DETAILED PROJECT REPORT

HIGHLIGHT OF PROJECT

The proposed project is for manufacturing of synthetic organic chemicals which is roofed under Category – 5 (f) "B" and excluding public hearing process because the proposed project is to be developed in notified industrial area, GIDC-Vapi of Gujarat, as per new EIA notification vide gazette no. S.O. 1533 dated 14th September 2006 and its amendments till date. Furthermore, the project is covered in category B, but its falls under critically polluted area as per revised CEPI, hence requires to apply at central level.

The details of the proposed project are summarized as "Highlight of Project" within the subsequent table.

Table 1: Highlight of Project

Sr. No.	Particulars	DETAILS
1.	Company Type & Registered Address	Proprietorship Company C-5/101/4, Near GIDC office, N.H. no.8, GIDC, Vapi-396195, Gujarat, India. Tel : 0260-2431587 Fax : 0260-2430487 E-mail : guptekishor@gmail.com
2.	Name and Location of project	M/s. Bhavisha Industries Plot No. 1705, Phase - III, G.I.D.C., Vapi - 396 195, Gujarat, India.
3.	Geographical position (Coordinates)	Lat: 20°22'16.54"N, Long: 72°56'45.29"E
4.	Name of Applicant-	Mr. Kishor S. Gupte
	(b) Address: (i) Postal	Office address: C-5/101/4, Near GIDC office, N.H. no.8, GIDC, Vapi-396195, Gujarat, India.
	(ii) E-mail	shailesh@gpcpl.net guptekishor@gmail.com
	(c) Phone (i) Land line	0260-2431587
	(ii) Mobile	9825142833, 9925100331
	(iii) Fax:	0260-2430487
5.	Year of Commissioning	2020
6.	Nature of project	New project Manufacturing Synthetic Organic Chemicals.
7.	Land Type of Project Site	**Notified Industrial Area (GIDC, Vapi)**
8.	Is land procured or to be procured for new project or For Expansion?	New Plot is procured within Notified Industrial Area, GIDC Vapi, Gujarat.
9.	Screening category (as per SO 1533 as timely amended)	5(f) – "Synthetics Organic Chemicals" Category: "B".
10.	Total area	6213.00 m2
11.	Land for Green belt	1202.00 m^2greenbelt will be provided within acquired land and additional greenbelt (approx. 1300.00 Sq.m. area) will be developed in outside through GPCB approved greenbelt developer.
12.	Products with capacity	**EC Product:** 1. Dispersing agent, leather chemicals and

Sr. No.	Particulars	DETAILS
		construction chemicals – 10100.00 MT/Month. **Non EC Product:** 2. Admixture for concrete & dyes industries – 3000.00 MT/Month.
13.	Cost of project	Rs. 1232.44 Lakhs
14.	Capital and recurring Cost earmarked for environmental protection measures:	Capital cost for EMP: Rs. 61.00 Lacs and Recurring cost for EPM+CER: Rs. 32.00 Lacs /Annum
15.	Total Fresh Water requirement, sources	210.50 KL/Day. Source: Water supply will be met from GIDC water supply dept.
16.	Total Power requirement and source	600 KVA Source: DGVCL
17.	D.G.Set (Standby power source)	D.G. Set 250 KVA x1 no, 500 KVA x1 no
	Fuel requirement	Diesel: 140.00 Lit/ Hr (250 KVA- 50.00 lit/hr, 500 KVA- 90.00 lit/hr)
18.	Steam Requirement	4.00 TPH Sources: In-house boilers.
19.	Steam Boiler	Steam boiler 2.00 TPH x 3 Nos
	Fuel Requirement	Boiler I – NG@ 120.00 SCM/Hr, Boiler II & III-NG@ 120.00 SCM/Hr. (one boiler will be on standby)
20.	Thermo Pack	Capacity: 10.00 lakhs Kcal/Hr
	Fuel Requirement	Natural Gas: 100.00 SCM /Hr
21.	Hot Air Generator	Capacity: 25.00 lakh k. cal/hr
	Fuel requirement	NG: 270.00 SCM/Hr
22.	Man Power	Total: 100 nos.
23.	Air pollution Control Measures	• Adequate stack height connected to utilities • Two stage Bag filters attached to spray dryers (3 nos.) • Two stage scrubber attached to sulphonation reactor
24.	Waste water Generation	Domestic Total: 2.00 KL/Day Industrial Total: 5.60 KL/Day
25.	Solid/Hazardous Wastes	• ETP Waste (35.3): 15.00 TPA • Used Oil (5.1): 0.095 KL/Annum • Discarded containers/barrels/liners (33.1): 125.0 TPA • Waste from scrubber(37.1): 290.00TPA • Used Filter Cloths (33.2):1.00 TPA • Process Waste (26.1): 400.00 TPA
26.	Status of the project	New Project- will be established after obtaining required permissions.

PROPOSED PRODUCTS DETAILS

The details of the products along with production capacity are presented below in tabular form.

Table 2: List of Products with Capacity

Sr.No	Name of the Products	CAS No.	Quantity (MT/Month)	End-use of the products
Non-EC Product				
1.	Admixture for Concrete and Dyes Industries	NA	**3000.00**	Construction chemicals
Products requiring Prior EC				
2.	**Dispersing Agents**		**6000.00**	Used to manufacture Disperse dyes, construction chemicals, Leather chemicals, etc. Used as dispersing agent in Agro formulation and Dyes industry.
	Naphthalene Based	9084-06-4		
	Phenol Based	102980-04-1		
	Sulphonated Alkyl naphthalene Formaldehyde Condensate Sodium Salt	577773-56-9		
	Dibutyl Naphthalene sulphonated sodium salt	25417-70-3		
3.	**Leather Chemicals**		**500.00**	In Leather processing industries.
	Syntans (Powder)	NA		
	Fat Liquor (Liquid)	NA		
4.	**PEG Based Polycarboxylate Ether (Liquid & Powder)**	70789-60-6	**3000.00**	Construction chemicals
5.	**Biaxial oriented polypropylene (BOPP) Self Adhesive**	9003-07-0	**300.00**	For manufacturing BOPP self-adhesive Taps
6.	**Waterproofing polymer**	25852-37-3	**300.00**	Use in Construction chemicals
		Total	**13100.00**	**--**

JUSTIFICATION& NEED OF PROJECT

Dyestuff industry is one many of the main chemical industries in India. It is correspondingly the second maximum export phase in chemical business. The Indian dyestuff enterprise is formed of approximately 1000 of small-scale units and 50 large organized units, who produce around 1,30,000 tonnes of dyestuff. Maharashtra and Gujarat account for 90% of dyestuff production in India because of the accessibility of raw materials and supremacy of fabric industry in these areas. The key customers of dyes in India are textiles, paper, plastics, printing ink and foodstuffs. The textiles department consumes around eighty percent of the entire production due to large call for polyester and cotton, globally.

The requirement for leather chemicals in India is estimated to grow from 406 KTPA in 2018 to 965 KTPA by 2030, demonstrating a CAGR of 7.5% throughout 2019-2030. Rising use of leather chemicals in tanneries, additionally to expected growth in the demand for specialty leather chemicals in wet-end and finishing stages of leather goods production, is anticipated to lead the Indian leather chemicals market during forecast period. Growing demand for leather products in the fashion industry, growing footwear industry and rising leather exports are numbers of the other factors that may drive the market.

The proposed new project will provide a possible growth opportunity for the company. We have recognised the demand for the proposed products and they can be developed in-house and produced commercially for

domestic market along with increased thrust on export markets. The export of such products also will increase the foreign revenue. The company's products are well established and satisfactory in both domestic and international markets.

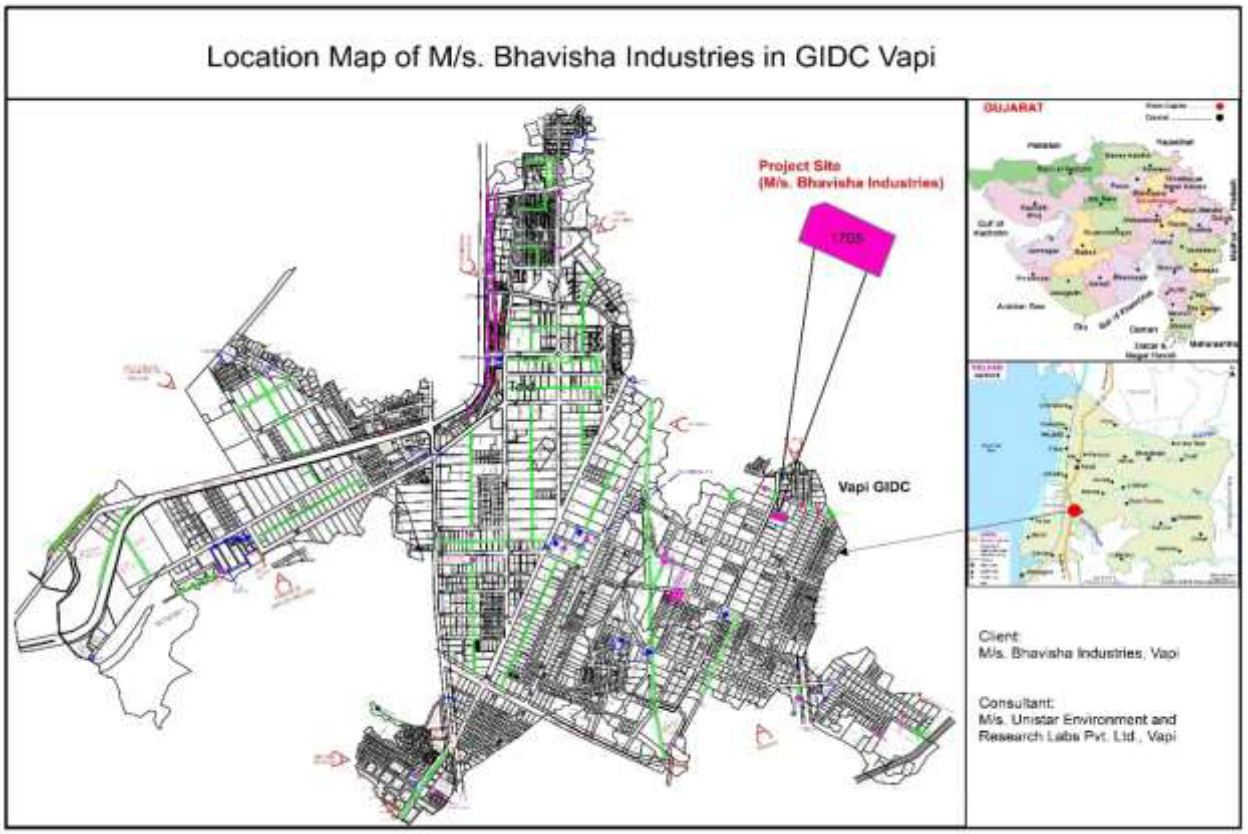
Keeping in sight on all above points, company have determined market potential for the particular products & their demand and with valuable R&D efforts Company is confident that it can develop the merchandise in very economical route of production and supply at very reasonable price and will benefit the buyer company. Company has also noticed that the products will be able to substitute the demand of the imported & costly products which successfully provide a growth potential opportunity to the company& buyers. Besides, there will be excellent opportunity of employment generation directly and indirectly due to proposed new project.

PROJECT SITE

The project site is located at plot no. 1705, Phase III, Vapi GIDC notified Industrial Estate. The subject site consists of a plot of land 6213.00 sq.m. Map showing the project boundary on Google image is shown as Figure 2-.1 and latitude and longitude of the site is given in Table 2.1. Similarly, the site layout map is presented as Figure 2.2 and area breakup at site is given in Table 2.3. Nearest National Highway 8- 2.42 Km W, nearest state highway - Silvassa-Vapi Road: 2.49 Km SW and nearest railway station-Vapi, 3.90 Km NW away from project site. Via the modernized highway, Mumbai is about 139.85 km to the south and the city of Surat is about 86.84 km to the north.

Fig.1: Location map

Fig 2: Map of Project Site (in GIDC etc. showing minimal area of representing land type)



RESOURCE REQUIREMENT

The proposed project is to be developed within the existing developed industrial plot located in notified industrial estate of GIDC Vapi. The site is already developed with constructed civil structures. Therefore, no construction works for the proposed project.

The details of the resource requirements of proposed project are presented below in subsequent paragraphs under respective headings.

LAND & BUILDINGS

The plot which is admeasuring 6213.00 Sq.m. This land is sufficient for proposed project. In 1202.00 Sq. m. area greenbelt will be developed. The details of the area statement for proposed unit are mentioned beneath.

Table 3: Area Statement for the Plant Premises

Area Statement	Available area (Sq. m.)	Required area (Sq. m.)
Open & Ground Floor Area (Constructed)		
Production Plant/Unit	1130.00	709.00
Raw Material Storage Area	459.00	176.49
Tank Area	463.00	300.00
Finished product Area	459.00	269.36
Utility Area	100.00	100.00
DG SET	100.00	50.00
Parking Area	50.00	50.00
Cooling Area	50.00	50.00
Waste storage Area	100.00	100.00
ETP	100.00	100.00
Offices & Other	26.00	26.00
O.H.C Area	15.00	15.00
Greenbelt Area	1202.00	2502.00 (40% greenbelt)
Other Available	0.00	--
Open Land Area	1959.00	--
Total Area	**6213.00**	--
Note: 1202 sq. m. greenbelt will be provided within acquired land and additional greenbelt (approx. 1300 Sq.m. area) will be developed in outside through approved greenbelt developer.		
1st Floor Area (Constructed)		
Production Plant/Unit	1130.00	--
Raw Material Storage Area	457.64	--
Finished Good Storage Area	459.00	--
Utility Area	100.00	--
Offices & Other	52.00	--
Other Available	100.00	--
Total Area	**2298.64**	
2nd Floor Area (Constructed)		
Production Plant/Unit	1130.00	--
Raw Material Storage Area	457.64	--
Finished Good Storage Area	459.00	--
Utility Area	50.00	--
Offices & Other	100.00	--
Other Available	100.00	--
Total Area	**2296.64**	
3rd Floor Area (Constructed)		
Production Plant/Unit	918.00	--
Raw Material Storage Area	0.00	--
Finished Good Storage Area	0.00	--
Utility Area	50.00	--
Offices & Other	100.00	--
Other Available	100.00	--
Total Area	**1168.00**	
4th Floor Area (Constructed)		
Production Plant/Unit	918.00	--
Raw Material Storage Area	0.00	--

Finished Good Storage Area	0.00	--
Utility Area	50.00	--
Offices & Other	0.00	--
Other Available	0.00	--
Total Area	**968.00**	

Justification for Adequacy of provided production, raw material and product storage area are presented below:

Raw material Storage Area Requirement, m^2

Total area available for storage:	27.00 m (length of the floor) *17.00 m (width of the floor) = 459.00 sq. m.
Required storage area:	176.49 sq. m. for 477 nos.-drums (286000 kgs), Triple rack with safety space
Area of a Drum:	0.37 sq. m.
Total Drums to be Stored:	The proposed project requires 476.49 sq. m. area for storage of raw material and 922.00 sq. m. area is already available for raw material storage area hence it is found that the available area is more than the required area.

