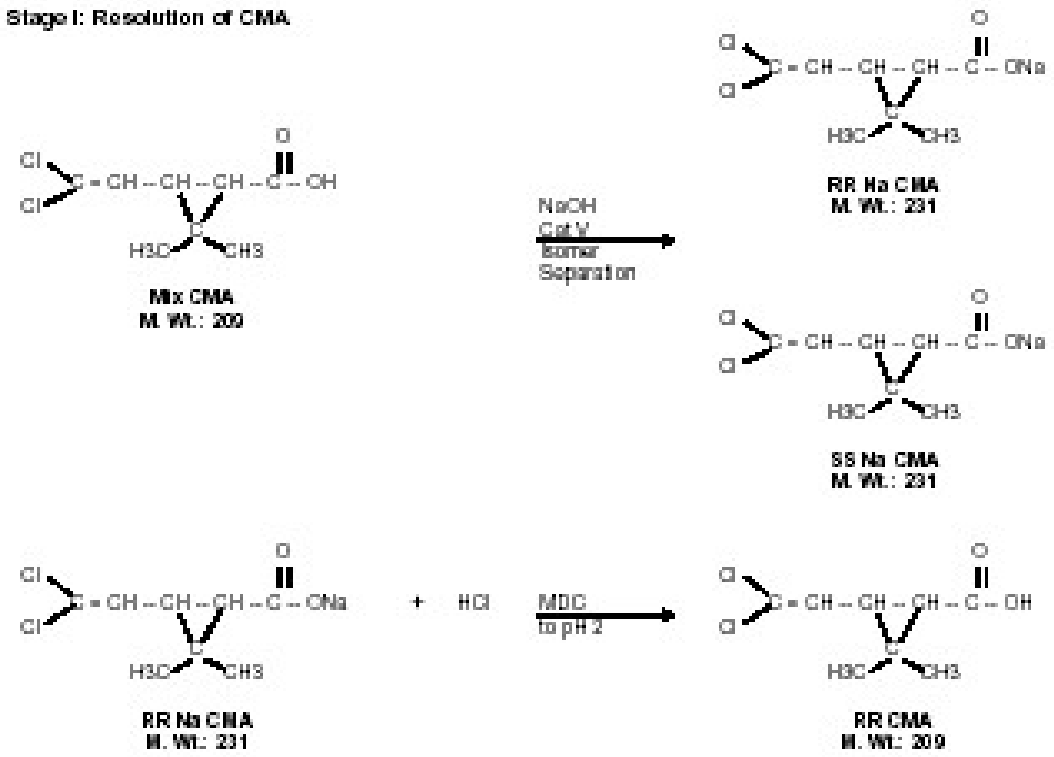
Ref - 4: Isopropyl Recovery

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.

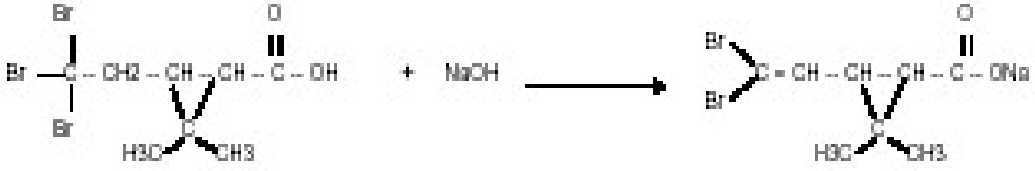
CHEMICAL REACTION



Stage II: Bromination of RR CMA

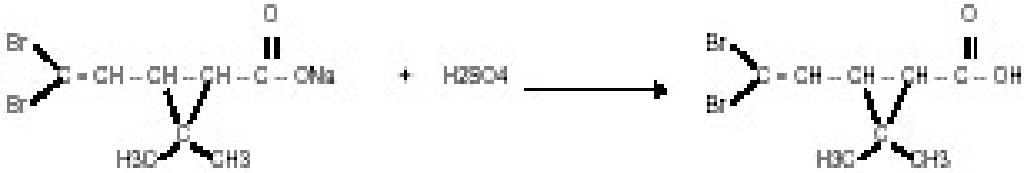
RR CMA
M. Wt.: 209

Unsaturated Bromo RR CMA
M. Wt.: 379



Unsaturated Bromo RR CMA
M. Wt.: 379

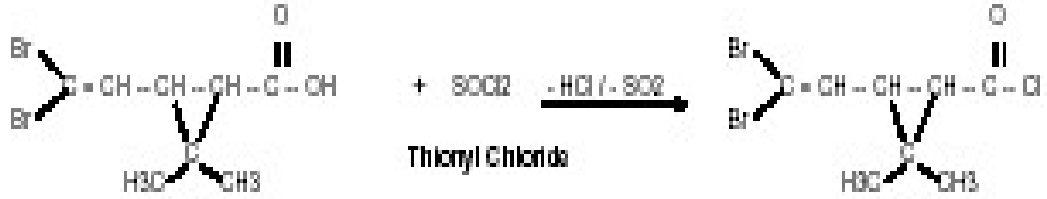
Saturated Bromo RR CMA Sodium
M. Wt.: 320



