FORM-1

for

PROPOSED EXPANSION OF SPECIALTY CHEMICALS IN EXISTING UNIT

of

M/S. REGAL REMEDIES LTD. (UNIT-II)

[FORMALLY KNOWN AS M/S. SAYONA INTERMEDIATES P. LTD.]

PLOT NO. 7406, GIDC ESTATE, ANKLESHWAR,

DISTRICT - BHARUCH-393002, GUJARAT

EIA CONSULTANT

NABL Accredited Testing Laboratory
ISO 9001:2008 Certified Company
Aqua-Air Environmental Engineers P. Ltd.
(Pollution Control Consultants & Engineers)
403, Centre Point, Nr. Kadiwala School,
Ring Road, Surat – 395002

APPENDIX I
FORM 1

(I) Basic Information

Sr. No.	Item	Details
1.	Name of the Project/s	M/s. Regal Remedies Ltd. (Unit-II)
2.	S. No. in the Schedule	5(f)
3.	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number of wells to be drilled	For Proposed production capacity please refer Annexure-I
4.	New/Expansion/Modernization	Expansion
5.	Existing capacity/area etc.	For existing production capacity please refer **Annexure-I**
6.	Category of project i.e. 'A' or 'B'	'A'
7.	Does it attract the general condition? If yes, please specify.	Yes. Located in critically polluted area (Ankleshwar)
8.	Does it attract the specific condition? If yes, please specify.	-
9.	Location	
	Plot/Survey/Khasra No.	Plot No. 7406
	Village	GIDC Estate, Ankleshwar
	Tehsil	Ankleshwar
	District	Bharuch
	State	Gujarat
10.	Nearest railway station/airport along with distance in kms.	Nearest Railway Station : Ankleshwar = 4.15 kms Nearest Airport: Surat = 63 kms
11.	Nearest Town, city, District Headquarters along with distance in kms.	Nearest town: Ankleshwar = 5 kms, Nearest District Head quarter: Bharuch = 10 kms
12.	Village Panchayats, zilla parishad, Municipal corporation, Local body (Complete postal addresses with telephone nos. to be given)	Plot No. 7406, GIDC Estate, Ankleshwar, Dist: Bharuch-393002, Gujarat
13.	Name of the applicant	Dr. Alpesh Savaliya
14.	Registered address	M/s. Regal Remedies Ltd. (Unit-II) Plot No. 7406, GIDC Estate, Ankleshwar, Dist: Bharuch-393002, Gujarat
15.	Address for correspondence:	
	Name	Dr. Alpesh Savaliya
	Designation (Owner/Partner/CEO)	Director
	Address	M/s. Regal Remedies Ltd. (Unit-II) Plot No. 7406, GIDC Estate, Ankleshwar, Dist:

		Bharuch-393002, Gujarat
	Pin Code	393002
	E-Mail	alpesh@regalremedies.com
	Telephone No.	02646-221903
	Mobile	+919879856562
	Fax No.	02646-221903
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?	No
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)	N.A.
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 thereof (with approximate quantities / rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	No	Unit is located in notified industrial area.
1.2	Clearance of existing land, vegetation and buildings?	No	
1.3	Creation of new land uses?	No	
1.4	Pre-construction investigations e.g. bore houses, soil testing?	No	
1.5	Construction works?	No	Construction will be carried out as per plan shown in **Annexure-II**
1.6	Demolition works?	No	
1.7	Temporary sites used for construction workers or housing of construction workers?	No	
1.8	Above ground buildings, structures or Earthworks including linear structures, cut and fill or excavations	Yes	Construction will be carried out as per plan shown in **Annexure-II**
1.9	Underground works including mining or tunneling?	No	
1.10	Reclamation works?	No	
1.11	Dredging?	No	
1.12	Offshore structures?	No	
1.13	Production and manufacturing	Yes	List of Products is attached as **Annexure- I** and manufacturing process attached as **Annexure-III.**
1.14	Facilities for storage of goods or materials?	Yes	Facilities for storage of raw materials & products will be developed as shown in **Annexure-II.**
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	Primary treatment facility is provided for effluent having low COD. Treated effluent will be sent to FETP after achieving prescribed norms. Details of ETP are attached as **Annexure: IV.** Hazardous waste shall be disposed to TSDF Site of BEIL, Ankleshwar. Details of solid & hazardous waste generation and disposal are attached as **Annexure: V.**

1.16	Facilities for long term housing of operational workers?	No	Local operational staff of around 25 people will be employed. No housing facility will be provided.
1.17	New road, rail or sea traffic during construction or operation?	No	The project is situated in GIDC's Notified Industrial Area. It is having well connectivity of Road as well as Railways.
1.18	New road, rail, air waterborne or other airports etc?	No	Existing transportation system is adequate.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	
1.20	New or diverted transmission lines or pipelines?	No	
1.21	Impoundment, damming, converting, realignment or other changes to the hydrology of watercourses or aquifers?	No	
1.22	Stream crossings?	No	
1.23	Abstraction or transfers or the water form ground or surface waters?	No	No ground water shall be used. The raw water shall be supplied by GIDC Ankleshwar Water Authority.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	No	The project is located in G.I.D.C., Ankleshwar. No water body, drainage or run off will be affected due to the project. Storm water drainage will be provided & diverted to existing natural storm water drain.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	No	By road only.
1.26	Long-term dismantling or decommissioning or restoration works?	No	No such work will be involved.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	
1.28	Influx of people to an area in either temporarily or permanently?	No	
1.29	Introduction of alien species?	No	
1.30	Loss of native species of genetic diversity?	No	
1.31	Any other actions?	No	

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

short supply):

Sr. No	Information/checklist confirmation	Yes/ No?	Details there of (with approximate quantities/rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agriculture land (ha)	No	Proposed Project site is located in GIDC, Ankleshawr.
2.2	Water (expected source & competing users) unit: KLD	Yes	Source: GIDC water supply For water consumption after proposed expansion, please refer **Annexure - IV**
2.3	Minerals (MT)	No	
2.4	Construction material -stone, aggregates, sand / soil (expected source MT)	Yes	Construction materials, like steel, cement, crushed stones, sand, rubble, etc. required for the project will be procured from the local market of the region.
2.5	Forests and timber (source - MT)	No	
2.6	Energy including electricity and fuels source, competing users) Unit: fuel (MT), energy (MW)	Yes	Power required from DGVCL is 125 KVA. The Detail regarding fuel consumption is shown in **Annexure VI**.
2.7	Any other natural resources (use appropriates standard units)	No	

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

Sr. No.	Information / Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities / rates wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	Yes	Please refer **Annexure : VII**
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	

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

Sr. No.	Information/Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	No	
4.2	Municipal waste (domestic and or commercial wastes)	No	
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	Please refer **Annexure: V**
4.4	Other industrial process wastes	Yes	Please refer **Annexure: V**
4.5	Surplus product	Yes	Not applicable
4.6	Sewage sludge or other sludge from effluent treatment	Yes	Please refer **Annexure: V**
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	No	

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

Sr. No.	Information/Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels From stationary or mobile sources	Yes	For details Please refer **Annexure – VI**
5.2	Emissions from production processes	Yes	For details Please refer **Annexure – VI**
5.3	Emissions from materials handling including storage or transport	Yes	For details Please refer **Annexure – VI**
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
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	The Noise level will be within the prescribed limit. At noisy areas adequate preventive & control measures will be taken. No significant noise, vibration or emission of light & heat from the unit.
6.2	From industrial or similar processes	Yes	-do-
6.3	From construction or demolition	No	
6.4	From blasting or piling	No	
6.5	From construction or operational traffic	No	
6.6	From lighting or cooling systems	No	
6.7	From any other sources	No	

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

Sr. No	Information/Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	Yes	All the raw materials will be stored separately in designated storage area and safely as per details given in **Annexure: VII.** Bund walls will be provided around raw materials storage tanks for containing any liquid spillage. Other materials will be stored in bags / drums on pallets with concrete flooring and no spillage is likely to occur. For Details Please refer **Annexure-VII.**
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	No	Sewage effluent shall be disposed through septic tank & soak pit system.
7.3	By deposition of pollutants emitted to air into the land or into water	No	
7.4	From any other sources	No	
7.5	Is there a risk of long term build up of pollution in the environment from these sources?	No	

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

Sr. No	Information/Checklist confirmation	Yes/ No?	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	Yes	For detail please refer **Annexure – VII**
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 thereof (with approximate quantities / rates, wherever possible) with source of information data
9.1	Lead to development of supporting. laities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: * Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) • housing development • extractive industries • supply industries • other	No	For detail please refer **Annexure – VIII**
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	

(III) Environmental Sensitivity

Sr. No	Information/Checklist confirmation	Name / Identity	Aerial distance (within 25 km). Proposed Project Location Boundary.
1	Areas protected under international	--	The site is located in Notified

	conventions national or local legislation for their ecological, landscape, cultural or other related value		Industrial Area of GIDC Ankleshwar, Dist Bharuch, Gujarat.
2	Areas which are important or sensitive for Ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	--	The site is located in Notified Industrial Area of GIDC Ankleshwar. Dist Bharuch, Gujarat.
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	--	Site is located in Notified Industrial Area of GIDC Ankleshwar
4	Inland, coastal, marine or underground waters	Yes	Arabian Sea = 40 Kms River Narmada = 9 Kms
5	State, National boundaries	No	
6	Routes or facilities used by the public for to recreation or other tourist, pilgrim areas.	--	N.A.
7	Defense installations	--	N.A.
8	Densely populated or built-up area	Yes	Ankleshwar City = 5 km
9	Areas occupied by sensitive man-made land community facilities)	--	N.A.
10	Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, tourism, minerals)	--	N.A.
11	Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)	--	N.A.
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions)	--	N.A.

Environmental Management Plan and Environmental Monitoring Plan are attached as Annexure: IX.

I hereby give 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: 08.02.2017
Place: Ankleshwar

For REGAL REMEDIES LTD. (Unit-II)

REGAL REMEDIES LIMITED ANKLESHWAR

Dr. Alpesh Savaliya
(Director)

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 Wastewater 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	Socio-economic Impacts
IX	Proposed Terms of Reference for EIA studies

ANNEXURE-I A

LIST OF PRODUCTS WITH THEIR PRODUCTION CAPACITY

Existing

Sr. No.	Product	Existing Qty. MT/Month	Total Proposed MT/Month
1	Hexafluorophosphoric acid	20	50
2	Sodium bromide	15	
3	Pottasium fluoride	20	
4	Hydrogenation of Nitro compounds… (4-fluoro nitrobenzene/2- fluoronitrobenzene/Difluronitr benzene/N-ethyl-nitromethyl pyrollidine/1(4-hydroxy phenyl)4--(4-nitrophenyl)piperazine) etc…	-	
5	4-FluoroBenzylamine	-	
6	3 Amino-4 Chloro Benzotrifluoride	-	
7	4-Fluoroanisole	-	
8	2-Fluoroanisole	-	
9	4-Fluorophenylacetic acid	-	
10	2,4-Difluorobenzylamine	-	
11	4-Fluoro methylbenzoete	-	
12	4-Bromo fluorobenzene	-	
13	2-Bromo fluorobenzene	-	
14	BF3-Ether	-	
15	Phenyl ethyl bromide	-	
16	3,5-Difluoro benzonitrile	-	
17	HF-Pyridine	-	
18	4'4-Difluorobenzophenone	-	
19	6-Fluoro-3,4-dihydro-2-oxiranyl-2H-1-benzopyran (NB-III)	-	
Total			**50**