Product Storage Area Requirement, m^2

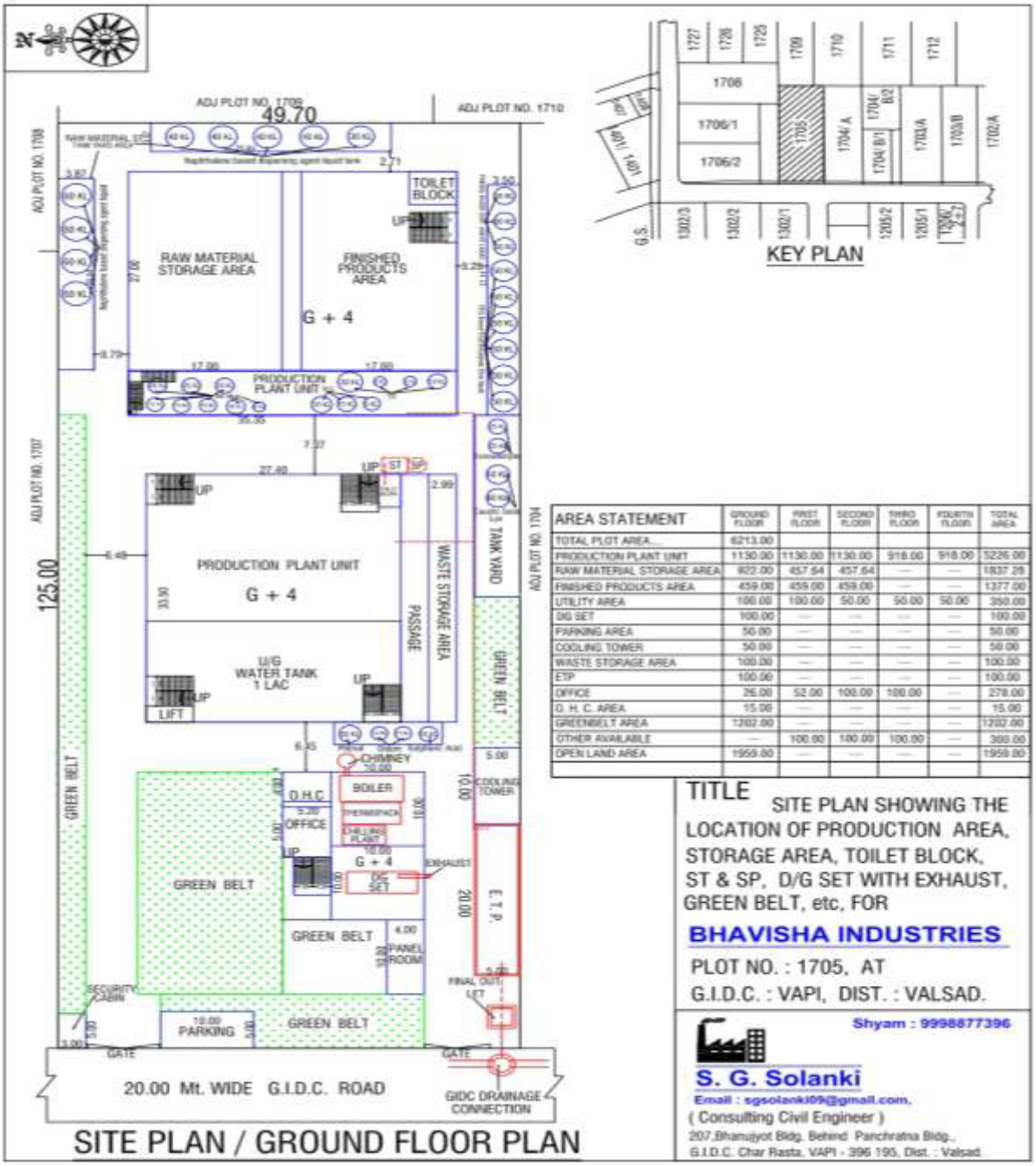
Total area available for storage:	27.00 m (length of the floor) *17.00 m (width of the floor) = 459 sq. m.
Area required for project:	269.36 sq. m. for 728 nos.-drums (436667 kgs), triple rack with safety space
Adequacy Remark:	The proposed project requires 269.36 sq. m. area for storage of product and 459.00 sq. m. area is already available for product storage area hence it is found that the available area is more than the required area.

Production Area Requirement of EC product, m^2

Total area available for production:	33.53 m (length of the floor) *27.43 m (width of the floor) = 920.00 sq. m. Production area for inorganic products = 200.00 sq.m. Total Area= 1130.00 sq. m.
Area required for project:	252 sq. M for Reactor & 274 sq. M for other Production activities = Total 526 sq. M Production area for inorganic products = 200.00 sq.m.
Adequacy Remark:	The proposed project requires 709.00 sq. m. area for production and 1130.00 sq. m. area is already available; hence it is found that the available area is more than the required area.

Site plan of Ground Floor is shown as fig 2.3 as Site layout plan and First floor to fourth floor plan is give in annexure- IX (G) Site Layout plan with all floor.

Fig. 3: Plant Layout



WATER

The unit will need 210.50 KLD freshwater, which will be met through Water supply pipeline of GIDC Vapi. The industrial operation of the unit will require 202.00 KLD, whereas the domestic activities will require 4.00 KLD. The details with required breakup for water requirement of proposed unit are presented in following table.

Table 4: Breakup of fresh Water Requirement

Category	Quantity (in KLD)	Remarks
(A) Domestic	**4.00**	Fresh water
(B) Gardening	**4.50**	2.50 KLD Fresh water & 2 KLD Reuse from STP.
(C) Industrial		
Process	190.00	Fresh water
Washing	2.00	Fresh water
Boiler & cooling	9.00	Fresh water
Scrubbing	1.00	Fresh water
Industrial Total	**202.00**	--
Total (A + B + C)	**210.50**	208.50 KLD Fresh water & 2.00 KLD Reuse.

ENERGY, FUEL & POWER

The details of Fuel & Power requirement is presented in tabular form in subsequent table.

Table 5: Energy, Fuel & Power Requirement

Components	Proposed	Sources
Power	600 KVA	DGVCL
Heat Requirement	29.00 Lakh K.cal/Hr.	HAG & Thermo pack
Steam Requirement	4000.00 Kgs/Hr.	2Nos of In-house boilers
Power during power failure	700 KVA	2 Nos of DG Sets
HSD	140.00 Ltr/Hr.	Local Pump
Natural Gas	610.00 SCM/Hr.	Local dealer

PLANT & MACHINERY

The company will setup its manufacturing unit having following main & foremost machineries & equipment. The details of the proposed machineries & equipment are presented underneath in tabular form.

Table 6: Major Machineries & Equipment

Sr. No.	Equipment/ Utility Name (Quantity)	MOC	Capacity
	STORAGE		
1.	Sulphuric Acid	MS (1 no.)	25 KL x 1 No.
2.	Oleum 23%	MS (2 no.)	15 KL x 2 Nos.
3.	Formaldehyde	PP (2 no.)	25 KL x 2 Nos.
4.	Caustic Soda Lye	MS (2 no.)	40 KL x 2 Nos.
5.	Phenol	MS Jacketed (1 no.)	30 KL x 1 No.
6.	Naphthalene based dispersing agent liquid	MS (9 no.)	40 KL x 4 Nos 60 KL x 4 Nos 30 KL x 1 No
7.	Phenol based Disp. Agent liquid	MS (3 no.)	30 KL x 3 Nos.
8.	PEG Based Polycarboxylate Ether liquid	PP (6 no.)	50 KL x 6 Nos.

	PROCESS PLANT		
9.	Sulphonator	MS (2 no.)	8 KLx 2 Nos.
10.	Lead Bonded Reactor	MS/LB (4 no.)	16 KL x 4 Nos.
11.	Glass Lined	MS/GL (3 no.)	16 KL x 3 Nos. 12.5 KL x 1 No.
12.	PP Neutralizer	PP (2 no.)	25 KL x 2 Nos.
13.	MS Mixer	MS (7 no.)	25 KL x 3 Nos. 15 KL x 3 Nos. 10 KL x 1 Nos. 5 KL x 1 Nos.
14.	SS Mixer	SS (4 Nos)	30 KL x 1 Nos. 10 KL x 1 Nos. 5 KL x 2 Nos.
		M.S (3 Nos)	20 KL x 1 Nos. 15 KL x 1 Nos. 5 KL x 1 Nos.
15.	PP Vessel	PP (5 no.)	20 KL x 2 Nos. 30 KL x 3 Nos.
16.	SS Reactor	SS -316 (10 no.)	10 KL x 4 Nos. 8 KL x 2 Nos. 5 KL x 2 Nos. 2.5 KL * 2 Nos.
17.	Spray Dryer	SS-316 (3 Nos.)	1000 kg/Hr x 2 500 kg/Hr. X 1
18.	Ribbon Blender	SS (3 no.)	5 KL x 1 3 KL x 1 1 KL x 1
	UTILITY		
19.	Thermopack	-	10 lakh K.cal x 1
20.	Boiler	-	2000 Kg/H X 3
21.	Air Compressor	-	7.5 HP x 2
22.	D.G Set	-	250 KVA x 1, 500 KVA x 1
23.	Chilling Plant	-	120 TR x 2
24.	Hot Air Generator	-	25 lakh x 1

HUMAN RESOURCE

The company will deliver employment to 100.00 people in different categories for operation of proposed project. The details of the projected employment structure are presented below in tabular form.

Table 7: Human Resource Requirement

Sr. No.	Particular	Employment Nos., Total
1	Managerial	10.00
2	Skilled	55.00
3	Semi-Skilled	20.00
4	Unskilled	15.00
	TOTAL	**100.00**

CAPITAL

The capital of proposed project has been assessed & budgeted with costs of Rs. 1232.44 lakhs. The proposed capital includes Rs. 61.00 Lakhs for environmental protection measures. The details of proposed capital costs approximation including land, buildings, plant machineries & equipment, environmental protection measures etc. is presented below in tabulated form.

Table 8: Capital Cost

Sr. No.	Purpose	Proposed Cost (Rs. In Lakhs)
1.	Land	361.44
2.	Building and Civil Works	--
3.	Plant, Machinery and other fittings	810.00
4.	Environmental protection, Safety & Emergency measures	61.00
	TOTAL:	**1232.44**

DESCRIPTION OF PROCESS & ALLIED DETAILS

The details of Raw Materials & production process of all products are described in subsequent paragraphs under respective headings.

RAW MATERIALS

All raw materials required for manufacturing of the above said products are easily available indigenously in local market, which will be transported through road. The details of the raw material requirement are presented below.

Table- 9: List of Raw Material and its Consumption per Month

Sr. no.	Name of the Products	Name of the Raw Materials	CAS / CI no. of raw materials.	Quantity MT/Month
1.	**Admixture for concrete and dyes industries**	Dispersing agent/PCE	-	2625.00
		Retarder	-	180.00
		Foaming agent	-	15.00
2.	**Dispersing Agents**			
	Naphthalene Based Dispersing Agent (Liquid & Powder)	Napthalene	91-20-3	1053.23
		Oleum (23%)	8014-95-7	432.30
		Sulphuric Acid (98%)	7664-93-9	620.93
		Formaldehyde	50-00-0	554.34
		Caustic Lye	1310-73-2	960.22
		Hydrated Lime	1305-62-0	62.00
		Soda Ash	497-19-8	15.49
	Phenol Based Dispersing Agent (Liquid & Powder)	Phenol	10895-2	359.79
		Formaldehyde	50-00-0	435.93
		Sodium Sulphite	7757-83-7	151.15
		Caustic Soda Lye	1310-73-2	235.23
		SulphuricAcid(98%)	7664-93-9	103.84
		EDTA	6381-92-6	5.76
	Sulphonated Alkylnapthalene	Alkyl Napthalene	68425-94-5	135.00

Sr. no.	Name of the Products	Name of the Raw Materials	CAS / CI no. of raw materials.	Quantity MT/Month
	Formaldehyde Condensate, Sodium Salt	Sulphuric Acid	7664-93-9	144.00
		Formaldehyde	50-00-0	66.00
		Caustic Lye	1310-73-2	132.80
	Di butyl Naphthalene Sulphonated, sodium salt	Naphthalene	91-20-3	100.00
		Sulphuric Acid	7664-93-9	150.00
		N-Butanol	71-36-3	120.00
		Caustic Lye (48 %)	1310-73-2	75.00
3.	**Leather Chemicals**			
	Leather Chemicals (Powder) Syntan	PAK liquid	2759-56-0	156.76
		Adipic Acid	124-04-9	5.70
		Fumeric Acid	110-17-8	2.85
		Pthalic Anhydride	85-44-9	2.85
		EDTA	6381-92-6	0.705
		Sodium LignoSulphonate	8061-51-6	28.50
		Glauber's Salt	7757-82-6	172.44
		HS Liquid	9084-06-4	17.10
	Leather Chemicals (Liquid) Fat Liquor	Wax Sulpho Chloride	8002-74-2	61.52
		CPW	6474243-4	30.76
		SPN	26571-11-9	9.22
		Caustic Soda	1310-73-2	10.76
		Hypo chlorite	7681-52-9	1.94
		Acetic Acid	64-19-7	3.46
		Sodium Sulphate	7757-83-7	24.98
4.	**PEG Based Polycarboxylate Ether Liquid &Powder**	Acrylic Acid	79-10-7	96.00
		PEG	25322-68-3	1800.00
		Meth acrylic Acid	79-41-4	44.00
		Caustic Lye	1310-73-2	32.80
		Soda Ash	497-19-8	1.60
		Potassium per sulphate	7727-21-1	9.60
		Sulphuric Acid	7664-93-9	16.00
5.	**BOPP (Biaxial oriented polypropylene) Self Adhesive**	Dainol 25	25155-30-0	1.25
		Butyl acrylate	141-32-2	131.80
		Meth acrylic acid	79-41-4	2.75
		Noigen DKX-405	67762-27-0	0.10
		Soda ash	497-19-8	0.10
		Potassium per sulphate	7727-21-1	0.60
		Ammonia	7664-41-7	1.10
		TBHP(Tent Butyl Hydro Peroxide)	75-91-2	0.05
		Safolite	149-44-0	0.10
		Nonyl phenol 9.5 mole	9016-45-9	0.55
		Formaldehyde	50-00-0	0.25
6	**Waterproofing polymer**	Dainol 25	2515530-0	1.87
		Butyl acrylate	141-32-2	102.50
		Meth acrylic acid	79-41-4	2.62
		Noigen DKX-405	67762-27-0	2.00
		Soda ash	497-19-8	0.25