Bromo RR CMA Sodium
M. Wt.: 320

Bromo RR CMA
M. Wt.: 208

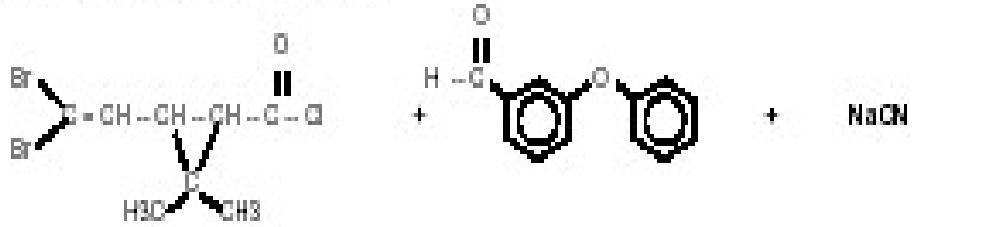
Stage III: Bromo RR CMAC preparation



Bromo RR CMA
M. Wt.: 298

Bromo RR CMAC
M. Wt.: 316.5

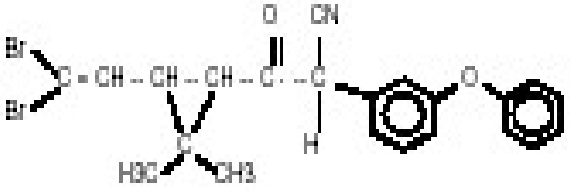
Stage IV: Deltamethrin Preparation



Bromo RR CMAC
M. Wt.: 316.5

M-Phenoxy Benzaldeyde
M. Wt.: 198

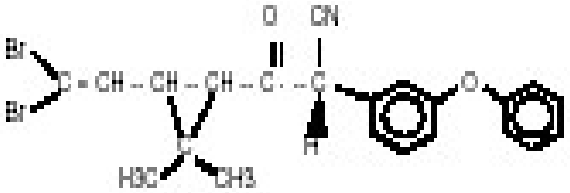
Sodium Cyanide
M. Wt.: 49



Deltamethrin
M. Wt.: 505.28

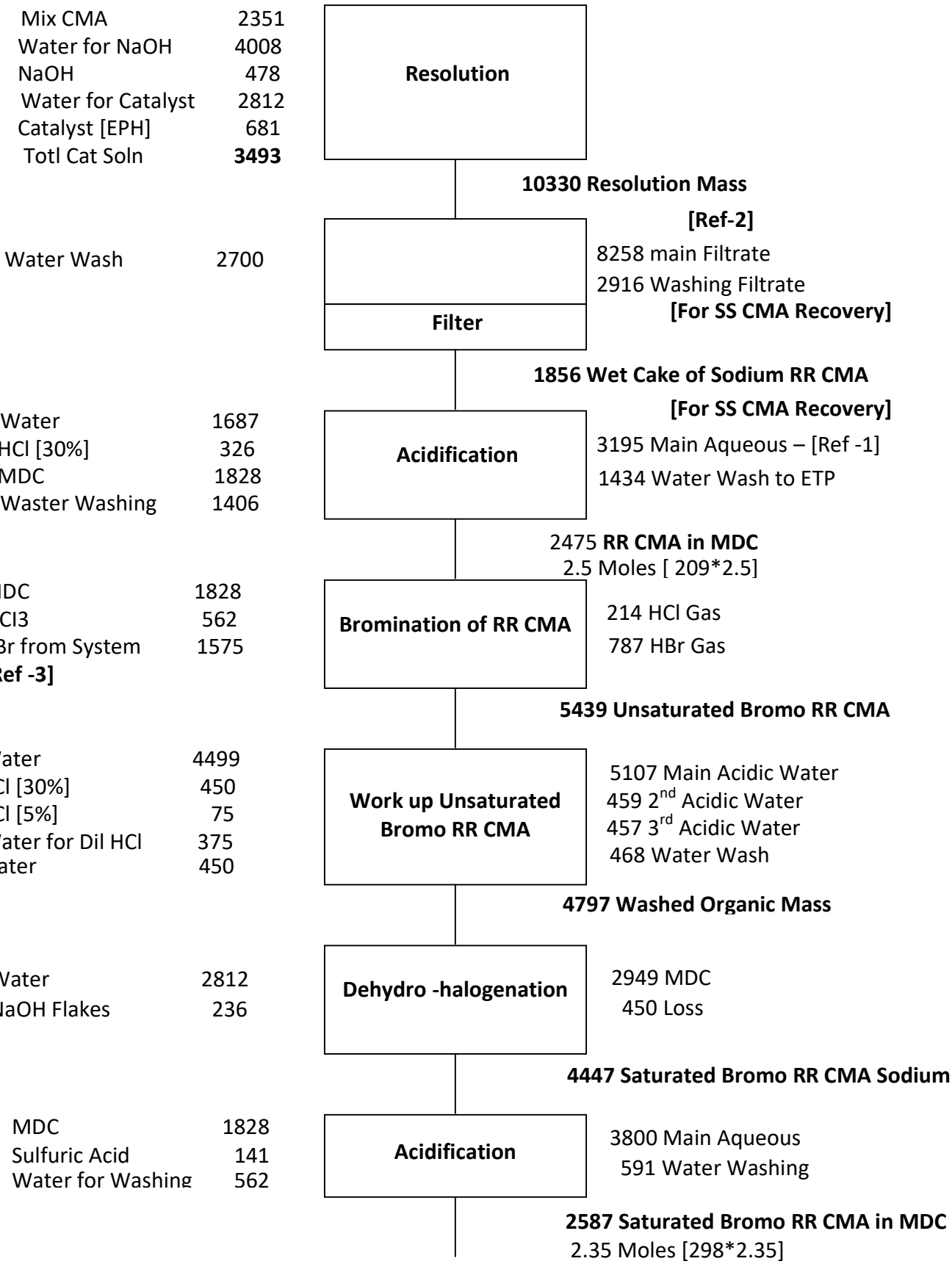
Epimerization in IPA / TEA

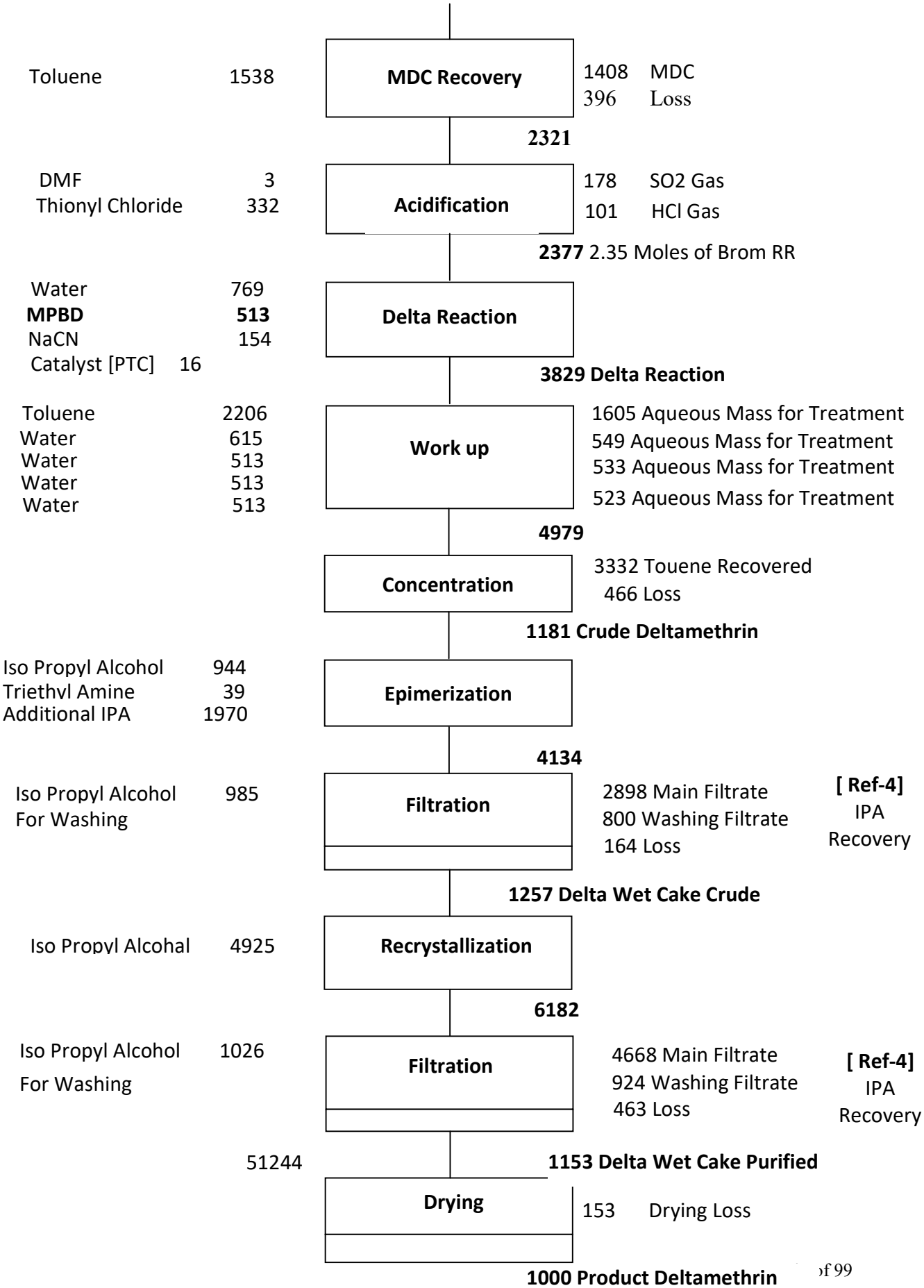
Stage V: Epimerization of Deltamethrin



Deltamethrin
M. Wt.: 505.28

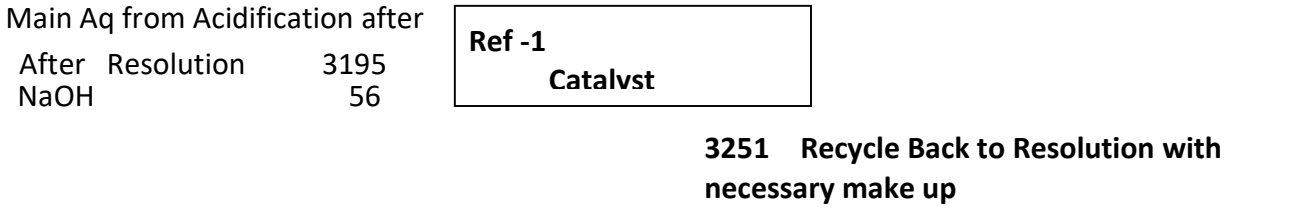
Process Flow
Main Process Flow



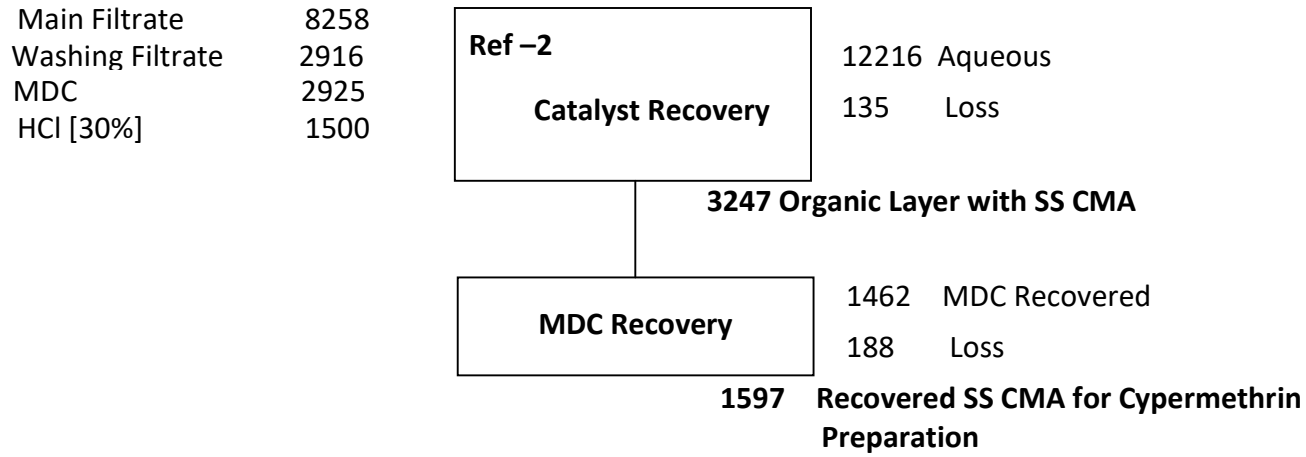

Toluene 1538
MDC Recovery
1408 MDC
396 Loss
2321
DMF 3
Thionyl Chloride 332
Acidification
178 SO2 Gas
101 HCl Gas
2377 2.35 Moles of Brom RR
Water 769
MPBD 513
NaCN 154
Catalyst [PTC] 16
Delta Reaction
3829 Delta Reaction
Toluene 2206
Water 615
Water 513
Water 513
Water 513
Work up
1605 Aqueous Mass for Treatment
549 Aqueous Mass for Treatment
533 Aqueous Mass for Treatment
523 Aqueous Mass for Treatment
4979
Concentration
3332 Touene Recovered
466 Loss
1181 Crude Deltamethrin
Iso Propyl Alcohol 944
Triethyl Amine 39
Additional IPA 1970
Epimerization
4134
Iso Propyl Alcohol 985
For Washing
Filtration
2898 Main Filtrate
800 Washing Filtrate
164 Loss
[Ref-4]
IPA
Recovery
1257 Delta Wet Cake Crude
Iso Propyl Alcohal 4925
Recrystallization
6182
Iso Propyl Alcohol 1026
For Washing
Filtration
4668 Main Filtrate
924 Washing Filtrate
463 Loss
[Ref-4]
IPA
Recovery
51244
1153 Delta Wet Cake Purified
Drying
153 Drying Loss
1000 Product Deltamethrin

Sub Process Flow

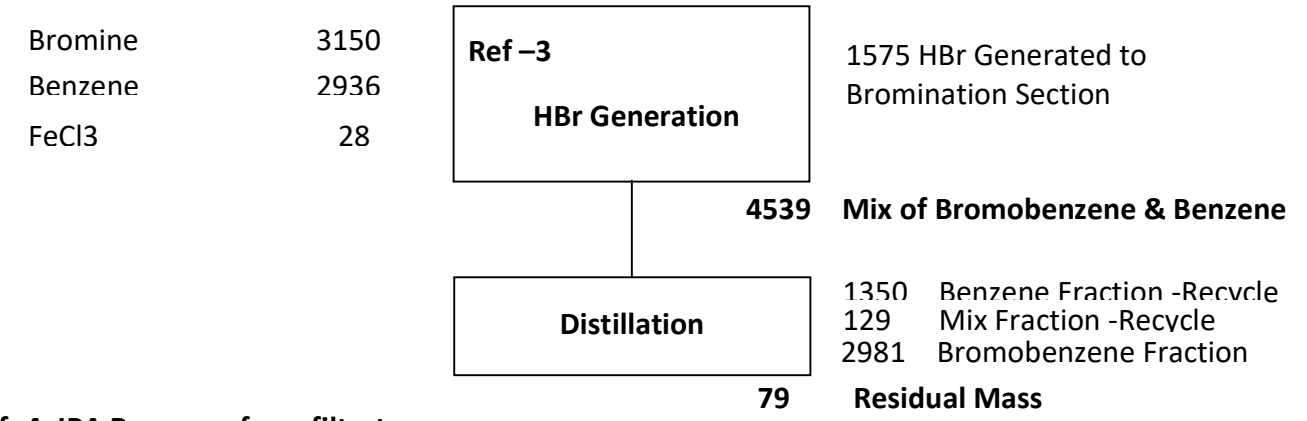
Ref -1: Catalyst Recovery and Recycle



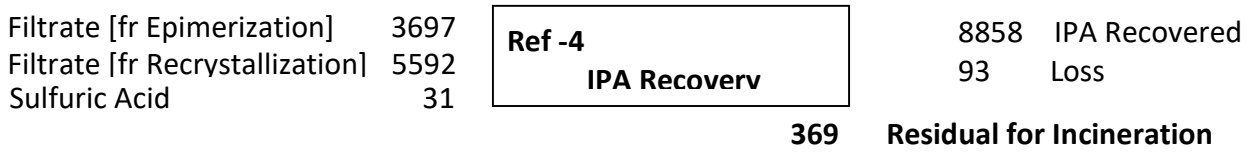
Ref -2: Recovery of SS CMA from aqueous Mass obtained from Resolution



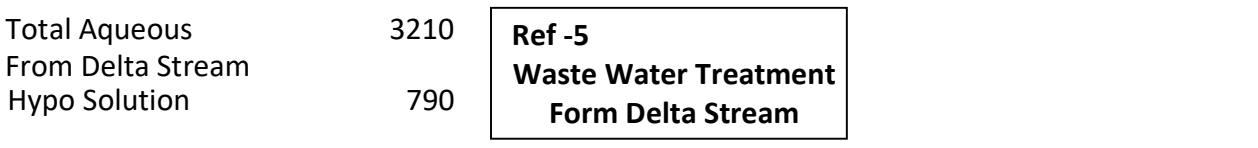
Ref -3: Bromination [HBr generation Syetm]



Ref -4: IPA Recovery from filtrates



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



5. DV-ACID CHLORIDE (CMAC) (PROPOSED)

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 Acide (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 excees Isobutylene gas is recovered. The whole mass is washed with water & Tri-ethylamine hydrochloric acid is separated & further proceeded 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)

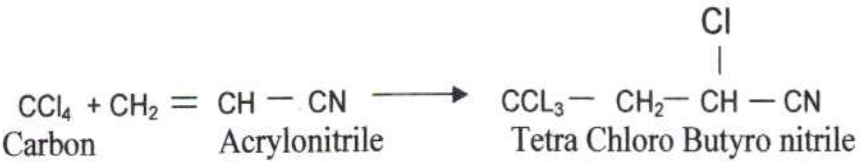
Na-CMA is acidified with dilute Sulphuric acid at Room temperature. CMA is extracted in n-hexane. Aqueous layer (sodium sulphate solution) is sent for triple effective evaporator. Organic mass (n-hexane +CMA) is taken for next process.

STAGE: 7 PREPARATION OF CYPERMETHRIN ACID CHLORIDE (CMAC).

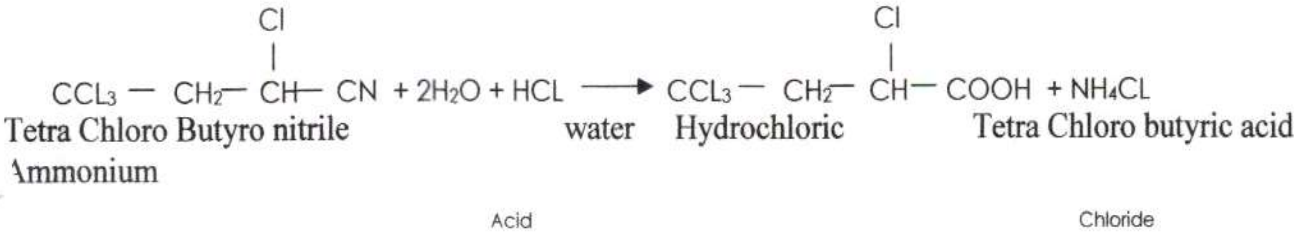
n-hexane is recovered from CMA solution. Crude CMA is reacted with thionyl chloride in presence of DMF catalyst to give crude CMAC. HCl & SO2 gas generated is scrubbed in water & caustic solution respectively. Crude CMAC is distilled out under high vacuum to get pure CMAC (Cypermethric acid chloride). The purity of distilled CMAC is above 99%.

CHEMICAL REACTION OF CYPERMETHRIC ACID CHLORIDE (CMAC)

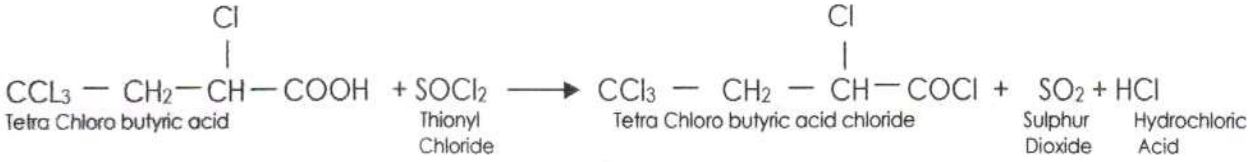
STAGE-1: - PREPARATION OF TETRA CHLORO BUTYRO NITRILE



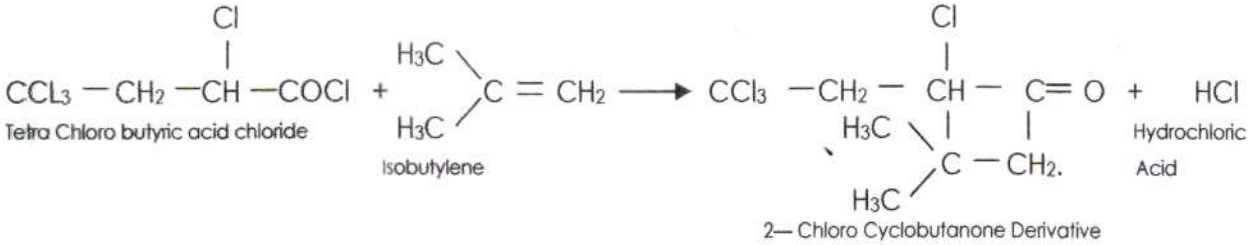
STAGE-2: - PREPARATION OF TETRA CHLORO BUTYRIC ACID



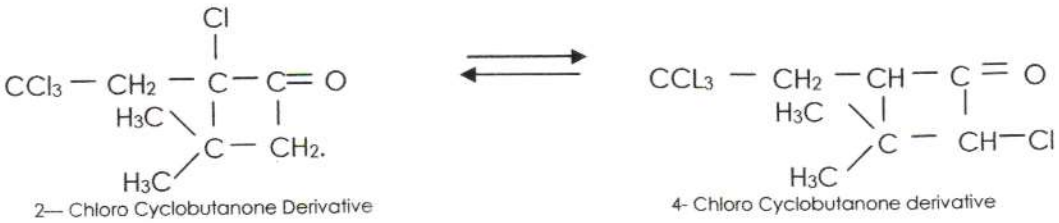
STAGE-3: - PREPARATION OF TETRA CHLORO BUTYRIC ACID CHLORIDE



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



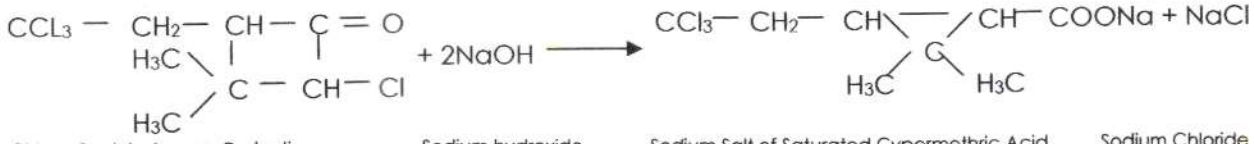
STAGE-5: - PREPARATION OF 4-CHLORO CYCLOBUTANONE DERIVATIVE



2— Chloro Cyclobutanone Derivative

4- Chloro Cyclobutanone derivative

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

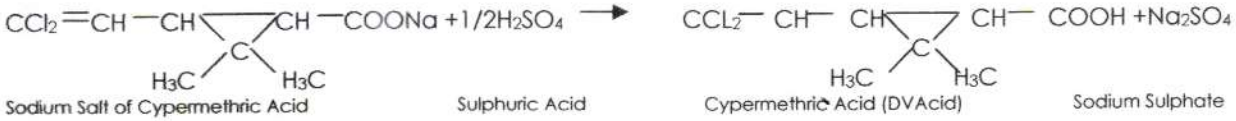


4-Chloro Cyclobutanone Derivative | Sodium hydroxide | Sodium Salt of Saturated Cypermethric Acid | Sodium Chloride

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

Sodium Salt of Saturated Cypermethric Acid | Sodium Hydroxide | Sodium Salt of Cypermethric Acid | Sodium chloride

