PROJECT

PREFEASIBILITY REPORT

FOR

THE PROPOSED EXPANSION PROJECT BY CAPACITY ENHANCEMENT AND ADDITION OF NEW PRODUCTS FOR MANURACTURING OF

Tri phenyl phosphite @300 MT/Month, Poly phosphoric acid @30 MT/Month, Plastic Additives (Organic Phosphite) @240 MT/Month Organic Phosphates @50 MT/Month and addition of Styrenated Phenol @100 MT/Month

Under Activity: 5(f), Category- B

(Synthetic Organic Chemicals Industry)

OF

M/s. S. M. Chemical Vapi Pvt. Ltd.
(formerly known as M/s. S. M. Chemicals)

Located at:

Plot No. 313/1, 40 Shed Area, GIDC Estate, Vapi-396 195, Dist- Valsad (Gujarat).

PROJECT PRE-FEASIBILITY REPORT

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PROJECT PRE-FEASIBILITY REPORT

1. EXECUTIVE SUMMARY

1.0 About Project:

M/s. S. M. Chemical Vapi Pvt. Ltd. proposes to expand its existing Particle Board manufacturing unit by capacity enhancement of production capacity of its existing products and addition of new products manufacturing covered under "Synthetic Organic Compounds" from 300.00MT/Month to 720.00MT/Month, at Plot No. 313/1, 40 Shed Area, GIDC Estate, Vapi-396 195, Dist- Valsad (Gujarat).

Highlights of the Project:

• Company Type & Registered Address	Small Scale, Private Limited Company Plot No. 313/1, 40 Shed Area, GIDC Estate, Vapi - 396195, Dist.- Valsad, Gujarat, India
• Name and Location of project	M/s. S.M. Chemical Vapi Pvt. Ltd. Plot No. 313/1, 40 Shed Area, GIDC Estate, Vapi- 396195, Dist.- Valsad, Gujarat, India
• Coordinates	20.364062°N & 72.935441°E
• Name of Applicant-	Mr. R. J. Shah
(a) Address: (i) Postal	C/o S.M.Chemical Vapi Pvt. Ltd. , Plot No. 313/1, 40 Shed Area, GIDC Estate Vapi
(ii) E-mail	sagarpatel@ sandhya-group.com
(b) Phone (i) Land line	0260-6451111
(ii) Mobile	09725260270
(iii) Fax:	0260-2425905
• Year of Commissioning	Exiting unit is under operation since 2005 and proposed expansion will be under operation after obtaining E.C. & CC&A
• Nature of project	Expansion of Existing Synthetic Organic Chemicals Manufacturing Unit by capacity enhancement and addition of new products.
• Land Type of Project Site	Industrial Plot in GIDC Notified Industrial Estate of Vapi Plot No. 313/1, 40 Shed Area, GIDC Estate, Vapi - 396195, Dist. Valsad. Gujarat, India
• Is land procured or to be procured for new project or for expansion?	The existing land is adequate for the proposed expansion and no additional land is required. Land within Notified Industrial estate: GIDC Industrial Estate of Vapi, Gujarat.
• Screening category (as per SO 1533 as timely amended)	5(f) – "Synthetics Organic Chemicals" Category: "B", but considered at Central level because of applicability of GC (Interstate boundary within 5 Km radius.)
• Total area	2197.00m^2
• Land for Green belt	330.00 m^2 within premises and 406.00 m^2 in common space in Vapi, GIDC. Total greenbelt area will be about 736.00 m^2
• Cost of project	Existing unit - Rs. 341.33 Lacks

	For proposed expansion-Rs. 73.15 Lacks Total after the proposed expansion- Rs. 414.63 Lacks
• Capital and recurring Cost earmarked for environment-al protection measures:	Capital cost for EMP: Rs. 12.75 lakhs and Recurring cost for EPM: Rs 19.00 Lakhs /Year
• Water requirement and sources	48.00 KLD, Through pipeline of GIDC Water Supply Dept., Vapi GIDC.
• Power requirement and source	Total requirement 250 KVA from Dakshin Gujarat Vij. Co. Ltd.
• D.G.Set	Total Capacity- 250 KVA, Set as standby arrangement
• Thermo Pack Heater	Existing: 2 Nos. (Total capacity: 8 Lac K.Cal/Hr
• Steam Boiler	Existing : 2 Nos.(Total capacity: 1.550 kg /Hr)
• Fuel Requirement	HSD from local supplier and Natural gas through pipeline of GSPC.
• Waste water Generation	**Domestic waste water: 3.00 KLD** Will be disposed off through septic tank & soak pit. **Industrial waste water: 5.00 KLD** Industrial effluent will be generated basically from boiler and cooling tower. It will be reused in scrubber. The recovered HCl solution from scrubber will be sold as by-product.
• Emissions and its control	**Utility Emissions:** Adequate stack will be provided for the utility emissions from D.G. Sets, Boiler and Thermopac. **Process Emission:** Adequate stack height will be provided to Two stage Water Scrubber and one stage alkali scrubberof Glass Reactor for HCl Recovery.
• Resource Recovery Reuse/Recycling	Phenol and Cresol recovery directly from process system during distillation for product separation and HCl solution is recovery as by-product using scrubber.
• Solid/Hazardous Wastes	Used Oil generated will be sold to the approved recycler and Discarded containers generated will be sold to authorised re-conditioner.
• Status of the project	Existing- Under operation obtained required permissions Proposed-Under progress with proceeding of necessary statutory clearances & permission

2. INTRODUCTION OF THE PROJECT

i) Identification of the Project and Proponent:

M/s. S. M. Chemical Vapi Pvt. Ltd. (formerly known as M/s. S. M. Chemicals) had its beginning in the year 2005 with manufacturing plant at GIDC Vapi (Gujarat) for manufacturing of "Synthetic Organic Compounds" at Plot No. 313/1, 40 Shed Area, GIDC Estate, Vapi-396 195, Dist- Valsad (Gujarat). The unit then obtained prior Environmental Clearance [vide EC Letter No. J-11011/293/2011- IA II (I), dated 22nd March 2013] for the proposed expansion by capacity enhancement and addition of new products. At present the existing unit is involved in the production of its main products @300.00 MT/Month (Tri phenyl phosphite @ 150MT/Month, Poly phosphoric @ 30 MT Kg/Month and Plastic additives @ 120MT/Month; whereas the by-products is generated @247.00 MT/Month.

Now, considering the increased demand of its existing products as well as focusing on the potential of some additional products developed through its extensive R&D, M/s. S.M. Chemical Vapi Pvt. Ltd. has proposed for expansion of the existing unit by capacity enhancement of its existing two products and introduction of one new product. After the proposed expansion project, the gross production capacity of the main products would be 720.00 MT/Month and the capacity of the by-products generated would be 579.85 MT/Month.

The proposed project being "Synthetics organic Compounds" is covered under scheduled category of EIA notification -2006 as Item – 5 (f) categories – B of Schedule I of the said notification as timely amended. Further, as the proposed project is the unit of manufacturing of Synthetic Organic Chemicals to be developed in notified industrial area-GIDC of Vapi of Gujarat, needs EIA study to be conducted excluding public hearing process as per provisions of EIA notification: SO 1533 Dtd. 14th September 2006. Moreover, the project is covered in category B requires to apply at state level but as the project falls within 5 Km distance from the interstate boundary, application has been made to national level expert appraisal committee for proceedings of prior EC in-line with the provision of general condition of SO 1533.

With planning of utilization of all suitable existing facilities and for capacity enhancement actions, the proposed project has been designed to establish within the existing unit premises. The key highlight of proposed project is tabulated below.

DETAIL ABOUT DIRCTRORS

Table 2: Details of Director:

Sr. No.	Name of Director	Residential Address
1.	Mr. Kantilal M Koli	Plot. No. 203 & 204, Residential Bunglow area, Saurabh Society, GIDC Vapi, Di; Valsad. Education :B.Sc. with chemistry Experience ; last from about 30years experience in the same line
2	Mrs.Sandhyaben K koli	Plot. No. 203 & 204, Residential Bunglow area, Saurabh Society, GIDC, Vapi, Di; Valsad. Education and experience: Matriculate with vast administrative experience
3	Mr.Smit K Patel	Plot. No. 203 & 204, Residential Bunglow area, Saurabh Society, GIDC Vapi, Di; Valsad. Education : B.Com.,M.B.A. in Marketing and administration Experience ; Vast experience in Commercial activity
4	Mr.Snehal K Patel	Plot. No. 203 & 204, Residential Bunglow area, Saurabh

		Society, GIDC Vapi, Di; Valsad. Education: B.E.-Chemical in India and M.S.at U.S.A. Experience: Very good experience in Plant Commissioning and technical activity

As, described The company was founded by CMD Mr.Kantilal Koli who ventured into the domain of phosphorus based specialty chemicals with the establishment of a manufacturing unit at Sarigam of Gujarat in 1984. Over the past years, the group has grown in strength with 4 strategic locations offering a multiproduct spectrum from phosphorus based industrial chemicals, specialty chemicals and agrochemicals carving a niche for itself by vertical integration offering cost effective quality inputs. A team of dedicated professionals has ensured that the manufacturing facilities are regularly upgraded to meet international accreditation for exports to regulated & unregulated market. Sandhya group believes in offering a quality product at a competitive price that meets the global standards for requirement of industrial chemicals, specialty chemicals and agrochemicals. A significant investment towards building quality infrastructure has ensured that lifeline moves rapidly toward becoming a manufacturing conglomerate across the country.

The company is a registered privet Limited company and is promoted by four Directors. The details of the Directors are presented below.

ii) Brief Description of the project:

M/s. S.M. Chemical Vapi Pvt. Ltd. is an existing unit, now proposing the enhancement of production capacity of its existing products and addition of new products manufacturing covered under “Synthetic Organic Compounds”. As per the EIA notification- 2006 as amended the manufacturing of proposed new products are covered under activity 5(f), hence required Prior Environmental Clearance. It is located in the main chemical hub of the country at Plot No. 313/1, 40 Shed Area, GIDC Estate, Vapi-396 195, Dist- Valsad (Gujarat).

The project area is situated mostly in the southern part of Gujarat State and shares some area of UT of Daman and Dadra & Nagar Haveli. The area has global identity for its industrial development since many decades. The region is also exhibiting some patch of good forest area and a reservoir –Dam on Damanganga. National Highway 8 bisects the city, creating east and west parts - the western part being the original old town-place, and the eastern part mainly hosting the industries and the newly constructed residential areas. Via the modernized highway, Mumbai is about 180 km to the south and the city of Surat is about 125 km to the north.
The Arabian Sea is about 7 km to the west, where the Daman Ganga River creates its delta. The city has tropical weather and enjoys three distinct seasons of mild winter, moderate summer and heavy monsoon, with rainfall ranging from 100 inches to 120 inches per annum.