Sr. no.	Name of the Products	Name of the Raw Materials	CAS / CI no. of raw materials.	Quantity MT/Month
		Potassium per sulphate	7727-21-1	1.00
		Ammonia	7664-41-7	3.00
		TBHP	75-91-2	0.08
		Safolite	149-44-0	0.13
		Styrene	100-42-5	0.75
		Formaldehyde	50-00-0	1.25

Table 10: Raw Material Requirement and their Source, Mode of transport& Storage

Sr. No.	Name of Raw Material	Storage Cap. In MT	Physical State	Mode of Transport	Storage	Type of Linkage	Distance of Source from Project Site
1.	Dispersing agent/PCE	200.00	Liquid	-	Drums	Captive	-
2.	Retarder	20.00	Liquid	Road	Drums	indigenous	125 km S
3.	Foaming agent	2.00	Liquid	Road	Drums	indigenous	125 km S
4.	Naphthalene based Dispersing agent (liquid)	400.00	Liquid	Road	MS storage tank	Captive	-
5.	Naphthalene	200.00	Solid	Road	Warehouse	indigenous	125 km S
6.	Oleum (23%)	30.00	Liquid	Road	MS storage tank with scrubber	indigenous	125 km S
7.	Sulphuric Acid (98%)	20.00	Liquid	Road	MS storage tank	indigenous	125 km S
8.	Formaldehyde	40.00	Liquid	Road	PP storage tank	indigenous	125 km S
9.	Caustic lye	50.00	Liquid	Road	MS Storage tank	indigenous	125 km S
10.	Phenol	30.00	Liquid	Road	MS storage with jacketed	indigenous	125 km S
11.	Sodium sulphite	10.00	Solid	Road	Warehouse	indigenous	125 km S
12.	EDTA	1.00	Solid	Road	warehouse	indigenous	125 km S
13.	Hydrated lime	15.00	Solid	Road	Ware house	indigenous	125 km S
14.	Soda ash	5.00	Solid	Road	warehouse	indigenous	125 km S
15.	Adipic Acid	2.00	Solid	Road	warehouse	indigenous	125 km S
16.	Fumeric acid	1.00	Solid	Road	warehouse	indigenous	125 km S
17.	Phthalic anhydride	1.00	Solid	Road	warehouse	indigenous	125 km S
18.	Sodium lignosulphonate	20.00	Solid	Road	Warehouse	indigenous	125 km S
19.	Glaubber's salt	10.00	Solid	Road	Warehouse	indigenous	125 km S
20.	Wax Sulpho Chloride	10.00	Liquid	Road	Drum storage in warehouse	indigenous	125 km S
21.	Chlorinated Paraffin Wax	10.00	Liquid	Road	Drum storage	indigenous	125 km S
22.	Acetic acid	5.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S
23.	Butyl acrylate	10.00	Liquid	Road	SS tank	indigenous	125 km S
24.	Dainol 25	2.00	Liquid	Road	Drum storage in	indigenous	125 km S

Sr. No.	Name of Raw Material	Storage Cap. In MT	Physical State	Mode of Transport	Storage	Type of Linkage	Distance of Source from Project Site
					ware house		
25.	HS Liquid	10.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S
26.	Acrylic Acid	20.00	Liquid	Road	SS tank	indigenous	125 km S
27.	Alkyl Naphthalene	10.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S
28.	Ammonia	5.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S
29.	Hypo chlorite	1.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S
30.	Meth acrylic Acid	2.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S
31.	N-Butanol	10.00	Liquid	Road	SS tank	indigenous	125 km S
32.	Noigen DKX-405	1.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S
33.	Nonyl phenol	1.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S
34.	PAK liquid	5.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S
35.	PEG	500.00	solid	Road	Ware house	indigenous	0.5 Km S
36.	Potassium per sulphate	1.00	solid	Road	Ware house	indigenous	125 km S
37.	Safolite	1.00	Solid	Road	Ware house	indigenous	125 km S
38.	SPN (sulphonated nonylphenol)	1.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S
39.	Styrene	10.00	Liquid	Road	SS tank	indigenous	125 km S
40.	TBHP	1.00	Liquid	Road	Drum storage in ware house	indigenous	125 km S

The products of proposed project are described in earlier section with required raw materials. The company shall use the latest available process technology for the production. This section includes the manufacturing process of the product, chemical reactions, and mass balance of each product.

1. PRODUCT : ADMIXTURE FOR CONCRETE AND DYES INDUSTRIES:

Capacity: 3000.00 MT/Month

Manufacturing Process:

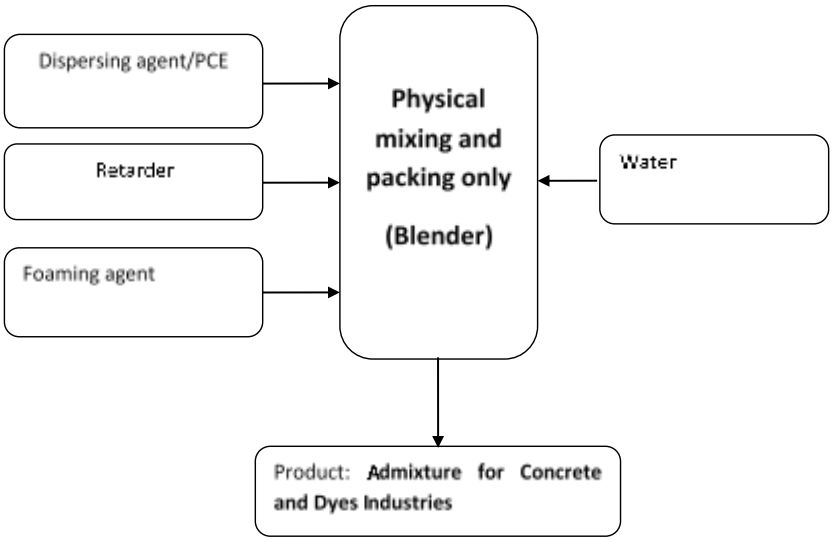
Dispersing agent/PCE, Retarder, Foaming agent and water are mixed in a mixer as per the required quantity. After proper mixing, materials packed for dispatch.

During the manufacturing product water is consumed for manufacturing product and process water is consumed along with product and there is no process waste water generation. There is no hazardous waste generation. Also there is no flue gas and process gas emission generated.

During the manufacturing process there is no any chemical reaction. There is no any flue gas stack and process stack installed for product manufactured.

Process water is consumed along with product and there is no any process waste generation.

Process flow diagram:



Mass Balance:

Sr.No.	INPUT	QTY (Kgs)	OUTPUT	QTY (Kgs)	REMARK
1.	Dispersing agent/PCE	2625.00	Admixture For Concrete And Dyes Industries	3000.00	Product
2.	Retarder	180.00			
3.	Foaming agent	15.00			
4.	water	180.00			
	Total	**3000.00**		**3000.00**	

2. PRODUCT : DISPERSING AGENT

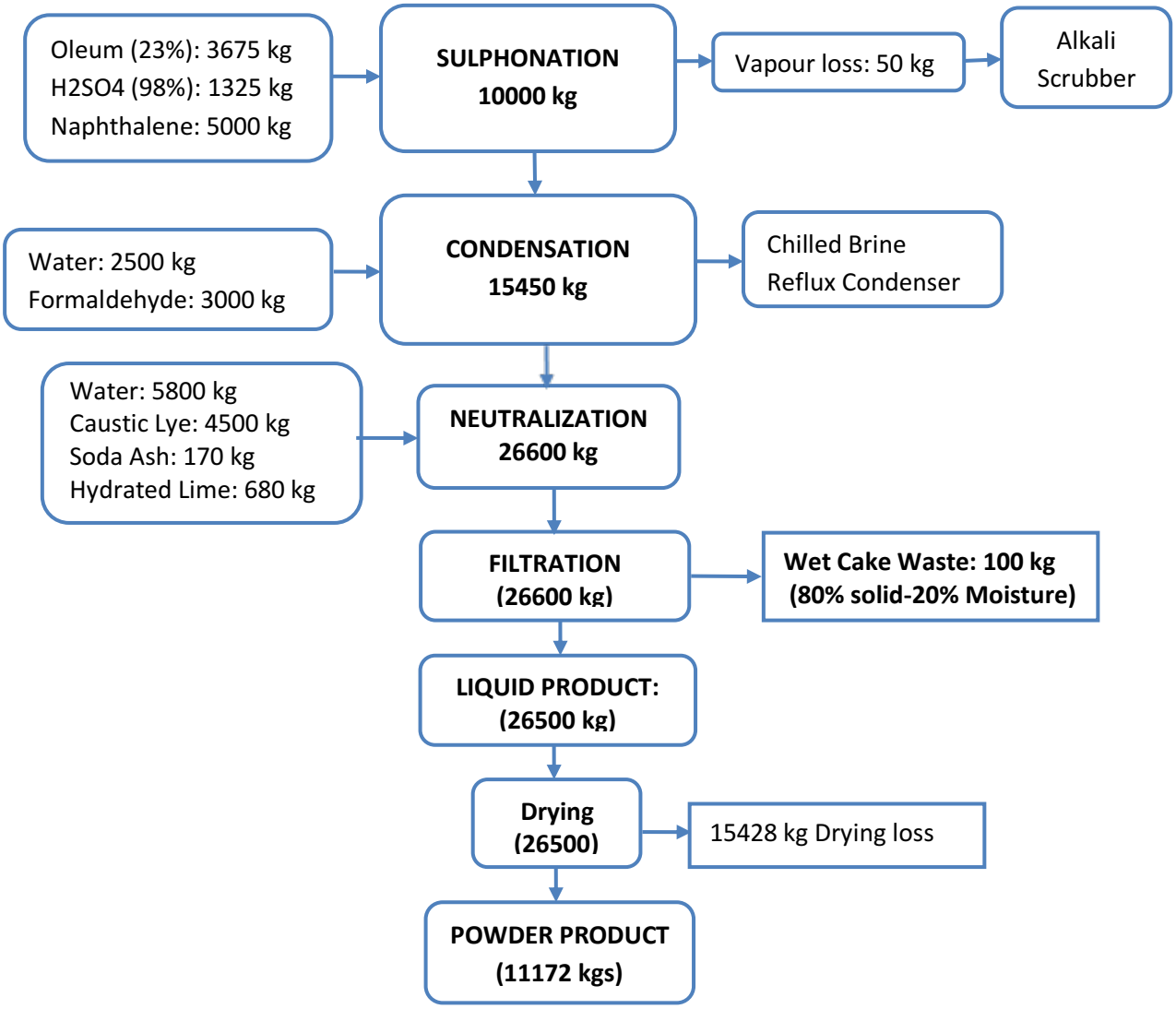
Capacity: 6000.00 MT/Month

a) Naphthalene Based Dispersing Agent (Liquid& Powder) - Capacity: 4000.00 MT/Month

Manufacturing process:

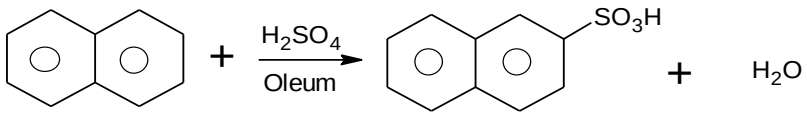
Naphthalene is charged in a reactor and heated up to 90 °C. 23 % Oleum and/or Sulphuric Acid is then added. Raise the temperature till Sulphonation reaction is completed. After testing for the completion of reaction, add 37 % Formaldehyde and water is added and the mass is stirred at 110 ºC for 10 hours. Then neutralized with Caustic Lye and water is added. Finally the liquid is packed in a drum as a final product for liquid one. For Powder product the mass is neutralized with Caustic Lye and Hydrated Lime to bring the pH to about 7. The mass is then filtered and washed. The wet cake is collected and stored as a solid waste. The wash water is recycled back in the neutralization process. The filtrate is further reacted with Soda Ash. Again the wet cake is collected and stored as solid waste. Finally the filtrate is taken to the Spray Drier for drying. The dry powder as a result is packed in HDPE bags for dispatch.

Process flow diagram:



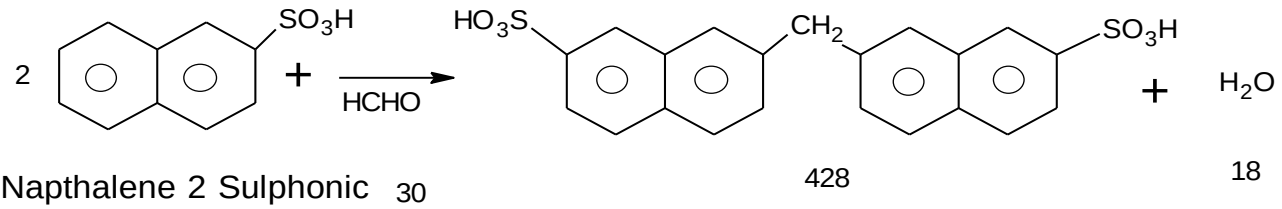
Chemical reaction:

- **SULPHONATION**



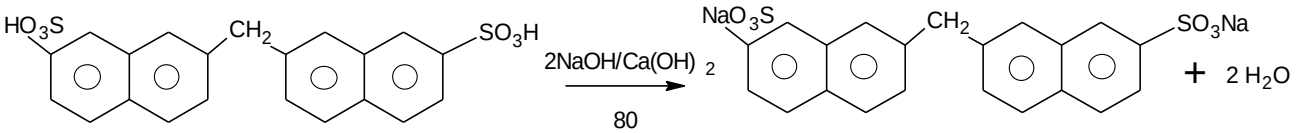
Napthalene: 128 | Napthalene 2 Sulphonic Acid: 208 | 18

- **CONDENSATION**



Napthalene 2 Sulphonic Acid: 416 — 30 — 428 — 18

- **NEUTRALIZATION**



428 — 80 — 472 — 36

Na Salt of B-Napthalene Sulphuric Acid Condensate

Mass Balance:

Sr. No.	INPUT	QTY (Kgs)	OUTPUT	QTY (Kgs)	REMARK
1.	Oleum (23%)	3675.00	**Dispersing Agent Based On Naphthalene (Liquid)**	26500.00	Product*
2.	Sulphuric Acid (98%)	1325.00	Vapour loss	50.00	
3.	Naphthalene	5000.00	Process waste	100.00	
4.	Water	8300.00			
5.	Formaldehyde	3000.00			
6.	Caustic Lye	4500.00			
7.	Soda Ash	170.00			
8.	Hydrated Lime	680.00			
	Total	**26650.00**		**26650.00**	