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

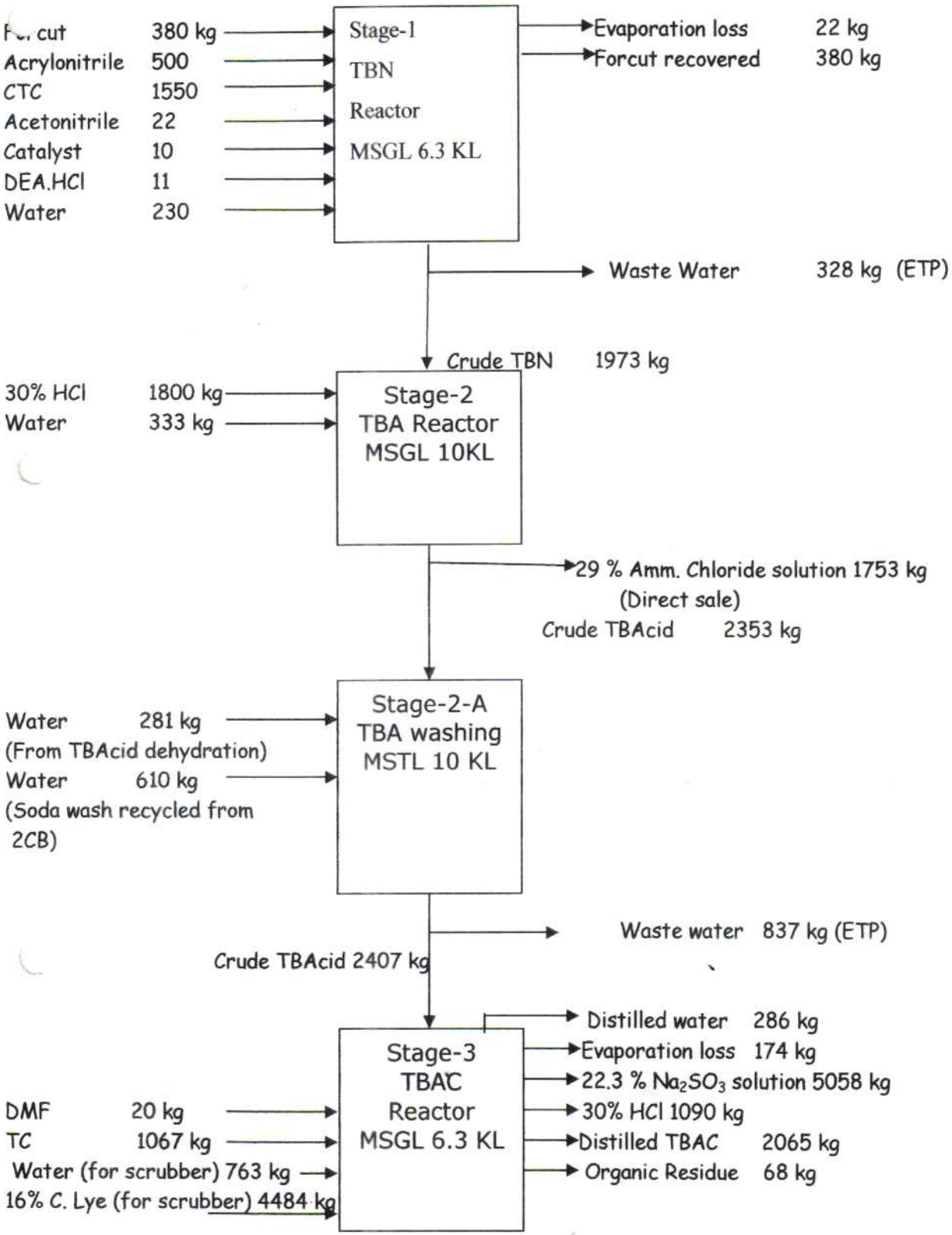


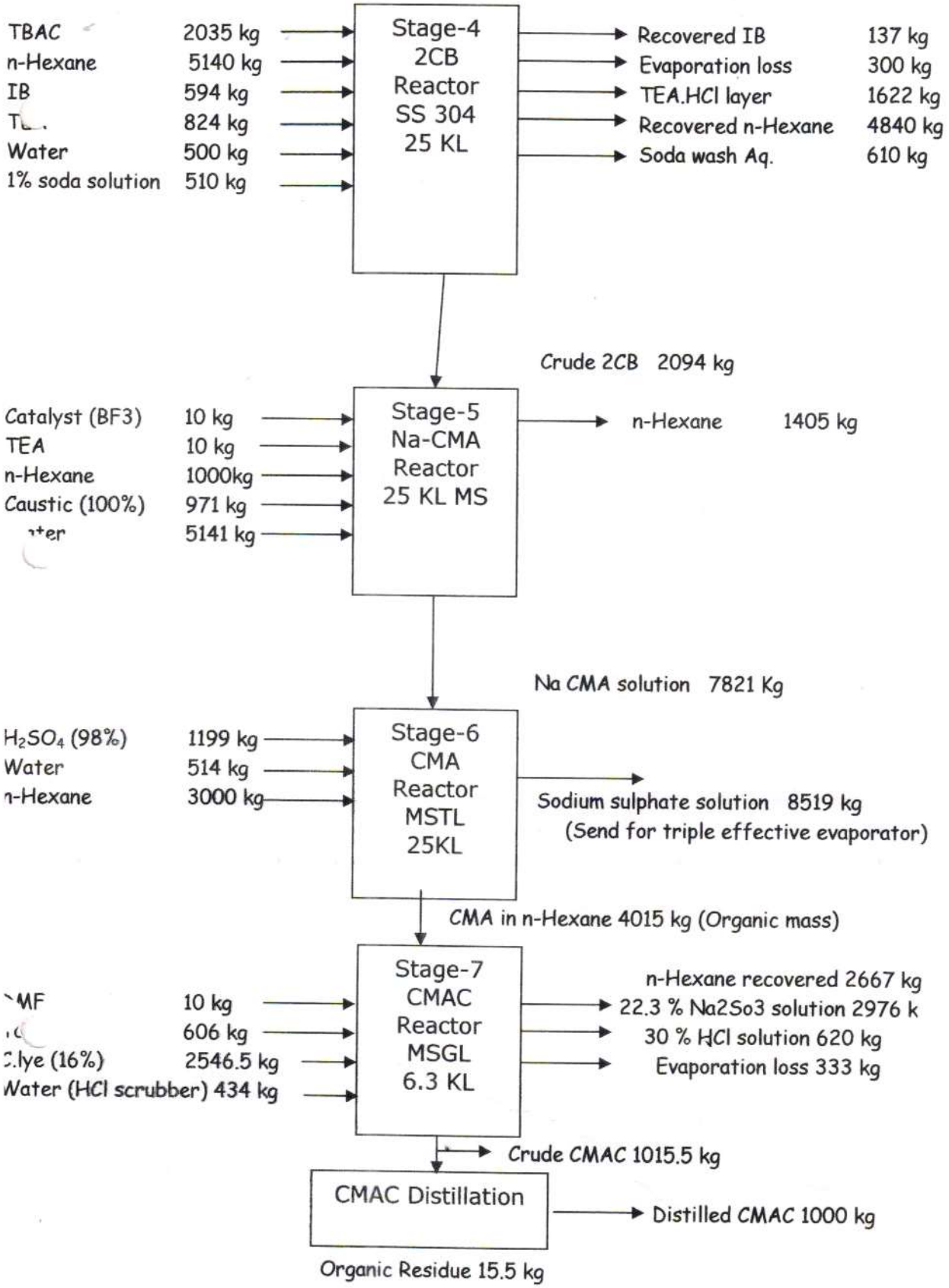
Sodium Salt of Cypermethric Acid | Sulphuric Acid | Cypermethric Acid (DVAcid) | Sodium Sulphate

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

Cypermethric Acid (DVAcid) | Thionyl Chloride | Cypermethric Acid Chloride (DVA-Cl) | Sulphur dioxide | hydrochloric acid

MASS BALANCE FOR CMAC (CYPERMETHRIC ACID CHLORIDE)




TBAC 2035 kg
n-Hexane 5140 kg
IB 594 kg
T[illegible] 824 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
[illegible]ter 5141 kg
Stage-5
Na-CMA
Reactor
25 KL MS
n-Hexane 1405 kg
Na CMA solution 7821 Kg
H_2SO_4 (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)
[illegible]MF 10 kg
[illegible] 606 kg
[illegible].lye (16%) 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. (PROPOSED)

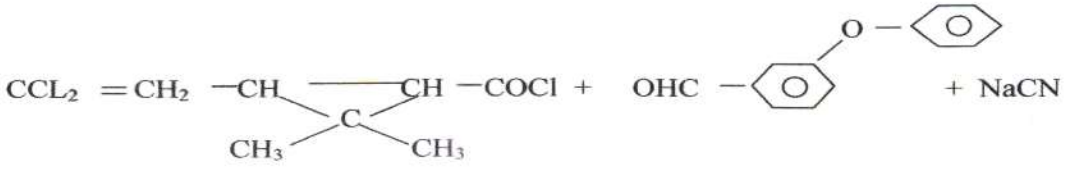
MANUFACTURING PROCESS

Solution of CMAC (in-house manufactured as well as procured from the market) and Meta phenoxy benzaldhyde 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%.

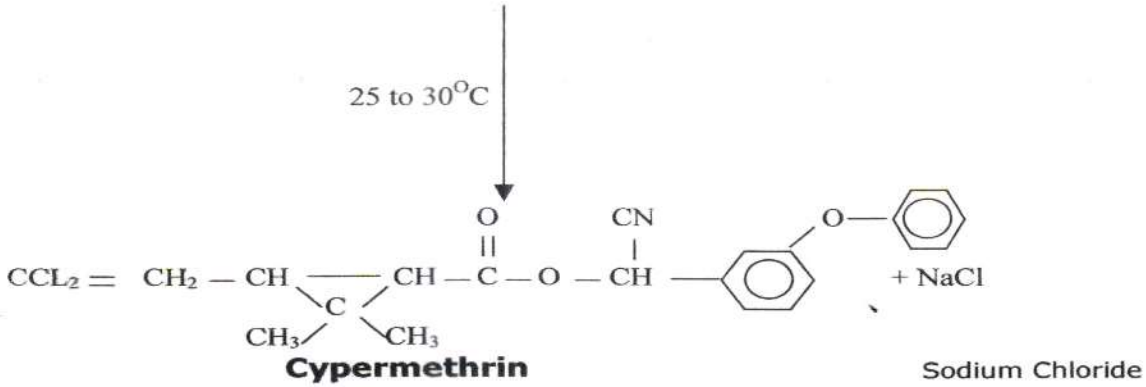
CHEMICAL REACTION OF CYPERMETHRIN

EMICAL REACTION

Preparation of Cypermethrin / Alpha Cypermethrin



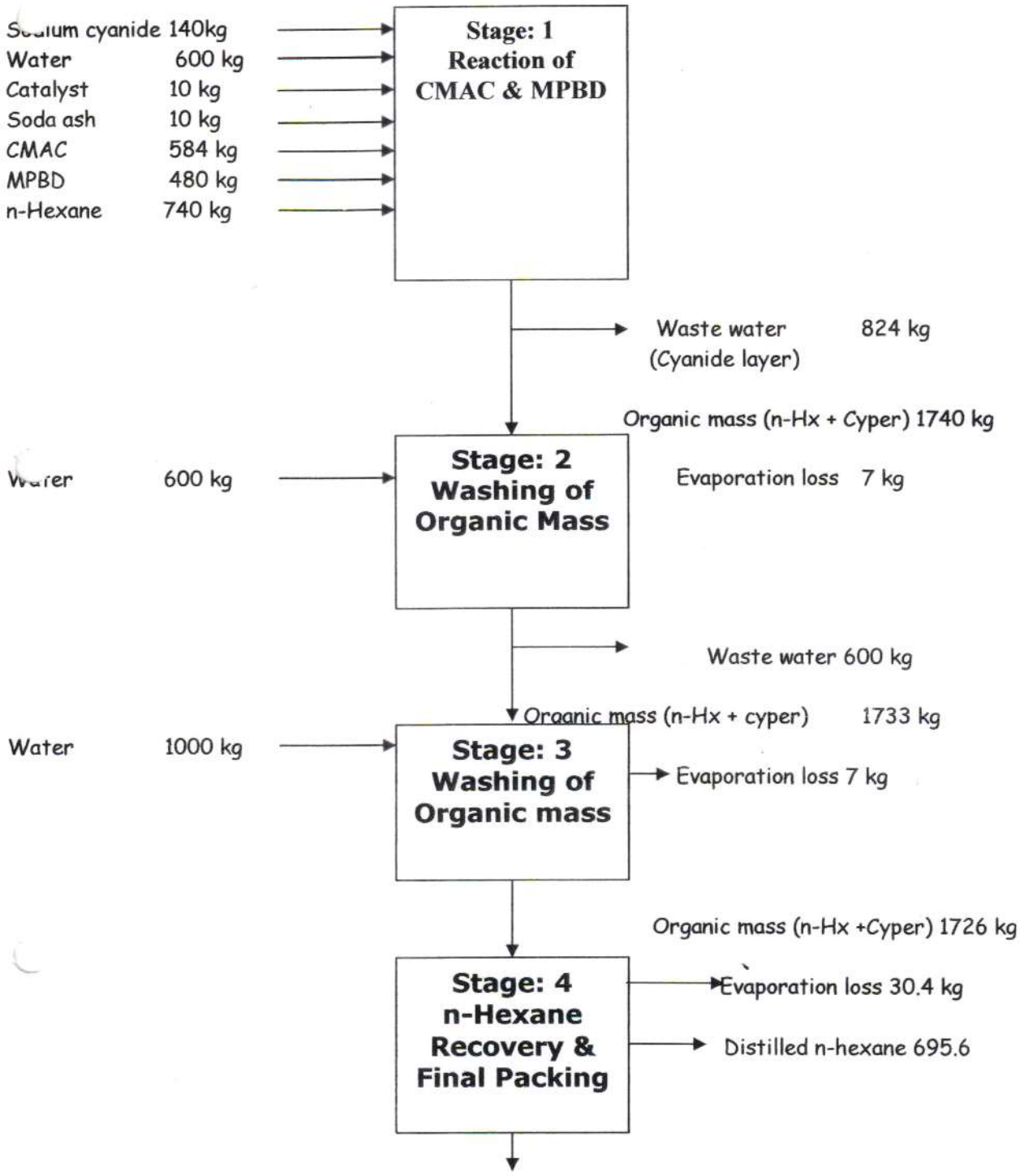
Cyper methric acid chloride — Meta phenoxy benzaldehyde — sodium cyanide



Cypermethrin — Sodium Chloride

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

MASS BALANCE FOR CYPERMETHRIN TECHNICAL



CYPERMETHRIN TECHNICAL PACKED 1000 KG

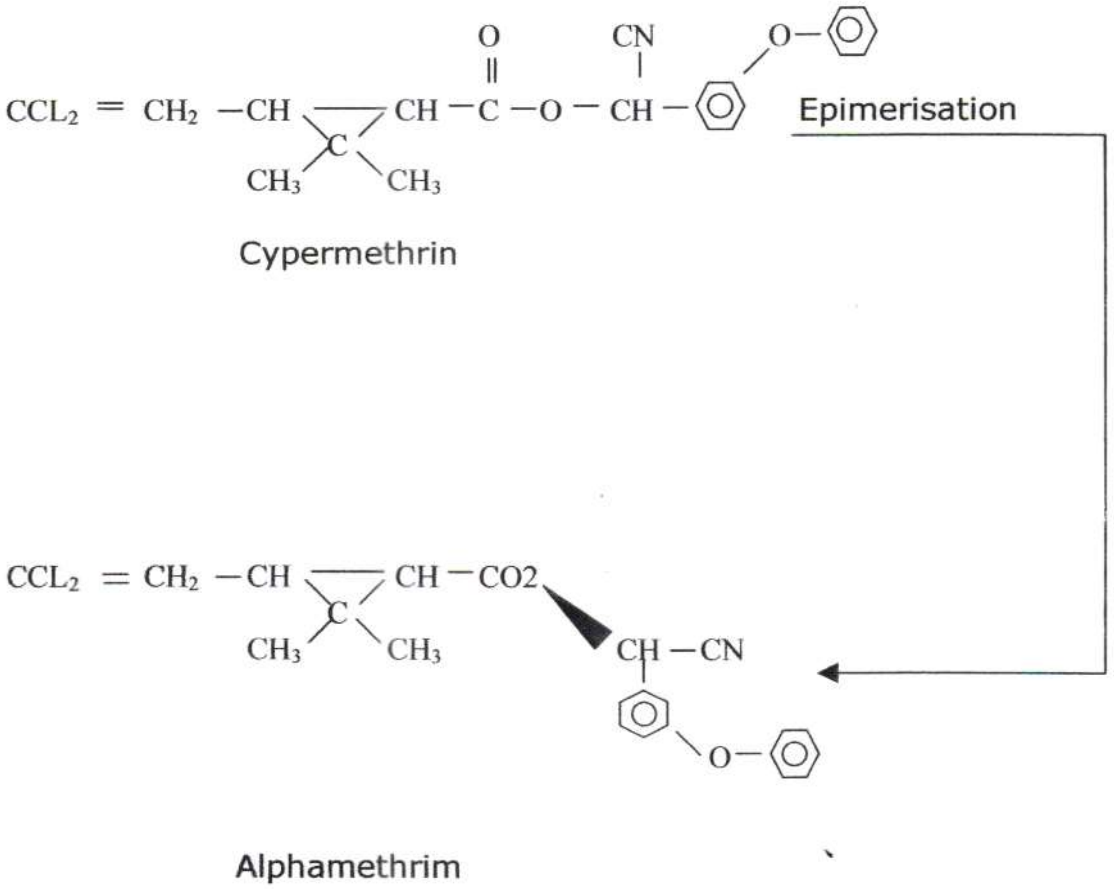
7. ALPHAMETHRIN TECH. / PERMETHRIN TECH. OR ACEPHATE (PROPOSED)