ANNEXURE-I B

LIST OF RAW MATERIAL

Sr. No	Production Capacity 50 MT/Month	Raw Material Consumption MT/Month		Production Capacity 50 MT/Month
1	Hexafluorophosphoric acid	Hydro Fluoric acid	27.5	50
		Poly Phosphoric acid	22.5	
2	Sodium bromide	48% C.S. Lye	40.45	
		48% dil. HBr	81.915	
3	Pottasium Fluoride	Potassium Hydroxide	59.475	
		45% dil. HF	38.255	
4	Hydrogenation of Nitro compounds… (4-fluoro nitrobenzene/2-fluoronitrobenzene/Difluronitr benzene/N-ethyl-nitromethyl pyrollidine/1(4-hydroxy phenyl)4--(4-nitrophenyl)piperazine) etc…	Nitro Compounds	56.94	
		Hydrogen Gas	1.39	
5	4-FluoroBenzylamine	4FBenzaldehyde	49.6	
		NH3 Gas	6.8	
		Hydrogen Gas	0.8	
6	3 Amino-4 Chloro Benzotrifluoride	4 chloro Benzotrifluoride	61.2	
		Sulphuric acid	89.7	
		Nitric acid	34.55	
		Soda Ash 10%	55.25	
		Hydrogen Gas	1.9	
7	4-Fluoroanisole	4Br FluoroBenzene	69.4	
		Sodium Methoxide	21.4	
8	2-Fluoroanisole	2Br FluoroBenzene	69.4	
		Sodium Methoxide	21.04	
9	4-Fluorophenylacetic acid	4- Fluorobenzaldehyde	40.2	
		H2 gas	0.65	
		phosphorus tribromide	29.25	
		Soda	12.5	
		NaCN	15.85	
		NaOH	12.95	
		H2SO4	15.9	
10	2,4-Difluorobenzylamine	2,4DiChloro benzonitrile	60.1	
		Potassium Fluoride	40.6	
		Hydrogen Gas	1.4	
11	4-Fluoro methylbenzoete	4-fluorobenzoic acid	45.45	
		MeOH	31.15	
12	4-Bromo fluorobenzene	FluoroBenzene	28.85	
		Bromine	48	

13	2-Bromo fluorobenzene	FluoroBenzene	28.85	
		Bromine	48	
14	BF3-Ether	Di Ethyl Ether	26.1	
		BF3 gas	23.9	
15	Phenyl ethyl bromide	Phenyl ethyl alcohol	33	
		Phosphorus tribromide	24.4	
16	3,5-Difluoro benzonitrile	3,5-difluoro bromobenzene	69.35	
		Copper Cyanide	32.2	
17	HF-Pyridine	Anhydrous hydrofluoric acid	35	
		PYRYDINE	15	
18	4'4-Difluorobenzophenone	Fluoro benzene	32.05	
		4Fbenzoylchloride	36.35	
		Alluminium chloride	30.55	
		15 % Soda Ash	5	
19	6-Fluoro-3,4-dihydro-2-oxiranyl-2H-1-benzopyran (NB-III)	para Fluoroanisole	26.25	
		Maleic anhydride	25.5	
		Aluminium trichloride	17.6	
		Na2CO3	8.5	
		Hydrogen	0.75	

SOLVENT & CATALYST

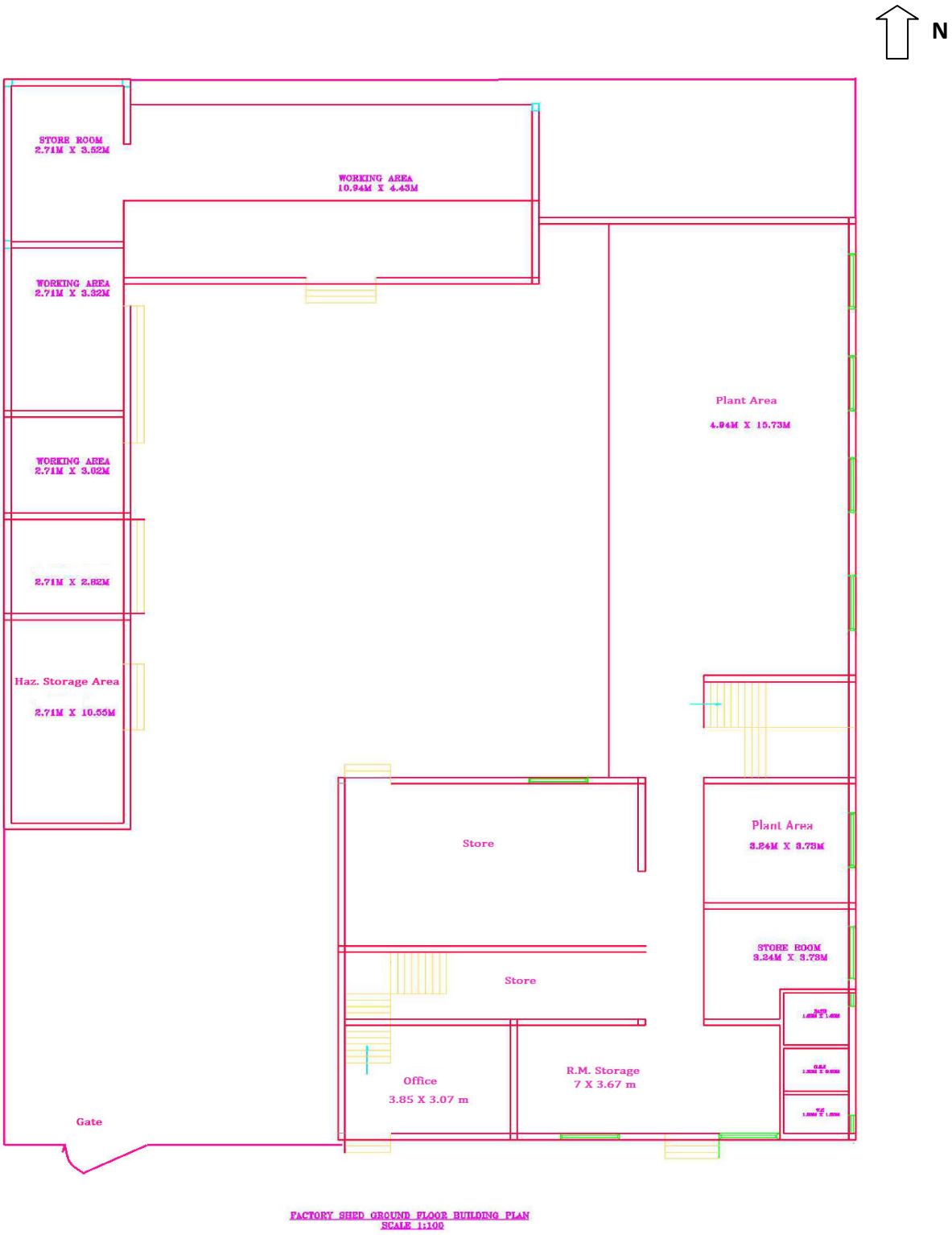
Product	Solvent		Catalyst
	MT/Month		
Hydrogenation of Nitro compound	Methanol	10.64	0.208
4 FluoroBenzylamine	Methanol	125	0.5
3 Amino - 4 Chloro Benzotrifluoride	Methanol	56	0.9
4-Fluoroanisole	Methanol	50	3.45
2-Fluoroanisole	Methanol	50	3.45
4-Fluoro Phenyl Acetic Acid	0	0	3
2,4-Difluorobenzylamine	sulfolane	125	0.1
	chloro benzene	10	
Para /o-Bromo Fluoro Benzene	0	0	0.85
3,5-Difluoro benzonitrile	sulfolane	70	
	chloro benzene	10	
4 4' di fluoro benzophenone	chloro benzene	10	0.6
NB-III	ethylene dichloride	187.5	
	ethyl acetate	187.5	

Solvent utilized in process will be recovered totally by solvent recovery system (Distillation column).
Distillation residue generated from the process will be sent for co-processing in cement industries or sent to CHWIF for incineration.

Catalyst will be sent for regeneration or disposed at TSDF site.

ANNEXURE-II

LAYOUT MAP OF THE PLANT



ANNEXURE-III

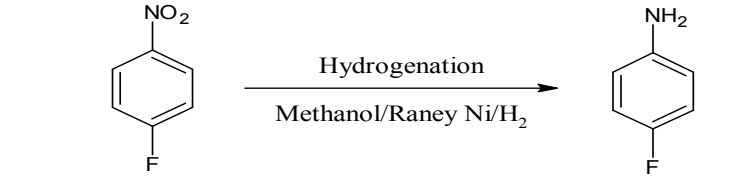
BRIEF PROCESS DESCRIPTION

1) Hydrogenation of Nitro Compounds (4-fluoro nitrobenzene/2- fluoronitrobenzene/N-ethyl-nitromethyl pyrollidine/1(4-hydroxy phenyl)4--(4-nitrophenyl)piperazine) etc…

Take 4-fluoronitrobenzene, methanol and Raney Ni catalyst in hydrogenator, apply heating to 60-65 Deg. C., apply hydrogen pressure up to 5-6 kg cm2 and maintain pressure and temp. till RM nil. Cool mass and replace hydrogen by nitrogen and filter mass to remove catalyst. Distill out methanol and water than apply vacuum to distill pure product.

NOTE- we can also hydrogenation of 4-fluoro nitrobenzene/2-fluoronitrobenzene/N-ethyl-nitromethyl pyrollidine/1(4-hydroxy phenyl)4--(4-nitrophenyl)piperazine to get 4-fluoroaniline/2-fluoroaniline/N-ethyl aminomethyl pyrollidine/1(4-hydroxy phenyl)-4-(4-aminophenyl)piperazine repectively.

Chemical Reaction



1-fluoro-4-nitrobenzene
M.F.: $C_6H_4FNO_2$
F.W.: 141.09

4-fluoroaniline
M.F.: C_6H_6FN
F.W.: 111.11

Flow Diagram

Flow Diagram

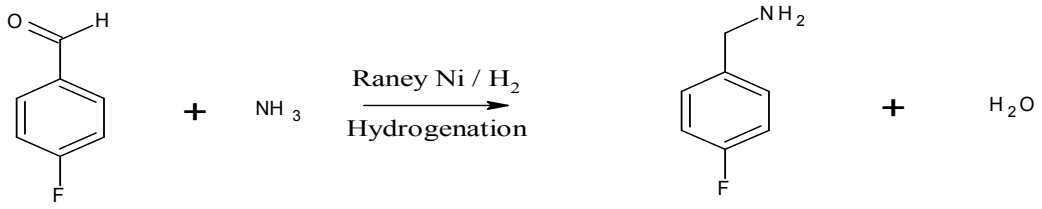
Mass Balance

Input	MT	Output	MT
Nitro Compounds	1.139	Fluoro Anilines	1.000
Hydrogen Gas	0.028	Effluent	0.167
Total	**1.167**	**Total**	**1.167**

2) 4 FluoroBenzylamine

Take 4-fluorobenzaldehyde in Hydrogenator than charge Ammonia, Solvent Methanol and Raney Nickel catalyst and pass hydrogen at 75-80 Deg. C. and maintain pressure 6 kg. Check complete conversion of RM. Filter the mass to remove catalyst and than take filtrate for distillation and distill out pure 4-fluorobenzylamine.