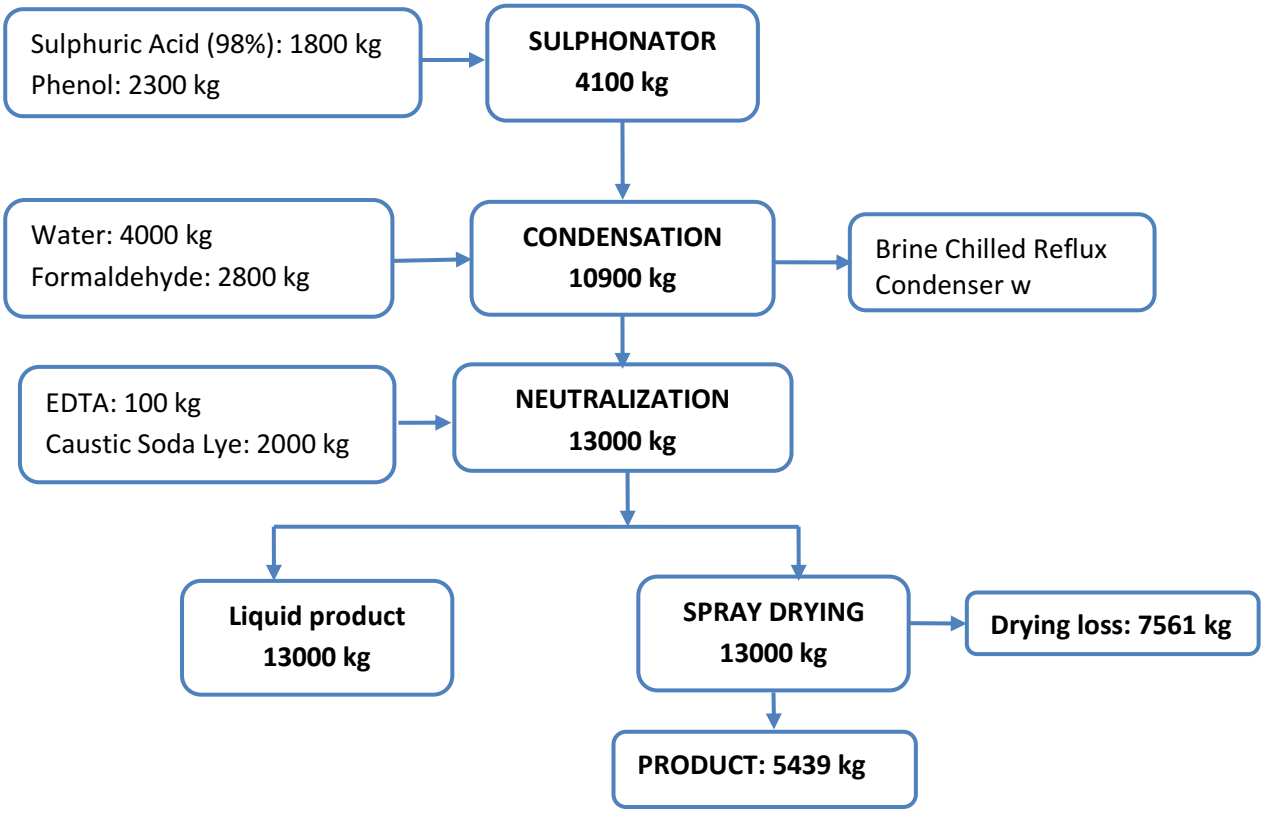
Note: * In case of solid powder product 15428 kg will be drying loss & 11172 kg will be solid product.

b) Phenol Based Dispersing Agent (Liquid) - Capacity: 1350.00 MT/Month

Manufacturing process:

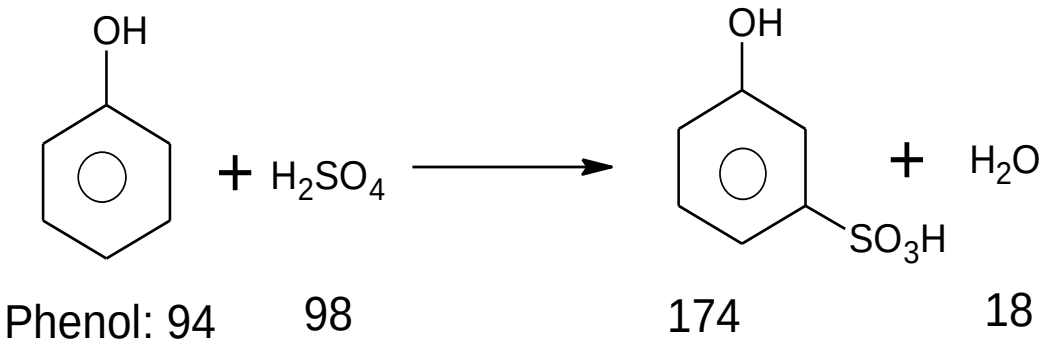
Phenol is first reacted with Sulphuric Acid in a Sulphonator Reactor at 90 °C for 10 hours. This is condensed with Formaldehyde and Sodium Sulphite at 110 °C and maintained for 10 hours. After the reaction is over, the liquid product is neutralized to pH 7 with Caustic Soda lye. The liquid mass is then spray dried in a Spray Drier. Finally, the dry powder is packed in bags as a final product.

Process flow diagram:

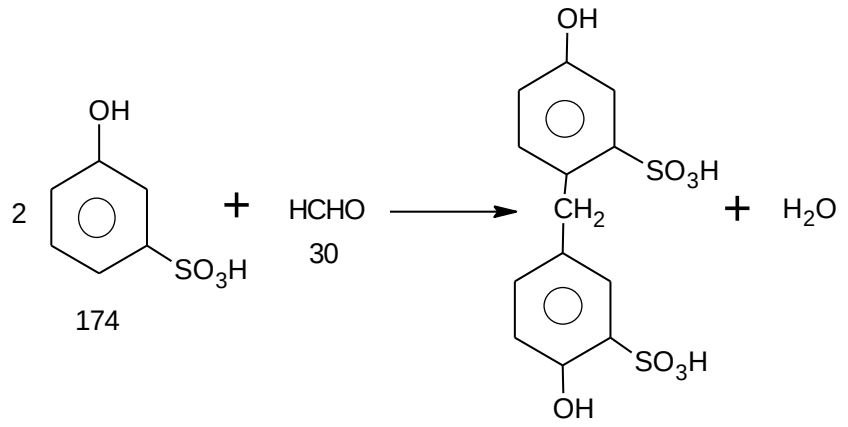


Chemical reaction:

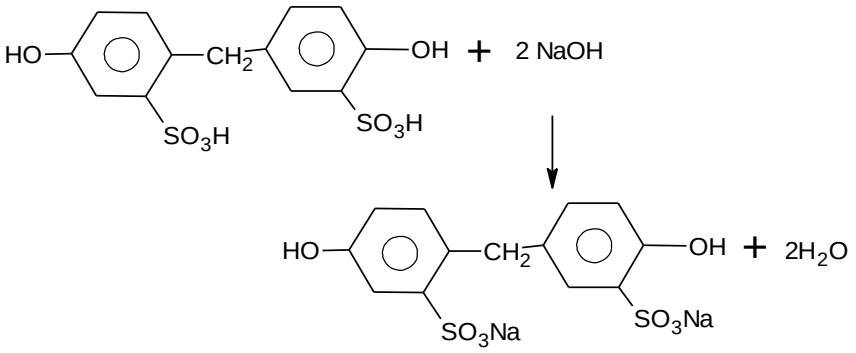
- **SULPHONATION**



- **CONDENSATION**



- **NEUTRALIZATION**



Mass Balance:

Sr. No.	INPUT	QTY (Kgs)	OUTPUT	QTY (Kgs)	REMARK
1.	Sulphuric Acid (98%)	1800.00	Dispersing Agent Based On Phenol (Liquid)	13000.00	Product
2.	Phenol	2300.00			
3.	Water	4000.00			
4.	Formaldehyde	2800.00			
5.	EDTA	100.00			
6.	Caustic Soda Lye	2000.00			
	Total	**13000.00**		**13000.00**	

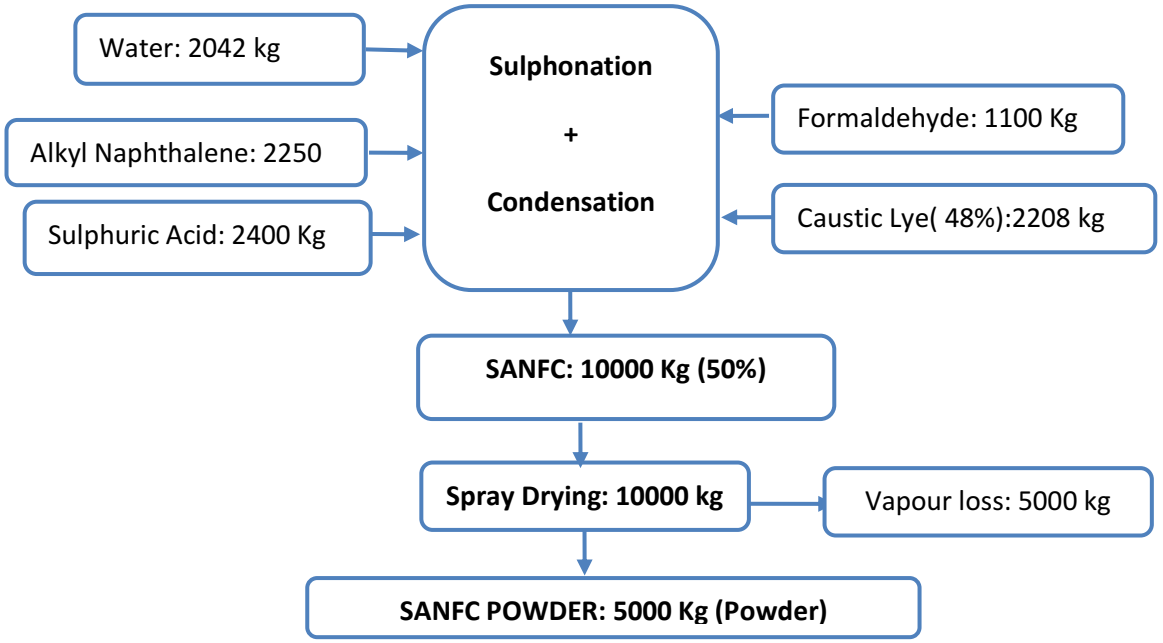
Note: * In case of solid powder product 7561kg will be drying loss & 5439 kg will be solid product.

c) Sulphonated alkyl naphthalene formaldehyde condensate sodium salt- Capacity: 300.00 MT/Month
Manufacturing process:

- After charge raw materials, slowly heat to 120°C temperature.
- After that maintain 4 hours at 120-125°C to get complete Sulphonation.
- First charge water in lead bonding reactor, than slowly charge sulphonated mass under cooling.
- Temperature should be below 80°C during drowning of acidic mass.
- After that charge formaldehyde in 3 hours at 70-80°.
- After addition of formaldehyde, slowly heat to 100-105°& maintain 8 hours at same temperature to get complete condensation.
- After condensation charge water & slowly add caustic lye under fast cooling.

- Temperature should not go above 80° during neutralization.
- After complete neutralization (PH 7.0 – 7.5), mix further 1 hour to get homogeneous solution. Sample send to QC lab for quality evaluation.
- If sample okay, then material hand over to spray dryer unit.
- Run SANFC liquid 50% into spray dryer through feed pump & keep inlet/outlet temperature.
- Power sample send to QC lab for quality evaluation. If sample okay, then pack in 25 kg bags.

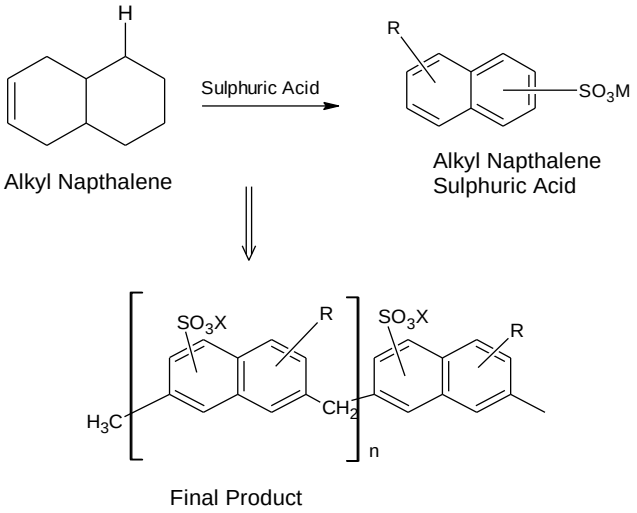
Process flow diagram:



Mass Balance:

Sr. No.	INPUT	QTY (Kgs)	OUTPUT	QTY (Kgs)	REMARK
1.	Alkyl Naphthalene	2250.00	Sulphonated alkyl naphthalene formaldehyde condensate sodium salt	5000.00	Product
2.	Suphuric Acid	2400.00	Vapour loss	5000.00	Due to Spray drying
3.	Formaldehyde	1100.00			
4.	Caustic Lye (48 %)	2208.00			
5.	Water	2042.00			
	Total	**10000.00**	**Total**	**10000.00**	

Chemical reaction:



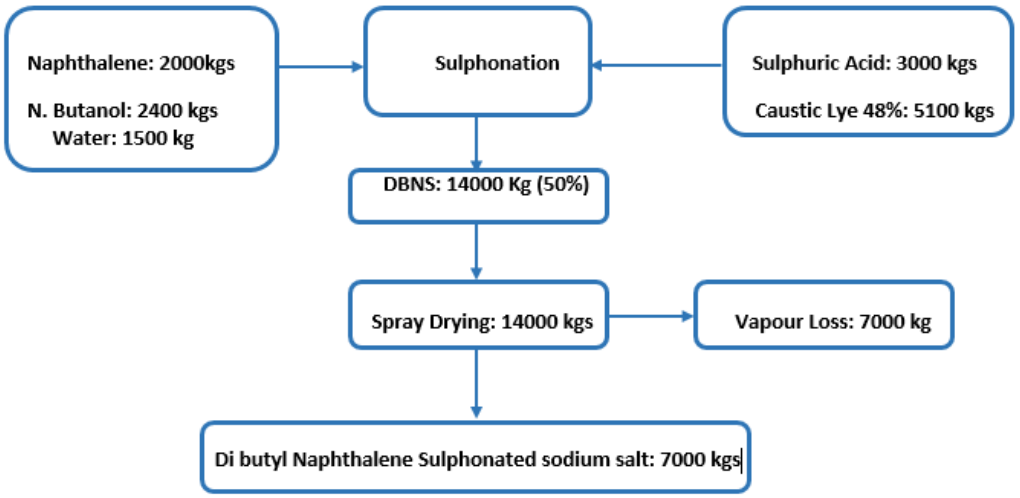
Final Product

d) Di butyl Naphthalene Sulphonated, sodium salt - Capacity: 350.00 MT/Month

Manufacturing process:

- After charge raw materials, cool to 12-16°C temperature.
- After that maintain 20 hours at 12-16°C to get complete sulphonation.
- After sulphonation charge water & slowly add caustic lye under fast cooling.
- Temperature should not go above 90° during neutralization.
- After complete neutralization (PH 7.0 – 7.5), mix further 1 hour to get homogeneous solution. Sample send to QC lab for quality evaluation.
- If sample okay, then material hand over to spray dryer unit.
- Run DNS (Dibutyl Naphthalene sulphonate) liquid 50% into spray dryer through feed pump & keep inlet/outlet temperature.
- Power sample send to QC lab for quality evaluation. If sample okay, then pack in 25 kg bags.