A. ALPHAMETHRIN

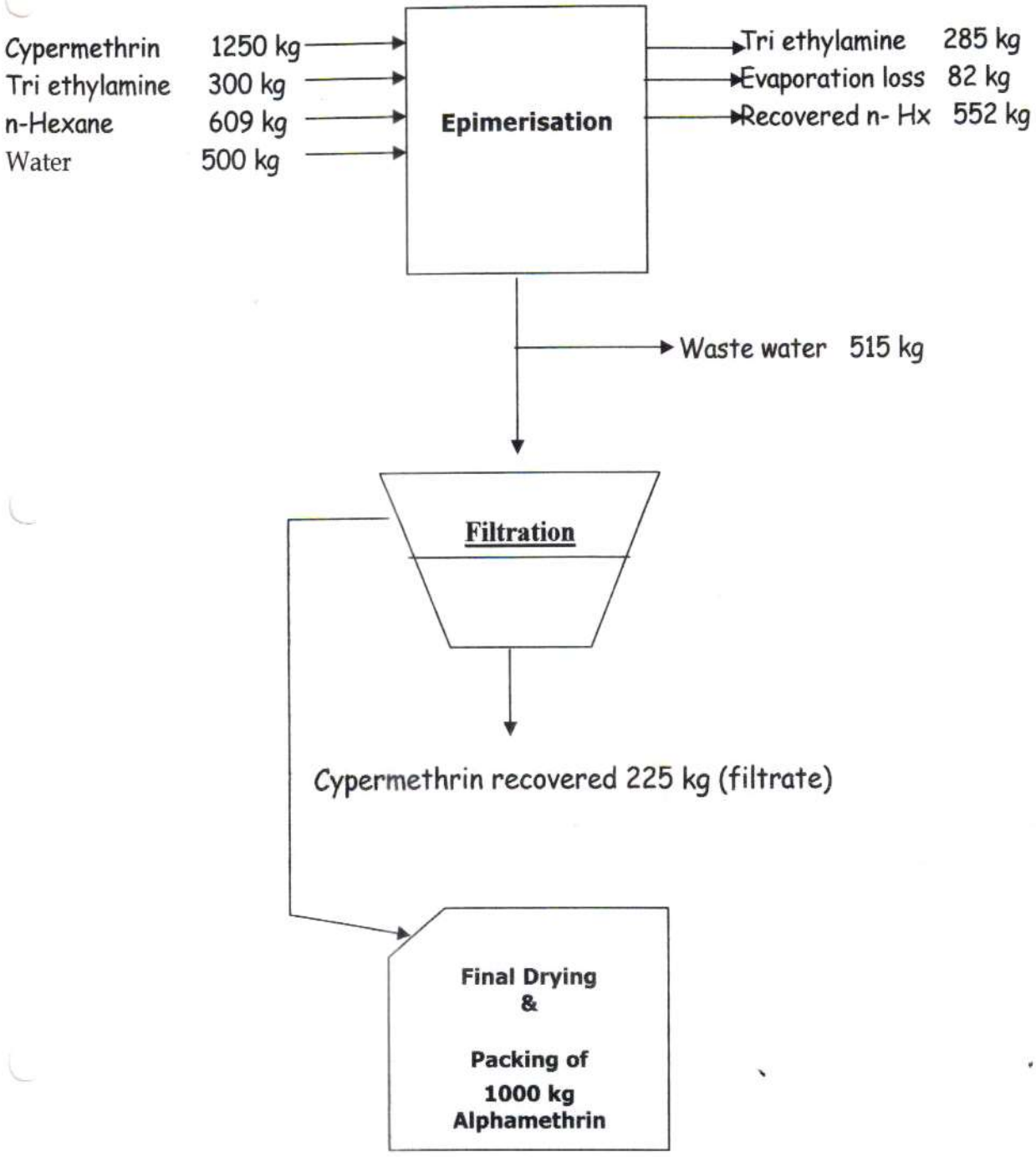
MANUFACTURING PROCESS

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-haxane 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 OF ALPHAMETHRIN



MASS BALANCE OF ALPHAMETHRIN TECHNICAL



B. PERMETHRIN

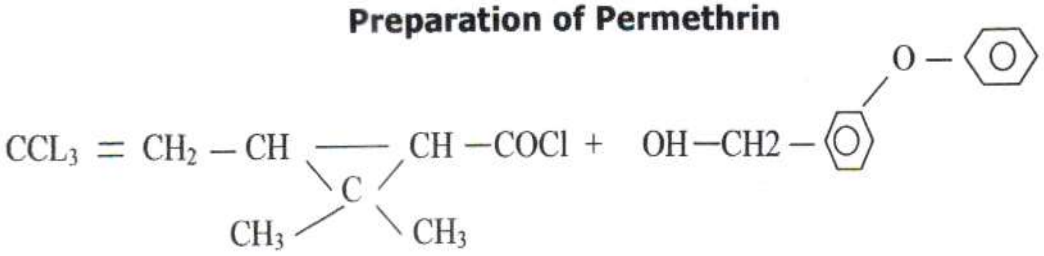
MANUFACTURING PROCESS

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%.

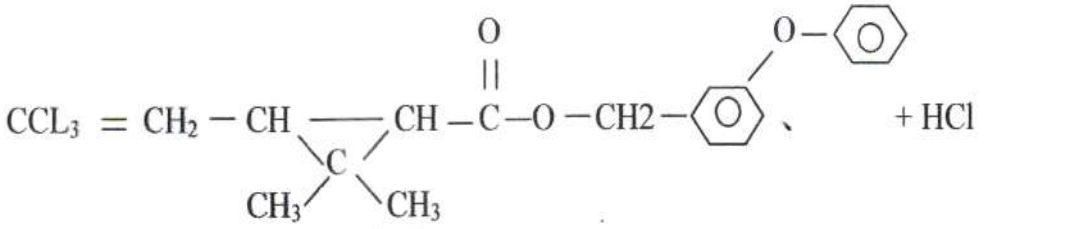
CHEMICAL REACTION

Preparation of Permethrin



Cyper methric acid chloride Meta phenoxy benzyl alcohol

25 to 30°C



Permethrin Hydrochloric acid

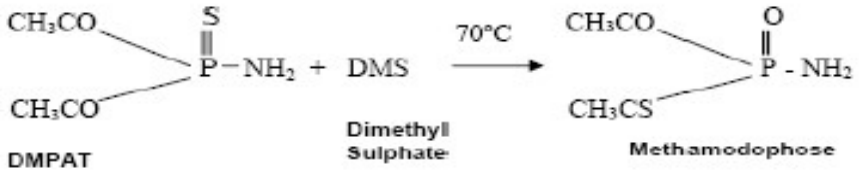
C. ACEPHATE (TECH.)

MANUFACTURING PROCESS

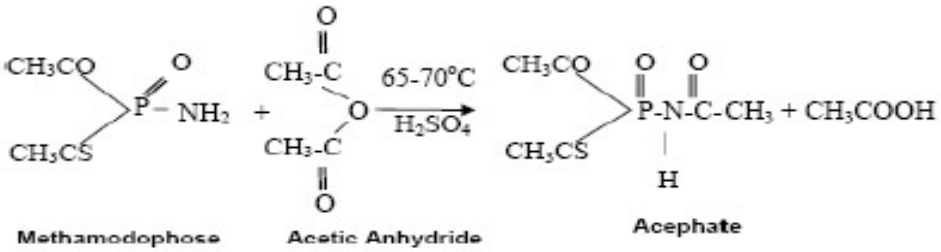
Dimethyl Phosphoro Amino Thioat (DMPAT) is isomerizes to Metha mediphos catalysis reaction at 30°C and atmospheric pressure. After isomerization, the mass is reacted with acetic anhydride at 40°C in presence of Dichloromethane as solvent. It is neutralized with aqueous ammonia. The layers are separated and aqueous layer containing ammonium acetate is sold as by product. The organic layer is taken in another reactor for dichloromethane recovery and acephate isolation. Recovered dichloromethane is recycled in the next batch and acephate is dissolved in ethyl acetate. The mass is chilled and filtered to get acephate. Acephate is dried in RVD and packed in bags. The ethyl acetate is recovered from mother liq. And it is recycled. The distillation residue will be incinerated.

CHEMICAL REACTION OF ACEPHATE

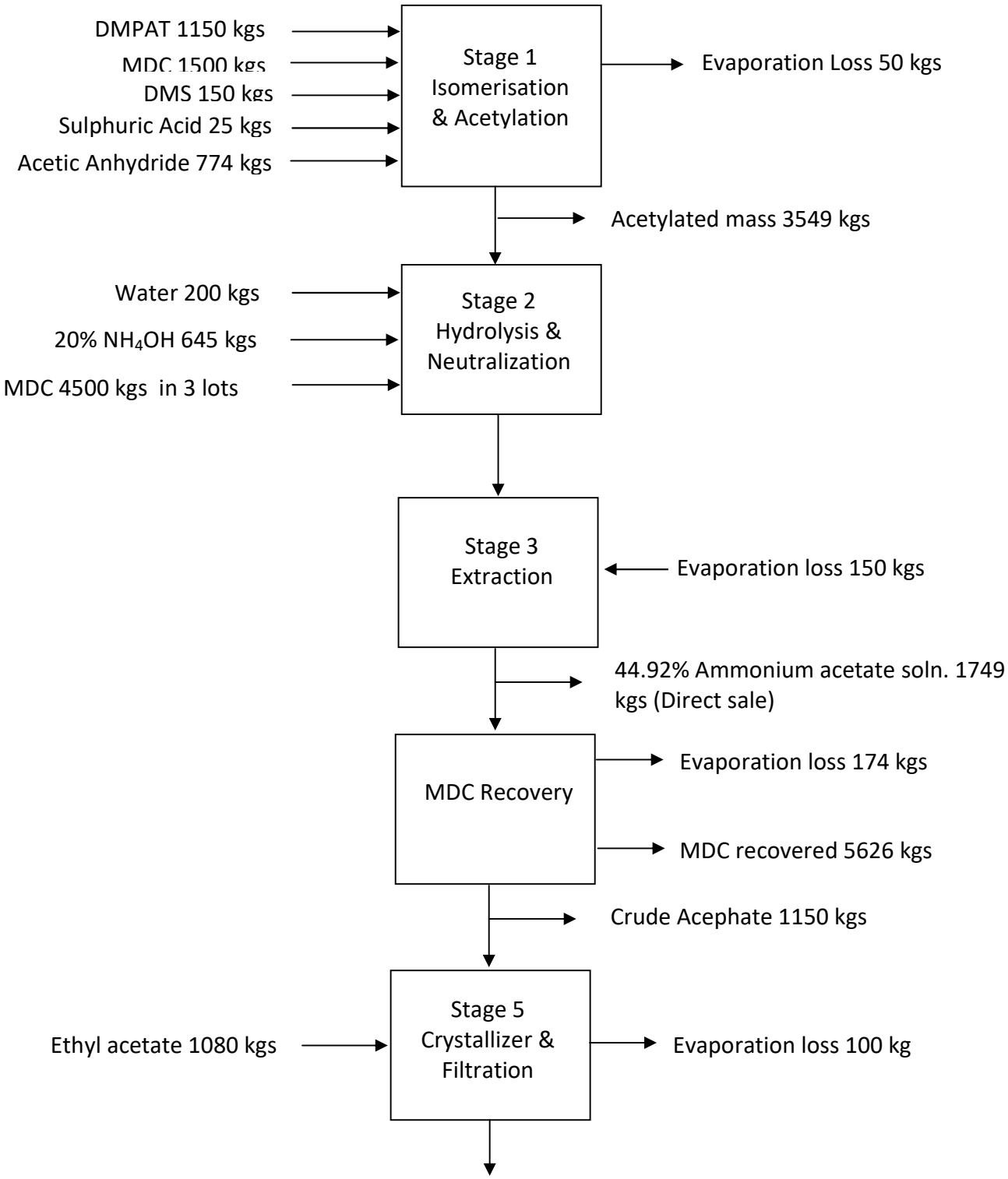
Step 1: Isomerisation

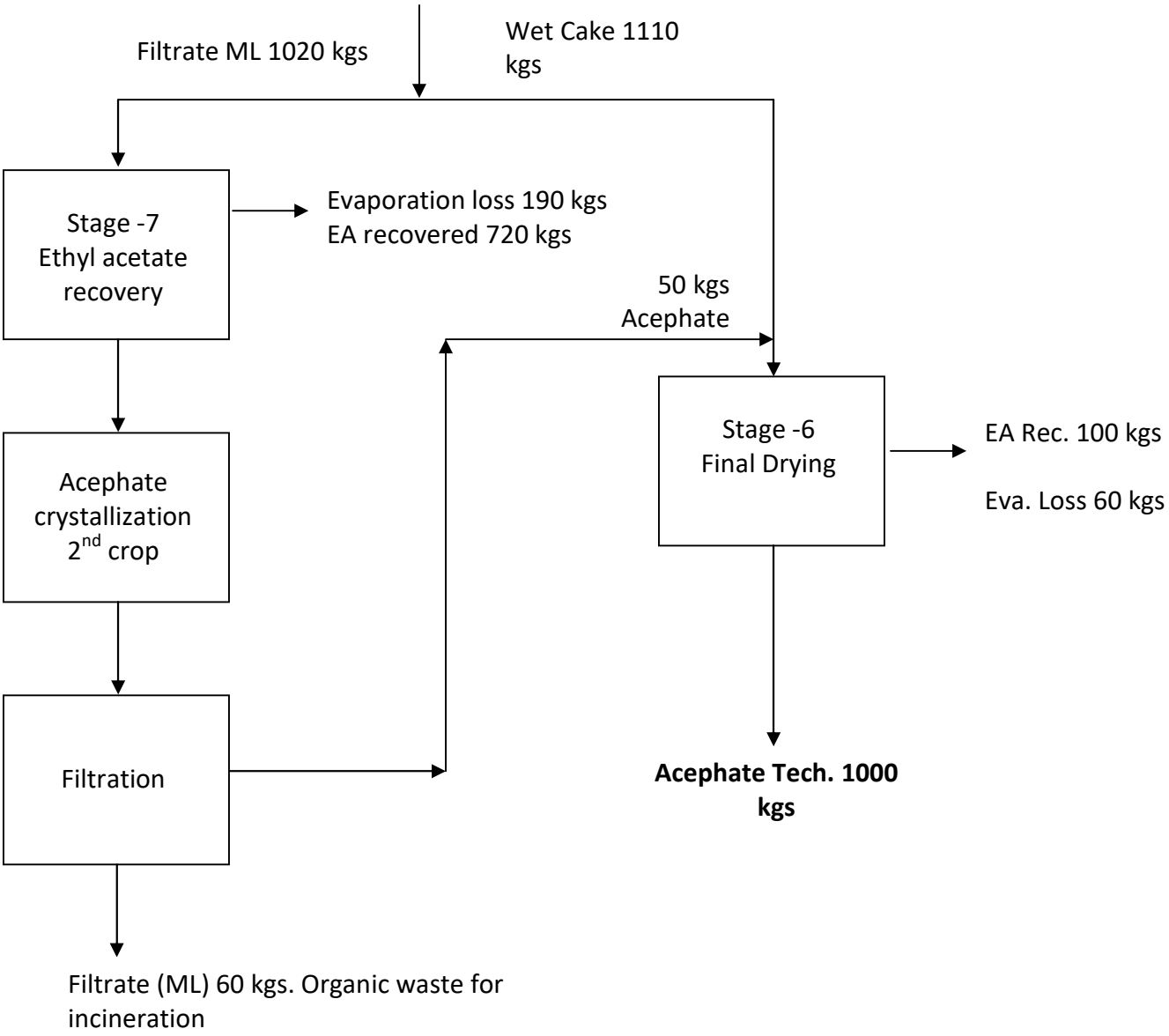


Step 2: Acetylation



Mass Balance of Acephate Technical




Filtrate ML 1020 kgs
Wet Cake 1110 kgs
Stage -7 Ethyl acetate recovery
Evaporation loss 190 kgs
EA recovered 720 kgs
50 kgs Acephate
Acephate crystallization 2nd crop
Stage -6 Final Drying
EA Rec. 100 kgs
Eva. Loss 60 kgs
Filtration
Acephate Tech. 1000 kgs
Filtrate (ML) 60 kgs. Organic waste for incineration

8. METAMITRON TECH. OR GLYPHOSATE TECH. OR OTHER HERBICIDES (PROPOSED)

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:-

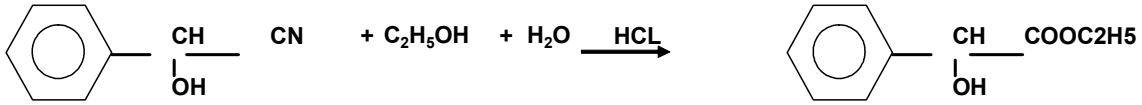
In SS reactor charge EtOH under vacuum, then charge phenyl hydrazone prepared in stage-4. Start addition of NH3 solution & send sample to QC for pH. Then start addition of 80% Hydrazine hydrate & complete in 3-4 hr & maintain for 12 hr. check sample for phenyl hydrazide percentage by GLC. If ok then 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 , 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.