Chemical Reaction



4-fluorobenzaldehyde

1-(4-fluorophenyl)methanamine

Flow Diagram:

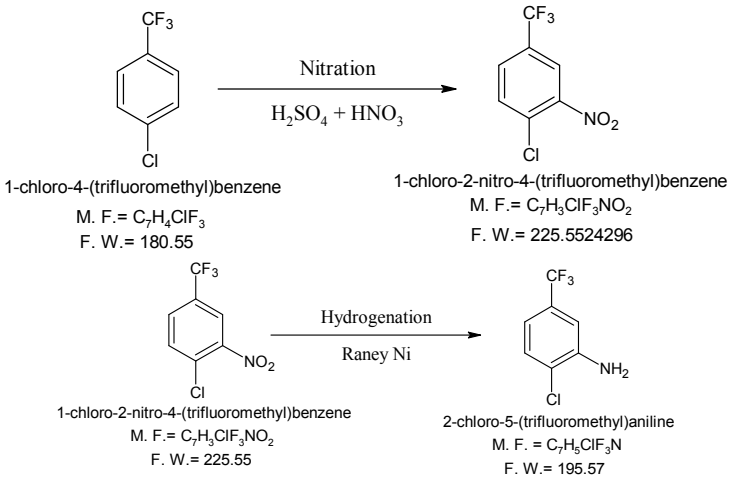
Mass Balance:

INPUT	MT	OUTPUT	MT
4FBenzaldehyde	0.992		
NH3 Gas	0.136	4Fluoro Benzylamine	1.000
Hydrogen Gas	0.016	Effluent	0.144
Total	**1.144**		**1.144**

3) 3 Amino-4 Chloro Benzotrifluoride

Preparation of 3-amino 4-Chloro BTF is two step **processes,** first step is nitration of 4-chloro BTF, here product obtained this crude mass taken for reduction in presence of Raney Ni catalyst under 10 Kg/cm^2 pressure of H2, here product obtained crude product. After removal of catalyst, Azeotropic distillation with water gives pure product.

Chemical Reaction



Flow Diagram:

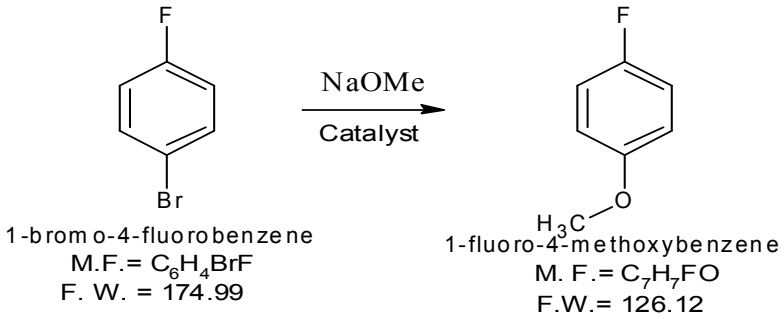
Mass Balance:

Input	MT	Output	MT	
4 chloro Benzotrifluoride	1.224			
Sulphuric acid	1.252	Effluent	3.0	MEE
Nitric acid	0.691	4 Chloro Benzotrifluoride	0.31	To recycle
Soda Ash 10%	1.105	3 Amino- 4 Chloro Benzotrifluoride	1	Product
Hydrogen Gas	0.038			
Total	**4.31**		**4.31**	

4) 4- Fluoro Anisole

Take 4-bromofluorobenzene in 20% sodium methoxide solution in methanol. Add Catalyst and reflux mass for 15 hrs. after complete reaction distill out methanol and charge water in to mass and filter the mass. Take ML for layer separation. Organic layer take for distillation and distill pure product under vacuum.

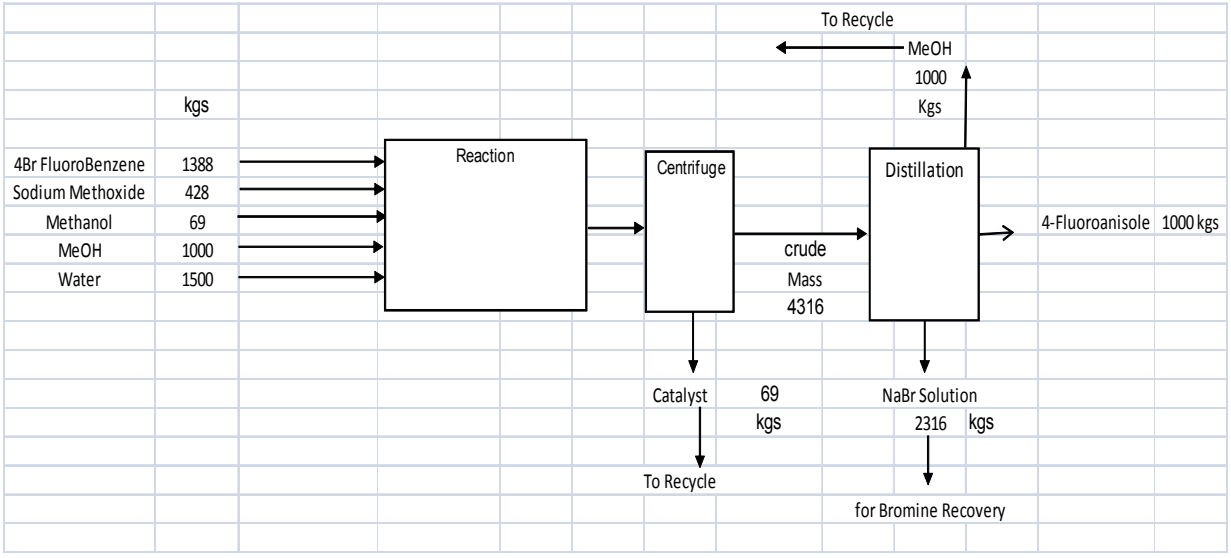
Chemical Reaction



1-bromo-4-fluorobenzene
M.F.= C_6H_4BrF
F. W. = 174.99

1-fluoro-4-methoxybenzene
M. F.= C_7H_7FO
F.W.= 126.12

Flow Diagram:



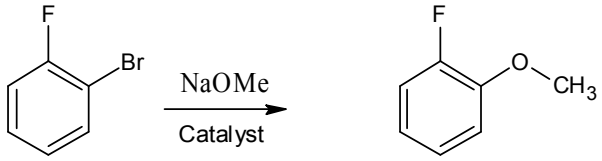
Mass Balance:

Input	MT	Output	MT	
4Br FluoroBenzene	1.388	4-Fluoroanisole	1.000	Product
Sodium Methoxide	0.428	NaBr Solution	2.316	Bromine Recovery
Water	1.5			
Total	**3.316**		**3.316**	

5) 2- Fluoro Anisole

Take 2-bromofluorobenzene in 20% sodium methoxide solution in methanol. Add Catalyst and reflux mass for 15 hrs. after complete reaction distill out methanol and charge water in to mass and filter the mass. Take ML for layer separation. Organic layer take for distillation and distill pure product under vacuum.

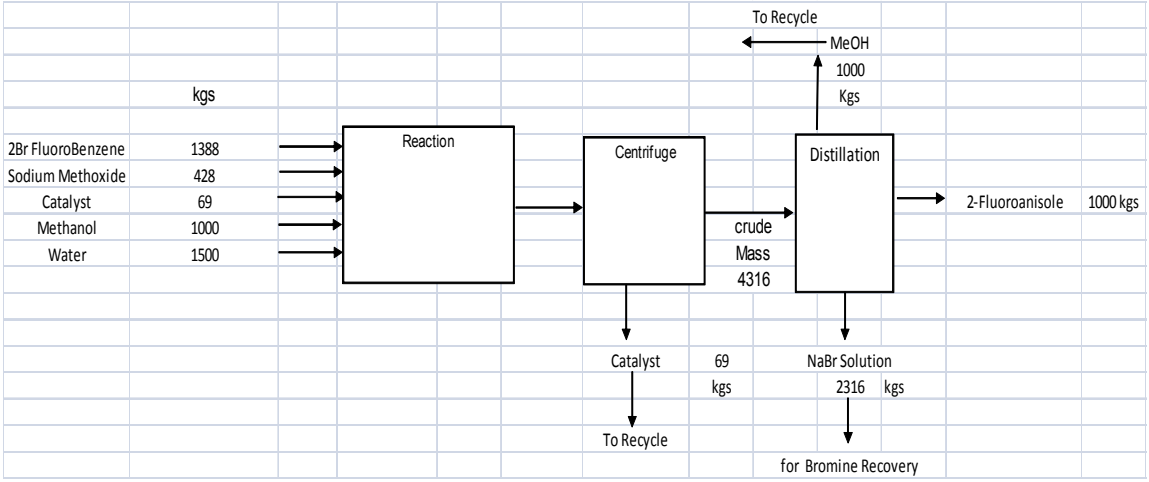
Chemical Reaction



1-bromo-2-fluorobenzene
M.F.= C_6H_4BrF
F. W. = 174.99

1-fluoro-2-methoxybenzene
M. F.= C_7H_7FO
F.W.= 126.12

Flow Diagram:



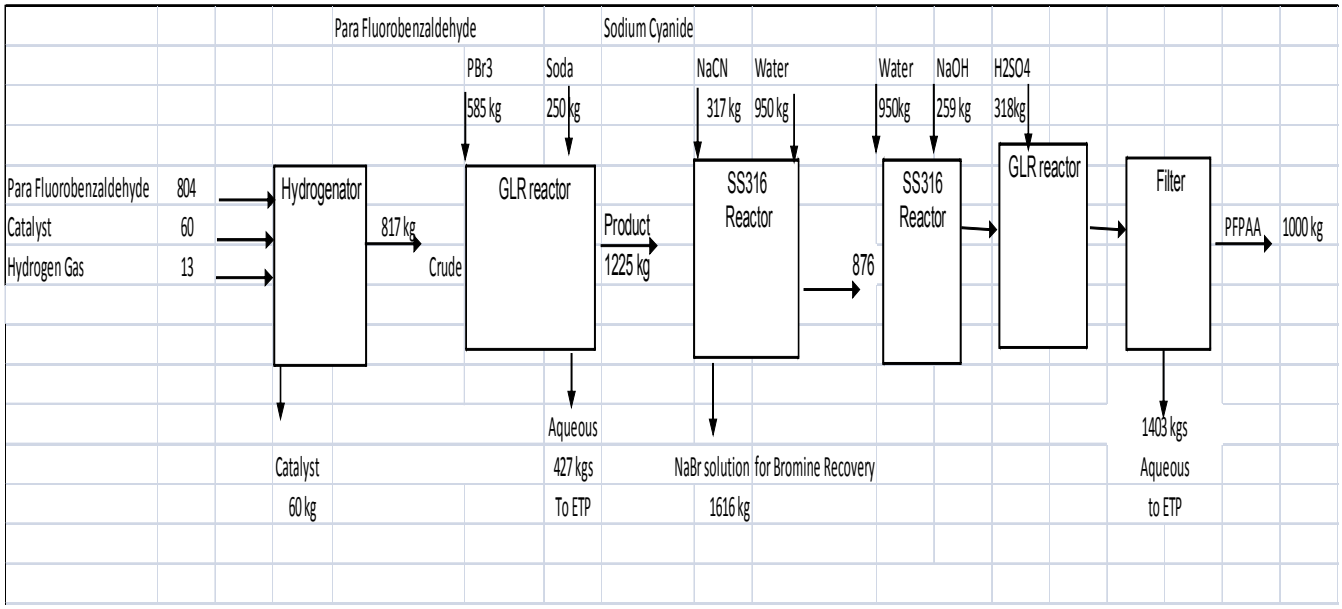
Mass Balance:

Input	MT	Output	MT	
4Br FluoroBenzene	1.388	2-Fluoroanisole	1	Product
Sodium Methoxide	0.428	NaBr Solution	2.316	For Bromine Recovery
Water	1.5			
Total	**3.316**		**3.316**	

6) 4-FLUOROPHENYLACETIC ACID

Take 4-fluorobenzaldehyde and Raney Ni catalyst in hydrogenation apply Hydrogen pressure 5-6 kgcm2 at temp. 60-70 Deg.C. maintain Hydrogene pressure till all RM convert in to alcohol. Cool mass to RT and release Hydrogen pressure and filter mass by applying nitrogen pressure to remove catalyst. Take filtrate in GLR add PBr3 slowly at temp. 60-65 Deg.C. and maintain it for 3 hrs than cool mass and add soda ash and water in to it. Take mass for layer separation. Take organic layer in to NaCN solution and reflux mass for 5 hrs. after complet conversation to cyano cool mass to room temp. and separate organic layer. Charge NaOH solution in Cyano comp. and heat mass for 6 hrs. cool mass and acidify with H2SO4. Filter product and wash with water. Dry it.