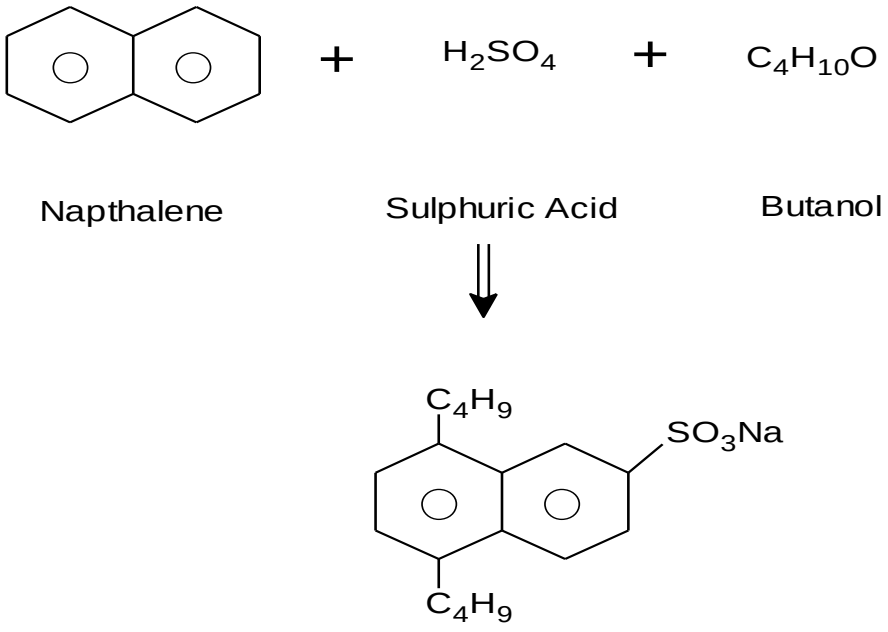
Process flow diagram:



Mass Balance:

Sr. No.	INPUT	QTY (Kgs)	OUTPUT	QTY (Kgs)	REMARK
1	Naphthalene	2000.00	Di butyl Naphthalene Sulphonated, sodium salt	7000.00	Product
2	Suphuric Acid	3000.00	Vapour loss	7000.00	Due to Spray drying
3	N-Butanol	2400.00			
4	Caustic Lye (48 %)	5100.00			
5	Water	1500.00			
	Total	**14000.00**	**Total**	**14000.00**	

Chemical reaction:



Dibutyl Napthalene Sulphonate, Sodium Salt

3. PRODUCT 3: LEATHER CHEMICALS

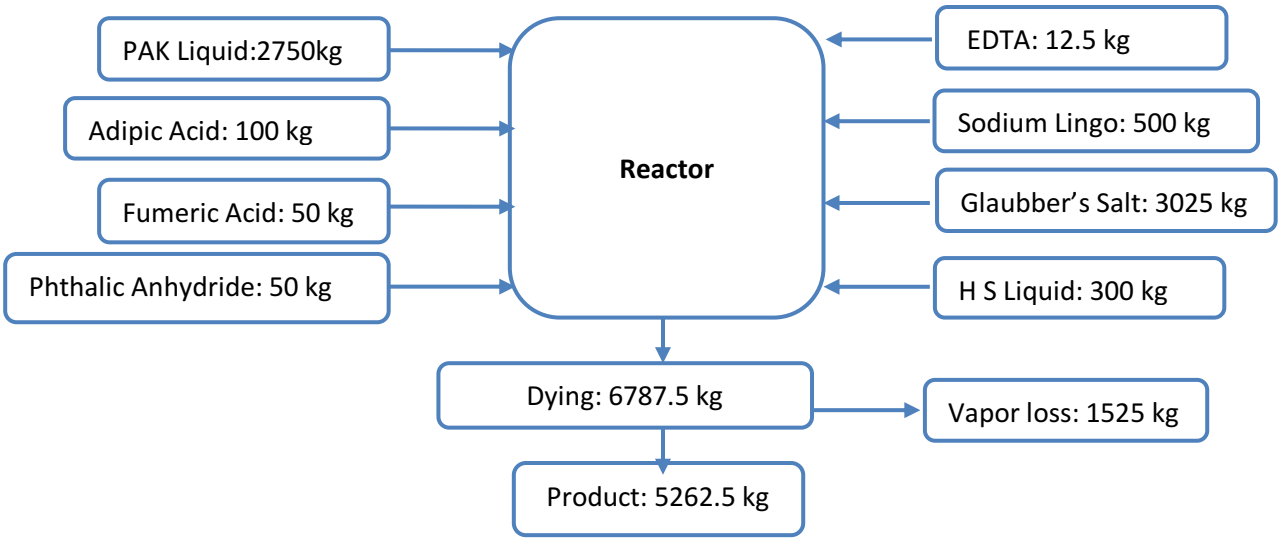
Capacity: 500.00 MT/Month

a) Leather Chemicals (Powder) Syntan - Capacity: 300.00 MT/Month

Manufacturing process:

PAK Liquid, Adipic Acid, Fumeric Acid, Phthalic Anhydride, EDTA, Sodium Lingo, Glaubbers Salt and H S Liquid are mixed in a reactor as per the required quantity. After proper mixing, the liquid mass is taken into the Spray Dryer. The drier powder is packed in bags for dispatch.

Process flow diagram:



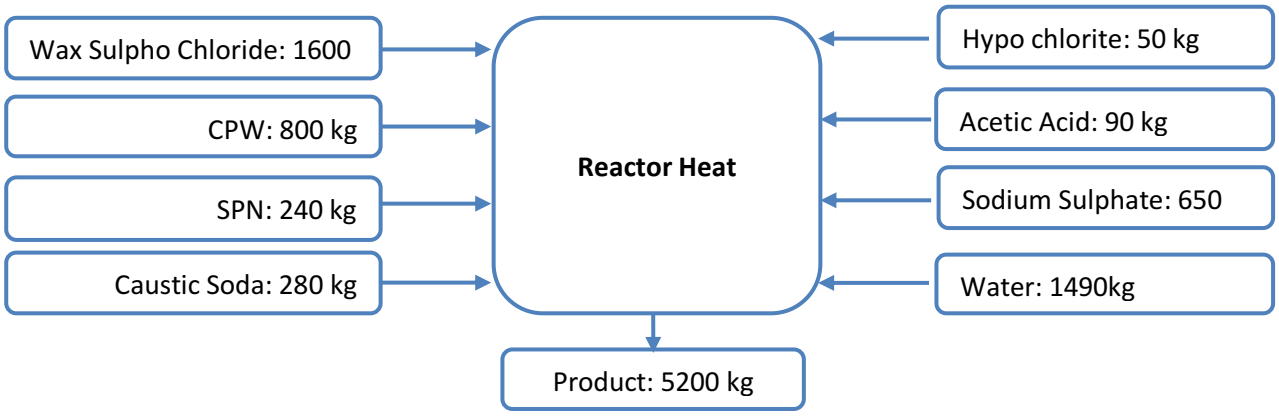
Chemical reaction: No Chemical reaction only mixing and spray drying process

Mass Balance:

Sr. No.	INPUT	QTY (Kgs)	OUTPUT	QTY (Kgs)	REMARK
1.	PAK liquid	2750.00	Leather Chemicals (Powder)	5262.50	Product
2.	Adipic Acid	100.00	Vapour loss	1525.00	
3.	Fumeric Acid	50.00			
4.	Phthalic Anhydride	50.00			
5.	EDTA	12.50			
6.	Sodium Lingo	500.00			
7.	Glauber's Salt	3025.00			
8.	H.S. liquid	300.00			
	Total	**6787.50**		**6787.50**	

b) Leather Chemicals (Liquid) Fat Liquor
Capacity: 200.00 MT/ Month
Manufacturing process:
Wax Sulpho Chloride, CPW, SPN, Caustic Soda, Sodium Hypochlorite, Acetic Acid, Sodium Sulphate and water are mixed in a reactor as per the required quantity. The reactor is fitted with a stirrer for proper mixing. The mass is heated up to 60 – 70 °C. Finally, the mixture is packed into drums as a final product.

Process flow diagram:



Chemical reaction: no Chemical reaction only mixing and blending process

Mass Balance:

Sr. No.	INPUT	QTY (Kgs)	OUTPUT	QTY (Kgs)	REMARK
1.	Wax Sulpho Chloride	1600.00	Leather Chemicals (Liquid) Fat Liquor	5200.00	Product
2.	CPW	800.00			
3.	SPN	240.00			
4.	Caustic Soda	280.00			
5.	Hypo chlorite	50.00			
6.	Acetic Acid	90.00			
7.	Sodium Sulphate	650.00			
8.	Water	1490.00			
	Total	**5200.00**		**5200.00**	

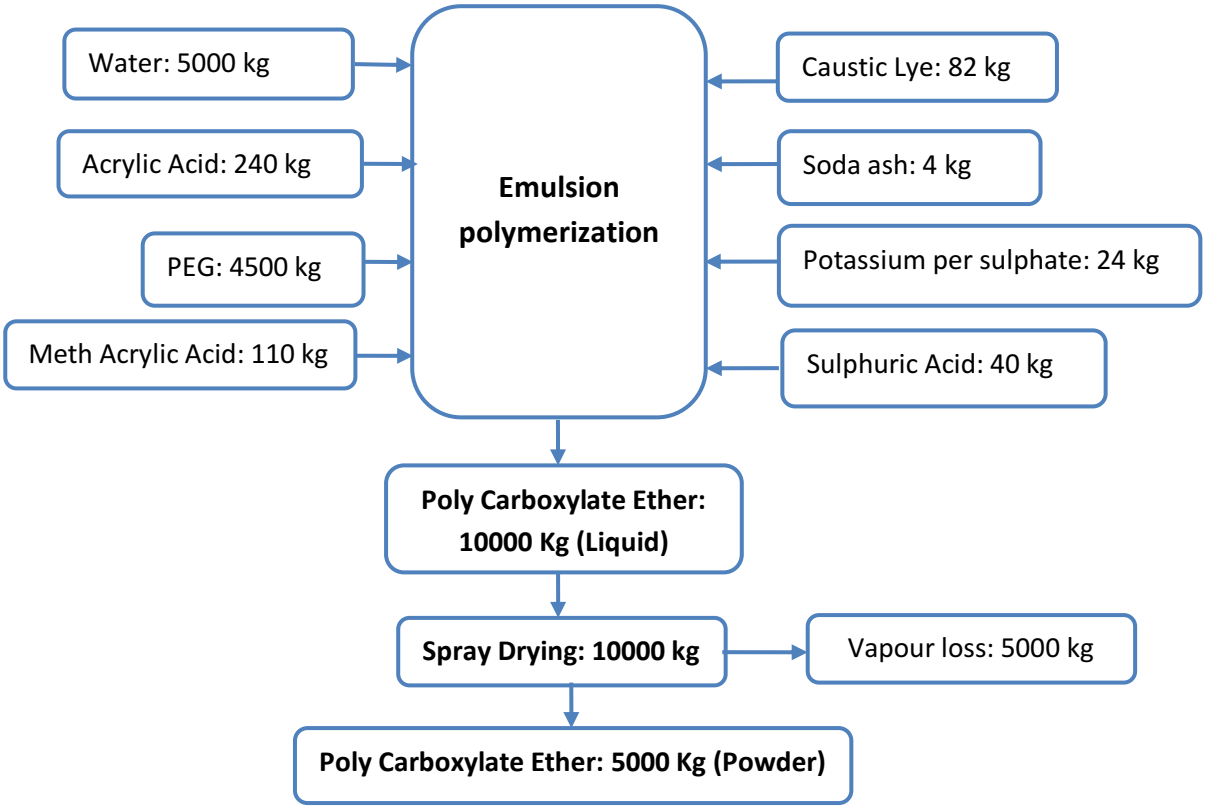
4. Product 4: PEG BASED POLYCARBOXYLATE ETHER (LIQ. & POWDER)

Capacity: 3000.00 MT/Month

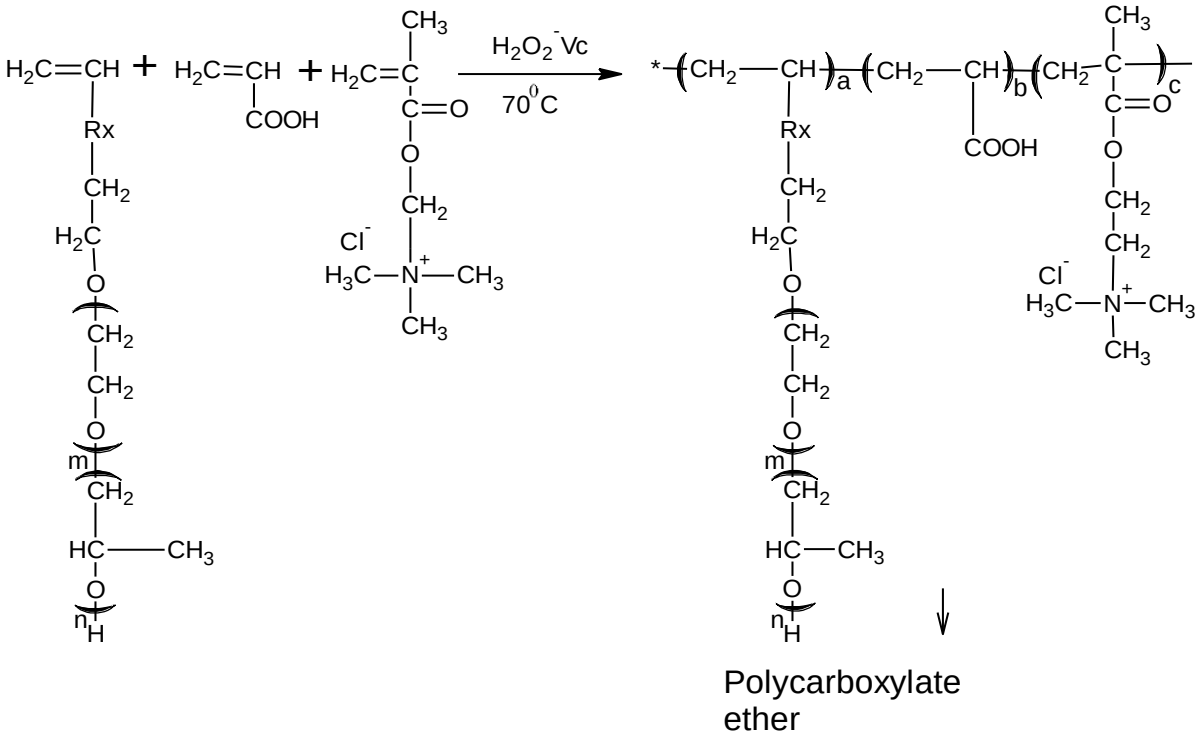
Manufacturing process:

- After charge raw materials, heat the reactor to 70°C & start addition of emulsion & potassium per sulphate solution.
- Charge both solutions simultaneously in 3 hours at 90°C to 95°C.
- After complete addition, maintain further 1 hour at 90°C to 95°C.
- After that cool to 50°C& charge caustic soda lye.
- Further mix 20 min. & sample send to QC lab for quality evaluation.
  If sample okay, then pack in drums.