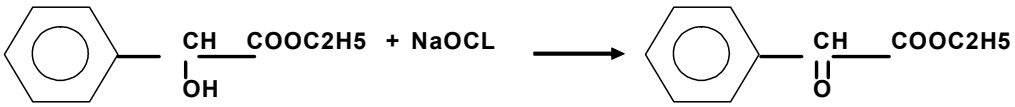
Synthesis route

A. ETHYL MENDELATE



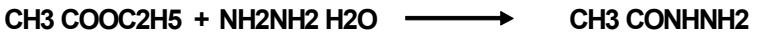
Mendelo Nitrile — Ethyl Mendelate

B. ETHYL PHENYL GLYOXALATE



Ethyl Mendelate — Ethyl Phenyl Glyoxalate

C. ACETYL HYDRAZINE

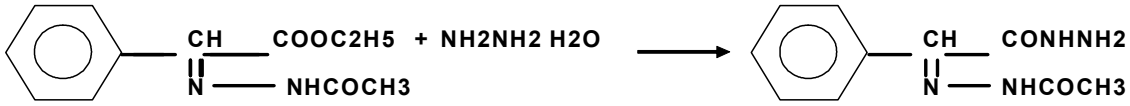


Ethyl Acetate — Hydrazine Hydrate — Acetyl Hydrazine

D. PHENYL HYDRAZIDE

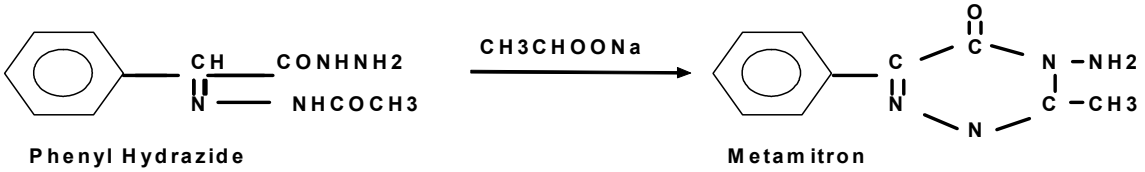
Ethyl Phenyl Glyoxalate — Acetyl Hydrazine — Phenyl Hydrazone

179 74



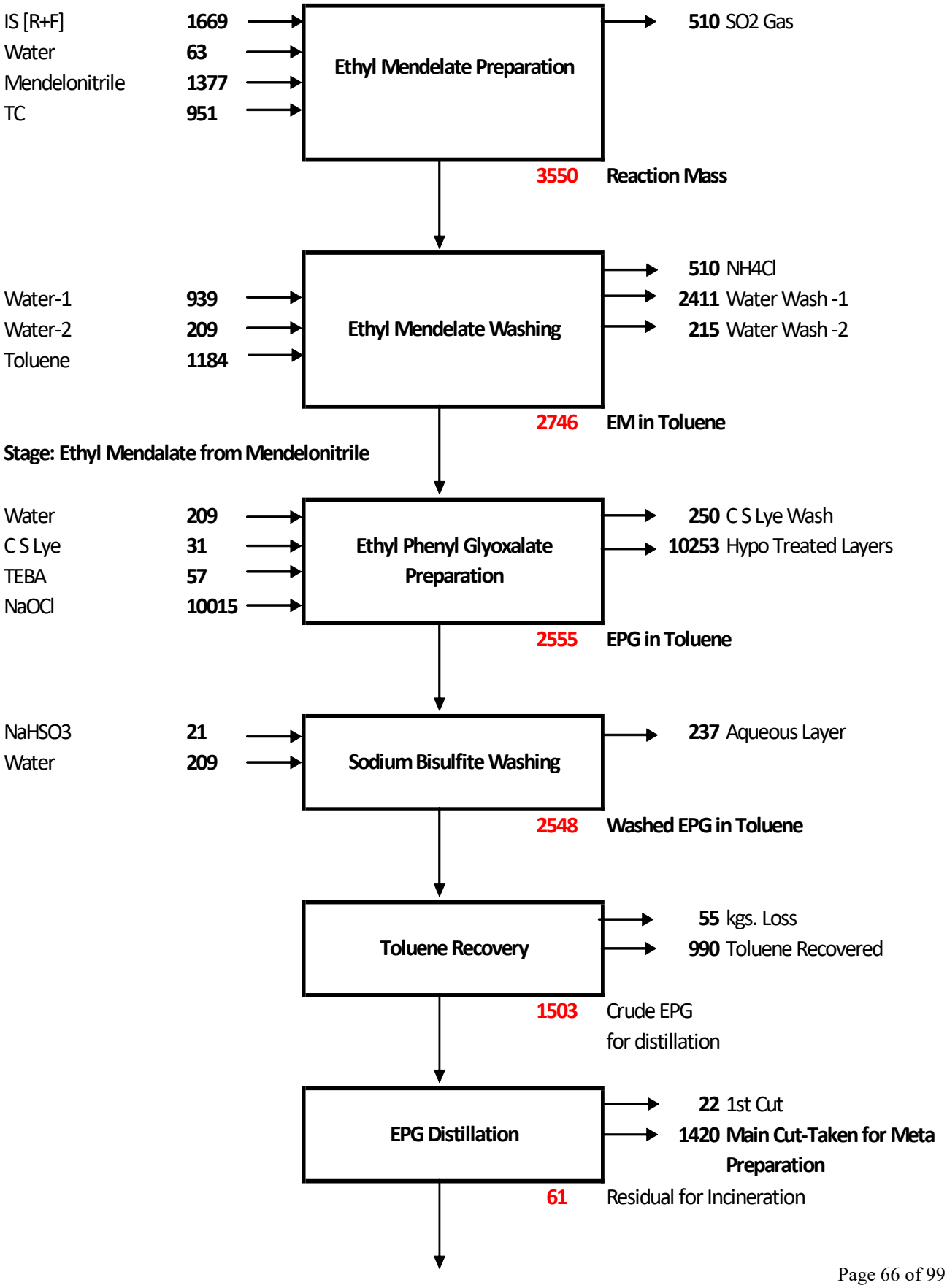
Phenyl Hydrazone — Hydrazine Hydrate — Phenyl Hydrazide

E. METAMITRON

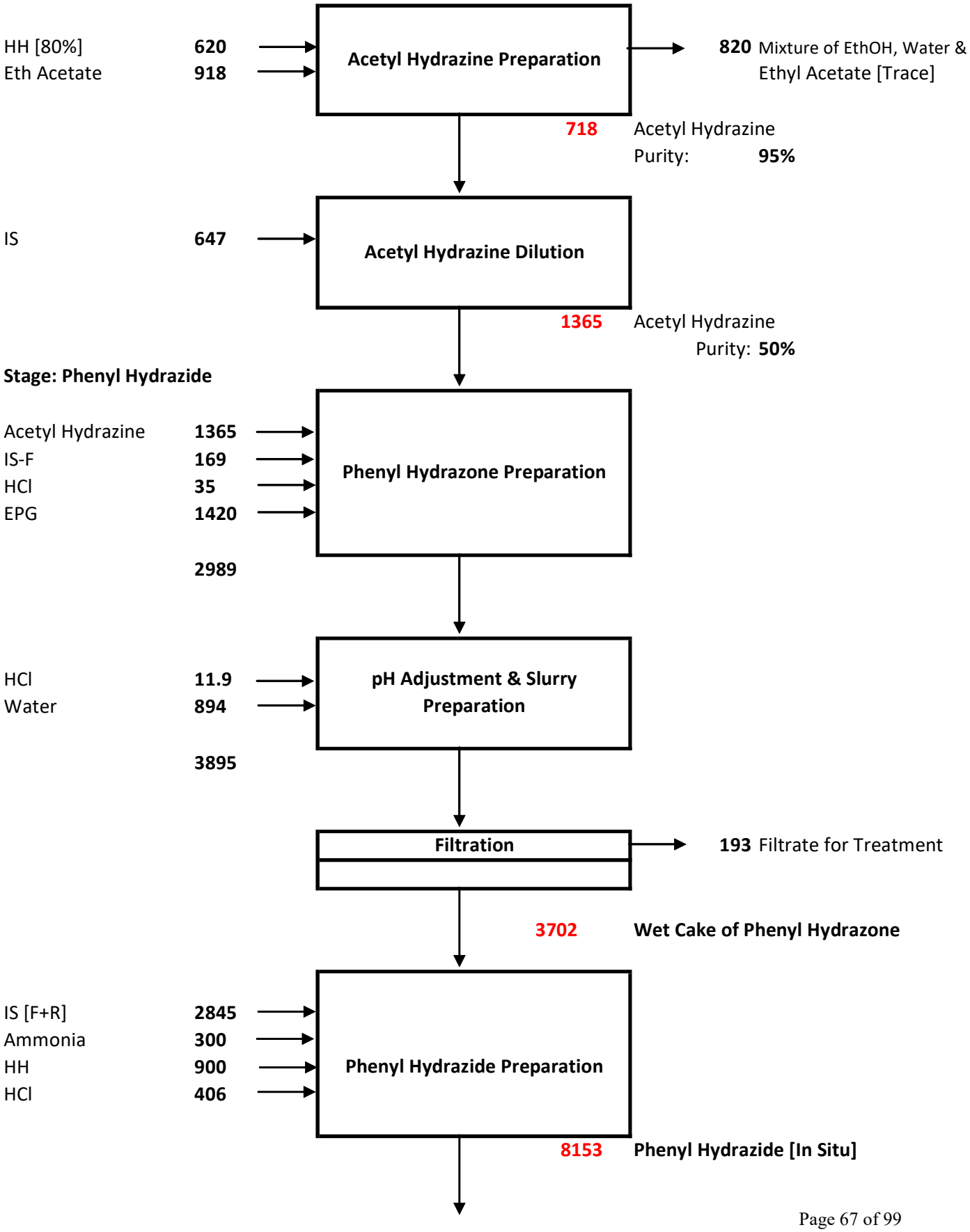


Phenyl Hydrazide — Metamitron

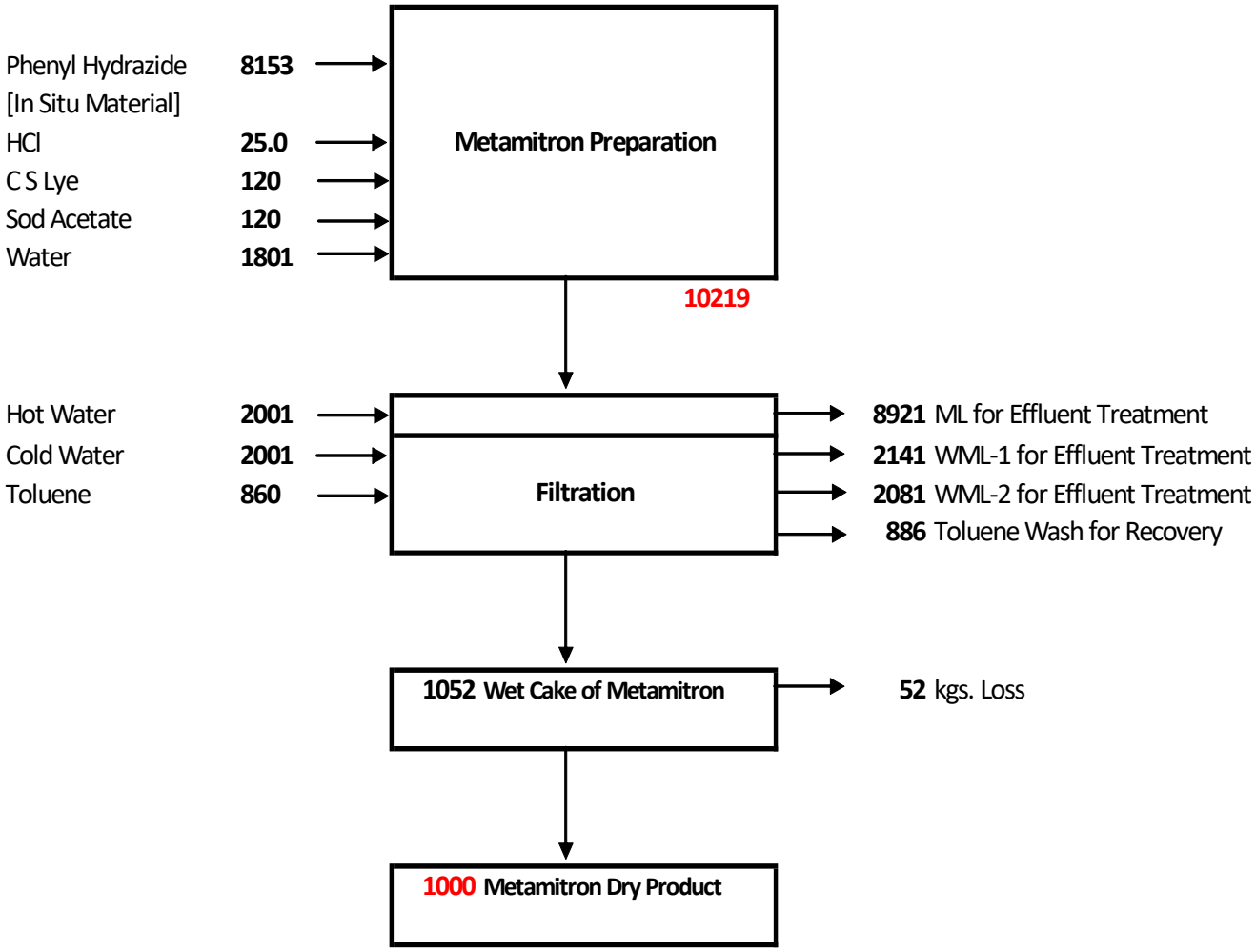
Stage: Ethyl Mendalate from Mendelonitrile



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**

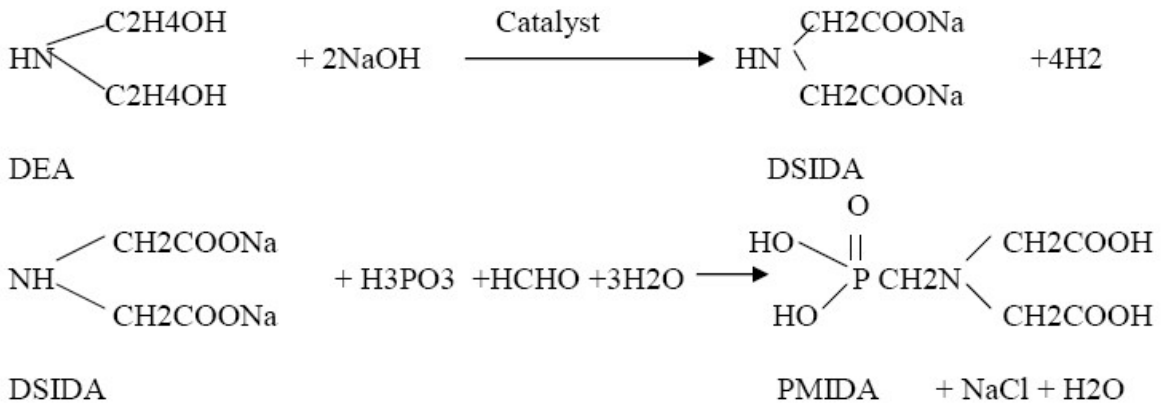
B. GLYPHOSATE ACID TECHNICAL

MANUFACTURING PROCESS

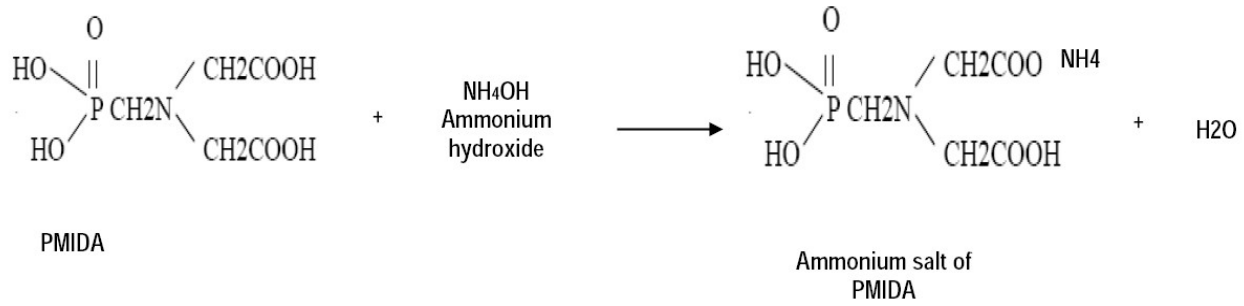
Take water, DEA, 48% caustic lye and catalyst in a pressure rector. Maintain the reaction temperature 160°C and pressure 10 kg /cm2. DSIDA (Disodium Salt of imino diacetic acid) formation taken place with total conversion of 90% hydrogen gas is vented to atmosphere through scrubber during the reaction. 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