Flow Diagram

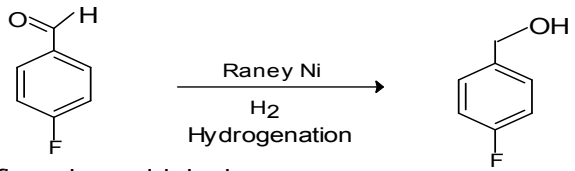


Mass Balance:

Input	MT	output	MT	
4- Fluorobenzaldehyde	0.804			
H2 gas	0.013	Effluent	0.83	To Common MEE
phosphorus tribromide	0.585	NaBr solution	1.616	For Bromine Recovery
Soda	0.25	PFPAA	1	Product
	0			
NaCN	0.317			
WATER	0.9			
NaOH	0.259			
H2SO4	0.318			
TOTAL	**3.446**		**3.446**	

Chemical Reaction

4 -Fluoro Phenyl Acetic Acid



4- fluorobenzaldehyde
M.F.: C_7H_5FO
F.W.: 124.11

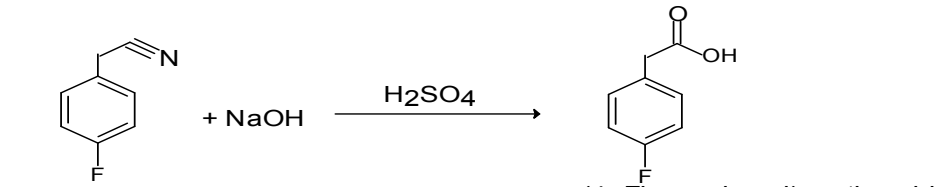
(4- fluorophenyl)methanol
M.F.: C_7H_7FO
F.W.: 126.12

(4- fluorophenyl)methanol
M.F.: C_7H_7FO
F.W.: 126.12

(1- bromomethyl)-4-fluorobenzer
M.F.: C_7H_6BrF
F.W.: 189.02

(1- bromomethyl)-4-fluorobenzene
M.F.: C_7H_6BrF
F.W.: 189.02

(4-fluorophenyl)acetonitrile
M.F.: C_8H_6FN
F.W.: 135.13



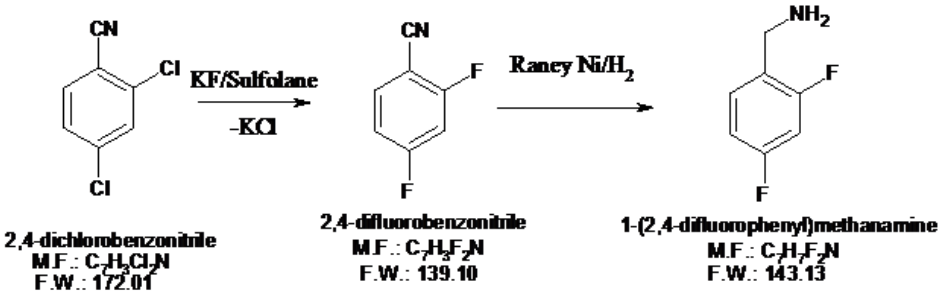
(4-fluorophenyl)acetonitrile
M.F.: C_8H_6FN
F.W.: 135.13

(4- Fluorophenyl)acetic acid
M.F.: $C_8H_7FO_2$
F.W.: 154.13

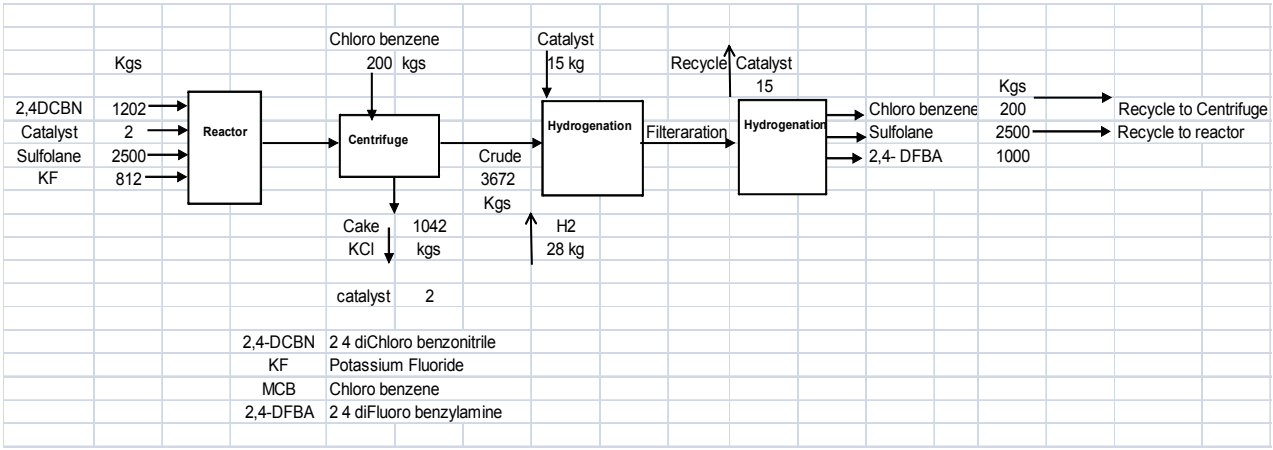
7) 2,4-DiFluoroBenzylamine

Take 2,4-Dichlorobenzonitrile in Sulfolane and KF, heat mass up to 225 Deg. C., after complete reaction distill out product and solvent. Pure 2,4-difluorobenzonitrile take in Hydrogenator , charge aq. Ammonia and heat mass up to 75 Deg. Charge Raney Nickel catalyst and pass hydrogen at 75-80 Deg. C. and maintain pressure 6 kg. Check complete conversion of RM. Filter the mass to remove catalyst and take filtrate for distillation and distill out pure 2,4-difluorobenzylamine.

Chemical Reaction of 2,4-Difluorobenzylamine:



Flow Diagram



Mass Balance

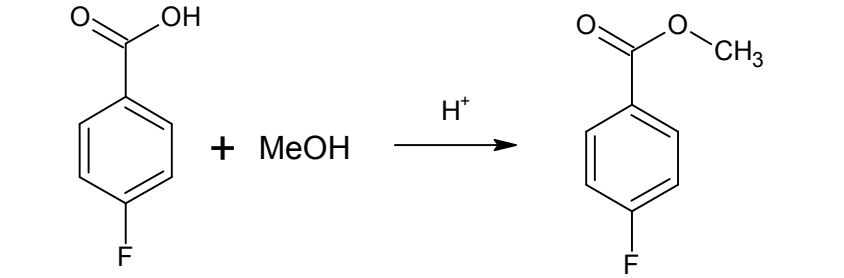
Input	MT	Output	MT
2,4DiChloro benzonitrile	1.202	2,4-Di Fluoro Benzyl Amine	1
Potassium Fluoride	0.812	cake (KCl)	1.042
Hydrogen Gas	0.028		
TOTAL	**2.042**		**2.042**

8) 4-FLUOROMETHYL BENZOATE

Brief Process -

Take 4-fluorobenzoic acid in methanol add H2SO4 and heat mass for 6 hrs to convert RM. Distill out methanol and charge water and neutralize with soda ash wash. Separate organic layer and distill pure product under vacum.

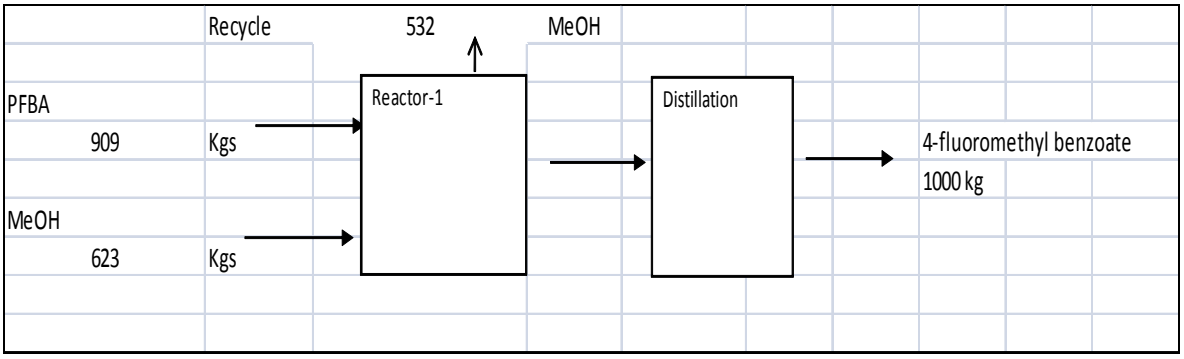
Chemical Reaction of 4-Fluoromethyl Benzoate:



4-fluorobenzoic acid
M.F.: $C_7H_5FO_2$
F.W.: 140.11

methyl 4-fluorobenzoate
M.F.: $C_8H_7FO_2$
F. W.: 154.13

Flow Diagram:



Mass Balance:

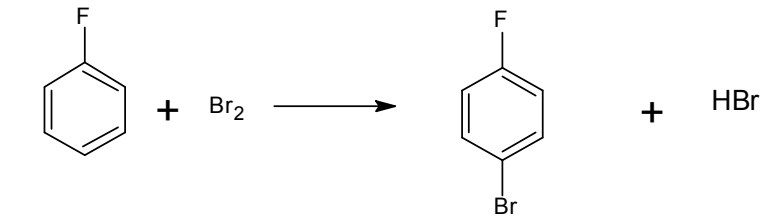
Input	MT	Output	MT	
4-Fluorobenzoic Acid	0.909	4-Fluoromethyl Benzoate	1	Product
Methanol	0.623	Methanol	0.532	Recycle
Total	1.532		1.532	

9) 4- Bromo Fluoro Benzene

10) 2-Bromo Fluoro Benzene

Take Fluorobenzene than charge iron catalyst followed by addition of Bromine in the mass after the neutralization of mass and finally fractional distillation obtained pure 4-bromofluorobenzene and 2-Bromo fluorobenzene.