Process flow diagram:



Chemical reaction:



Mass Balance:

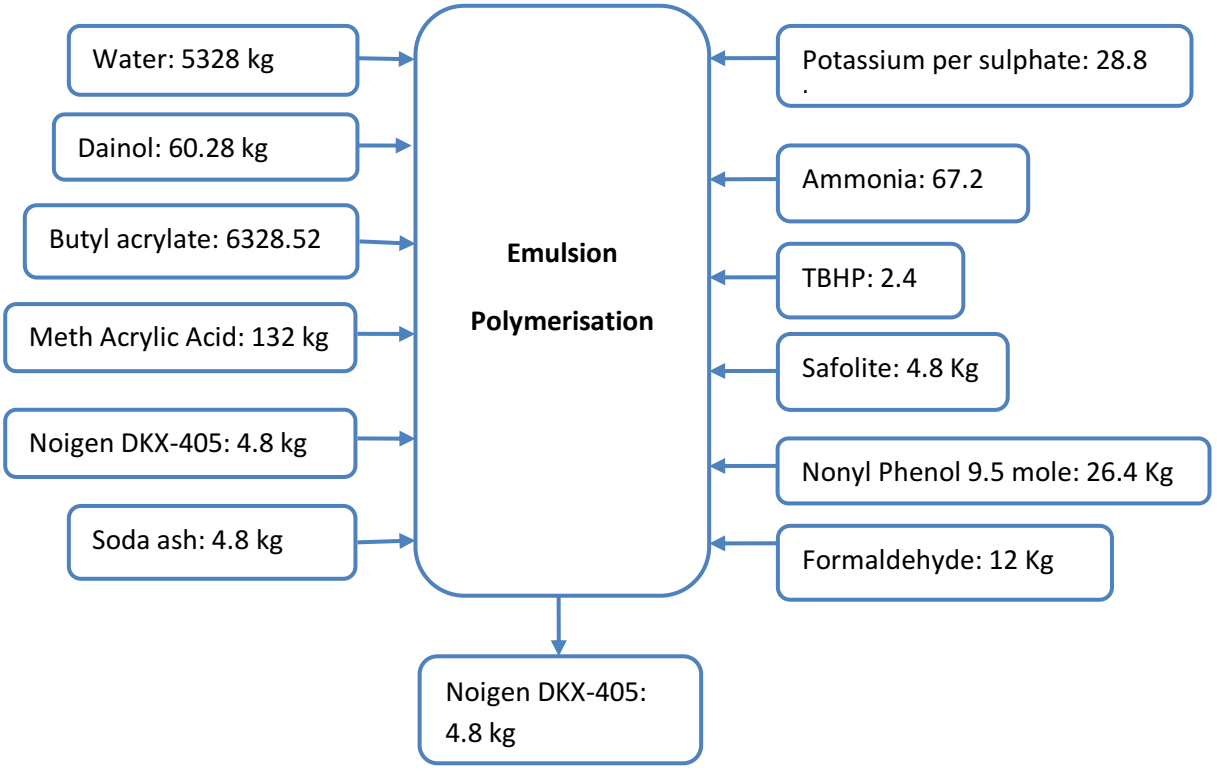
Sr. No.	INPUT	QTY (Kgs)	OUTPUT	QTY (Kgs)	REMARK
1.	Acrylic acid	240.00	Poly carboxylate ether	5000.00	Product
2.	PEG	4500.00	Vapour Loss	5000.00	
3.	Meth acrylic acid	110.00			
4.	Caustic Lye	82.00			
5.	Soda ash	4.00			
6.	Potassium per sulphate	24.00			
7.	Sulphuric acid	40.00			
8.	water	5000.00			
	Total	**10000.00**		**10000.00**	

5. PRODUCT 5: BOPP SELF ADHESIVE (Capacity: 300.00 MT/Month)

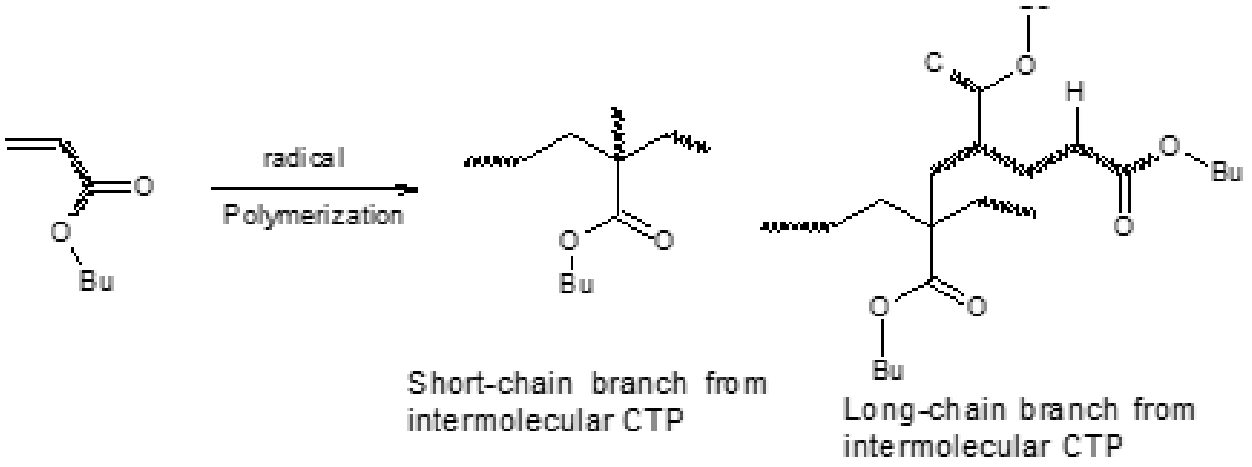
Manufacturing process:

- After charge raw materials, heat the reactor to 70°C & start addition of emulsion & potassium per sulphate solution.
- Charge both solution simultaneously in 2 hours at 70°C to 75°C.
- After complete addition, maintain further 1 hour at 70°C to 75°C.
- After that cool to 50°C& charge ammonia.
- Further mix 20 min. & sample send to QC lab for quality evaluation.
  If sample okay, then pack in drums.

Process flow diagram:



Chemical reaction:



Mass Balance:

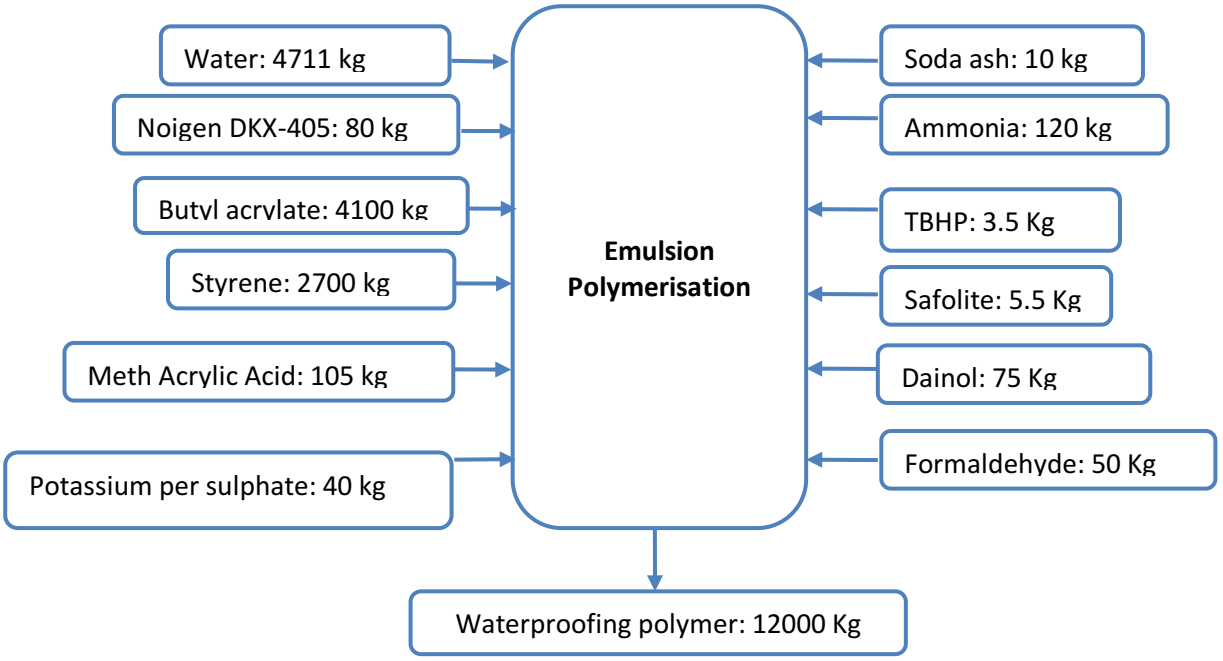
Sr. No.	INPUT	QTY (Kgs)	OUTPUT	QTY (Kgs)	REMARK
1.	Dainol 25	60.28	BOPP Self Adhesive	12000.00	Product
2.	Butyl acrylate	6328.52			
3.	Meth acrylic acid	132.00			
4.	Noigen DKX-405	4.80			
5.	Soda ash	4.80			
6.	Potassium per sulphate	28.80			
7.	Ammonia	67.20			
8.	TBHP	2.40			
9.	Safolite	4.80			
10.	Nonyl phenol 9.5 mole	26.40			
11.	Formaldehyde	12.00			
12.	Water	5328.00			
	Total	**12000.00**		**12000.00**	

6. Waterproofing polymer - Capacity: 300.00 MT/Month

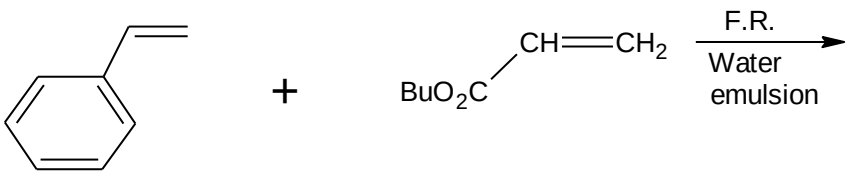
Manufacturing process:

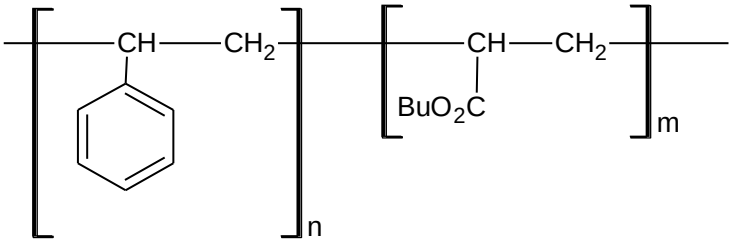
- After charge raw materials, heat the reactor to 70°C & start addition of emulsion & potassium per sulphate solution.
- Charge both solution simultaneously in 2 hours at 70°C to 75°C.
- After complete addition, maintain further 1 hour at 70°C to 75°C.
- After that cool to 50°C& charge ammonia.
- Further mix 20 min. & sample send to QC lab for quality evaluation.
  If sample okay, then pack in drums.

Process flow diagram:



Chemical reaction:





Waterproofing Polymer

Mass Balance:

Sr. No.	INPUT	QTY (Kgs)	OUTPUT	QTY (Kgs)	REMARK
1	Dainol 25	75.00	Waterproofing polymer	12000.00	Product
2	Butyl acrylate	4100.00			
3	Meth acrylic acid	105.00			
4	Noigen DKX-405	80.00			
5	Soda ash	10.00			
6	Potassium per sulphate	40.00			
7	Ammonia	120.00			
8	TBHP	3.50			
9	Safolite	5.50			
10	Styrene	2700.00			
11	Formaldehyde	50.00			
12	Water	4711.00			
	Total	**12000.00**		**12000.00**	

POLLUTION POTENTIALS & CONTROL MEASURES

Air Pollution Sources & Control

There will be total 4 kinds of utilities are identified as source of stationary emission. The utilities are 3 nos. of Boilers (one in standby), 1 no. of Thermo Pack, 2nos. of DG sets and one Hot Air Generator. Company is using NG and Diesel for operating their Utilities. All utilities are going to be given adequate stack height to regulate the air pollution because of emission. The details of the Utility Emission & Control Measures are presented in tabular form beneath.