In addition to the old town, some of the other main residential areas and suburbs that make Vapi a city are Geeta Nagar, Gunjan, Chanod Colony, Vapi Town, Dungra, Hariya Park, Chala and also upcoming Balitha and Salvav with many other small areas. Vapi is surrounded by some magnificent location around it namely: Daman & Diu, Dadra & Nagar Haveli, Umbergaon, Sarigam, Bhilad, Udavada, Sanjan, Pardi, Silvassa. Premises of Vapi are rich in all sorts, i.e. both the Union territories as well as Sarigam, Bhilad, Umbergaon &Pardi are good residential cum commercial areas, which are situated near Vapi with a mere distance of 12–40 km. Daman and Silvassa (capital of D&NH) have proved magnificent attraction for tourist not only in India but they have been successful enough to attract people from other countries even. Vapi has recorded a very important note in Gujarat's and India's success story. To

cater to the industry, the city handles a huge amount of what is called a "floating population" and the Vapi railway station on the Mumbai-Vadodara rail link of Western Railway (India) has become the direct beneficiary in terms of revenues due to daily commuters. Most of the trains including Rajdhani Express passing through Vapi have a stop here.

For the proposed expansion project, the company intends to install required plant & machinery with the help of competent people in this field.

- ***PLANT & MACHINERYRESOURCES***

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

Table 3: Major Machineries & Equipment

SR.NO.	EQUIPMENT	CAPACITY	MOC
Existing			
1.	Glass Line Reactor (1No)	02 KL	Glass Lined
2.	Glass Line Reactor(2Nos)	03 KL	Glass Lined
3.	Glass Line Reactor (1No)	05 KL	Glass Lined
4.	Holding Tank	05 KL	SS-316
5.	WATER + Steam Ejector	Adequate	Graphite
6.	Hcl Scrubbing System (3 stage)	Adequate	Graphite HDPE
7.	Cooling Tower	250 TR	FRP
8.	Holding Tank	05 KL	SS-316
9.	Four Stage Steam Ejector	Adequate	Graphite
Proposed			
1.	Glass Line Reactors (4Nos)	05KL	Glass Lined
2.	S.S. Reactors (2Nos)	05 KL	SS
3.	S.S. Reactor (1No)	10 KL	SS
4.	S.S. Holding Tank (1No)	05 KL	SS
5.	Cooling Tower	60 m^3	PPFRP
6.	Dry vacuum pump (1 No)	--	MS
7.	Flakers (1 no.)	--	SS
8.	Air compressor (1No)	8.5 CFM	
9.	HCl Scrubber System (1 no.)	--	PPFRP

- The company will provide employment to 57people in different categories for operation of proposed project. The details of the proposed employment structure are presented below in tabular form.

Table 4: Human Resource Requirement

Sr. No.	Particular	Employment Nos., Shift 1	Employment Nos., Shift 2	Employment Nos., Shift 2
1	Managerial	4	0	0
2	Skilled	2	1	1
3	Semi-Skilled	3	3	3
4	Unskilled	15	15	10
	TOTAL	**24**	**19**	**14**

Table 5: Details of Infrastructure

Green Belt	330 sq.m. Within premises + 406 sq.m. in GIDC common area
Connectivity (Traffic and Transportation Road/ Rail/ Metro/ Water ways etc.	NH 8: 1.49km W& SH185:1.13Km S
Drinking Water management (Source & Supply of water)	GIDC Water Supply
Sewerage System	Sewage water is disposed off through the septic tank/soak pit.
Industrial Waste Management	The unit is Zero discharge unit
Solid Waste Management	The Discarded container will be after decontamination will be sold to re-conditioners
Power Requirement & Supply / Source	Sale to registered re-refiners.

EXISTING &PROPOSED PRODUCTS

The existing unit is involved in the production of its main products @300.00 MT/Month (Tri phenyl phosphite @ 150MT/Month, Poly phosphoric @ 30 MT Kg/Month and Plastic additives @ 120MT/Month); whereas the by-products is generated @247.00 MT/Month. And after the proposed expansion project, the gross production capacity of the main products would be 720.00 MT/Month and the capacity of the by-products generated would be 579.85 MT/Month.

Table 6: List of Products and By-products with Capacity

Sr. No.	Products Name	Production Capacity (MT/Month)		
		Existing	Proposed	Total
1	Tri phenyl phosphite(TPP)	150.00	150.00	300.00
2	Poly phosphoric acid	30.00	00.00	30.00
3	**Plastic Additive** [Products like: Di-phenyl isodecyl phoshite (DPDP), Di-phenyl 2-ethyl hexyl phosphite (2EHDP), Phenyl Di-Isodecyl Phosphite (DDPP), Tri-Decyl Phosphite (TDP), Tri-Trisdecyl Phosphite (TTDP), Tris Nonyl Phenyl Phosphite (TNPP), Tris Lauryl phosphite(TLP), Di-phenyl phosphite (DPP), Tri-isooctyl phophite (TIOP), Di-phenyl tridecyl phosphite (DPTDP), Tetra-phenyl dipropylene glycol phosphite (THOP), Poly(dipropylene glycol)phenyl phosphite (DHOP), 4-4 isopropylidene di phenol C12-15 alcohol phosphite(Sanphos **1500)** etc.]	120.00	120.00	240.00
4	**Organic Phosphates (tri aryl and alkyl phosphate)** Triphenyl Phosphate, Tricresyl Phosphate, Cresyl Diphenyl Phosphate.)	0.00	50.00	50.00
5	**Styrenated Phenol**	**0.00**	**100.00**	**100.00**
	Total of Main Product	**300.00**	**420.00**	**720.00**
Name of by-products				
1	Hydrochloric Acid (25-31 % Solution)	187.00	266.00	453.00
2	Phenol	60.00	60.00	120.00
3	Cresol	0.00	6.85	6.85
	Total of By-products	**247.00**	**332.85**	**579.85**

- By-product HCl will be sold out to its actual users.
- By product Phenol will be reused to manufacture TPP and excess will be sold out to its actual users.
- By product cresol will be reused to manufacture our phosphate products.

Table 6: End-Use of Products

Sr. No.	Products Name	End Use
1	Tri phenyl phosphite (TPP)	Anti-oxidant
2	Poly phosphoric acid	Strong drying and dehydrating agent.
3	Plastic Additive [Products like: Diphenyl isodecyl phoshite (DPDP), Diphenyl 2-ethyl hexyl phosphite(2EHDP), Phenyl Di-Isodecyl Phosphite (DDPP), Tri-Decyl Phosphite (TDP), Tri-Trisdecyl Phosphite (TTDP), Tris Nonyl Phenyl Phosphite (TNPP), Tris Lauryl phosphite(TLP), Di-phenyl phosphite (DPP), Tri-isooctyl phophite (TIOP), Di-phenyl tridecyl phosphite (DPTDP), Tetra-phenyl dipropylene glycol phosphite (THOP), Poly(dipropylene glycol)phenyl phosphite (DHOP), 4-4 isopropylidene phenol C12-15 alcohol phosphite(Sanphos **1500)** etc.]	Pharmaceuticals, Paints & Plastic, Rubber Industry, Antioxidant for Polyster, Acrylics and Polyphenylene oxide, Improve colour retention during processing of polymer, Stabilizer used in epoxies, as component in PVC stabilizer mixtures for heat and light stability in PP, HDPE, LDPE, and ABS. Also in Food Packaging, Adhesive, Latexes, etc.
4	**Organic Phosphates(tri aryl and alkyl phosphate)** Triphenyl Phosphate, Tri cresyl Phosphate, Cresyl Diphenyl Phosphate.)	Leather cloth (PVC), utility articles (footwear, raincoat, hand gloves etc.) Extruded articles: cables (PVC & Rubber), Hose Pipe, Coatings
5	**Styrenated Phenol**	Antioxidant for Polyester & Rubber

iii) Need for the project and its importance to the country and or region:

The proposed expansion project provides a potential growth opportunity for the already running business of the company. The company is already engaged in the business of manufacturing of "Synthetic Organic Compounds".

Additional capacities of product range required over & above our existing capacities, as the company expect strong growth of local market.

iv) Demand–Supply Gap:

The products have very high specific demand for manufacturing of Synthetic Organic Compounds.

v) Imports vs. Indigenous production:

Existing products manufacturing in the country will be very much economical compare to Imports of the same and also the export of the same will earn extra revenue generation for our county.

vi) Export Possibility / Domestic / export Markets:

Existing products are having very good domestic market as well as high export potential.

Additional capacities of product range required over & above our existing capacities, as the company expect strong growth of exports to the extent of 40-50%. Local market also showing strong growth potential.

vii) Employment Generation (Direct and Indirect) due to the project:

The man power employed in the existing unit is 57 Nos. and due to the expansion of the project there will be very good opportunity of employment generation directly and indirectly due to proposed project. Due to proposed expansion project there will be requirement of manager, supervisor, operator and semi-skilled workers.