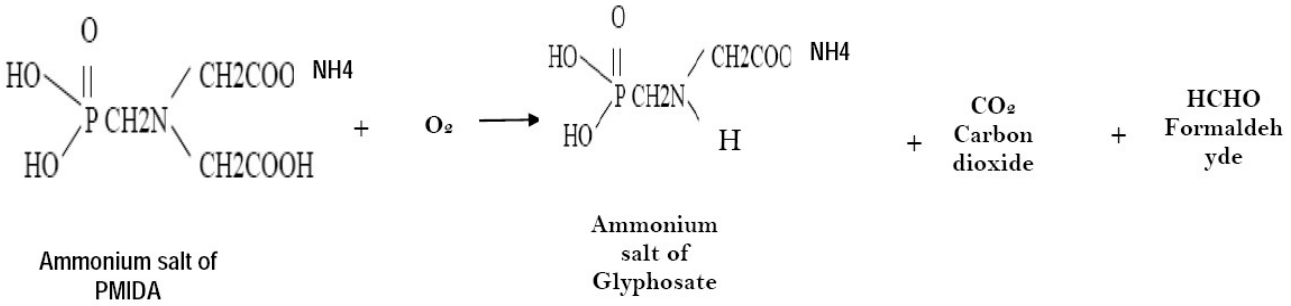
Stage-1 &2 Preparation of PMIDA



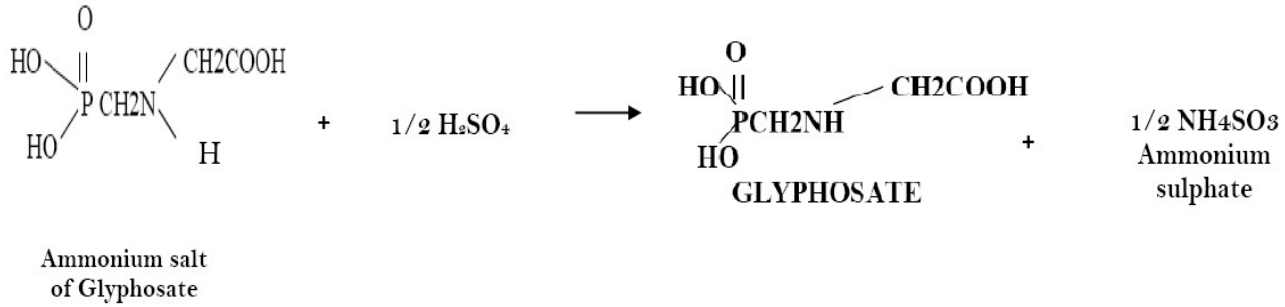
Stage-3 Preparation of Ammonium salt of PMIDA



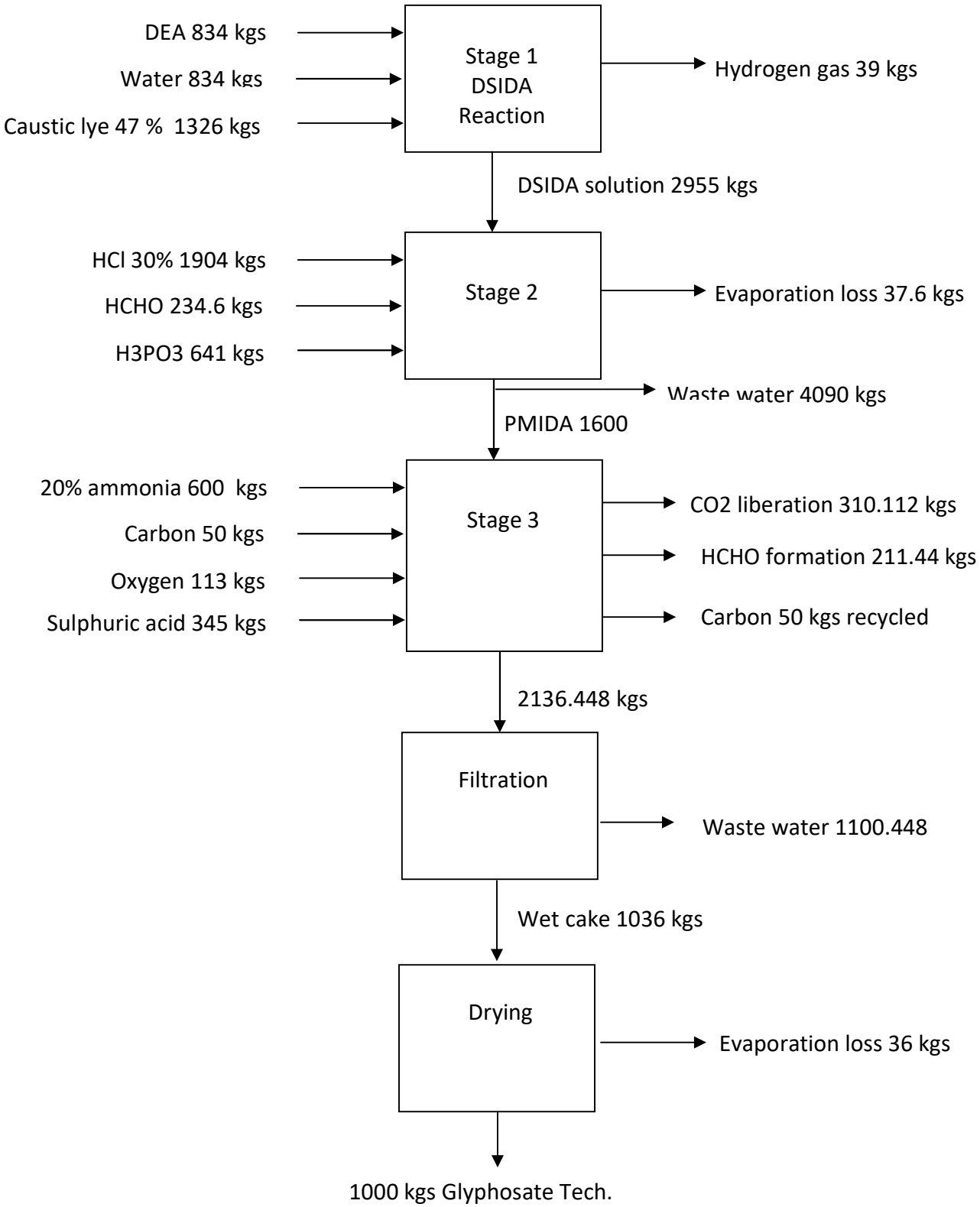
Stage-4 Oxidation of Ammonium salt of PMIDA



Stage-4 Oxidation of Ammonium salt of PMIDA



Mass Balance Of Glyphosate Technical



9. THIONYL CHLORIDE (PROPOSED)

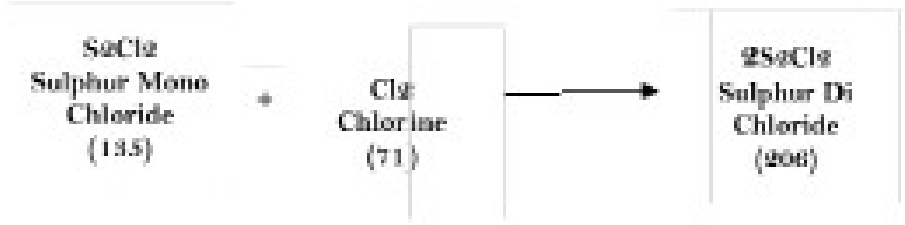
MANUFACTURING PROCESS

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.

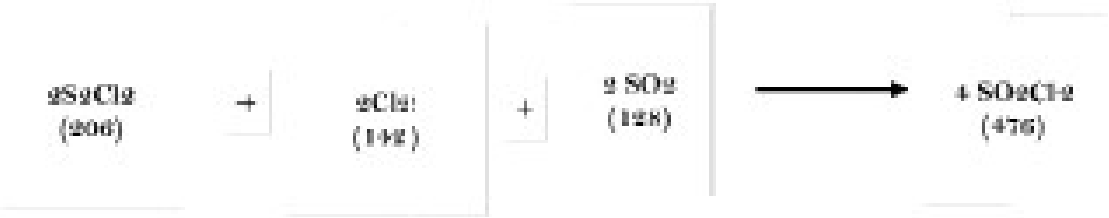
Note:

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.

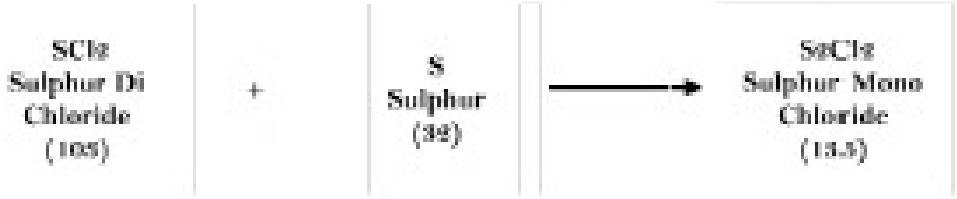
Chemical Reaction -1



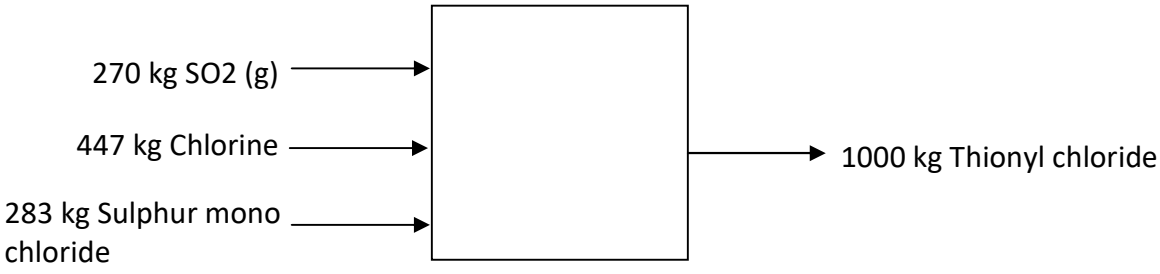
Chemical Reaction -2



Chemical Reaction -3



MASS BALANCE OF THIONYL CHLORIDE



10. SULPHUR CHLORIDE (PROPOSED)

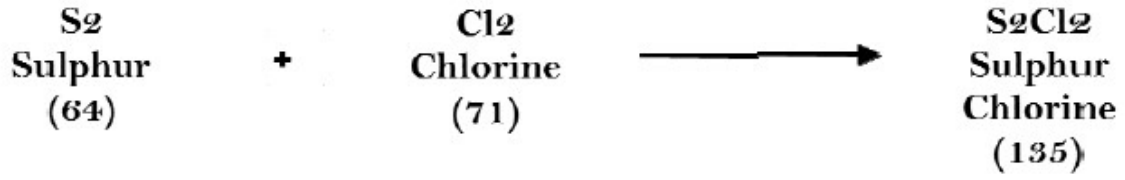
MANUFACTURING PROCESS

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.

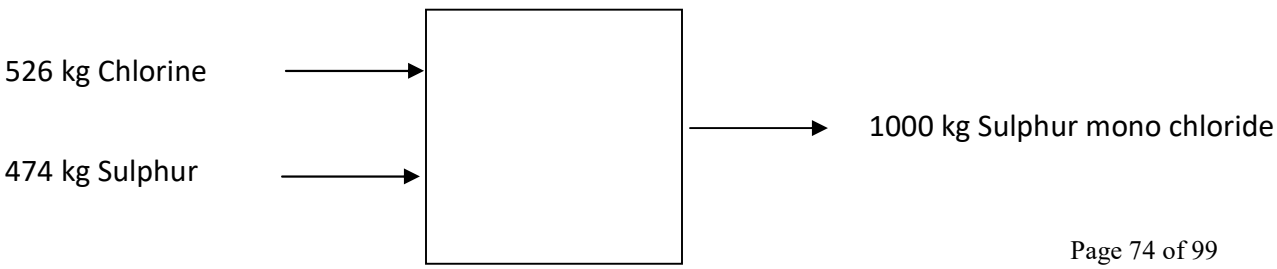
Note:

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



MASS BALANCE OF THIONYL CHLORIDE



11. ACID CHLORIDE LIKE VALEORYL CHLORIDE, PHENYL ACETYL CHLORIDE (PROPOSED)

MANUFACTURING PROCESS

VALEORYL CHLORIDE:

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.

$CH_3(CH_2)_3COOH + SOCl_2 = CH_3(CH_2)_3COCl + SO_2 + HCl$

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 Acis 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.

Per 1000 Kgs of Valeoryl Chloride:

Thionyl Chloride: 990 Kgs,
Valeoric Acid : 850 Kgs.

By Product: HCl Gas to Scrubber 302 Kgs,
By Product: So2 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:

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 Acis 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.

Per 1000 Kgs of Phenyl Chloride:

Thionyl Chloride: 970 Kgs,
Valeoric Acid : 856 Kgs.

By Product: HCl Gas to Scrubber 336 Kgs,

By Product: So2 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

ANNEXURE-IV

DETAILS OF WATER CONSUMPTION, WASTEWATER GENERATION AND TREATMANT

BREAK UP OF WATER CONSUMPTION AND WASTEWATER GENERATION

WATER CONSUMPTION:

WATER CONSUMPTION		**QUANTITY (KL/DAY)**		
		EIXSTING	**FOR EXPANSION**	**TOAL QTY AFTER EXPANSION**
Domestic		113	64	177
Industrial	Process	151	288	439
	Washing	130	80	210
	Boiler	358	172	530
	Cooling	440	196	636
	Total (Industrial)	**1079**	**736**	**1815**
Others		55	0	55
Gardening		53	0	53
Total Water Consumption (KL/DAY)		**1300**	**800**	**2100**

WASTEWATER GENERATION:

WASTEWATER GENERATION		**QUANTITY (KL/DAY)**		
		EIXSTING	**FOR EXPANSION**	**TOAL QTY AFTER EXPANSION**
Domestic		90	35	125
Industrial	Process	326	182	508
	Washing	130	97	227
	Boiler	45	31	76
	Cooling	55	55	110
	Total (Industrial)	**556**	**365**	**921**
Others			---	---
Gardening			---	---
Total wastewater Generation KL/DAY)		**646**	**400**	**1046**

TREATMENT PROCESS

PROCESS DESCRIPTION: ETP (EFFLUENT TREATMENT PLANT)

High TDS effluent generated from the process is sent to Evaporation System (triple effective evaporator). Water is evaporated, condensed and recycled to process/scrubber/sent to proposed Effluent Treatment plant (ETP). Remaining salts from Evaporator will be sent to authorize secured land filling site at BEIL Ankleshwar. Rest of the effluent is sent to ETP.