Table 11: Details of Utility Emission & Control Measures

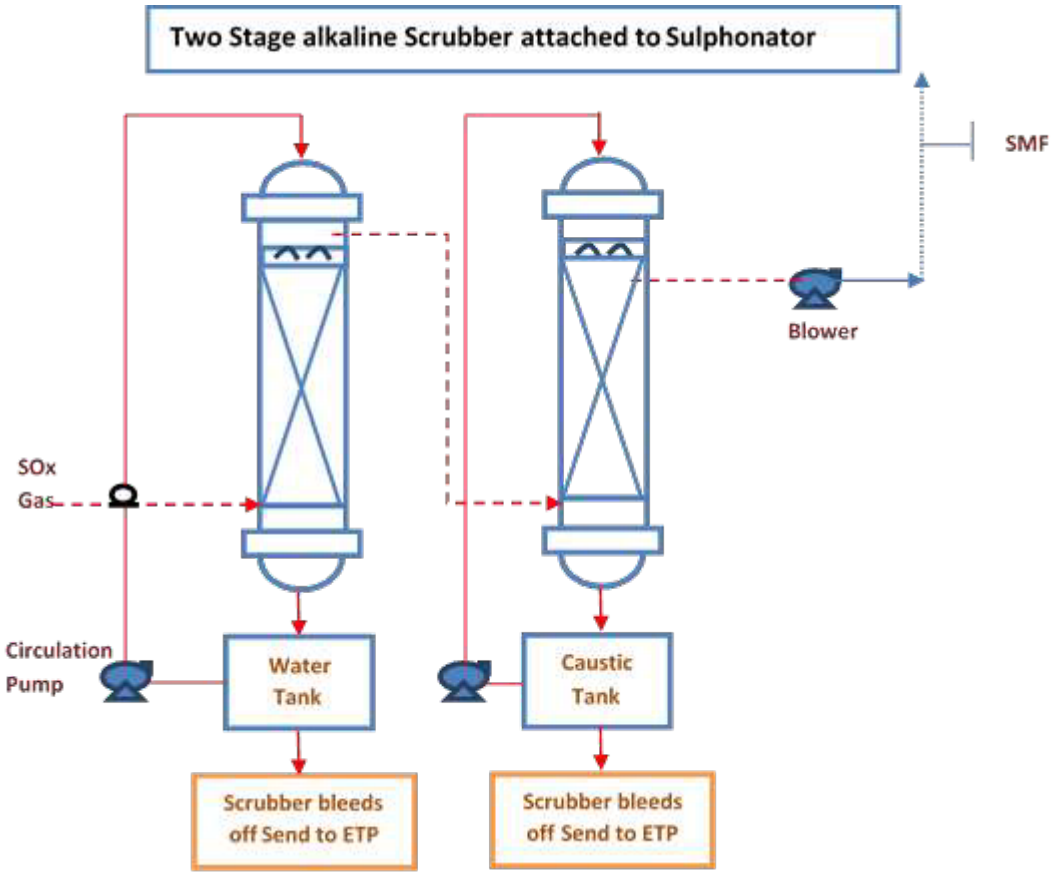
Sr.No.	Stack Attached	Type of fuel and consumption	Air Pollution Control Measures	Applicable norms for CPA
1.	Thermo pack (10.00 Lakh K.cal/hr)	NG: 100.00 SCM/Hr	Adequate stack height 15 m	PM <120 mg/Nm^3 SO_2 <80 ppm NOx<40 ppm
2.	D.G. Sets: 1 X 200 KVA 1 X 500 KVA	Diesel:140.00 Lit/hr	Adequate stack height 11m and operated only during power break down.	PM <120 mg/Nm3 SO2 < 80 ppm NOx< 40 ppm
3.	Steam boiler 2.00 TPH (3 Nos.) (one boiler will be on standby)	NG@ 240.00 SCM/Hr	Adequate stack height 15 m.	PM <120 mg/Nm3 SO2 < 80 ppm NOx< 40 ppm
4.	Hot Air Generator 25.00 Lakh k. cal/hr	NG@ 270.00 SCM/Hr	Adequate stack height 15 m.	PM <120 mg/Nm3 SO2 < 80 ppm NOx< 40 ppm

In addition to the stationary emission two sources of process emissions are also identified which are spray dryer and SS Reactor. Mainly PM is anticipated from spray dryer, SO2 is anticipated from SS Reactor. The details of the process emission and the APCD planed are presented below in tabular form.

Table 12: Details of Process Emission & Control Measures

Sr. No.	Product Name	Stack attached to	Stack Ht. (in mtr.)	Probable pollutants & Limits	Air Pollution Control System
1.	Phenol Based Dispersing Agent	Spray dyer -1(Cap.- 600 kgs/hrx1)	15	PM<120 mg/Nm^3	Bag filter
	Di butyl Naphthalene Sulphonated & PEG based polycarboxylate ether	Spray dyer -2 (Cap.200x1kgs/hr)	15	PM<120 mg/Nm^3	Bag filter
	Sulphonated alkyl naphthalene formaldehyde condensate	Spray dyer -3 (Cap.900x1kgs/hr)	15	PM<120 mg/Nm^3	Bag filter
2.	Naphthalene Based Dispersing Agent	Process Vent (Sulphonator & Oleum Storage Tank)	11	SO_x<32 mg/Nm^3	Two stage Alkali-scrubber

Fig. 4: Detailed diagram of scrubbing system:



Fugitive Emissions

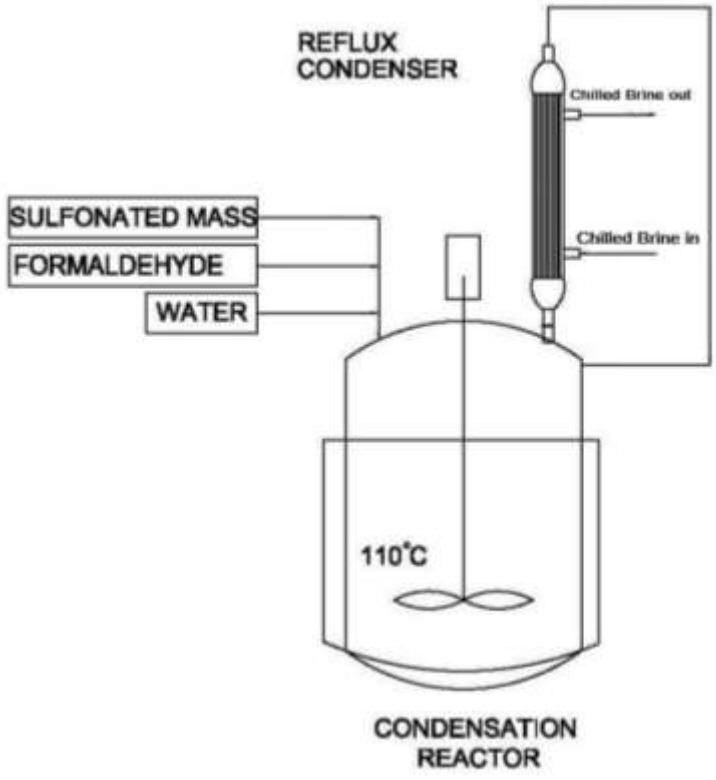
Fugitive emissions are anticipated to be produced during installation and operational phases of the project. During installation stage, key source of fugitive emission is dust which is predicted mainly due to the movement of vehicles carrying machineries and equipment used for installation.

During operation stage, seepage through valves, pumps, emission from open drum having chemicals, open feeding; storage tanks, etc. are the main causes of fugitive emissions of organic chemicals and VOCs. VOC is also expected from the storage of formaldehyde and process.

Following actions will be implemented to avert and regulate the fugitive emissions:

- Airborne dust at all transfers actions/ points will be controlled either by spurting water or providing enclosures.
- To control fugitive emission from formaldehyde storage, Brine chilled reflux condenser will be provided
- Raw materials loading and unloading will be done in roofed area.
- All the raw materials will be pneumatically transfer to the reactor.
- Plantation will be done around the project area and along the roads.
- Adequate aeration will be provided.
- Regular maintenance of valves, pumps and other equipment will be done to avoid leakages and thus curtailing the fugitive emissions of VOCs.
- Entire process will be carried out in the closed reactors with appropriate maintenance of pressure and temperature.
- Intervallic monitoring of work area will be carried out to check the fugitive emission as per the norms of Gujarat Factory Rules.

Fig. 5: Detailed diagram of Chilled Brine Reflux Condenser



Action Plan for Odour control:

- Raw material and Finished good will be transferred and Processed/Stored into closed system, there is no expose of the raw material and finished good into the atmosphere air.
- Green belt development inside the periphery of the plant, open area and also along the road area. It helps to reduce the concentration of pollutant in the ambient air and source emissions. Weight age should be given to the species which are used to counteracting the odour.
- Covering the Water supply, pipelines, roads storm water drainage, sewerage, temporary waste storage facility, common facility etc.
- Gas detector in Storage & Process Area to detect the Leakage of gases.
- Auto Sprinkle system in the storage area to dilute the impact of hazardous gases during the major leakage.
- Adequate Stack height to disperse the release odour into the atmosphere.

Wastewater Generation & Management

Domestic effluent (2.00 KLD) will be sent to septic tank to Holding Tank & Disinfection system & the disinfected sewage to be reused for gardening. The industrial effluent generation will be @ 5.60 KLD generated from floor washing, scrubbing, boiler and cooling only which will be treated using adequate in-house ETP then, will be send to through spray dryer to achieve ZLD.
The details of wastewater generation are tabulated below whereas the water balance diagram is shown in subsequent figure.

Table 13: Details of Waste water Generation

Sr. No.	Particulars	Proposed Quantity (KL per day)	Treatment Facility
1	**Domestic**	**2.00**	To septic tank to Disinfection system & Holding Tank & the disinfected sewage to be reused for gardening.
2	**Industrial**		
	Process	0.00	-
	Floor/container/Equipment Washing	1.80	To ETP
	Boiler & Cooling	3.00	To ETP
	Scrubbing	0.80	To ETP
Sub Total Industrial		**5.60**	
Total		**7.60**	

Table 14: Stream wise quality of waste water generation (to ETP)

Sr. No	Parameters	Unit	Stream I	Stream II	Stream III
1	pH	--	7.12	7.30	7.05
2	Total Dissolved Solid	mg/lit	<2500	<1350	<1200
3	Total Suspended Solid	mg/lit	<1100	<135	<800
4	Chemical Oxygen Demand	mg/lit	<1350	<100	<2000
5	Biochemical Oxygen Demand	mg/lit	<450	<35	<650

Stream I-Washing - 1.80 KLD, Stream II- Boiler & Cooling - 3.00 KLD, Stream III- Scrubbing- 0.80 KLD

- Untreated Composite Effluent sample was analysed for relevant parameters and was taken for the treatability study.

INITIAL ANALYSIS:

Table 15: Sample Particulars: Untreated Effluent Sample (Composite) Qty: 5.00 Lit.

Sr. No.	Test Parameters	Unit	Results
1.	pH	--	6.0
2.	Total Dissolved Solids	mg/lit	1750
3.	Total Suspended Solids	mg/lit	570
4.	COD Value	mg/lit	785
5.	BOD Value (3 days at 27° c)	mg/lit	270

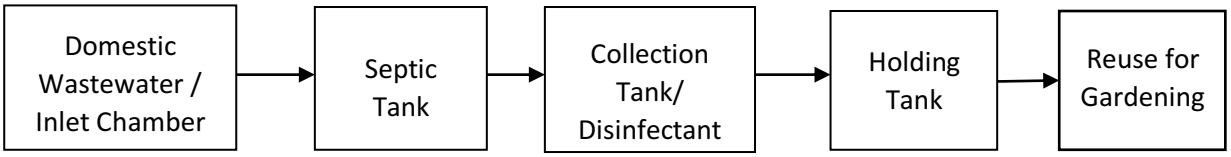
As can be observed from above analysis results that the sample needs treatment for some relevant parameters like pH & Suspended Solids. Hence the study has been carried out as follows to achieve the treated waste water norms laid down by GPCB.

Details of Proposed Sewage Effluent Treatment Plant and Effluent Treatment Scheme:

❖ **Design Criteria of STP**

- Source of Effluent: Domestic Sewage effluent.
- Effluent Generation: 2.00 KLD Max.
- Capacity of STP: 3.00 KLD Max

Domestic effluent (2.00 KLD) will be sent to septic tank to Holding Tank & Disinfection system & the disinfected sewage to be reused for gardening.



❖ **Design Criteria of ETP**

- Source of Effluent: process, washing and utility etc.
- Effluent Generation: 5.60 KLD Max.
- Capacity of ETP: 10.00 KLD Max

Primary Treatment:

The effluent was taken and hydrated lime was added to make the effluent alkaline up to pH 10.0. Then Non ferric alum solution was added to neutralize the effluent. After neutralization, Polyelectrolyte (coagulant) is added for proper settling of flocks to reduce the suspended solid concentration, color and COD in the effluent. Then neutral effluent will be filtered through filter paper and a clear effluent was analyzed and the results of the same are as below.

Table 16: Analysis Report after primary treatment

Sr. No.	Test Parameters	Unit	Results	% reduction
1.	pH	--	7.3	--
2.	Total Dissolved Solids	--	1785	--
3.	Total Suspended Solids	mg/lit	84	85 %
4.	COD Value	mg/lit	635	19 %
5.	BOD Value (3 days at 27° c)	mg/lit	223	17 %

Tertiary Treatment:

After Primary treatment clear effluent was passed through Pressure Sand Filter & Activated Carbon Filter and outlet effluent was analyzed as follows.

Table 17: Analysis Report after tertiary treatment

Sr. No.	Test Parameters	Unit	Results	% reduction
1.	pH	--	7.2	
2.	Total Dissolved Solids	mg/lit	1790	--
3.	Total Suspended Solids	mg/lit	67	20 %
4.	COD Value	mg/lit	552	13 %
5.	BOD Value (3 days at 27^{o} c)	mg/lit	197	11 %

- As can be observed from above results, almost all the parameters are observed well within the desired limit suitable for evaporation of treated wastewater in Spray Dryer to achieve ZLD.

Table 18: Details of Effluent Treatment Plant

SR NO.	ITEM	MOC	CAPACITY	NOS
1	Oil/ Grease Trap	RCC	0.5 KL	2
2	Collection Tank	RCC	11 KL	1
3	P.E. Dosing Tank	HDPE	0.5 KL	1
4	Flocculator	MS	2.0 KL	1
5	Primary Lamella separator with tube deck packing	MS	3.0 KL	1
6	Holding Tank	RCC	5 KL	1
7	Pressure sand Filter	MS	1.0 m^3/hr.	1
8	Activated Carbon Filter	MS	1.0 m^3/hr.	1
9	Sludge Drying Beds	BM	1.0 x 1.0 x 1.0	3
10	Sludge storage Area	BM	2.0 x 2.0 x 1.0	1

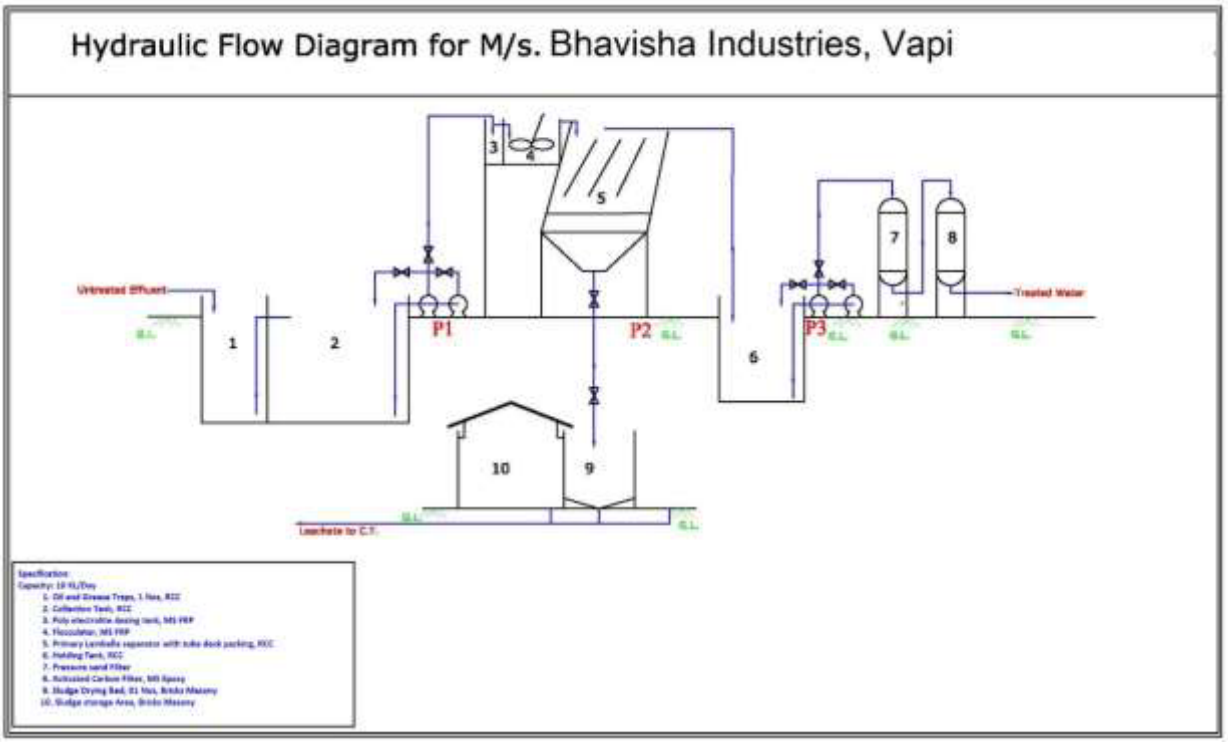
Economic Viability of ETP:

ETP Installation cost – **7 Lakh**

ETP Maintenance Cost –

- ETP Chemical Cost – 12240 Rs. /Yr.
- Energy Cost – 42000 Rs. /Yr.
- Man Power Cost – 180000 Rs. /Yr.