3. Project Description

I. Type of Project including interlinked and interdependent projects, If any :

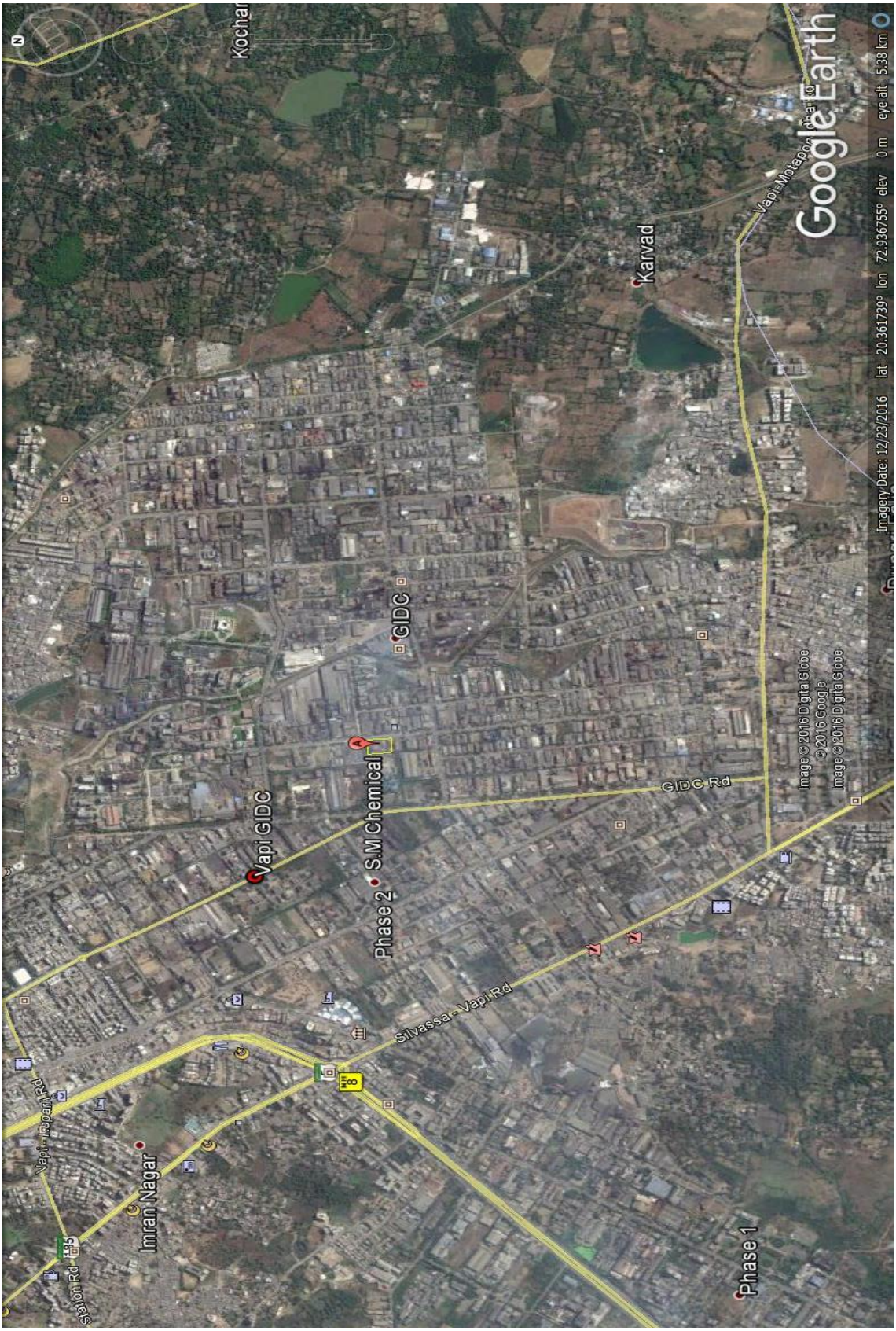
The proposed project is an independent project of the company.

II. Location (map showing general location, specific location, and project boundary & project site layout) with coordinates:

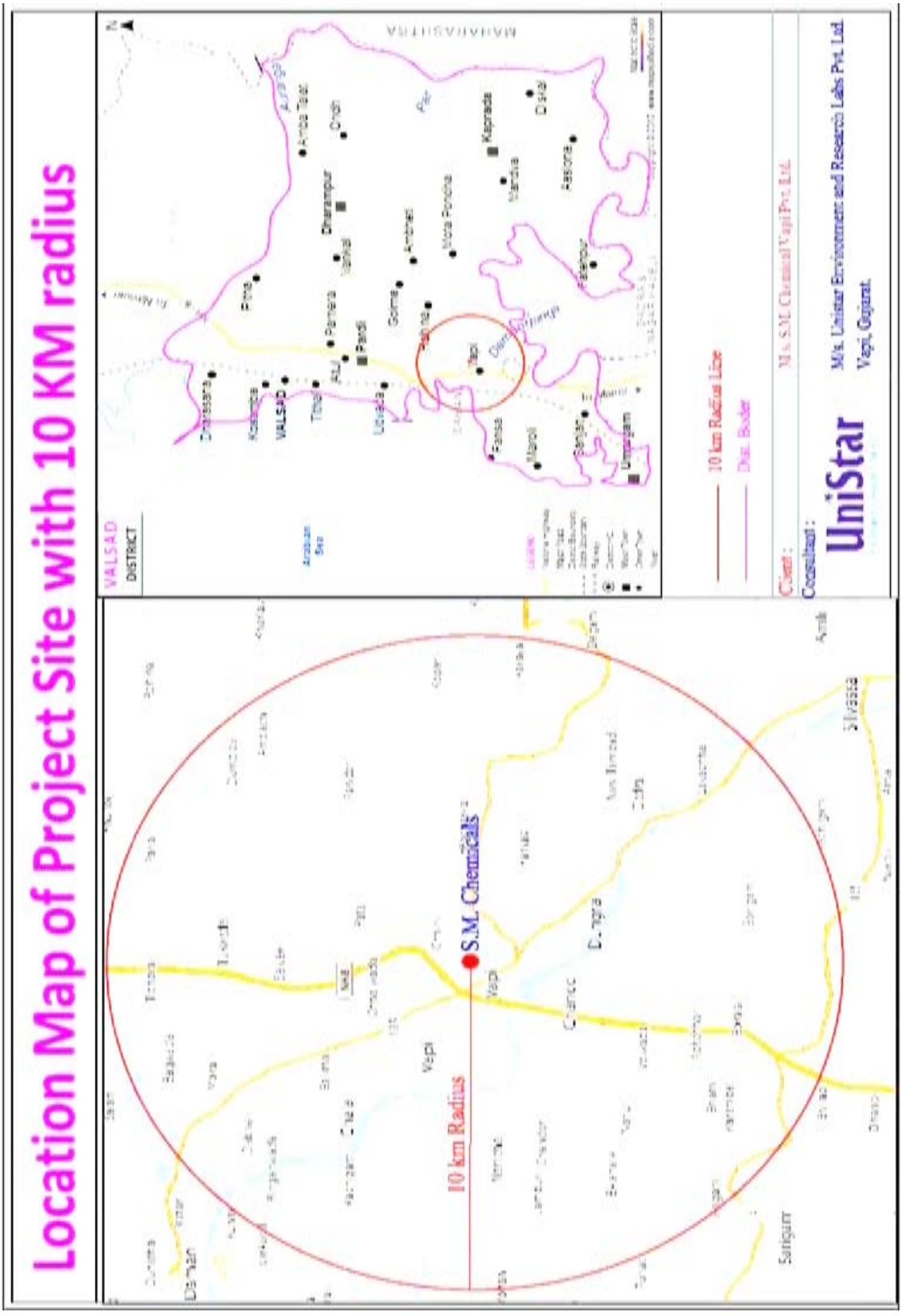
The map showing general location, specific location and project boundary and project site layout of M/s. S. M. Chemical Vapi Pvt. Ltd. unit located at Plot No. 313/1, 40 Shed Area, GIDC Estate, Vapi-396 195, Dist- Valsad (Gujarat).

The latitude and longitude of the project site is 20.364062°N & 72.935441°E

Fig 1: Map of Project Site (in GIDC etc. showing minimal area of representing land type)



ii) Map of Project Area (10 Km radius)



III. Profile of Project Site:

Table 5: Salient Features of Project Area

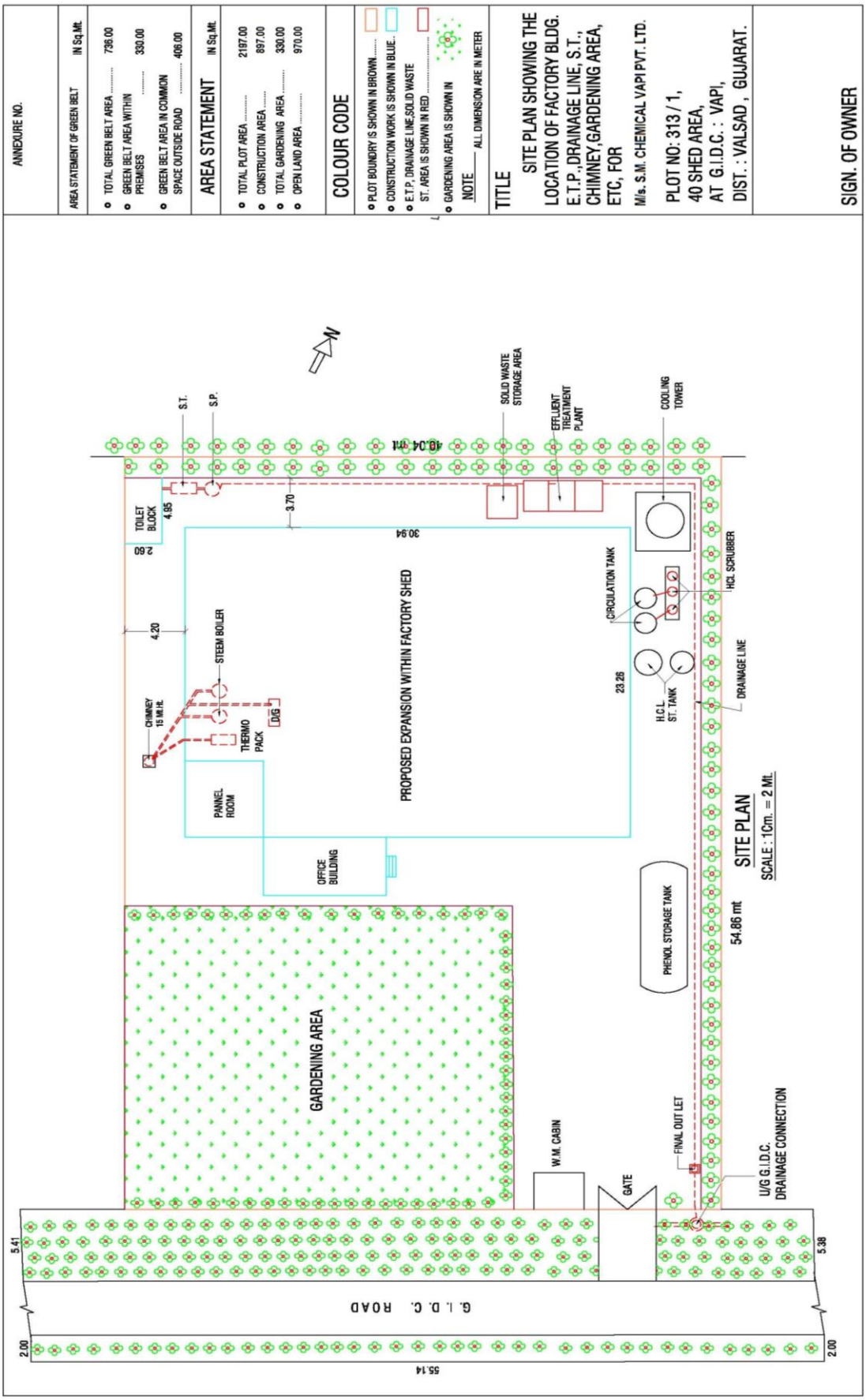
Sr.No.	Nearest Infrastructure Feature	Approx. Aerial Distance from Site
1	Geographical Position	Lat.: 20.364062°N, Long.: 72.935441°E
2	Elevation above Sea Level	23 Meters
3	Nearest Village	Chhiri: 1.92 Km NE
4	Nearest Town	Vapi residential town area –1.39 Km N Site is in Vapi (Notified industrial Estate)
5	Nearest National & State Highway	NH 8: 1.49km W & SH185:1.13Km S
6	Nearer Railway station	Vapi – 3.5 Km W
8	Nearest Airport	Public: Surat 85.75 Km NW Non-Public: Daman- 12.12 Km NW
9	Nearest Surface water Resource/Reservoir	Damanganga River 3.5 Km SW GIDC Water Supply Weir: 3.6 Km SW
10	Nearest Forest Land	Approx. 3 Km SW
11	National Park/Sanctuary or Ecologically sensitive Area	D&NH WLS Approx. 12 km SE
12	Inter-State Boundary	UT of Dadra &Nagar Haveli -2.1 Km SE, UT of Daman-4.46 Km NW