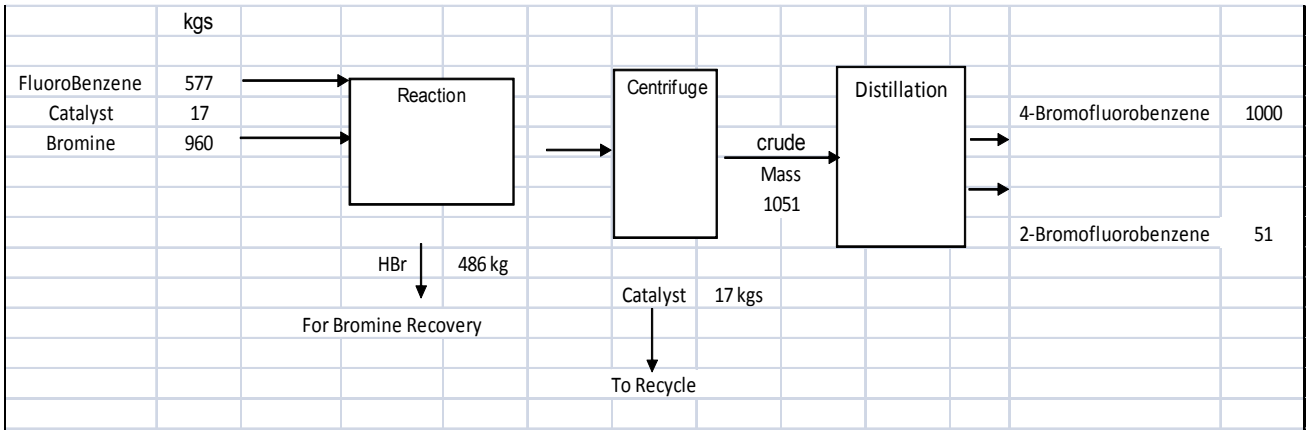
Chemical Reaction of 4-Bromo Fluorobenzene



fluorobenzene
M.F.= C_6H_5F
F. W. = 96.10

1-bromo-4-fluorobenzene
M.F.= C_6H_4BrF
F. W. = 174.99

Flow Diagram:



Mass Balance:

Input	MT	Output	MT	
FluoroBenzene	0.577	4-Bromofluorobenzene	1	Product
Bromine	0.96	2-Bromofluorobenzene	0.051	Product
		HBr	0.486	For Bromine Recovery
Total	**1.537**		**1.537**	

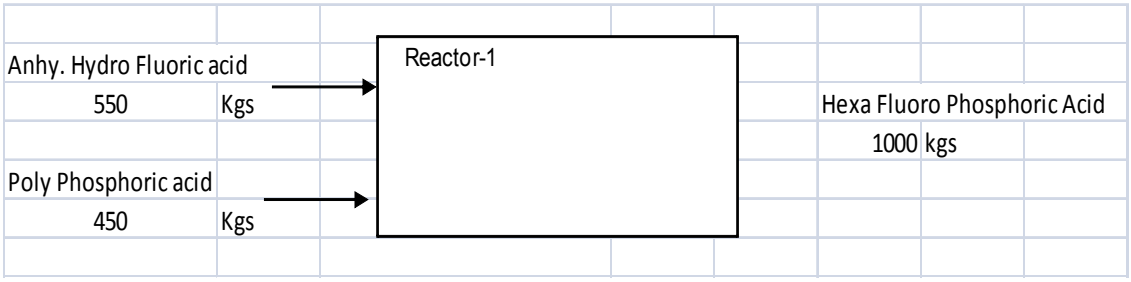
11) Hexafluoro phosphoric acid (65-67%) (Existing)

Take anhydrous hydrofluoric acid in close reactor cool it to -10 Deg. C. than add plolyphosphoric acid slowly to maintain temp. below 2 Deg. C., after addition maintain stirring for 3 hrs. Increase temp. of mass up room temp. Unload material.

Chemical Reaction of Hexafluorophosphoric Acid :

$$H_3PO_4 + 6HF \longrightarrow HPF6 + 4\ H_2O$$

Flow Diagram:



Mass Balance:

Input	MT	Output	MT	
Hydro Fluoric acid	0.55	Hexa Fluoro Phosphoric acid	1	Product
Poly Phosphoric acid	0.45			
Total	1		**1**	

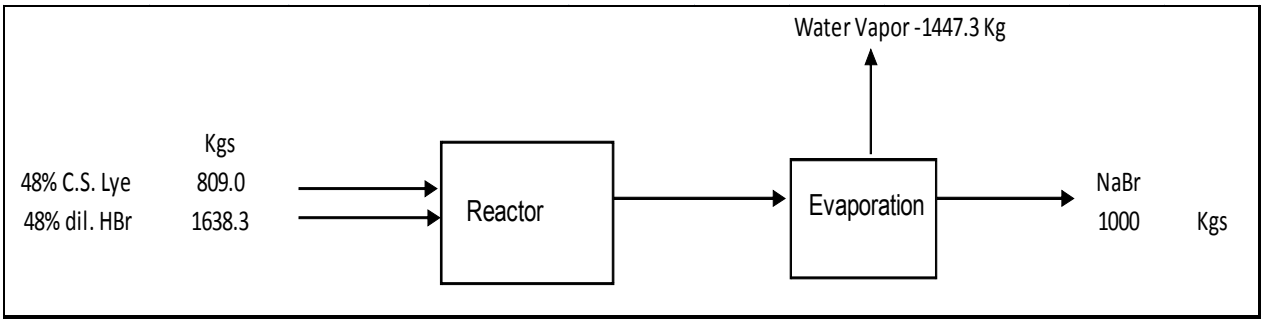
12) Sodium Bromide (NaBr) (Existing)

The Sodium Hydroxide and Hydrobromic Acid charge in reaction tank. After completed of reaction and the mass required temperature to the crystallization and after crystallization, mass is centrifuge to separates solids from mother liquor. The crystallized mass is dry and packed for dispatch. The mother liquor collected and reused in next batch.

Chemical Reaction of Sodium bromide

$$\underset{\text{M.W. 40gm/m}}{NaOH(48\ \%)} + \underset{\text{M.W. 81 gm/m}}{HBr(47\%)} \longrightarrow \underset{\text{M.W. 103 gm/m}}{NaBr} + \underset{\text{M.W. 18 gm/m}}{H_2O}$$

Flow Diagram:



Mass Balance:

Input	MT	Output	MT
48% C.S. Lye	0.809	NaBr	1
48% dil. HBr	1.6383	Water Vapor	1.4473
total	2.4473		2.4473

product
Evaporation

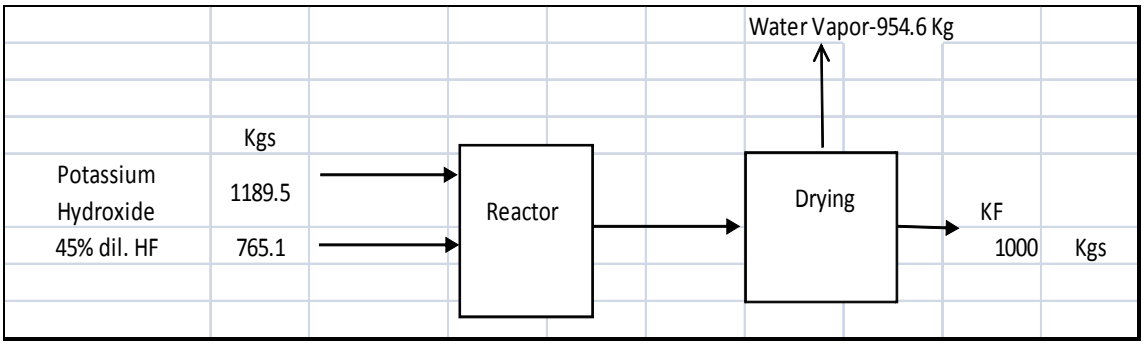
13) Potassium Fluoride (KF) (Existing)

The Potassium Hydroxide and hydrofluoric Acid charge in reaction tank. After completed of reaction and the mass required temperature to the crystallization and after crystallization, mass is centrifuge to separates solids from mother liquor. The crystallized mass is dry and packed for dispatch. The mother liquor collected and reused in next batch.

Chemical Reaction

KOH (48%) +	HF(65%)	⟶	KF	+	H_2O
M.W. 56.10	M.W. 20		M.W. 58.09		M.W. 18
gm/m	gm/m		gm/m		gm/m

Flow Diagram:



Mass Balance:

Input	MT/Month	Output	MT/Month
Potassium Hydroxide	1.1895	KF	1
45% dil. HF	0.7651	Water Vapor	0.9546
total	**1.9546**		**1.9546**

product

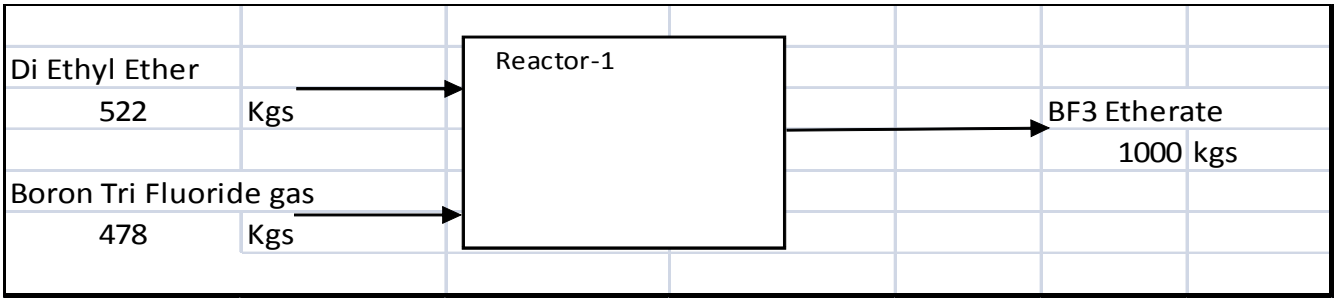
14) BF3-Etherate (Boron Tri Fluoride Etherate)

Take diethyl ether in reactor and cool it to -20 to -25 Deg. C. than purge BF3 gas such a rate so temp. can not cross to -15 Deg. C, after complete charging take crude mass for distillation under vacuum and distill out pure BF3-Etherate.

Chemical Reaction of BF_3- Etherate

$$BF_3 + C_2H_5OC_2H_5 \longrightarrow BF_3\text{-}C_2H_5OC2H_5$$

Flow Diagram:



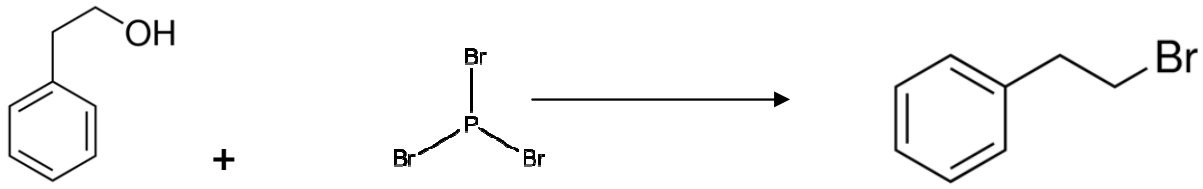
Mass Balance:

Input	MT/Month	Output	MT/Month	
Di Ethyl Ether	0.522	BF3 Etherate	1	product
BF3 gas	0.478			
total	1		1	

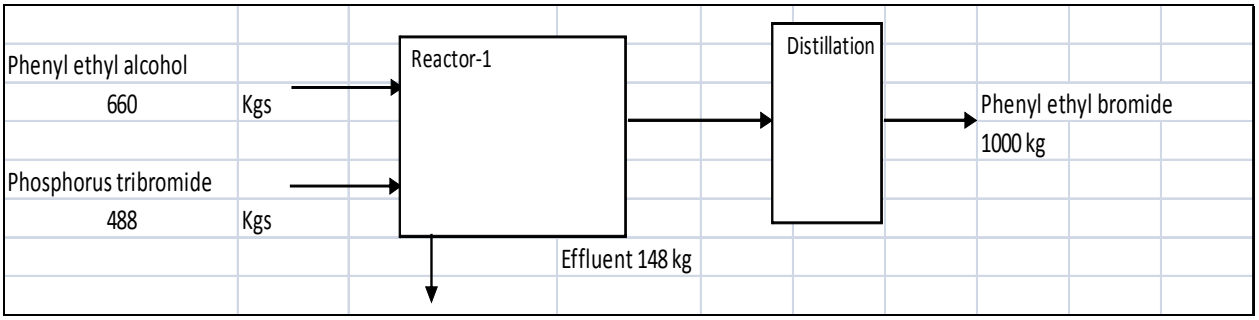
15) Phenyl Ethyl Bromide

Take Phenyl ethyl alcohol in Reactor. heat mass up tp 55 to 60 Deg. C. add Phosphorus tribromide slowly within 6 hrs Maintain temp. 80 Deg. For 6 hrs. Take mass for layer separation Take uper organic layer for distillation. Distill pure product

Chemical Reaction



Flow Diagram



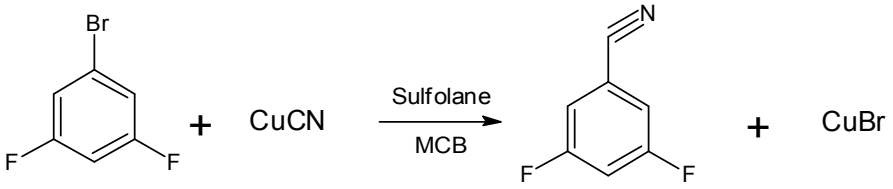
Mass Balance

Input	MT	Output	MT	
Phenyl ethyl alcohol	0.66	Phenyl ethyl bromide	1	Product
Phosphorus tribromide	0.488	Effluent	0.148	ETP
Total	1.148		1.148	

16) 3,5-Difluoro benzonitrile

Take 1-bromo-3,5-difluorobenzene in sulfolane add copper cyanide and apply heating up to 220 Deg. C. maintain heating for 20 hrs to complete conversation. Cool mass and centrifuge the mass to remove copper bromide. Wash cake with chlorobenzene. Take mother liqure for distillation to distill pure product.