DETAILS OF UNITS OF ETP

SR. NO.	NAME OF UNIT	DIMENSIONS (m)	NO. OF UNIT NOS.
1.	Oil & Grease Trap	1.8 x 3.6 x 2.5	01
2.	Collection Tank	2.5 X 2.5 X 3.5	02
3.	Neutralization Tank	2.5 x 2.5 x 3.0	02
4.	Flash Mixer	1.0 x 1.0 x 1.3	01
5.	Primary Clarifier – I	3.0 ϕ x 3.3 HT	01
6.	Aeration Tank – I	12.0 x 24.0 x 3.5	01
7.	Secondary Settling Tank – I	3.5 ϕ x 3.3 HT	01
8.	Clarified Water Tank	2.5 x 2.5 x 3.3	01
9.	Pressure Sand Filter	2.1 ϕ x 1.5 HT	01
10.	Activated Carbon Filter	3.5 ϕ x 3.3 HT	01
11.	Sludge Drying Beds	5.0 x 5.0 x 1.2	05
12.	Sludge Storage Area	8.0 x 3.0 x 1.2	01

- Removal of oil & grease by skimming in oil & grease trap.
- Collection / equalization of effluent in collection tank provided with diffused air mixing system.
- Transfer of effluent to neutralization tank with a pump with level control switch.
- Neutralization with caustic or HCl to pH 7.5
- Coagulation flocculation in Flocculator by addition of PAC & Poly Electrolyte.

- Overflow from flocculation tank passes through the CPS & PPS for further settling.
- Biological treatment under aerobic condition with the help of activated biomass and micro fine bubble diffused aeration system.
- Settling of biomass in built in secondary settling tank, recirculation of active biomass into aeration tank.
- Collection of secondary treated effluent into a collection tank.
- Tertiary polishing treatment in pressure sand filter and activated carbon filter.
- The final treated effluent will be discharged through GIDC sewer line to deep sea.

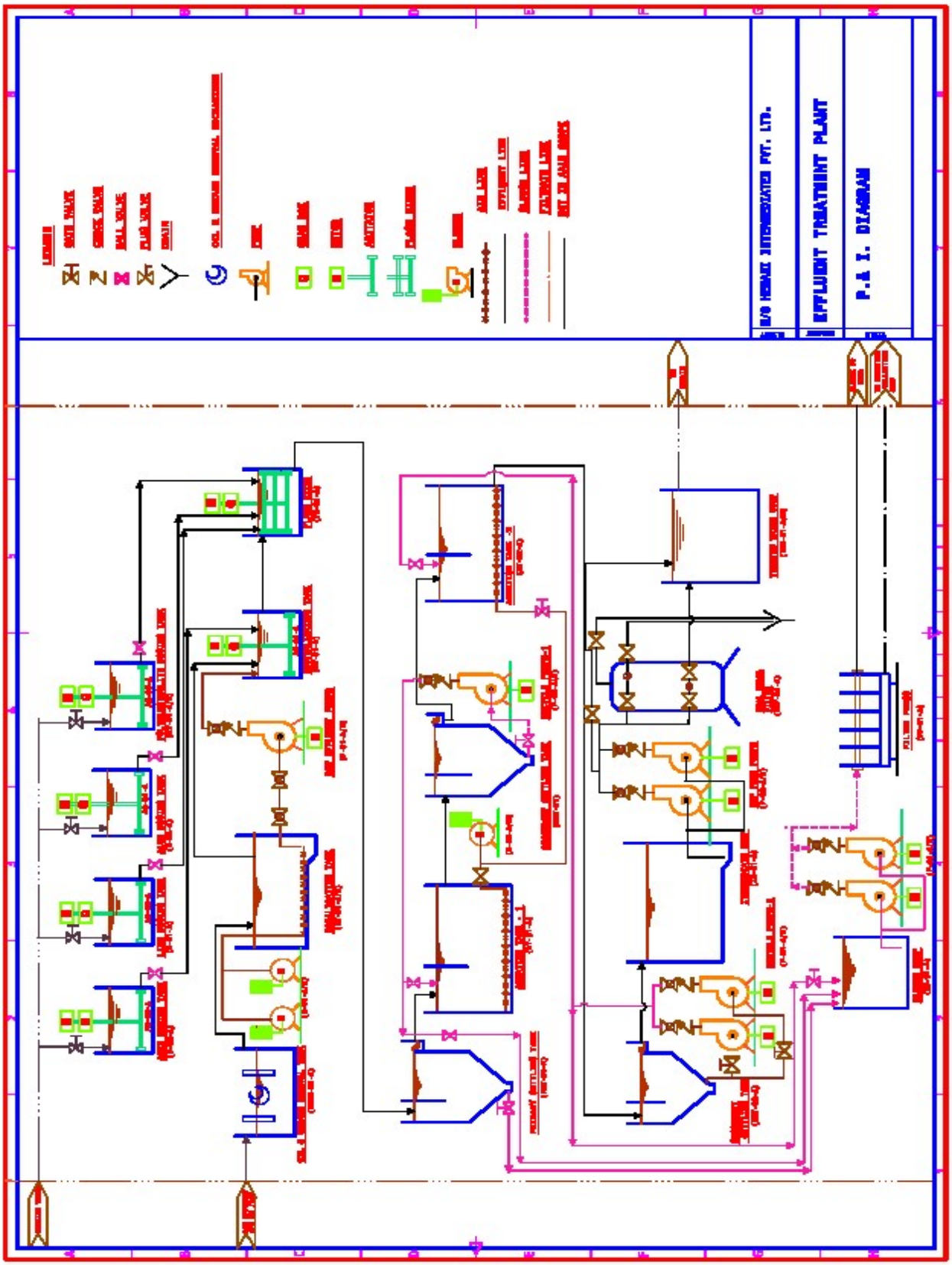
TOXIC EFFLUENT:

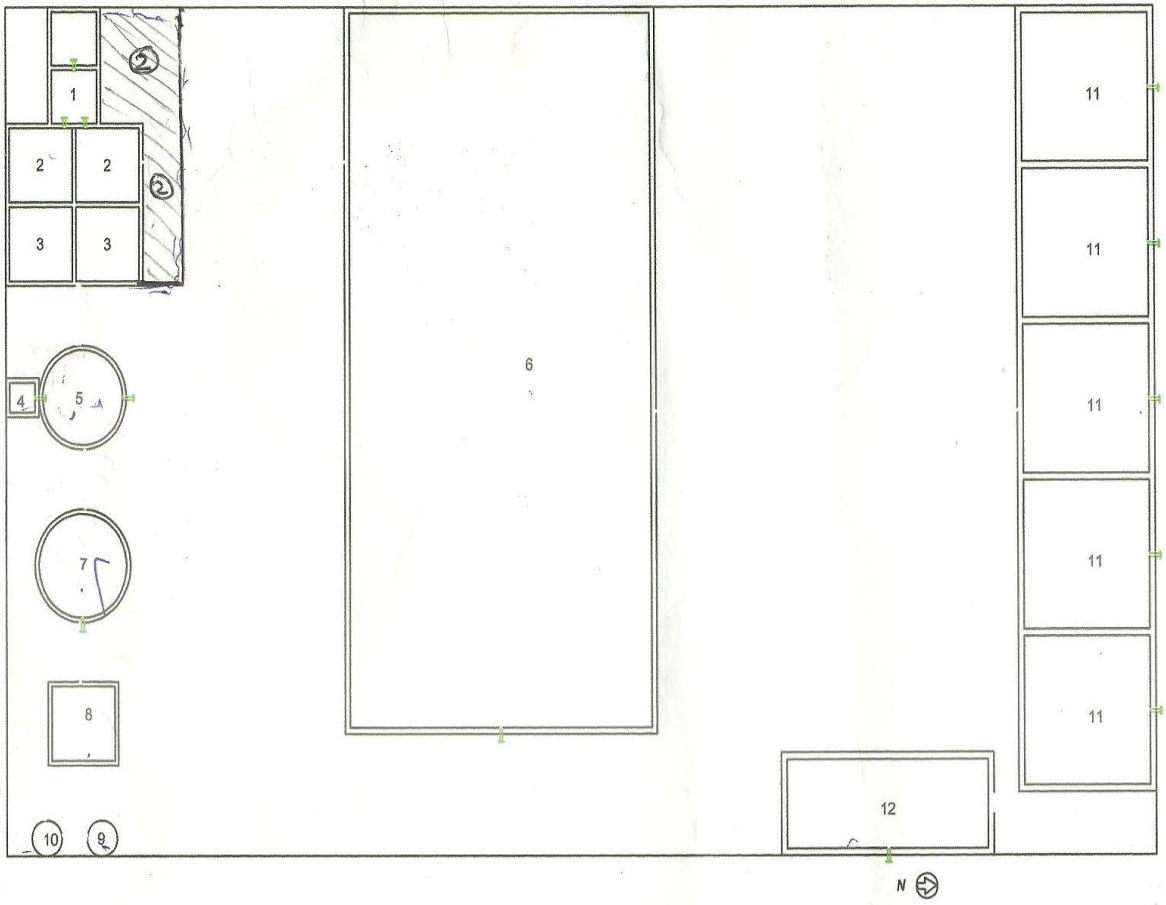
Effluent after passing through bar screen chamber and oil & grease trap is collected in the equalization tank (2 Nos. of 20 m^3 capacities each). From the equalization tank the effluent is passed through alkali peroxide treatment system for destruction of cyanide and then the effluent is passed through a transfer sump to incinerator for incineration.

DOMESTIC EFFLUENT:

Domestic effluent will be treated separately through septic tank/soak pit or will be treated with non – toxic effluent.

ETP DRAWING:





UNITS' SPECIFICATIONS: FLOW : 150 KL/DAY

1. OIL & GREASE TRAP (1800 x 3600 x 2500) (RCC)
2. COLLECTION TANK (2500 x 5000 x 3500) (RCC)(2 COMPARTMENT)
3. NEUTRALIZATION TANK (2500 x 2500 x 3000) (RCC) (2 NOS)
4. FLASH MIXER (1000 x 1000 x 1300) (RCC)
5. PRIMARY CLARIFIER (Ø-3200, HT-3300) (RCC)
6. AERATION TANK (12000 x 24000 x 3500) (RCC)
7. SECONDARY CLARIFIER (Ø- 3500, HT-3300) (RCC)
8. CLARIFIED WATER TANK (2500 x 2500 x 3300) (RCC)
9. PRESSURE SAND FILTER (Ø- 1.2 , HT- 1.5) (MS EPOXY)
10. ACTIVATED CARBON FILTER (Ø- 1.2 , HT- 1.5) (MS EPOXY)
11. SLUDGE DRYING BEDS (5000 x 5000 x 1200) (5 NOS.) (BM)
12. SLUDGE STORAGE AREA (8000 x 3000 x 1200) (BM)

+ 9.05 x 1.500 x 3.500
1.45 x 3.75 x 2.500
total Collection = 43.75 + 61.10
104.85 m3

EVAPORATOR SYSTEM FOR RO REJECT EFFLUENT

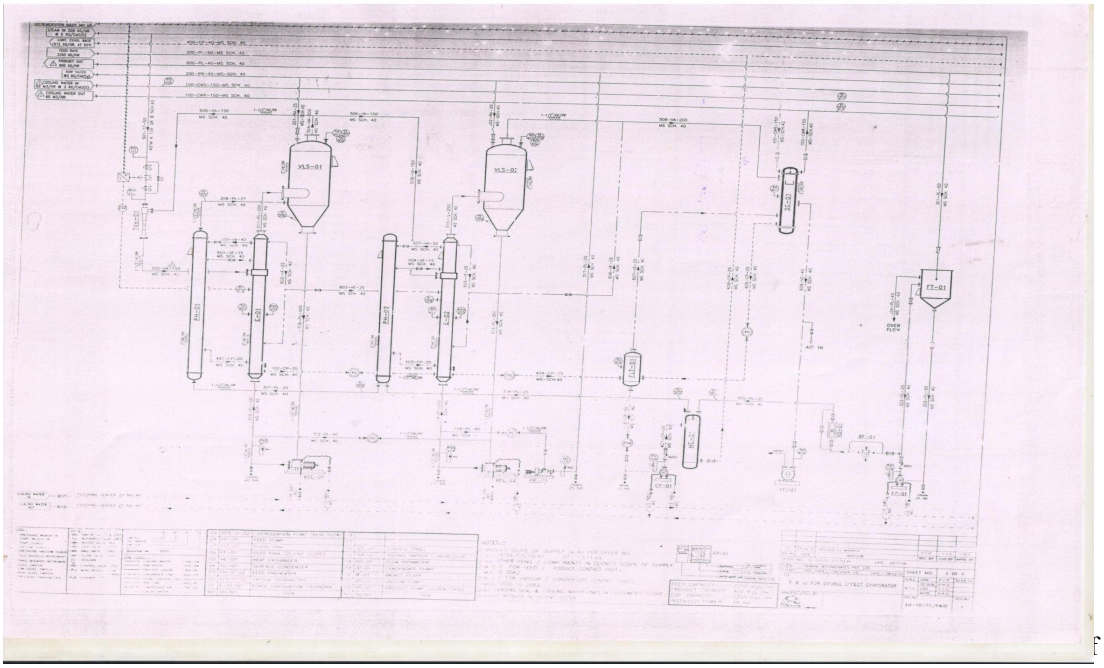
TECHNICAL DATA:

Feed Material	: Pre-treated Effluent
Input Capacity	: 140 KL/Day
pH	: 7.5-8.0
Solids Output from the Filter	: 5.2 MT/Day
Plant Type	: Quadruple Effect

PROCESS DESCRIPTION:

The pretreated effluent will be preheated by using hot condensate coming from the evaporator and fed to the continuous IV effect evaporator and the effluent concentrated continuously by using steam as heating medium to the first effect. The evaporated and condensed water will be recycled to ETP.

The evaporation will be carried out till the inorganic salts will start crystallizing in the evaporator and slurry is formed. The slurry of salts and effluent will be withdrawn and fed to settler. The thick slurry coming from the settler will be fed to a Nutsche Filter for separating the solids. Two Nutsche filters will be provided to sustain continuous operation. The ML coming from the Nutsche Filters will be collected in a ML tank and pumped back to the evaporator. The solids coming from the Nutsche filter will be manually scooped and can be dumped to BEIL/GEPIL.



INCINERATOR SYSTEM

PROCESS DESCRIPTION:

PRIMARY COMBUSTION CHAMBER

The drums containing wastes as well as the organic waste will be burned into Primary Combustion Chamber having dual fuel burner (LDO). The organic vapors as well as flue gas will release from primary Combustion chamber between 150-450 ^{0} C. The temperature of the drums will be in the region 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). The chamber will maintain at sufficiently high temperature of the order of about 900-1200 ^{0} C for complete oxidation of organic/flue gas. i.e complete incineration.