Table 6: Plot site Area Statement:

Area Statement	Existing (in m^2)	Proposed (in m^2)	Area After Proposed Expansion(in m^2)
Production plant[consider only ground floor area but actually it is three layer plant]	576.00	00.00	576.00
Storage Shed/ Godown Area	221.00	00.00	221.00
Office & other built-up Area	100.00	00.00	100.00
Open area and Road & Parking Area	970.00	00.00	970.00
Green Belt* Area[o/s adjoining common area place 206sq.mt. not consider]	330.00	00.00	330.00
Total Area	**2197.00**	**00.00**	**2197.00**

Note: * Along with 330m^2green belt area within premises, additional 406m^2 greenbelt area will also be developed in common space of GIDC, Vapi, totalling to 736 m^2 of greenbelt area.

iv) Site Layout Plan:



v) Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted:

The proposed expansion project will be accommodated within the existing plot, so no alternative site is being considered.

vi) Size or magnitude of operation:

As per the proposed project cost the project is covered under Medium Scale category of manufacturing industries, it comes under SME segment of the industry.

vii) Project description with process details (a schematic diagram/ flow chart showing the project layout components of the project etc. should be given):

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

Product 1: Tri Phenyl Phosphite (TPP)

Manufacturing Process:

Phenol and PCl3 are reacted at elevated Temperature. During the course of reaction HCl gas is generated, which is scrubbed in water and dispatched as HCl solution. Excess phenol is recovered by distillation at elevated temperature and under reduced pressure. After complete removal of phenol from the reaction mass finally pure Tri phenyl Phosphite is collected and packed in suitable containers as per customer's requirements.

Reactions of Process:

$3C_6H_5OH + PCl_3 \longrightarrow (C_6H_5O)_3P + 3HCl_{gas}$ *……In Reactor for Main Product*

$HCl_{gas} + H_2O \longrightarrow HCl_{Soln.}$ *…….In Scrubber for By-Product*

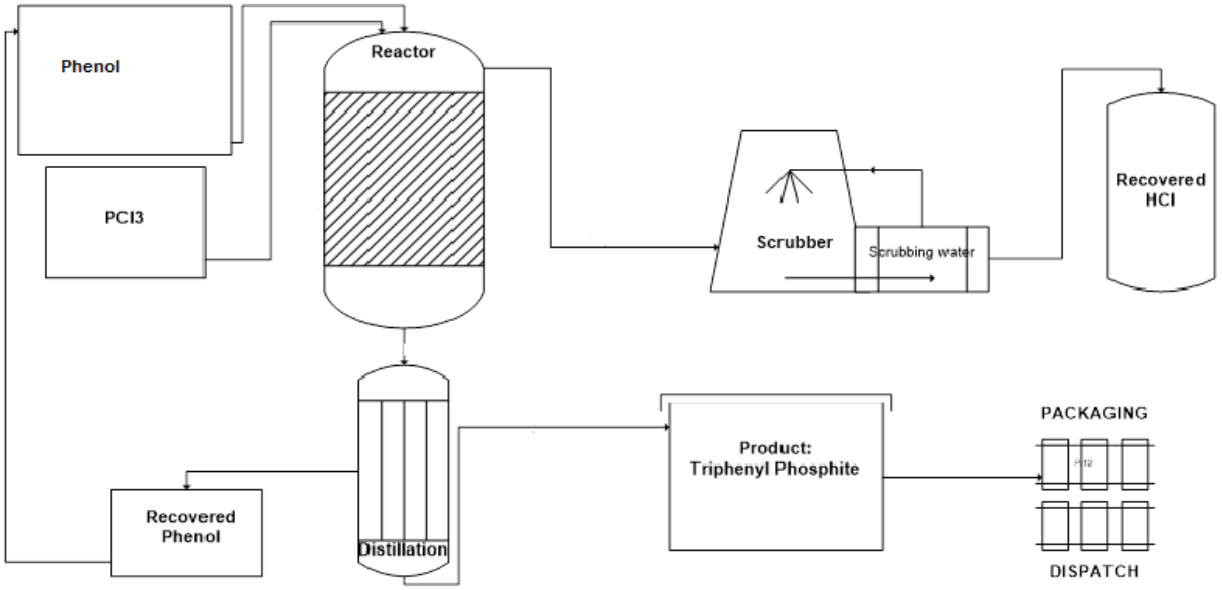
Details of Product: CAS# 101-02-0

Molecular formula: $(C_6H_5O)_3P$ **Mole. Weight:** 310.28g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
In Reactor (Main Product)			
1.Phenol	: 951.00kgs	1. Tri Phenyl Phosphite	: 1000.00 Kgs
2. PCl_3	: 450.00kgs	2. HCl_{gas}	: 360.00kgs
		3. Phenol	: 41.00 Kgs
Total	**: 1401.00 Kgs**	**Total**	**: 1401.00 Kgs**
In Scrubber (By-Product)			
2. HCl_{gas}	: 360.00kgs	1. HCl_{Soln}(25-30%)	: 1440.00kgs
4. Scrubbing Water	: 1080.00kgs		
Total	**: 1440.00 Kgs**	**Total**	**: 1440.00 Kgs**

Manufacturing Process Flow Diagram for Tri Phenyl Phosphite



Product 2: Poly Phosphoric Acid (PPA) (Existing Product)

Manufacturing Process:

Phosphoric Acid is charged and then slowly Phosphorus Pentoxide added. It is exothermic reaction. So temperature is controlled through slow addition of Phosphorous Pentoxide. Once solid P_2O_5 is dissolved, batch is collected and packed in suitable containers as per customer's requirement.

Reaction of Process: $H_3PO_4 + P_2O_5 \longrightarrow (P_2O_5)nH_3PO_4$

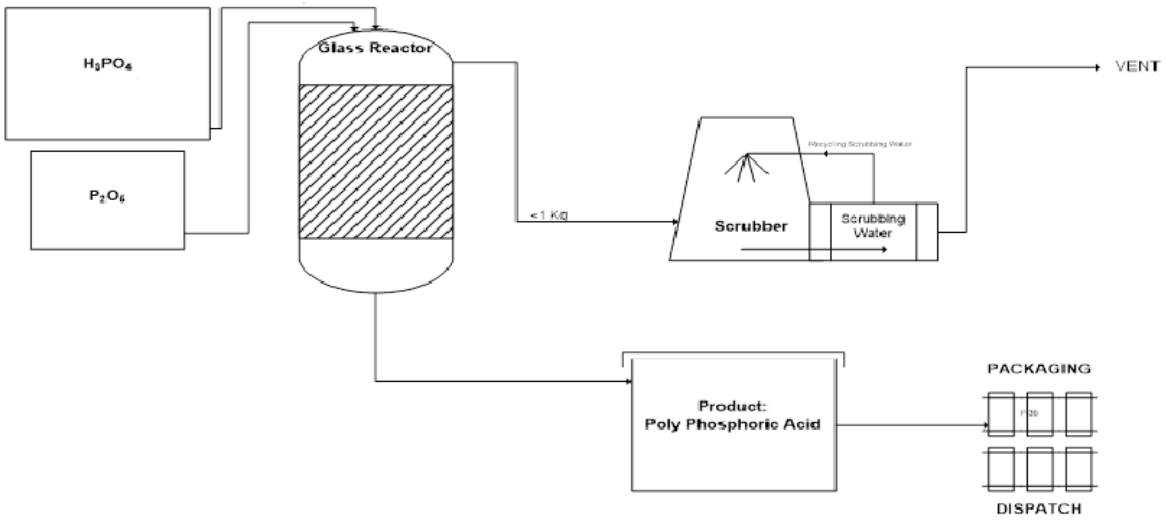
Details of Product: CAS# 8017-16-1,

Molecular formula: $(P_2O_5)nH_3PO_4$ **Mole. Weight:** 338 g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
1. Phosphorous pentoxide	:625.00kgs	1. Poly Phosphoric acid	: 1000.00 Kgs
2. Phosphoric Acid (85%)	:375.00kgs		
Total	**:1000.00 Kgs**	**Total**	**: 1000.00 Kgs**

Manufacturing Process Flow Diagram of Poly Phosphoric Acid



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Product 3 (A): Plastic Additives (Di-Phenyl Isodecyl Phosphite (DPDP), Di-phenyle tridecyl phosphite (DPTDP), THOP, DHOP, etc.

Manufacturing Process:

TPP and 1 mole IsoDecanol reacted at elevated temperature. During the course of reaction 1 mole phenol is generated. Phenol is distilled out and Di phenyl IsoDecyl Phosphite is collected and packed in suitable containers as per customer's requirement.