Chemical Reaction



1-bromo-3,5-difluorobenzene
M.F.: $C_6H_3BrF_2$
F.W.: 192.98

3,5-difluorobenzonitrile
M.F.: $C_7H_3F_2N$
F.W.:139.10

Flow Diagram:

Mass Balance:

Input	MT	Output	MT	
3,5-difluoro bromobenzene	1.387	3,5- Difluoro benzonitrile	1	product
Copper Cyanide	0.644	CuBr Solution	1.031	Bromine Recovery
Total	**2.031**		**2.031**	

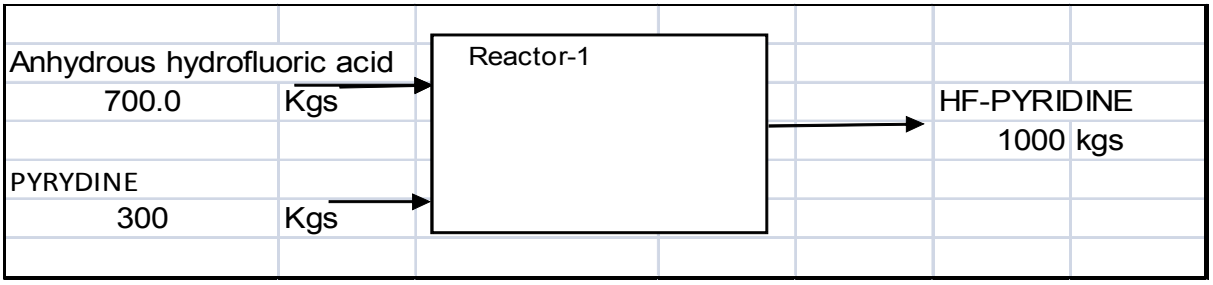
17) HYDROFLUORIC ACID-PYRIDINE (65-67%)

The Anhydrous Hydrofluoric acid take in to reactor and cool it to 0-5 Deg. C. than start addition of pyrideine slowly in to above reactor such a rate to maintain temperature 0-5 Deg. C. After completed addition of pyridine maintain mass to room temperature. The mass is packed for dispatch.

Chemical Reaction of HF- Pyridine (65-67 %)

PYRIDINE + HF ⟶ HF- PYRIDINE COMPLEX

Flow Diagram:



Mass Balance:

Input	**MT**	**Output**	**MT**	
Anhydrous hydrofluoric acid	0.7	HF-PYRIDINE	1	product
PYRYDINE	0.3			
Total	1		**1**	

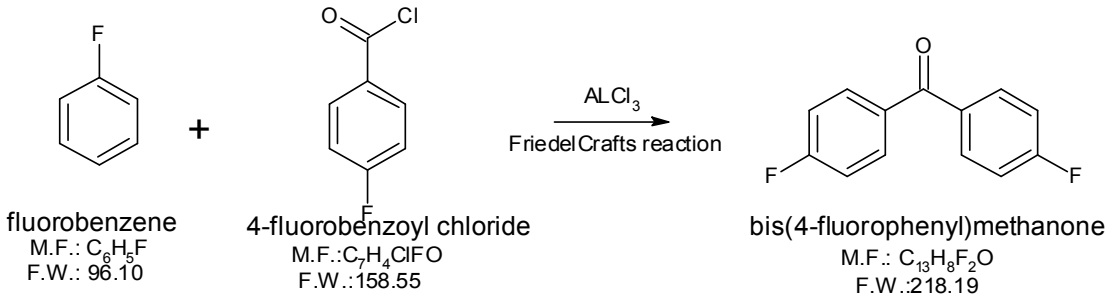
18) 4 4' DI FLUORO BENZOPHENONE

Crude bis(4-fluorophenyl)methanone was prepared by acetylation of Fluorobenzene with 4-Fluorobenzoylchloride in presence of AlCl3 and by dumping the acetylated mass into diluted HCl after solvent recovery.

Step-2 Crystallization

The crude product was crystallized two times in 2-volume methanol and the crystallized product given carbon treatment in 9-volume of methanol to give pure product.

Chemical Reaction

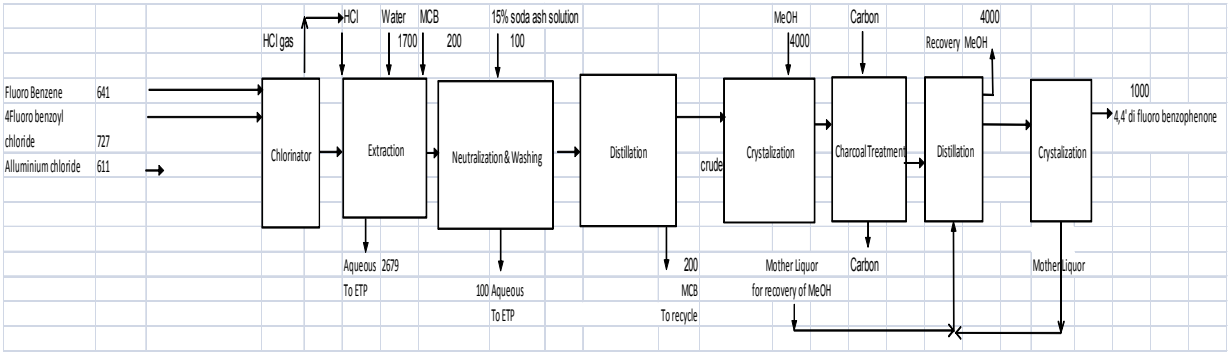


fluorobenzene
M.F.: C_6H_5F
F.W.: 96.10

4-fluorobenzoyl chloride
M.F.:C_7H_4ClFO
F.W.:158.55

bis(4-fluorophenyl)methanone
M.F.: $C_{13}H_8F_2O$
F.W.:218.19

Flow Diagram



Mass Balance:

Input	MT/Month	Output	MT/Month	
Fluoro benzene	0.641	4,4' di fluoro benzophenone	1	Product
4Fbenzoylchloride	0.727	Effluent	2.779	ETP
Alluminium chloride	0.611			
Water	1.7			
15 % Soda Ash	0.1			
Total	**3.779**		**3.779**	

19) NB-III (6-FLUORO-3,4-DIHYDRO-2H-BENZOPYRAN-2-CARBOXYLIC ACID)

Step-I : Preparation of NB-I.

Charge EDC and Maleic anhydride in to GLR, than stir it for hrs at 50-55 Deg. C. than add 4-fluoroanisole in the mass. Increase temp. of mass up to 75-80 Deg. C. maintain mass and confirm RM should be absent. Than quench the mass in to HCl water solution at 0-5 Deg. C. centrifuge the material and wash with water to get pH-3 to 4. Again wash with Hexane. Spin dry material. Than dry it at 80-95 Deg. C.

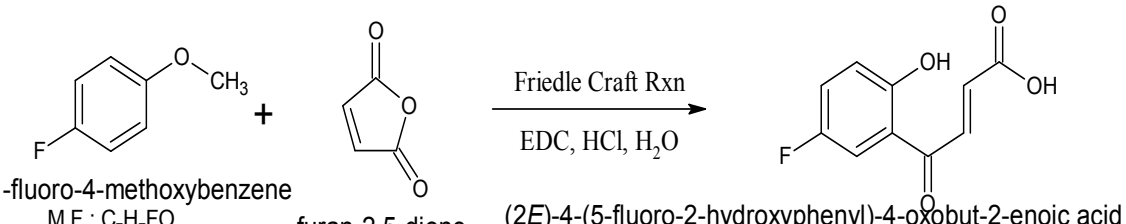
Step-II : Preparation of NB-II.

Charge water and sodium carbonate in to the reactor. Raise the temp. up to 85-90 Deg. C., add NB-I in to mass lot wise. Maintain temp. for 2 hrs. check RM should be absent. Cool mass up to 30-35 Deg. C. make pH-2.8 to 3 by dil. HCl. Filter mass. Again make pH-1.0 of filtrate by dil. HCl. Extract solid product in Ethyl acetate. Distill out ethyl acetate under vacuum at 50-55 Deg. C. Cool the mass up to 0-5 Deg. C. filter solid product, wash with chilled ethyl acetate. Dry it at 50-55 Deg. C.

Step-III : Preparation of NB-III.

Charge Acetic acid, NB-II, H2SO4 and 10% Pd/C in Hydrogenator. Flush the Hydrogenator with nitrogen and hydrogen. Pressurize the Hydrogenator with hydrogen up to 5-5.5 kg/cm2 and raise the rxn mass temp. 40-45 Deg. C. maintain the mass for 20 hrs. check RM should be absent. Filter the mass through hyflo bed. Distill out acetic acid under vacuum at 50-55Deg. C. cool the mass at 25-30 deg. C. charge water in the mass and stir for 30 min., filter the solid product wash with water. Dry it at 50-55 Deg. C.

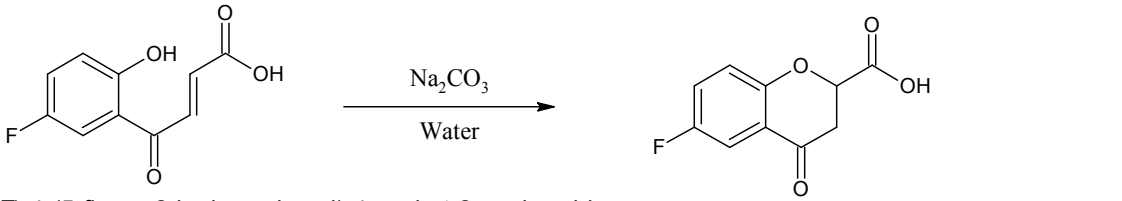
Chemical Reaction



1-fluoro-4-methoxybenzene
M.F.: C_7H_7FO
F.W.: 126.12

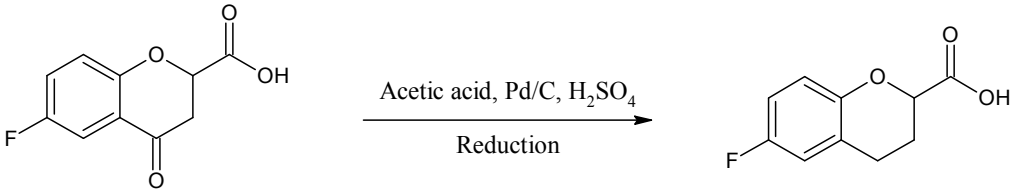
furan-2,5-dione
M.F.: $C_4H_2O_3$
F.W.: 98.05

(2*E*)-4-(5-fluoro-2-hydroxyphenyl)-4-oxobut-2-enoic acid
M.F.: $C_{10}H_7FO_4$
F.W.: 210.15



(2*E*)-4-(5-fluoro-2-hydroxyphenyl)-4-oxobut-2-enoic acid
M.F.: $C_{10}H_7FO_4$
F.W.: 210.15