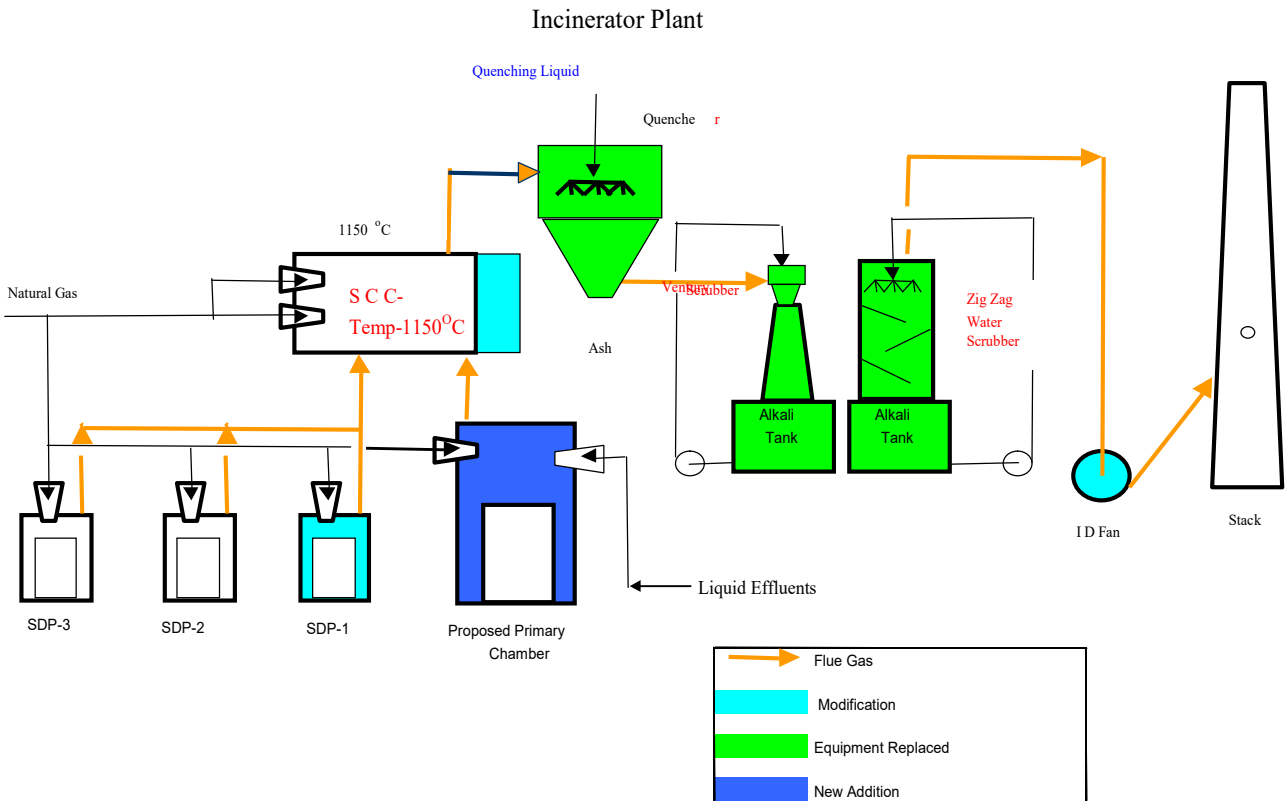
These hot gases will passed through spray quencher where water is sprayed as cooling agent to cool down the hot gases from a temperature from 1200 ^{0} C to 150 ^{0} C. The cooling water will spray through three spray nozzles. Flue gases will further cooled by mixing atmospheric air through dilution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

SCRUBBING SYSTEM

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

CHIMNEY

The clean gases will 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.



Note:

For new waste water generation load, same configuration of second ETP will be constructed.

ANNEXURE-V

DETAILS OF HAZARDOUS/ SOLID WASTE GENERATION, HANDLING & DISPOSAL

Sr. No.	Source Of Waste	Category	Existing Quantity (Mt/ Month)	Expansion Qty (Mt/ Month)	Total Qty After Expansion (Mt/ Month)	Treatment & Disposal
1	ETP Sludge	34.3	34.015	165.985	200	Collection, storage , transportation & final disposal at common TSDF by M/S. GEPIL, SURAT or M/S. BEIL, ANKLESHWAR
2	Non-Toxic Process Waste	29.1	228	22	250	Collection, storage , transportation & final disposal at common TSDF by M/S. GEPIL, SURAT or M/S. BEIL, ANKLESHWAR
3	Incinerable Waste	36.2	350	350	700	Collection, storage , transportation & final disposal at common TSDF by M/S. GEPIL, SURAT or M/S. BEIL, ANKLESHWAR
4	Distillation Residue + Incineration Waste	20.3	13.1	136.9	150	Collection, storage , transportation & final disposal at common TSDF by M/S. GEPIL, SURAT or M/S. BEIL, ANKLESHWAR
5	Used Oil	5.1	---	200 Ltrs	200 Ltrs	Collection, storage, transportation & disposal by selling to registered reprocessors / reuse as lubricant
6.	Discarded Containers / Bags	33.3	---	1000 Nos	1000 Nos	Collection, storage, decontamination, detoxification & sale to GPCB authorized vendors
7.	Incineration Ash	36.2	---	7.5	7.5	Collection, storage & sent to M/S. BEIL, ANKLESHWAR
8	Coal Ash	36.2	---	4040	4040	Collection, storage & sell to brick manufactures
9	Salts of Multiple Effective Evaporator	---	---	250	250	Collection, storage & sent to M/S. BEIL, ANKLESHWAR

ANNEXURE-VI

DETAILS OF STACKS & VENTS (EXISTING & PROPOSED)

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 (PROPOSED)	Bag Filter	50	SPM SO_2 NOx	150 mg/nm^3 100 ppm 50 ppm
3	Incinerator stack (fuel used LDO 5 Kl/month)	Multi cyclone	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 stack (fuel used fuel oil 15 Kl/month)	--	12	SPM SO_2 NOx	150 mg/nm^3 100 ppm 50 ppm
Process Gas Stacks					
5.	Reactor - I	Caustic Scrubber	15	SO_2 NOx HC H_2S HCl Cl_2	40 mg/NM3 25 mg/NM3 15 mg/NM3 45 mg/NM3 20 mg/NM3 9 mg/NM3
6.	Reactor - II	Venturi Scrubber	15		
7.	TC (PROPOSED)	Caustic Scrubber	25	SO_2 HCl Cl_2	40 mg/NM3 20 mg/NM3 9 mg/NM3

ANNEXURE-VII

DETAILS OF HAZARDOUS CHEMICAL'S STORAGE & HANDLING

DETAILS OF HAZARDOUS CHEMICAL'S STORAGE & HANDLING (EXISTING)

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	• 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	• Store at ambient temperatures with venting open. Protect containers against physical damage and water. • Handling should occur in a chemical fume hood. • 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	• Store at ambient temperatures with venting open. Protect containers against physical damage and water. • Handling should occur in a chemical fume hood.
4	28 %	2	20 KL	Tank Farm	• Safeguard containers against

SR. NO.	NAME OF HAZARDOUS SUBSTANCE	NO. OF STORAGE TANK	TOTAL QUANTITY	PLACE OF STORAGE	CONTROL MEASURES PROVIDED
	Hydrochloric Acid			Area	mechanical injury. • Emergency eyewash fountains and safety showers should be available in the immediate vicinity of potential exposure. Do not puncture or incinerate containers. • Wear appropriate chemical protective clothing.
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	• 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

SR. NO.	NAME OF HAZARDOUS SUBSTANCE	NO. OF STORAGE TANK	TOTAL QUANTITY	PLACE OF STORAGE	CONTROL MEASURES PROVIDED
					within flammable limits noted above.
8	EDC	1	20 KL	Tank Farm Area	• 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	• 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., No manual handling
10	IPA	1	20 KL	Tank Farm Area	• 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	• 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

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

DETAILS OF HAZARDOUS CHEMICAL'S STORAGE & HANDLING (PROPOSED)

Sr. No.	Hazardous Chemicals	Maximum Storage Capacity (KL)	Actual Stored (KL)	State of Operations Temperature and pressure	Possible Hazard	Control Measures Provided
ACEPHATE:						
1	Acetic Anhydride	15	10	Ambient	Toxic, Corrosive & Flammable	Separately stored with fire extinguishers & fire hydrant
2	Ammonia (20% liquor)	15	10	Ambient	Toxic	Separately stored
3	Ethyl Acetate	15	10	Ambient	Flammable	Separately stored with fire extinguishers & fire hydrant
4	Methylene dichloride	15	10	Ambient	Toxic	Separately stored
GLYPHOSATE ACID TECHNICAL						
1	Formaldehyde	150 kg/drum	10	Ambient	Flammable	fire extinguishers & fire hydrant point
2	PCl3	15	10	Ambient	Toxic, Corrosive & Flammable	Separately stored with fire extinguishers & fire hydrant & foam cylinders
DELTAMETHRIN						
1	MDC	15	10	Ambient	Toxic	Separately stored
2	Aluminium Chloride	25 kgs x 120 bags	25 kgs x 100 bags	Ambient	Corrosive	Separately stored
3	Benzene	20	15	Ambient	Toxic, Fire	Separately stored

Sr. No.	Hazardous Chemicals	Maximum Storage Capacity (KL)	Actual Stored (KL)	State of Operations Temperature and pressure	Possible Hazard	Control Measures Provided
					Hazard	with fire extinguishers & fire hydrant, flame arrestor & vent breather provided to tank.
4	Toluene	20	15	Ambient	Fire Hazard	Separately stored with fire extinguishers & fire hydrant, flame arrestor & vent breather provided to tank.
5	NaCN	5 ton	3 ton	Ambient	Highly Toxic	Separately stored in strong room with all safety measures
6	Bromine	6.3 x 2 no. tanks	8 ton	Ambient	Corrosive, Toxic	Separately stored & vent attached to scrubber

ANNEXURE-VIII

FUEL, ENERGY REQUIREMENT & DETAILS OF CAPTIVE POWER PLANT

SOURCE OF POWER (KW)

Sr.No.	GEB	DG sets (As Standby)
Existing		
1	650 KVA	1010 KVA
Proposed		
2	2250 KVA	2020 KVA (1010 KVA *2)

FUEL REQUIREMENT

Sr. No.	Fuel	Requirement	Purpose
1	Natural Gas or Coal	2250 MT/Month (Coal) 1150 MT/ Month (Natural gas)	Steam Generation
2	LDO	20 KL/Month	For Incinerator
3	Fuel Oil	15 KL/Month	For Thermic Fluid System
4	Diesel	5 KL/Month	For DG Set
5	LNG	--	--

DETAILS OF CAPTIVE POWER PLANT

Captive Power Plant (CPP) will be installed with details as follows:-

Capacity: 1.66 MW

Boiler : 16 Ton / hr

Turbine: Condensing - cum - Back pressure

Net Power Output: 1.66 MW

* The CPP will be operated phase wise & will brought up to full capacity over the period of 3 years after commissioning the phase –I.

ANNEXURE-IX

SOCIO - ECONOMIC IMPACTS

1) EMPLOYMENT OPPORTUNITIES

During construction phase, skilled and unskilled manpower will be needed. This will temporarily increase the employment opportunity. Secondary jobs are also bound to be generated to provide day-to-day needs and services to the work force. This will also temporarily increase the demand for essential daily utilities in the local market. The manpower requirement for the proposed expansion 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

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

3) PUBLIC HEALTH

During construction period, workers will be provided with basic amenities like safe water supply, low cost sanitation facilities, first aid, required personal protective equipment, etc. Otherwise, there could be an increase in diseases related to personal hygiene. The company will regularly examine, inspects and tests its emission from sources to make sure that the emission is below the permissible limit. Hence, there will not be any significant change in the status of sanitation and the community health of the area, as sufficient measures have been taken and proposed under the EMP.

4) TRANSPORTATION AND COMMUNICATION

Since the proposed factory is having proper linkage for the transport and communication, the development of this project will not cause any additional impact. In brief, as a result of the expansion 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 expansion is not expected to make any significant change in the existing status of the socio - economic environment of this region.

ANNEXURE-X

PROPOSED TERMS OF REFERENCE FOR EIA STUDIES

1. Project Description

- Justification of project.
- Promoters and their back ground
- Project site location along with site map of 5 km area and site details providing various industries, surface water bodies, forests etc.
- Project cost
- Regulatory framework
- Project location and Plant layout.
- Existing infrastructure facilities
- Water source and utilization including proposed water balance.
- Product spectrum (proposed products along with production capacity) and process
- List of hazardous chemicals with their toxicity levels.
- Mass balance of each product along with the batch size
- Storage and Transportation of raw materials and products.
- Existing environmental scenario

2. Description of the Environment and Baseline Data Collection

- Micrometeorological data for wind speed, direction, temperature, humidity and rainfall in 5 km area.
- Study of Data from secondary sources.
- Other industries in the impact area
- Prevailing environment quality standards
- Existing environmental status Vis a Vis air, water, noise, soil in 5 km area from the project site. For SPM, RSPM, SO2, NOx.
- Ground water quality at 5 locations within 5 km.
- Complete water balance

3. Socio Economic Data

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

4. Impacts Identification and Mitigatory Measures.

- Impact on air and mitigation measures including green belt
- Impact on water environment and mitigation measures
- Soil pollution source and mitigation measures
- Noise generation and control.
- Solid waste quantification and disposal.
- Control of fugitive emissions

5. Environmental Management Plan

- Details of pollution control measures
- Environment management team
- Proposed schedule for environmental monitoring including post project

6. Risk Assessment

- Objectives, Philosophy and methodology of risk assessment
- Details on storage facilities
- Identification of hazards
- Consequence analysis through occurrence & evaluation of incidents
- Recommendations on the basis of risk assessment done
- Disaster Management Plan.
- Safety precautions for the storage of Chemicals and vapour condensation.

7. Information for Control of Fugitive Emissions

8. Post Project Monitoring Plan for Air, Water, Soil and Noise.

9. Occupational Health and Safety Program for the Project.

10. Information on Rain Water Harvesting

11. Green Belt Development plan

ANNEXURE-XI

MEMBERSHIP CERTIFICATE FOR COMMON SOLID WASTE DISPOSAL FACILITY

HEMANI INTERMEDIATES PVT. LTD.
(HEMANI GROUP)
Plot No. CH/5, GIDC Industrial Estate, Dahej, Tal. Vagara. Dist Bharuch.
Email : hocpl2003@yahoo.com

HIPL/BEIL/2010
June 12, 2010

M/s. Bharuch Enviro Infrastructure Ltd
117, GIDC Estate
Ankleshwar – 393 002

Sub: Application for Membership

Dear Sir,

Please find enclosed following documents for issue of membership certificate to our Dahej unit for use of your TSDF facility.

1. Application form in prescribed format
2. List of Directors
3. List of Raw Materials
4. Effluent Treatment Flow Diagram
5. Copy of CTE (Consent to Establish) from GPCB
6. Copy of Registration certificate (IEM) from DIC
7. Copy of allotment letter from GIDC for the plot
8. Articles / Memorandum of association.
9. Demand Draft of Rs.4,92,000/- towards membership fee.

Please issue us the membership certificate at the earliest and oblige.

Thanking you,

Yours faithfully,

For HEMANI INTERMEDIATES PRIVATE LTD

AUTHORISED SIGNATORY
Encl: as above.

O/C

Received 14/06/10

Bharuch Enviro Infrastructure Ltd. Ankleshwar

- Head Office : 706-710, Reena Complex, Vidyavihar (W), Mumbai-400 086. INDIA
  Tel. : +91-22-2515 7491, 2515 6988, Fax : +91-22-2513-4483
- Regional Office : Plot No. 3207 & 3208, G.I.D.C., Industrial Estate, Ankleshwar - 393 002. (INDIA)
  Tel. : +91-02646-250627, 226195 Fax : +91- 02646-227554

RECEIPT

BHARUCH ENVIRO INFRASTRUCTURE LTD.

PLOT NO. 9701-16, G.I.D.C. ESTATE, ANKLESHWAR - 399 002.
Ph. : 02646 - 253135, 225228

Receipt No. : 03136 Date : 14/06/2010

Received with thanks from M/s. Hemani Intermediates Pvt. Ltd. Dahej Sum of Rs. 4,92,000/-

(Rupees Four Lacs Ninety Two Thousand only)

towards share Capital / Deposit / Operation charges / Capacity Commitment Charges / Others vide Cheque / Demand Draft No. 000461

dated 12-06-2010 drawn on AXIS Bank Ltd. Bnk.

Rs. 492000/-

Subject to realisation of cheque / D.D

Authorised Signatory

BHARUCH ENVIRO INFRASTRUCTURE LIMITED

Date 24/07/10

Hemani Intermediates` Pvt. Ltd.
Plot No.CH-5, GIDC,
Taluka Vagra,
Dahej, Dist. Bharuch.

Sub : Membership Certificate for Common Solid Waste Disposal Facility.

Dear Sir,

We hereby certify that you have become member for the common Solid/Hazardous waste disposal facility of Bharuch Enviro Infrastructure Ltd., at GIDC, Ankleshwar. You have booked solid waste quantity of **410 MT/year.** You have also paid your capacity commitment charges. Your Membership No. is **Oth/121.**

Thanking you,

Yours faithfully,
For BHARUCH ENVIRO INFRASTRUCTURE LTD.

AUTHORISED SIGNATORY

Plot No. 9701-16 GIDC Estate, Post Box No. 82, Ankleshwar 393 002, Dist.: Bharuch (Gujarat)
Phones (02646) 253135, 225228 • Fax : (02646) 222849 • E-mail : panjwania@uniphos.com