Reaction of Process: $(C_6H_5O)_3P + C_{10}H_{21}OH \longrightarrow (C_6H_5O)_2\text{-}P\text{-}OC_{10}H_{21} + C_6H_5OH$

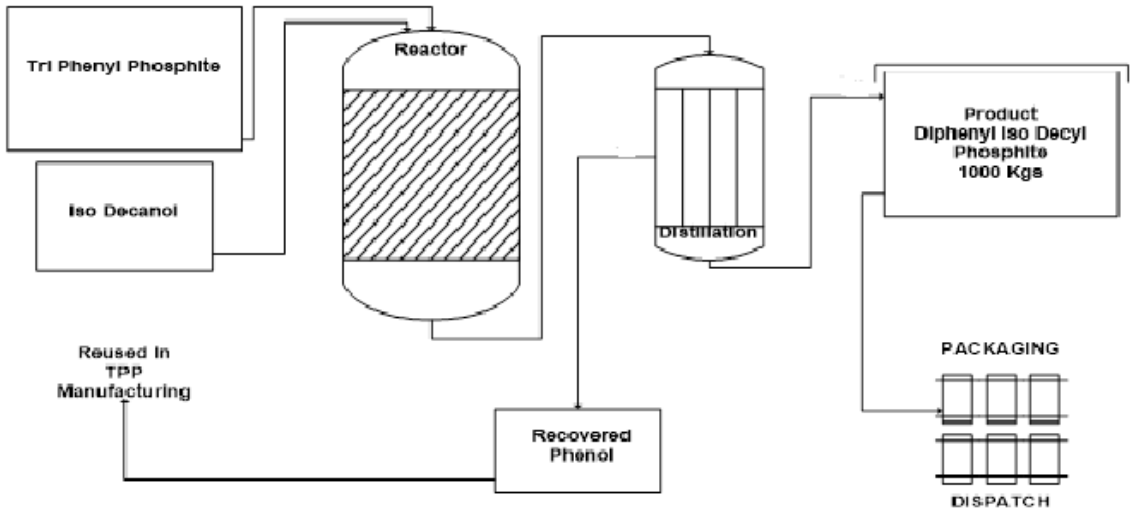
Details of Product: CAS# 26544-23-0,
Molecular Formula: $(C_6H_5O)_2\text{-}P\text{-}OC_{10}H_{21}$ **Mole. Weight:** 374 g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
1.Triphenyl Phosphite	: 829.00kgs	1. Di-Phenyl IsodecylPhosphite	: 1000.00 Kgs
2. IsoDecanol	: 423.00kgs	2. Phenol	: 252.00 Kgs
Total	**: 1252.00 Kgs**	**Total**	**: 1252.00 Kgs**

Note: - **If(1) TPP and 1 mole TDA reacted give DPTDP**
(2) 2 mole TPP and 1 mole DPG reacted give THOP
(3) 8mole TPP and 7 moles DPG reacted give DHOP

Manufacturing Process Flow Diagram of Di-Phenyl IsodecylPhosphite



Product 3 (B): Plastic Additives (Di-Phenyl 2-Ethyl Hexyl Phosphite) (2-EHDP)

Manufacturing Process:

TPP and 1 mole 2- Ethyl Hexanol are reacted at elevated temperature. During the course of reaction 1 mole phenol is generated. Phenol is distilled out and Diphenyl2- Ethyl Hexyl Phosphite is collected and packed in suitable containers as per customer's requirement.

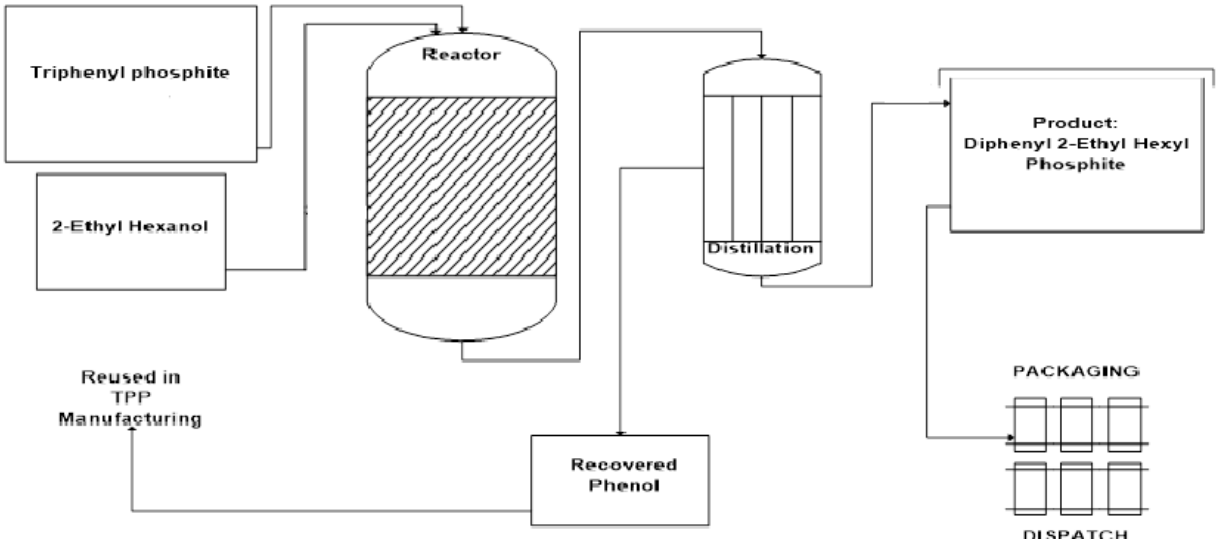
Reaction of Process: $(C_6H_5O)_3P + C_8H_{17}OH \longrightarrow (C_6H_5O)_2\text{-}P\text{-}OC_8H_{17} + C_6H_5OH$

Details of Product: CAS# 15647-08-2,
Molecular Formula: $(C_6H_5O)_2$-P-OC_8H_{17} **Mole. Weight:** 346 g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
1.Triphenyl Phosphite	: 896.00kgs	1. Di-Phenyl 2-Ethyl Hexyl Phosphite	:1000.00 Kgs
2. 2- Ethyl Hexanol	: 376.00kgs	2. Phenol	:272.00 Kgs
Total	**: 1272.00 Kgs**	**Total**	**:1272.00 Kgs**

Manufacturing Process Flow Diagram of Di-Phenyl 2-Ethyl HeaxylPhosphite



Product 3(C): Plastic Additives (Phenyl Di-Isodecyl Phosphite) (DDPP)

Manufacturing Process:
TPP and 2 mole IsoDecanol reacted at elevated temperature. During the course of reaction 2 mole phenol is generated. Phenol is distilled out and Phenyl Di-Isodecyl Phosphite is collected and packed in suitable containers as per customer's requirement.

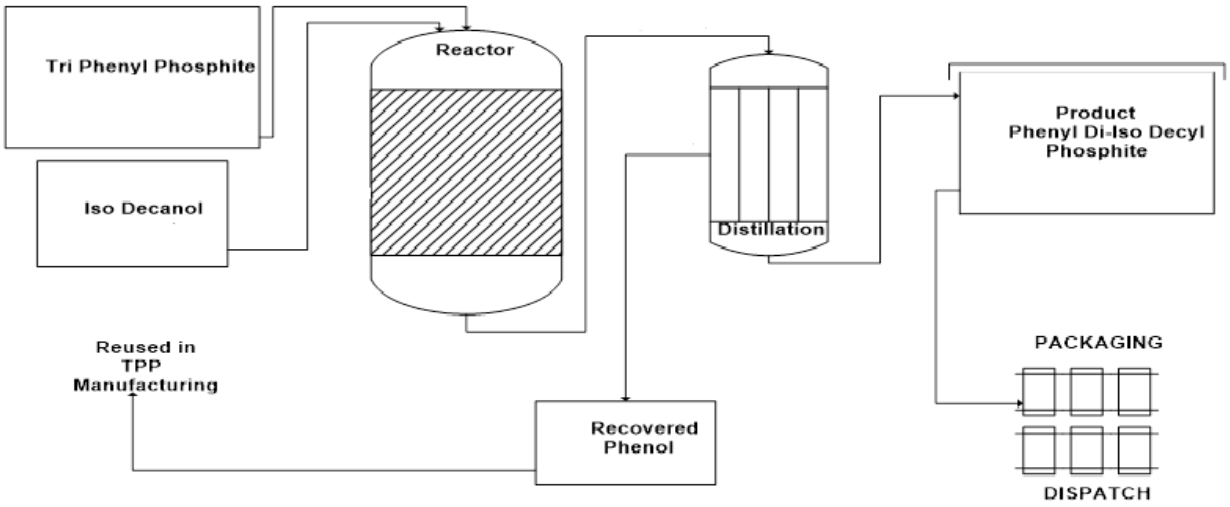
Reaction of Process: $(C_6H_5O)_3$-P+ 2 $C_{10}H_{21}OH \longrightarrow C_6H_5O$-P-$(OC_{10}H_{21})_2$ +2C_6H_5OH

Details of Product: CAS# 25550-98-5,
Molecular Formula: (C_6H_5O)-P-$(OC_{10}H_{21})_2$ **Mole. Weight:**438.64 g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
1.Triphenyl Phosphite	: 708.00kgs	1. Phenyl Di-IsodecylPhosphite:	1000.00 Kgs
2. IsoDecanol	: 721.00kgs	2. Phenol	: 429.00 Kgs
Total	**: 1429.00 Kgs**	**Total**	**: 1429.00 Kgs**

Manufacturing Process Flow Diagram of Phenyl Di-Isodecyl Phosphite



Product 3 (D): Plastic Additives (Tri Isodecyl Phosphite) (TDP), Tri lauryl phoshite(TLP), Tri-isooctyl phophite (**TIOP)**

Manufacturing Process:

TPP and 3 mole Iso Decanol reacted at elevated temperature. During the course of reaction 3 mole phenol is generated. Phenol is distilled out and Tri Iso Decyl Phosphite is collected and packed in suitable containers as per customer's requirement.

Reaction of Process: $(C_6H_5O)_3P + 3\ C_{10}H_{21}OH \longrightarrow (C_{10}H_{21}O)_3P + 3\ C_6H_5OH$

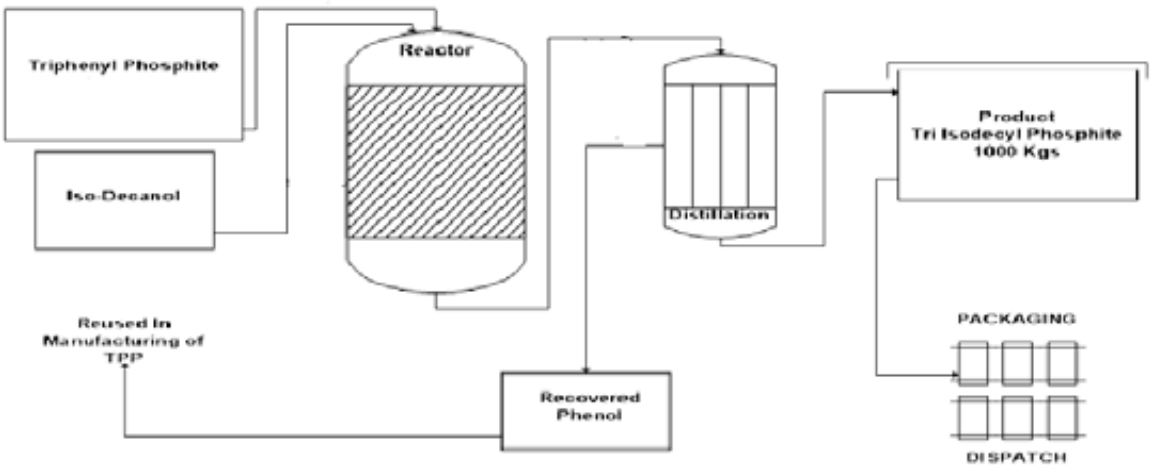
Details of Product: CAS# 25448-25-3,

Molecular Formula: $(C_{10}H_{21}O)_3P$ **Mole. Weight:**503 g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
1.Triphenyl Phosphite	: 616.00kgs	1. Tri IsodecylPhosphite	: 1000.00 Kgs
2. Iso-Decanol	: 944.00kgs	2. Phenol	: 560.00 Kgs
Total	**: 1560.00 Kgs**	**Total**	**: 1560.00 Kgs**

Manufacturing Process Flow Diagram of Tri-IsodecylPhosphite



NOTE: - **(1) we use1 mole TPP and 3 mole Lauryl alcohol reacted give Tri lauryl phoshite(TLP)**

(2) We use1 mole TPP and 3 mole 2-Octanol reacted give Triiso octyl phosphite(TIOP)

Product 3 (E): Plastic Additives Tri Trisdecyl Phosphite(TTDP),

Manufacturing Process:

TPP and 3mole TDA reacted at elevated temperature. During the course of reaction 3 mole phenol is generated. Phenol is distilled out and Tri TrisDecyl Phosphite is collected and packed in suitable containers as per customer's requirement.