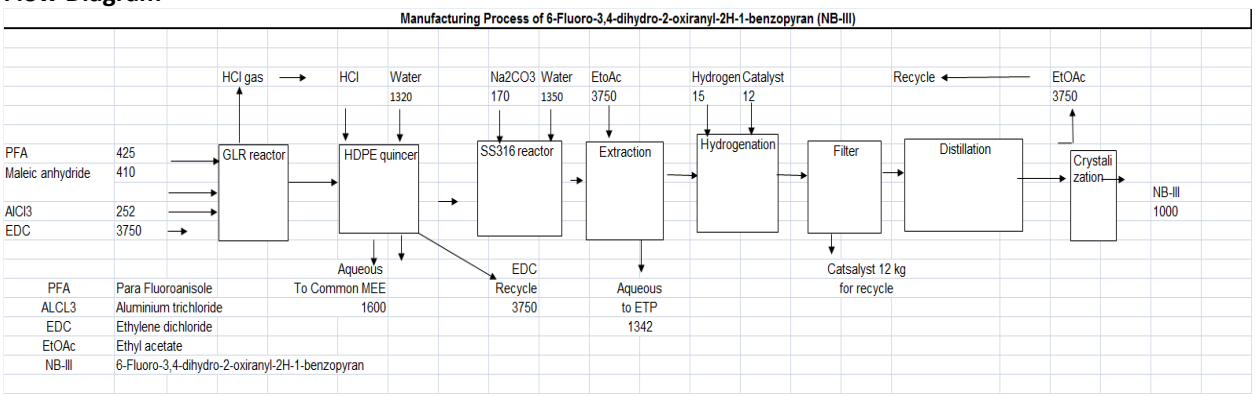
6-fluoro-4-oxo-3,4-dihydro-2*H*-1-benzopyran-2-carboxylic acid
M.F.: $C_{10}H_7FO_4$
F.W.: 210.15



6-fluoro-4-oxo-3,4-dihydro-2*H*-1-benzopyran-2-carboxylic acid
M.F.: $C_{10}H_7FO_4$
F.W.: 210.15

6-fluoro-3,4-dihydro-2*H*-1-benzopyran-2-carboxylic acid
M.F.: $C_{10}H_9FO_3$
F.W.: 196.15

Flow Diagram



Mass Balance

Input	MT	Output	MT	
para Fluoroanisole	0.425	NB-III	1.000	PRODUCT
Maleic anhydride	0.41	Effluent	2.942	MEE
Aluminium trichloride	0.252			
Water	2.67			
Na2CO3	0.17			
Hydrogen	0.015			
total	**3.942**		**3.942**	

ANNEXURE-IV

DETAILS OF WATER CONSUMPTION, WASTEWATER GENERATION AND TREATMANT

Details of Water consumption and Wastewater Generation :

Existing

Sr. No.	Category	Water Consumption (KL/Day)	Waste Water Generation (KL/Day)
1.	Domestic	2.0	1.0
2.	Industrial		
	Process	Nil	Nil
	Washing	Nil	Nil
	Boiler	2.0	Nil
	Cooling	1.7	Nil
3.	Gardening	0.1	Nil
Total Industrial		**3.7**	**Nil**
Grand Total		**5.8**	**1.0**

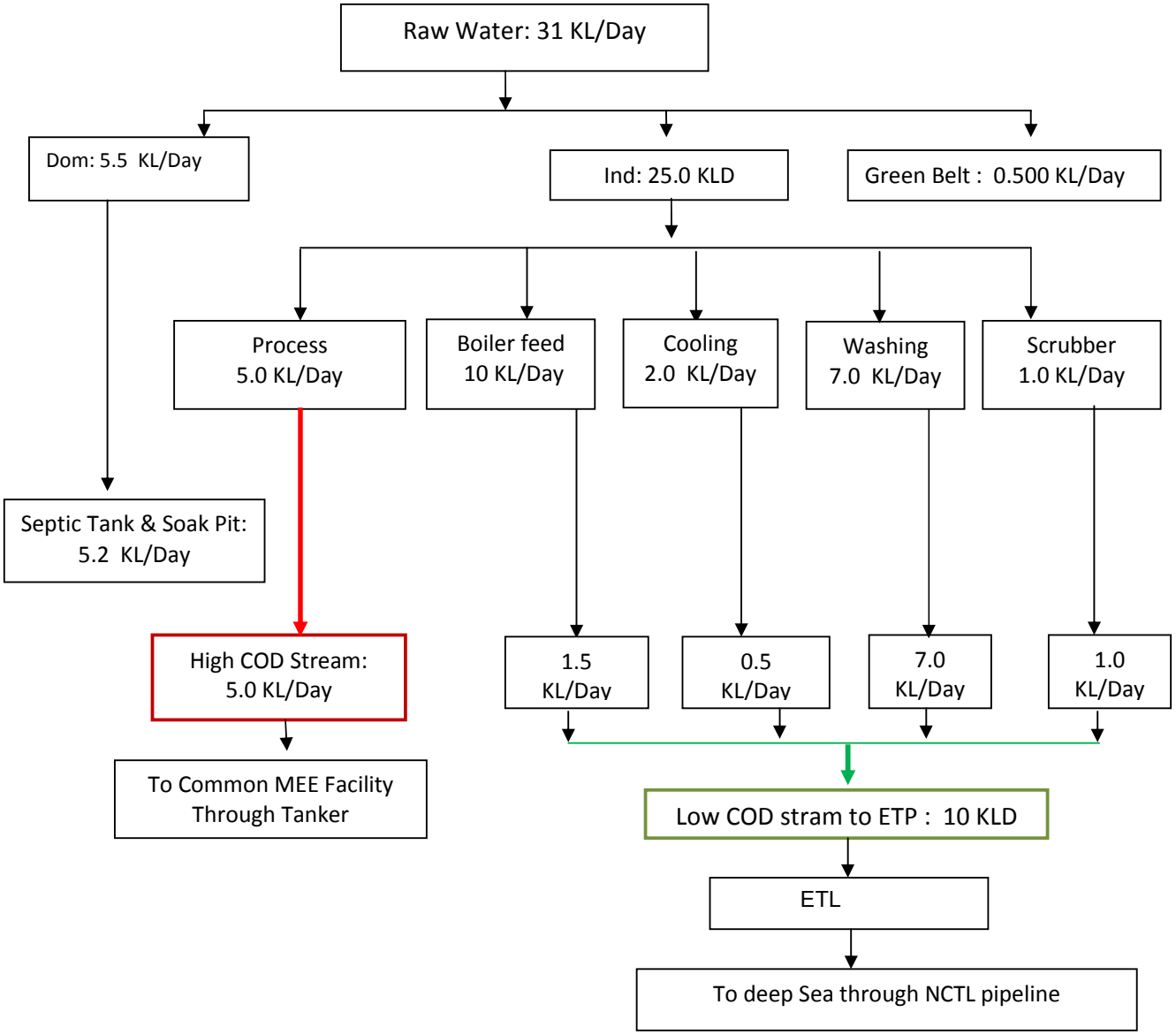
Details of water consumption and wastewater generation

Total after proposed expansion

Sr. No.	Category	Water Consumption (KL/Day)	Waste Water generation (KL/Day)		Mode of discharge
1.	**Domestic**	**5.5**	**5.2**		Septic tank & Soak Pit
2.	**Industrial**				
	Process	5.0	*5.0		* Segregated high COD stream will be sent to Common MEE Facility of ***Ankleshwar Cleaner Process Technology Centre Ltd.***
	Washing	7.0	7.0	**10	** Segregated low COD stream will be treated in ETP & sent to ETL for treatment & disposal
	Boiler	10.0	1.5		
	Cooling	2.0	0.5		
	Scrubbing	1.0	1.0		
Total Industrial		**25.0**	**15**		
3.	**Gardening**	**0.5**			
Grand Total		**31.0**	**5.2 (Dom) + 15 (Ind) = 20.2**		

PROPOSED WATER BALANCE DIAGRAM:

Source: GIDC Water Authority



Wastewater characteristics & Treatability

Laboratory Treatability Studies

During manufacturing process high and low COD effluent stream shall be generated from various operations. The effluent stream shall be segregated into two streams, one shall be from the process (concentrated stream) and second from utilities (dilute stream).

1) Concentrated effluent stream = 5 KL/Day
2) Dilute effluent stream = 10 KL/Day

Concentrated stream generated from manufacturing of…

1. Hydrogenation of Nitro compounds…
2. 4 Fluoro Benzaldehyde
3. 3 amino 4 chloro Benzotrifluoride
4. 4-Fluorophenylacetic acid
5. Phenyl Ethyl Bromide
6. 4'4- difluorobenzophenone
7. NB III

The stream wise characteristic of effluent is as under…

No.	Parameter / Production	CONCENTRATED EFFLUENT						
		Hydrogenation of Nitro compounds…	3-Amino 4 Chloror Benzo Trifluoride	4-Fluoro phenylacetic acid	NB III	4 Fluoro Benzylamine	4,4 DFBenzophenon	Phenyl Ethyl Bromide
	Quantity	0.278 KL/Day	5.0 KL/Day	1.383 KL/Day	4.903 KL/Day	0.240 KL/Day	4.632 KL/Day	0.247 KL/Day
1.	pH	3.6	6.4	5.6	5.6	5.6	5.6	5.6
2.	Oil and Grease, mg/L	3.5	1.2	1.5	1.5	1.5	1.5	1.5
3.	COD, mg/L	28,000	40,000	55,000	60,000	35,000	35,000	44,000
4.	BOD_3, mg/L	8,000	10,000	11,500	12,000	10,000	1,100	10,500
5.	Suspended Solids, mg/L	160	154	110	180	140	150	160
6.	Ammonical Nitrogen	50	BDL	BDL	BDL	BDL	BDL	BDL
7.	TDS, mg/L	45,000	50,000	35,000	55,000	40,000	45,000	48,000

IN WORST SITUATION EFFLUENT CHARACTERISTICS

(For Concentrated effluent)

Parameter	Raw Effluent (5 KL/Day)
pH	5.6
Oil and Grease, mg/L	1.5
COD, mg/L	60,000
BOD_3, mg/L	12,000
Suspended Solids, mg/L	180
Ammonical Nitrogen	BDL
TDS, mg/L	55,000

The above characteristics effluent will be sent to M/s. Ankleshwar Cleaner Process Technology Centre Ltd., Ankleshwar (after Neutralization) for the treatment & disposal.

2 Stream generated from the Boiler, Cooling, Washing and Scrubber) shall be given primary treatment in existing Effluent Treatment Plant and then sent to ETL for further treatment and final disposal.

The characteristic of composite sample is as under…

		Washing	**Cooling**	**Boiler**	**Scrubber**
	Quantity	**7.0 KL/Day**	**0.5 KL/day**	**1.5 KL/Day**	**1.0 KL/Day**
1.	pH	7.1	7.9	7.5	8.8
2.	Oil and Grease, mg/L	7.8	0.5	3.2	1.9
3.	COD, mg/L	1,000	500	75	500
4.	BOD_3, mg/L	300	150	BDL	150
5.	Suspended Solids, mg/L	180	110	90	80
6.	Phenolic Compounds, mg/L	BDL	BDL	BDL	BDL

From the various utilities effluent shall be generated and composite effluent characteristics shall be as under.

Parameter	**Composite Sample (Dilute Stream) 10.0 KL/Day**
pH	6.8
Oil and Grease, mg/L	1.2
COD, mg/L	786
BOD_3, mg/L	230
Suspended Solids, mg/L	100
Phenolic Compounds, mg/L	BDL

The above characteristic effluent is given primary treatment in Effluent treatment plan.

Primary Treatment

For study of primary treatment on effluent i.e. neutralization, flocculation and settling, effluent sample was treated with Lime as neutralizing agent and $FeSO_4$ as flocculating agent. Various parameters were studied such as lime dose, $FeSO_4$ dose, settling time, influent and effluent suspended solids and COD.

The summary of the result is tabulated herewith in Table .