Fig. 6: Hydraulic Flow Diagram



Spray Dryer Details

In the proposed project, effluent from the process is zero, hence no volatile organic compound is going to be present in the effluent. The effluent is generated from washing, scrubbing & utility operation only. Because of volatile organic compounds absence any kind of evaporator will works for the proposed project, therefore the company choose spray dryer with bag filter for evaporation, as it is more environmental friendly and more sustainable.

Adequacy of Spray Dryer Capacity:

- Total quantity of effluent need to be evaporated- 5.60 KLD
- Maximum hours anticipated for evaporation operation- 10 hrs./Day
- Evaporation rate of proposed Spray Dryer- 1000 Kg/Hr.

Therefore, number of hours required to evaporate the effluent quantity is

= **Quantity of effluent (lit)/Evaporation rate per hour**
= 5600/1000
= 5.6 Hrs.
i.e = 6 Hrs.

From above calculation the proposed spray dryer required only maximum 6 hrs to evaporate the effluent, which is more than adequate as the spray dyer has capacity of 1000 kg/hr. Also it has been noticed that the spray dryer will have significantly high spare operational hours (4 hrs more than anticipated operation hours and 18 Hrs. more than the daily max operation hours). Hence the proposed spray dryer capacity is adequate for the proposed project.

Environmental Impact Potential:

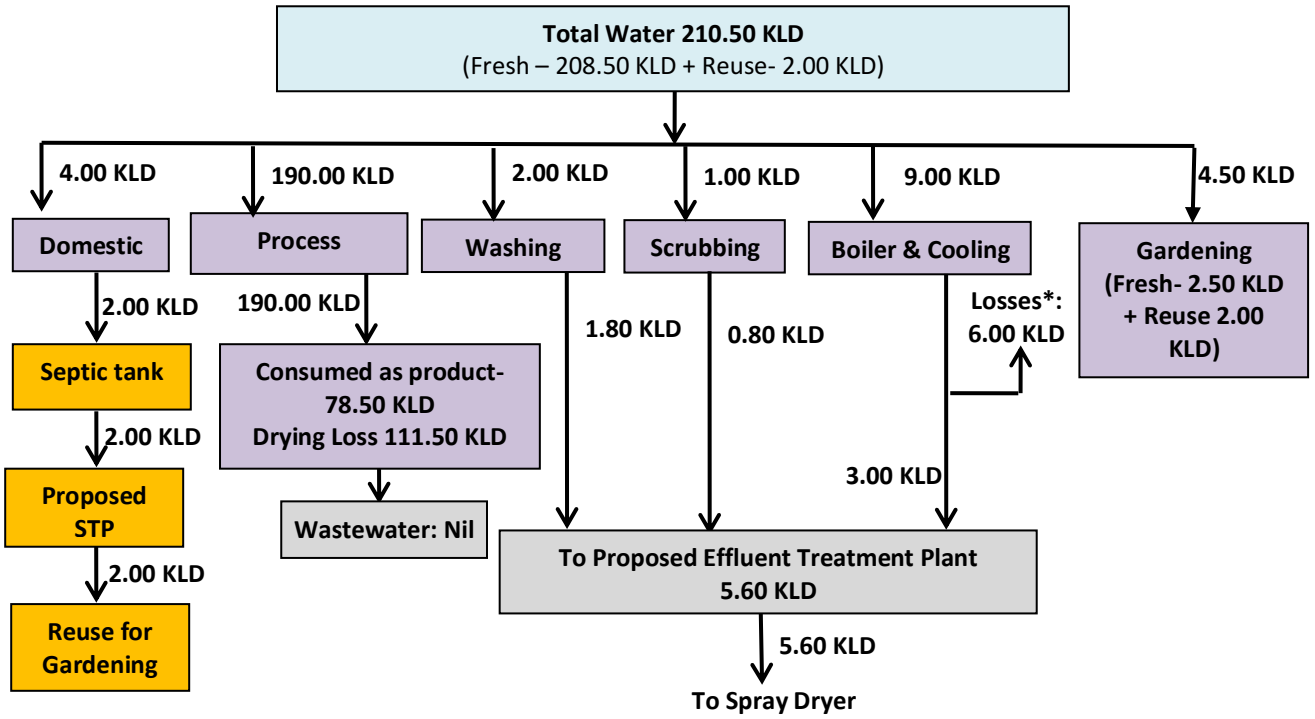
- In the proposed project, effluent from the process is zero, hence no volatile organic compound will be present in the final effluent to be evaporated in spray dryer. Hence no potential impact on

surrounding environment as well as human health due VOC from evaporation of effluent through spray dryer is anticipated.

- Evaporation salt from the spray dry will be in a dry form, which can have impacts on surrounding environment & human health may occur. Considering this, company has planned to provide bag filter along with the proposed spray dryer with 99% efficiency. After such control measure for control of PM emission, PM emission will significantly reduce and the probable impacts on environment & human health will be almost nullified.
- The evaporation salt will be stored along with ETP waste after necessary stabilization of mix waste in a dedicated hazardous waste storage area and will send to TSDF. Hence there will no impact on environment & human health is anticipated due to the management & disposal of evaporation salt.

Details & adequacy study report of spray dyer is attached as Annexure-VIII.

Fig. 7: Water Balance Diagram



Note: *Losses includes Evaporation & drift loss in cooling and Steam Loss from boiler.

Solid & Hazardous Waste Generation & Management

The hazardous waste from the unit will be generated in form of waste from scrubber, process, Used Oil, Discarded/Empty containers/Barrels/Liner, used filter cloths and ETP waste. The details of all wastes & their management are tabulated below.

The details of all wastes & their management are tabulated below.

Table 19: Details of Solid/Hazardous Waste Generation & Management

Sr. no.	Type/Name of Hazardous waste	Specific Source of generation (Name of the Activity, Product etc.)	Category and Schedule as per HW Rules.	Quantity (MT/Annum)	Management of HW
1	ETP Waste	ETP operation & Spray dryer	35.3	15.00	Collection, Storage, Transportation, Disposal at TSDF Site.
2	Spent/ Used Oil	Machinery	5.1	0.095	Collection, Storage, Transportation, disposal by selling to registered recyclers.
3	Discarded materials Drum, Liners/ Bags/ Carboys	Raw Materials	33.1	125.00	Collection, Storage, Decontamination, Disposal on sell to actual users.
4	Process Waste	Mfg. Process (Product-Naphthalene based Dispersing agent)	26.1	400.00	Collection, storage, transportation, disposal at TSDF Site.
5	Scrubber Bleedoff	Process Scrubber (Product-Naphthalene based Dispersing agent)	37.1	290.00	To be managed with other wastewater using ETP.
6	Used Filter Cloths	Mfg. Process	33.2	1.00	Collection, Storage, Transportation, disposal to Co-Processing.

Noise & Vibration Generation & Control

Noise & Vibration generation is predicted in utility & production area along with from operation of pumps, motor & compressors etc. installed at altered site within premises. Mainly the high noise & vibration is probably going to be generated in utility area. The amplitude in premises ranges from 50 dB(A) to 80 dB(A) depending up on the abreast of the space from the noise sources. Noise level outside of production & utility area will never cross the permissible limit for industrial unit as mostly remains below 75 dB(A). All noises are going to be managed by providing of suitable PPEs for working people in the corresponding areas. Vibrations will be managed by provision of proper fitting, shunting and sturdy non-vibrating foundation with rubber pads.

Greenbelt Development & Rainwater Harvesting

Green belt act as a surface, which is capable of engrossing air pollutants and sinks for pollutants. Other than functioning as a pollutant sink, green belts provide other benefits like:

- Green belt helps in noise diminution for the surroundings area. Thus, it is recommended as noise fences.
- Green belt helps in achieving bio diversity by providing possible habitats for birds and animal, thus restoring welcoming nature in drab urban industrial scene.
- Green belts upsurge the aesthetic worth of the site.

Company has acquired plot admeasuring 6213 Sq. Mt. The sufficient greenbelt will be developed at the periphery of plant premises also in some open area within the site which admeasures 1202 Sq. Mt. (19 % of total plot area). Greenbelt is/will be maintained by regular fertilization, irrigation & replantation to provide thick pasture view considering the guideline of CPCB for three tiers greenbelt development. Besides this company will do plantation outside the company premises.

The proposed project would have about 2583 m2 area as rooftop which might have potential of rainwater harvesting with runoff co-efficient of 0.85.

The long term average rainfall of the area is perceived to be around 2100 mm, which may have great potential of rainwater harvesting resulting in 6119.37 m3/annum. The harvested rain water shall never be used to recharge ground water or to release in surface water.

Occupational Health & Safety

Hazardous Materials Management & Safety

There will be total 16 hazardous materials in the proposed project. All of these materials are identified as hazardous as per MSIHC Rules (2000) the list of hazardous chemicals are shown in table 2.20

Table 20: Hazardous Raw materials identified as per MSIHC Rule 2000

Sr. No.	Name of Raw material	Storage Cap. In MT	Threshold Storage as per MSIHC Rule	Classification as per Schedule of MSIHC Rule
1.	Naphthalene	400.00	--	Sh-I,Part-II,417
2.	Oleum (23%)	30.00	--	Sh-I,Part-II,444
3.	Sulphuric Acid (98%)	20.00	--	Sh-I,Part-II,591
4.	Formaldehyde	40.00	5 t	Sh-I,Part-II,285
5.	Caustic lye	50.00	--	Sh-I,Part-II,571
6.	Phenol	30.00	--	Sh-I,Part-II,481
7.	EDTA (Ethylene di amine tetra acetic acid)	1.00	--	Sh-I, Part-I, (a)2
8.	Phthalic anhydride	1.00	--	Sh-I,Part-II,508
9.	Acetic acid	5.00	--	Sh-I,Part-II,2
10.	N-Butanol	10.00	--	Sh-I,Part-II,412
11.	Acrylic Acid	20.00	15,000 t	Sh-I, Part-I, b(v)
12.	Methacrylic acid	2.00	15,000 t	Sh-I, Part-I, b(v)
13.	Butyl acrylate	10.00	10,000 t	Sh-I, Part-I, b (iv)
14.	Ammonia	5.00	50 t	Sh-I,Part-II,31
15.	TBHP(Tent Butyl Hydro Peroxide)	1.00	10,000 t	Sh-I, Part-I, b(iv)
16.	Styrene	10.00	--	Sh-I,Part-II,583

All hazardous materials are going to be managed in accordance with national & state regulations. Detailed RA study will be conducted for storage and handling of the hazardous materials and all essential measures as recommended in RA report will be implemented for avoidance of hazards related with the hazardous chemicals of the project.

Primarily proponent has got to implement the subsequent general risk reduction measures for Handling, Storage of Hazardous Materials (Drums & Tanks) to sustain safe work place & hazard free areas in the proposed unit.

- Adequate aeration in godown & production area to avoid toxic chemical vapour exposure built-up in workplace and to maintained area below PEL/TLV limits. Air change ratio in these areas are managed around 1.
- Appropriate label and identification board /stickers in storage & production area for all chemicals
- Conductive drum pallets are going to be provided.
- Trolley / stackers/fork lift for heavy goods/drum/bag handling.
- Storage of Materials as per compatibility
- Separate storage area for combustible, scarring and toxic chemical storage.
- Prohibition/constraint on smoking and other spark/ flame causing item.
- Lower level ventilation exhaust system will be provided in drum storage area.
- Material safety data sheets at storage along with process and chemical handling area.
- Fire hydrant system & firefighting equipment in unit as per TAC/NFPA Norms.
- Plant should meet provisions of the Manufacture, storage & Import of Hazardous Chemicals Rules, 1986 & the factories Act, 1948 and also the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 (As amended timely).
- Static grounding to any or all process vessels and equipment
- Caution note board for all hazardous chemicals
- Safety valve provision to be made on reactor.
- Periodic On Site Emergency, Mock Drills so as to coach the staff and make them mentally prepared to challenge any emergency
- Safety devices and control instruments should be calibrated once in an exceedingly year.
- Proper coloring as per IS 2379 in plant to pipeline network, tank and equipment to protect it from corrosion.
- Preventive maintenance agenda for all the equipment and colour code or tagging
- Permit to work system on 100 % basis for hazardous work to be dispensed within the plant
- Automated Fire detection system &/or manual call points for fire location identification in storage area as well as plant area
- Obligatory Induction safety course and training of all new employees
- Empty drums & bags will be stored in separate devoted empty drum & bag storage area. All drums & bags will be neutralized/decontaminated before send it to recyclers.

Management of Occupational Health & Safety

The company is dedicated towards ensuring high level of health & safety of its employee and every one necessary implementation & actions are going to be observed well in place in the proposed unit. Company will follows all constitutional guidelines related with occupational health & safety and all necessary facilities & procedures will be provided within the unit. Health check-up programs are dole out regularly and all records & documents related with employee health check-up program will be maintained. All necessary risk control & prevention measures are going to be implemented in unit. Management will provide required PPEs, safety equipment/ materials as mentioned in above section of risk reduction to ensure healthy & safe work conditions. Consistent inspection for the safety procedures and use of PPEs & Safety

equipment/material will be done by the management/safety cell. Premedical examination and periodical examination are going to be carried out once in a very six month and record are maintained in Form No-32 & 33 as per GFR. Training programs & safety audit shall be done on regular basis to avoid impacts of the operational activities on occupational health as well as to progress workplace condition & safe work system.