Reaction of Process: $(C_6H_5O)_3P + 3\ C_{13}H_{27}OH \longrightarrow (C_{13}H_{27}O)_3P + 3\ C_6H_5OH$

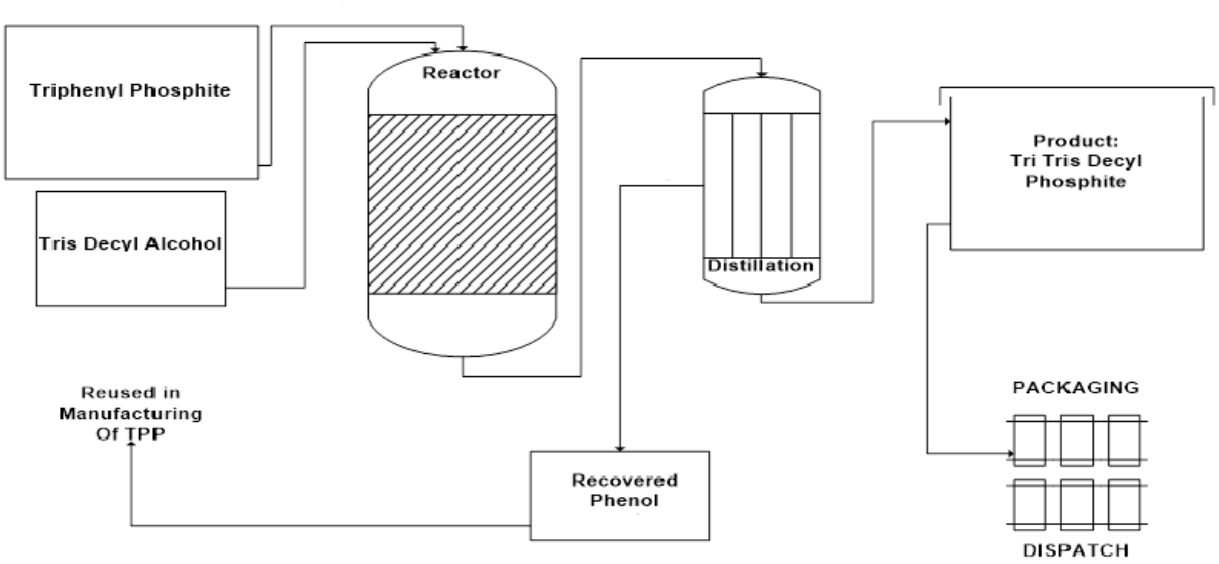
Details of Product: CAS# 77745-66-5

Molecular Formula: $(C_{13}H_{27}O)_3P$ **Mole. Weight:** 628 g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
1.Triphenyl Phosphite	: 495.00kgs	1. Tri Tris decyl Phosphite	: 1000.00 Kgs
2. Tridecanol	: 955.00kgs	2. Phenol	: 450.00 Kgs
Total	**: 1450.00 Kgs**	**Total**	**: 1450.00 Kgs**

Manufacturing Process Flow Diagram of Tri Trisdecyl Phosphite



Product 3 (F): 4-4 iso propylidene di phenol C12-15 alcohol (Sanphos -1500)

TPP , Bisphenol and C12-15 alcohol reacted at elevated temperature. During the course of reaction 6 mole phenol is generated. Phenol is distilled out and product is collected and packed in suitable containers as per customer's requirement.

Reaction of Process:

$$\mathbf{2\{}(C_6H_5O)_3P\}+ C_{15}H_{16}O_2 + 4(C_{12\text{-}15}H_{25\text{-}31)} \longrightarrow [(\ C_{12\text{-}15}H_{25\text{-}31}\ O)_2\ P\ \ C_6H_4O)]_2\ C\ (CH_3\ )_2 + 6\ C_6H_5OH$$

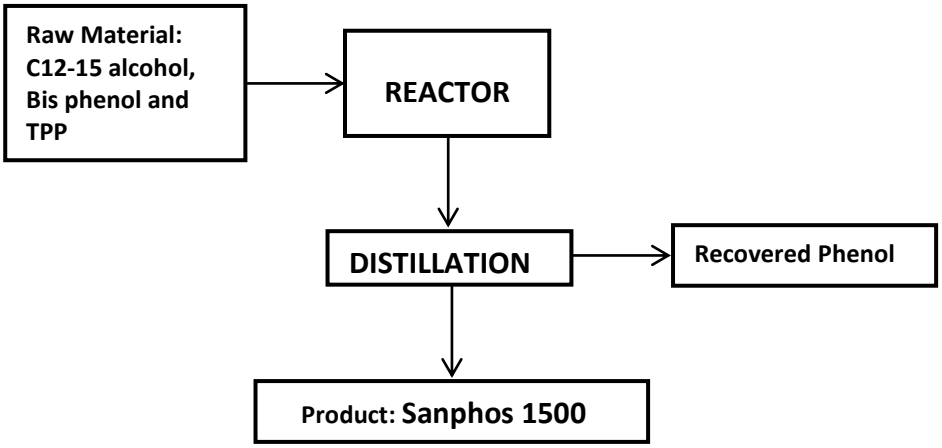
Details of Product: CAS# 96152-48-6

Mole. Weight: 1112 g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
1.Triphenyl Phosphite	: 558.00kgs	1. Sanphos 1500	: 1000.00 Kgs
2. Bis phenol	: 205.00kg	2. Phenol	: 508.00 Kgs
3 C12-15 alcohol	: 745.00kg		
Total	**: 1508.00 Kgs**	**Total**	**: 1508.00 Kgs**

Manufacturing Process Flow Diagram of Sanphos -1500



Product 3 (G): Plastic Additives (Tris Nonyl Phenyl Phosphite) (TNPP)

Manufacturing Process:

$PCl_3$and Nonyl Phenol retreated at elevated temperature. During the course of reaction 3 mole HCl is generated as gas. Gaseous HCl is scrubbed in water scrubber attached to the reactor and Tris Nonyl Phenyl Phosphite is collected after complete removal of HCl from reactor. The product Tris Nonyl Phenyl Phosphite is then packed in suitable containers as per customer's requirement.

Reaction of Process:

$3C_9H_{19}\text{-}C_6H_4OH + PCl_3 \longrightarrow (C_9H_{19}\text{-}O\text{-}C_6H_4)_3P + 3HCl_{gas}$ *……In Reactor for Main Product*

$HCl_{gas} + H_2O \longrightarrow HCl_{Soln.}$ *…..In Scrubber for By-Product*

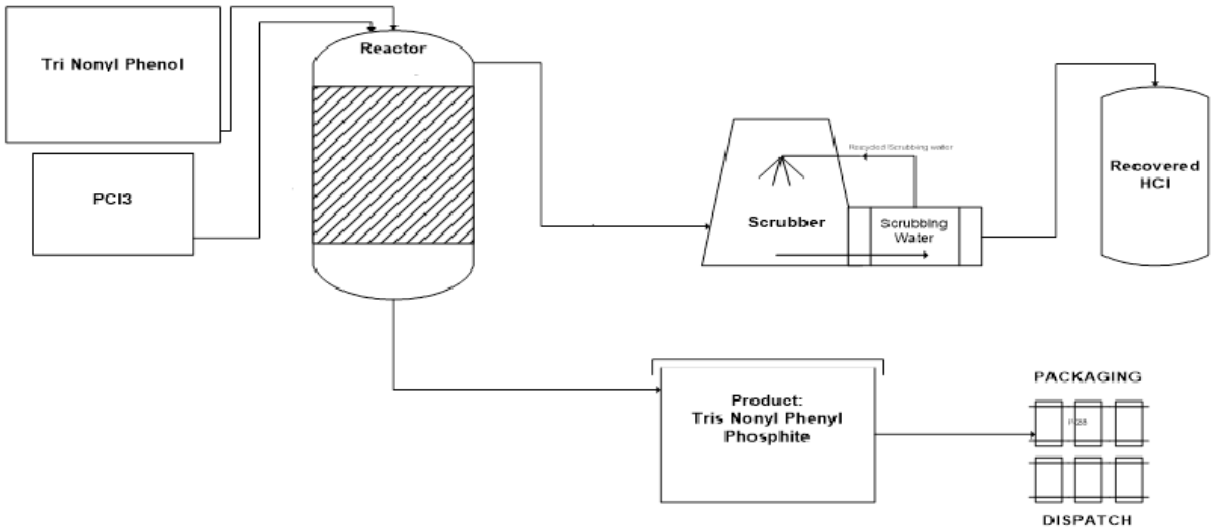
Details of Product: CAS#26523-78-4

Molecular Formula: $(C_9H_{19}\text{-}O\text{-}C_6H_4)_3P$ **Mole. Weight:** 688 g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
In Reactor (Main Product)			
1. NonylPhenol	: 959.00kgs	1. Tri Nonyl Phenyl Phosphite	: 1000.00 Kgs
2. PCl_3	: 200.00kgs	2. HCl_{gas}	: 159.00kgs
Total	**: 1159.00 Kgs**	**Total**	**: 1159.00 Kgs**
In Scrubber (By-Product)			
2. HCl_{gas}	: 159.00kgs	1. HCl_{Soln}(30%)	: 530.00kgs
4. Scrubbing Water	: 371.00 kgs		
Total	**: 530.00 Kgs**	**Total**	**: 530.00 Kgs**