Table Summary of Primary Treatment Study

Initial COD: 500 mg/L

	Run 1	Run 2	Run 3
Effluent Sample taken, ml	500	500	500
Lime Dose mg/L	100	150	275
$FeSO_4$ Dose mg/L	50	65	85
COD after primary treatment with $FeSO_4$ mg/L	402	360	416
% reduction of COD	50	55	48

Observations:

1. Reduction of 55 % in COD load is found at primary treatment level with Lime dose of 150 mg/L and $FeSO_4$ dose of 65 mg/L.

After primary treatment, characteristic of effluent is as under:

Parameter	Treated effluent (Dilute Stream)	FETP inlet Norms
pH	7.02	6.5 to 8.5
Oil and Grease, mg/L	1.5	<10
COD, mg/L	350	<1,000
BOD_3, mg/L	95	<300
Suspended Solids, mg/L	45	<100
Phenolic Compounds, mg/L	BDL	1

The primary treated effluent conforming to above standards shall be sent to ETL, Ankleshwar.

BRIEF DESCRIPTION OF EFFLUENT TREATMENT PLANT:

ETP DETAILS

Process Description of Effluent Treatment Plant

M/s. Regal remedies Ltd. (Unit II) shall have an Effluent treatment plant consisting of primary units. The details of ETP are as follows.

First all non-toxic and biodegradable streams of wastewater shall be collected in Equalization cum Neutralization Tank (ENT-01) where the continuous addition and stirring of Lime solution is done to maintain neutral pH of wastewater from Lime Dosing Tanks (LDT-01) as per requirement by gravity. Mixer is provided in ENT-01 to keep all suspended solids in suspension and to provide proper mixing.

Then after, neutralized wastewater shall be pumped to Flash Mixer (FM-01). Alum and Polyelectrolyte shall be dosed from Alum Dosing Tank (ADT-01) and Polyelectrolyte Dosing Tank (PEDT-1) respectively by gravity into FM-01 to carry out coagulation by using a Flash Mixer. Then after, coagulated wastewater shall be settled in Primary Settling tank (PST-01). Clear supernatant from PST-01 Then, Clear effluent shall be collected in Treated Effluent Sump (TES) before final disposal to GIDC drain.

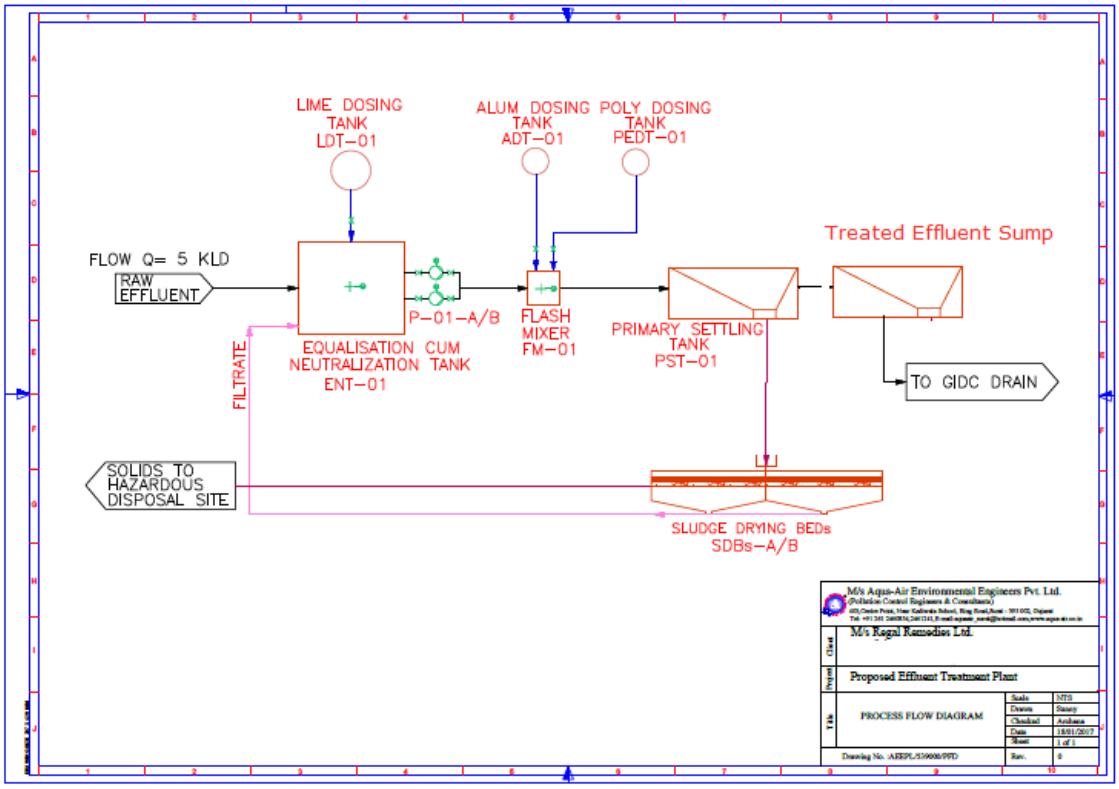
Sludge settled in PST-01 shall be pumped to Sludge Drying Beds (SDBs-A/B) where, dewatering shall be carried out before storage in HWSA and ultimate disposal to TSDF. Leachate from SDBs-A/B shall be pumped back to ENT-01 for further treatment.

SIZE OF TANKS

S.N.	Name of unit	Size (m x m x m)	No.	MOC/ Remark
1	Equalization cum Neutralization Tank (ENT-01)	2.5 x 2.5 x (1.5 +0.5)	1	RCC M25
2	Flash Mixer (FM-01)	1.0 x 0.75 x (1.5 +0.3)	1	MSPP
3	Primary Settling Tank (PST-01)	1.5 x 1.0 x (1.2+0.5)	1	MSEP
4	Treated Effluent Sump (TES-01)	2.5 x 2.5 x (1.5 +0.5)	1	RCC M25
5	Lime Dosing Tank (LDT-01)	250 lit	1	HDPE
6	Alum Dosing Tank (ADT-01)	250 lit	1	HDPE
7	Poly Dosing Tank (PDT-01)	100 lit	1	HDPE
8	Sludge Drying Beds (SDBs-A/B)	2.0 x 3.0	2	Bk. Mas. With PCC Bedding+ filling Media

RCC M25 = REINFORCED CEMENT CONCRETE (M 25 GRADE)
MSPP = MILD STEEL POLYPROPELENE
HDPE = HIGH DENSITY POLY ETHELINE
BK.MAS. = BRICK MASONARY

ETP FLOW DIAGRAM



ANNEXURE-V
DETAILS OF HAZARDOUS WASTE GENERATION & DISPOSAL

Sr. No.	Type of Hazardous Waste	Hazardous Waste Category	Existing Qty.	Total proposed Qty.	Mode of disposal
1.	ETP Sludge	35.3	--	2 MT MT/Month	Collection, Storage, Transportation & Disposal at TSDF of M/s. BEIL, Ankleshwar.
2.	Used Oil/Spent Oil	5.1	0.05 Lit/Year	0.2 MT/Year	Collection, Storage, Transportation & Sell to GPCB Authorized Reprocessor or reuse as lubricant of machinery
3.	Empty Drums/Bag/ Liners	33.1	100 Nos/Month	200 Nos/Month	Collection, Storage, Transportation & Sell to GPCB Authorized Vendor
4.	Distillation Residue	20.3	--	5 MT MT/Month	Collection, Storage, Transportation & Disposal at Incinerator Site (M/s. BEIL, Ankleshwar) or given to cement industries for co-processing.
5.	Spent Carbon	36.2	--	0.1 MT/Month	Collection, Storage, Transportation & Disposal at Incinerator Site (M/s. BEIL, Ankleshwar) or given to cement industries for co-processing.
6.	Sodium Bromide/Hydrogen Bromide	Sch-II ClassB-Inorganic Acid	--	120 MT/Month	Collection, Storage, Transportation & sell to end user for Bromine Recovery
7.	Waste Cake (KCl)	20.4	--	55 MT/Month	Collection, Storage, Transportation & sell to end users.
8.	Spent Catalyst	28.2	--	0.1 MT/Month	Collection, Storage, Transportation & Disposal at TSDF Site (M/s. BEIL, Ankleshwar) or return to supplier for re-generation

ANNEXURE-VI

DETAILS OF STACK AND VENTS

EXISTING

DETAILS OF FUEL CONSUMPTION

SR. NO.	NAME OF FUEL	QUANTITY		
		Existing	Additional	TOTAL
1.	Natural Gas	400 SM3/day	--	400 M3/day

FLUE GAS EMISSION

Sr. No.	Stack Attached to	Stack Height in meter	APCM	Parameter	Permissible Limit
1.	Furnace	11	--	PM SO_X NO_X	150 mg/Nm3 100 ppm 50 ppm

UNIT GOT CTE-AMENDMENT

FLUE GAS EMISSION

Sr. No.	Stack Attached to	Stack Height in meter	APCM	Parameter	Permissible Limit
1.	Boiler (400 kg/Hr.)	11	--	PM SO_X NO_X	150 mg/Nm3 100 ppm 50 ppm
2	TFH (1 Lac K. Cal)	11	--	PM SO_X NO_X	150 mg/Nm3 100 ppm 50 ppm

TOTAL PROPOSED

FLUE GAS EMISSION

Sr. No.	Stack Attached to	Stack Height in meter	Fuel	APCM	Parameter	Permissible Limit
1.	Boiler (1 TPH)	11	Natural Gas: 400 M3/day	--	PM SO_X NO_X	150 mg/Nm3 100 ppm 50 ppm
2	TFH (1 Lac K. Cal)	11		--	PM SO_X NO_X	150 mg/Nm3 100 ppm 50 ppm
3	D.G. Set (125 KVA)	5	Diesel 10 Lit/Hr	--	PM SO_X NO_X	150 mg/Nm3 100 ppm 50 ppm

PROCESS GAS EMISSION

Sr. No.	Stack Attached to	Stack Height/Dia. meter	APCM	Parameter	Permissible Limit
1	Reaction Vessel	9/0.05	Water Scrubber	HF	20 mg/Nm^3 9 mg/Nm^3
2	Reaction Vessel (Chlorination)	11/0.05	Alkali Ventury Scrubber	HCl Cl2	20 mg/Nm^3 9 mg/Nm^3

ANNEXURE-VII

STORAGE DETAILS OF HAZARDOUS CHEMICALS

Sr. No.	Raw Materials	Storage Capacity (MT)	Type of Storage & MOC	No. of Vessel	Vessel Capacity (MT)	Type of Hazard
1.	Chlorine Gas	1	Tunner	1	0.9	Toxic
2.	Hydrogen	Hydrogen BanK 75 Nos- 427 m3				Flammable & Explosive
3.	H2SO4	20	HDPE Tank	2	10	Corrosive

ANNEXURE-VIII

SOCIO - ECONOMIC IMPACTS

1) EMPLOYMENT OPPORTUNITIES

The manpower requirement for the proposed expansion project is being expected to generate some permanent jobs and secondary jobs for the operation and maintenance of plant. This will increase direct / indirect employment opportunities and ancillary business development to some extent for the local population.

This phase is expected to create a beneficial impact on the local socio-economic environment.

2) INDUSTRIES

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

3) PUBLIC HEALTH

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

4) TRANSPORTATION AND COMMUNICATION

Since the existing factory is having proper linkage for the transport and communication, the development of this project will not cause any additional impact.

In brief, as a result of the 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-IX

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 10 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
- 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 PM_{10}, $PM_{2.5}$, SO_2, 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**

- Identification of impacting activities from the proposed project during construction and operational phase.
- 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**

- Details on storage facilities
- Process safety, transportation, fire fighting systems, safety features and emergency capabilities to be adopted.
- Identification of hazards
- Consequence analysis through occurrence & evaluation of incidents
- Recommendations on the basis of risk assessment done
- Disaster Management Plan.

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 Develop