Manufacturing Process Flow Diagram of TrisNonylPhenylPhosphite



Product 3 (H): Di-phenyl phosphite(DPP)

Manufacturing Process:

In TPP to be charge phosphorus acid crystal with at elevated temperature. After complete the reaction cool to 70 C temperature. This Finished product packed in drums

Reaction of Process:

2 $(C_6H_5O)_3P + H_3PO_3 \longrightarrow$ 3{ $C12H11O_3$**P}**

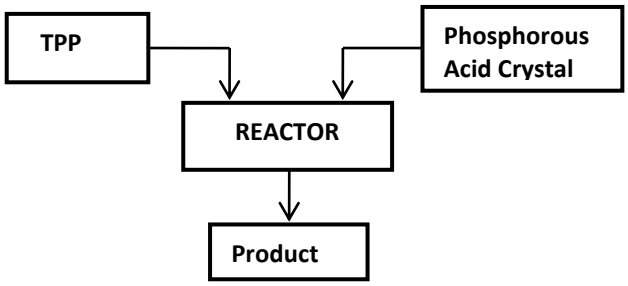
Details of Product: CAS# 4712-55-4

Molecular Formula: $C12H11O_3$**P** **Mole. Weight:** 234.19 g/mol

Material balance for 1 MT Product:

INPUT			**OUTPUT**		
In Reactor (Main Product)					
1. TPP	:	883.00kgs	1.DPP	:	1000.00 kgs
2. phosphorus acid	:	117.00kgs			
Total	**:**	**1000.00 Kgs**	**Total**	**:**	**1000.00 Kgs**

Manufacturing Process Flow Diagram



Product 4 (A): Organic Phosphates -Tri cresyl Phosphate (TCP)

Manufacturing Process:

3 mole alcohol (Cresol) reacted with 1 mole of $POCl_3$ at elevated temperature in presence of catalyst during the course of reaction HCl is generated which is trapped in water and will be dispatched as HCl solution. Excess alcohol used is distilled out under vaccum after the reaction.

Finished product distilled at elevated temperature and at reduced pressure and collected in to the receiver. From receiver the material is packed in drums.

Reaction of Process:

$3(C_7H_8O) + POCl_3 \longrightarrow (C_7H8O)P + 3HCl_{gas}$ *……In Reactor for Main Product*

$HCl_{gas} + H_2O \longrightarrow HCl_{Soln.}$ *…..In Scrubber for By-Product*

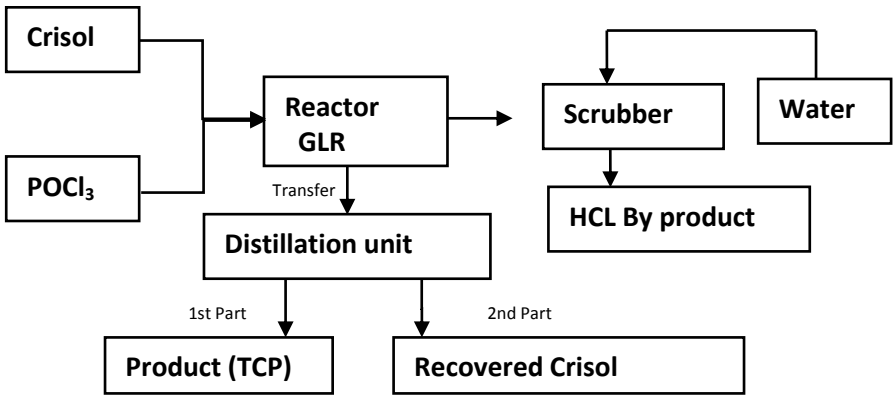
Details of Product: CAS#1330-78-5

Molecular Formula: (C_{21} H_{23} O_4 P) **Mole. Weight:** 368.37 g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
In Reactor (Main Product)			
1. Crisol	: 1012.00 kgs	1. Tricrysyl Phosphate [TCP]	: 1000.00 Kgs
2. $POCl_3$	: 417.00 kgs	2. HCl_{gas}	: 297.00 kgs
		3. Recover cresol	: 122 Kgs
		4. Process Residue	: 10 kgs
Total	**: 1429.00 Kgs**	**Total**	**: 1429.00 Kgs**
In Scrubber (By-Product)			
2. HCl_{gas}	: 297.00 kgs	1. HCl_{Soln}(30%)	**:** 990.00 kgs
4. Scrubbing Water	: 693.00 kgs		
Total	**: 990.00 Kgs**	**Total**	**: 990.00 Kgs**

Manufacturing Process Flow Diagram TCP



Product 4 (B): Organic Phosphates (Cresyl Diphenyl Phosphate)(CDPP)

Manufacturing Process:

1 mole Cresol and 2 mole phenol are reacted with 1 mole of $POCl_3$ at elevated temperature in presence of catalyst during the course of reaction HCl is generated which is trapped in water and will be dispatched as HCl solution. Excess alcohol used is distilled out under vaccum after the reaction.

Finished product distilled at elevated temperature and at reduced pressure and collected in to the receiver. From receiver the material is packed in drums.

Reaction of Process:

$C7H8O + 2C_6H_6O + POCl_3 \longrightarrow C19H17O4P + 3HCl_{gas}$ *……In Reactor for Main Product*

$HCl_{gas} + H_2O \longrightarrow HCl_{Soln.}$ *…..In Scrubber for By-Product*

Details of Product: CAS#115-86-6

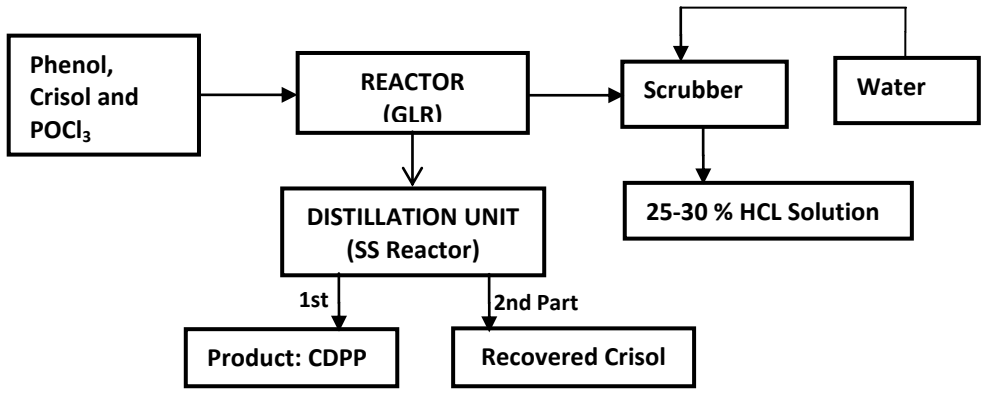
Molecular Formula: ($C_{19}H_{17}O_4P$) **Mole. Weight:** 340.31 g/mol

Material balance for 1 MT Product:

INPUT		**OUTPUT**	
In Reactor (Main Product)			
1. Crisol	: 470.00 kgs	1. CRESYL DIPHENYL PHOSPHATE (CDPP):1000.00 Kgs	
2. Phenol	: 553.00 kgs	2. HCl_{gas}	:322.00 kgs
3. $POCl_3$	: 451.00 kgs	3. Cresol recover	:137.00 kgs
		4. Process residue	:15.00kgs
Total	**: 1474.00 Kgs**	**Total**	**:1474 Kgs**

In Scrubber (By-Product)			
2. HCl_{gas}	:322.00 kgs	1. HCl_{Soln}(25-30%)	:1073.00 kgs
4. Scrubbing Water	:751.00 kgs		
Total	**:1073.00 Kgs**	**Total**	**: 1073.00 Kgs**

Manufacturing Process Flow Diagram CDPP



Product 4 (C): Organic Phosphates (Triphenyl Phosphate)

Manufacturing Process:

3 mole of Phenol reacted with 1 mole of $POCl_3$ at elevated temperature in presence of catalyst during the course of reaction HCl is generated which is trapped in water and will be dispatched as HCl solution. Excess alcohol used is distilled out under vaccum after the reaction.

Finished product distilled at elevated temperature and at reduced pressure and collected in to the receiver. From receiver flaking the material and flakes packed in drums.

Reaction of Process:

$3C_6H_6O + POCl_3 \longrightarrow OP(OC_6H_5)_3 + 3HCl_{gas}$ *……In Reactor for Main Product*

$HCl_{gas} + H_2O \longrightarrow HCl_{Soln.}$ *…..In Scrubber for By-Product*

Details of Product: CAS#115-86-6

Molecular Formula: ($C_{18}H_{15}O_4P$) **Mole. Weight:** 326 g/mol

Material balance for 1 MT Product:

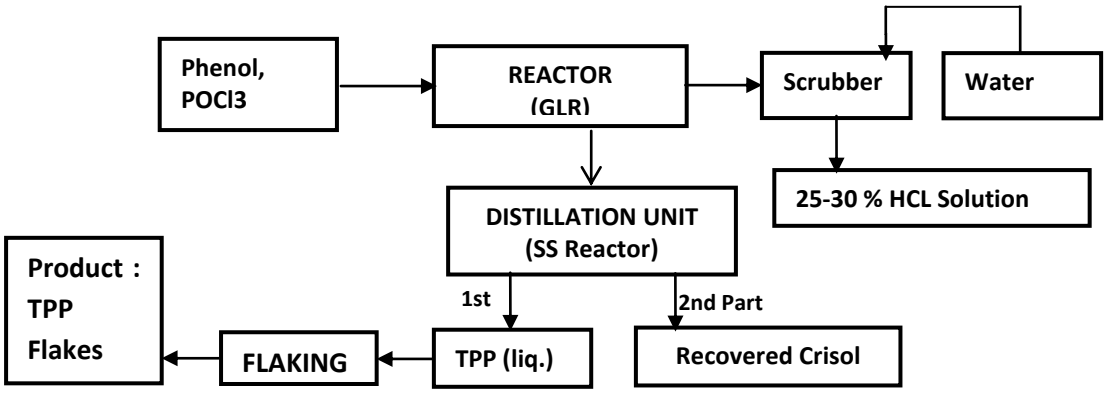
INPUT	**OUTPUT**
In Reactor (Main Product)	

1. Phenol	: 937.00 kgs	1. TRI PHENYL PHOSPHATE	:1000.00 Kgs
2. $POCl_3$	: 471.00 kgs	2. HCl_{gas}	:335.00 kgs
		3. Phenol recover	:61.00 kgs
		4. Process residue	:12.00kgs
Total	**: 1408.00 Kgs**	**Total**	**:1408.00 Kgs**

In Scrubber (By-Product)

2. HCl_{gas}	:335.00 kgs	1. HCl_{Soln}(30%)	:1117.00 kgs
4. Scrubbing Water	:782.00 kgs		
Total	**:1117.00 Kgs**	**Total**	**:1117.00 Kgs**

Manufacturing Process Flow Diagram TPP



Product 5: Styrenated phenol (Mono,Di,Tri Styrenated phenol)

Manufacturing Process:

Phenol reacted with 1, 2 OR 3 mole of Styrene at elevated temperature under reflux. After complete the reaction cool to 70 C temperature. This Finished product packed in drums

Reaction of Process: **(1) Mono Styrenated phenol**
(2)Di Styrenated phenol
(3) Tri Styrenated phenol

(1) C_6H_6O+ (R) ⟶ (C14H14)O **M.W:198.26** g/mol (Mono)
(2) C_6H_6O+ 2(R) ⟶ (C22H22)O **M.W:**302.41 g/mol (Di)
(3) C_6H_6O+ 3(R) ⟶ (C30H30)O M.W. 406.56 g/mol (Tri)

- **Note: R= C8H8 (Styrene)**

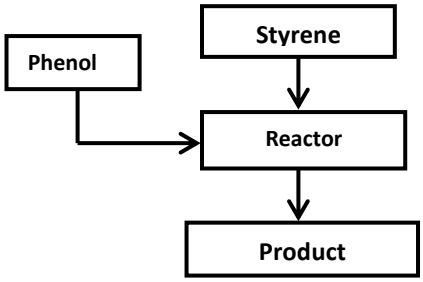
Details of Product: CAS# 61788-44-1

Molecular Formula: $C_{22}H_{22}O$ **Mole. Weight:** 302.41 g/mol

Material balance for 1 MT Product: (As Di Styrenated phenol)

INPUT		**OUTPUT**	
In Reactor (Main Product)			
1. Phenol	: 311.22 kgs	1.Di Styrenated phenol	:1000.00 kgs
2. Styrene	: 688.78 kgs		
Total	**: 1000.00 Kgs**	**Total**	**:1000.00 Kgs**

Manufacturing Process Flow Diagram Di Styrenated phenol



Raw material required along with estimated quantity, likely source, marketing area of final product(s), mode of transport of raw material and finished product:

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

RAW MATERIALS

In existing unit the company requires 8 raw materials. After proposed project these raw materials requirement will increase to meet the additional requirement of capacity enhancement of the existing product. Beside these 8 chemical, 11 additional chemicals will be required for the proposed project. The details of raw materials for proposed products are given below in tabular form.

Table 7: Details of Source, Transportation & Storage Raw Materials

Sr. No.	Name Of Raw Material	Physical State	Storage Capacity	Mode Of Transport	Mode Of Storage	Source
1.	Phenol	Solid	26MT	By Road	SS Tanks	Import/Local
2.	Isodecanol	Liquid	20MT	By Road	HDPE Tanks/Drums	Import/Local
3.	Trisdecanol	Liquid	20MT	By Road	HDPE Tanks/Drums	Import/Local
4.	2-Ethyl Hexanol	Liquid	20MT	By Road	HDPE Tanks/Drums	Import/Local
5.	Lauryl alcohol	Liquid	5 MT	By Road	Drums	Local
6.	C12-15 alcohol	Liquid	5 MT	By Road	Drums	Local
7.	Bis phenol A	Solid	1.0 MT	By Road	Drums	Local
8.	Phosphorus acid Crystals	Solid	0.5 MT	By Road	Drums	Local
9.	Phosphorus Trichloride	Liquid	15MT	By Road	Ms Tanks	Local
10.	Phosphorous Pentoxide	Powder	5MT	By Road	Carboys	Local
11.	Phosphoric Acid	Liquid	10MT	By Road	Carboys	Local/Import
12.	Cresol	Liquid	5 MT	By Road	Drums	Local/Import
13.	Nonyl Phenol	Liquid	20MT	By Road	HDPE Tanks/Drums	Local/Import
14.	$POCl_3$	Liquid	1MT	By Road	Carboys	Local

Sr. No.	Name Of Raw Material	Physical State	Storage Capacity	Mode Of Transport	Mode Of Storage	Source
15.	Styrene	Liquid	10 MT	By Road	Drum	Local
16.	Dipropylene gycol	Liquid	5 MT	By Road	Drum	Local
17.	Stearyl alcohol	Solid	5 MT	By Road	Drum	Local
18.	Petaerythritol	Solid	5 MT	By Road	Drum	Local
19.	2-Octanol	Liquid	5 MT	By Road	Drum	Local

Table 8: List of Hazardous Materials (Products & Raw Materials) as Per MSIHC Rule 2000

Sr. No.	Name of Raw material	Classification as per Schedule of MSIHC Rule	Threshold Storage as per MSIHC Rule
1.	Phenol	Sch-I, part –II,481	5000 MT
2.	2-Ethyl Hexanol	Sch-I,Part-II, 254	--
3.	Phosphorus trichloride	Sch-I,Part-II,506	NA
4.	Phosphorous pentoxide	Sch-I,Part-II, 505	NA
5.	Phosphoric Acid	Sch.I, part –II,497	NA
6.	$POCl_3$	Sch.I, part –II,504	--
7.	Styrene	Sch.I, part –II,583	--

Table 9: Hazardous characteristics of Chemicals (Product & Raw Material)

LIST OF CHEMICAL PROPERTIES OF HAZARDOUS CHEMICALS IDENTIFIED														
Sr. No.	Name of Raw materials	Chemical Classification	Moleculer weight (g/mol)	MP (°C)	BP (°C)	FP (°C)	LEL %	UEL %	NFPA (H, F & R)	VP (mmHg)	VD	HC (cal/g)	TLV ppm OR mg/m^3	LD_{50} mg/Kg (LC_{50} mg/l)
1	Phenol	Toxic	94.11 g·mol−1	40.91	181.75	85.00	1.30	9.50	4,2,0	0.35 mm Hg @ 25 deg C	3.24	-	5 ppm	ORAL-RAT(LD50): Acute: 530 mg/kg
2	2-Ethyl Hexanol	Irritant	130.23	-76.00	184.34	81.00	0.90	9.70	2,2,0	0.36 mm Hg @ 20 deg C	4.50	-	-	2049 mg/kg
3	PCL3(Phosphorus trichloride)	Toxic, Corrosive	137.332	-93.60	76.10	_	_	_	3,0,0	100	4.75	_	0.2 ppm (1.5 mg/m3)	LC50 (rat) mg/kg:0.28 mg/m3/4 hours
4	Phosphorous pentoxide	Toxic, Flammable, Corrosive	141.94 g/mole	562.00	360 °C	NA	NA	NA	3,0,2	1 mm Hg at 384 deg C	NA	_	_	(LC50): Acute: 1084 ppm 4 hour(s)
5	Phosphoric Acid	Corrosive	98.00	42.35	158.00	Non Flammable	NA	NA	3,0,0	0.03@20	0.03		1 mg/m3	1530.00
6	POCl3	Toxic, Flammable, Corrosive		1.25	105.80	NA	NA	NA	0,4,2	40 mm Hg at 27.3 deg C	5.30	_	0.1 ppm (0.6 mg/m3)	(LC-50)0.3 mg/liter/4 hours
MP – melting point BP – Boiling Point FP – Flash Point			LEL- Lower explosive limit UEL- Upper Explosive limit NFPA- National Fire Protection Association Rating – (H-Health, F- Fire & R-Reactivity)								VP – Vapour Pressure VD- Vapour Density HC- Heat of Combustion			

viii) Resource optimization/ recycling and reuse envisaged in the project, if any, should briefly outlined:

By-product HCl will be sold out to its actual users.
By product Phenol will be reused to manufacture TPP and excess will be sold out to its actual users.
By product cresol will be reused to manufacture our phosphate products.

ix) Availability of water its source, energy/power requirement and source should be given: Availability of water its source energy/power required and its source.

The company does not require water for process of manufacturing of product and washing in existing unit. Similarly the water will not require for manufacturing of proposed products& washing. Water is required only for operations of utilities and domestic activities as well as irrigation of garden & greenbelt area. The breakup of total water requirements are presented in tabular form below.

Table 10: Water Requirement

Sr. No.	Particulars	Quantity(KL per day)		
		Existing	Proposed	Total
1	**Domestic**	**3.50**	**1.50**	**5.00**
2	**Industrial**			
	Process & Washing	0.00	0.00	0.00
	Boiler	6.00	6.00	12.00
	Cooling	6.00	10.00	16.00
	Scrubbing	10.00	* 0.00	10.00
	Sub Total Industrial	**22.00**	**16.00**	**38.00**
3	**Gardening**	**5.00**	**0.00**	**5.00**
	Total	**30.50**	**17.5**	**48.00**

Source: The water supply from GIDC Water Supply Dept.

Note: * 5 KL from boiler and cooling tower blow down water and boiler condensate will be reused in scrubber for HCl scrubbing.

Power

Total power requirement after the proposed expansion will be 250 KVA. The existing unit is having 150 KVA powers and the additional100 KVA power for proposed expansion project will also be met from Dakshin Gujarat Vij. Co. Ltd. As a standby power source, D. G. sets of total capacity 250 KVA is required after proposed expansion. The unit is having a D. G. Set of capacity 125 KVA and is now proposing to install another D.G. Set of capacity 125 KVA to meet the requirement only during power failure and emergency. The details of power requirement are tabulated in subsequent table.

Fuel

In existing unit, natural gas is used in the utilities as fuel. The natural gas requirement of existing unit is 28000 SCM/month which supplied by GSPC through the gas pipeline laid in the GIDC Vapi for industrial supply. The Steam Boiler &Thermopack are the fuel consuming utilities of the existing unit. The fuel (natural gas) consumption of these utilities will therefore increase after proposed project. After proposed project the natural gas requirement of these utility will be 40000SCM/month and the supply source will remain same as pipeline of GSPC existing in GIDC Vapi. Additionally, for proposed project HSD will be used as fuel for DG set only during power failure from DGVCL and the HSD requirement will be 60 lit/hr. The HSD will be procured from local authorized supplier/dealer. The details of fuel requirement are tabulated below.

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

Table 11: Energy, Fuel & Power Requirement

Components	Existing	Proposed	Total (after proposed expansion)	Sources
Power	150 KVA	100 KVA	250 KVA	Domestic
Heat Requirement	6 lakh K.cal/Hr & 2 lac kcal/hr	-	8 lakh Kcal/hr	Thermopack
Steam Requirement	550 kg /Hr & 1.0 T/ hr	-	1.55 T/Hr	Steam Boiler
Power during power failure	125 KVA	125 KVA	250 KVA	D.G. Set
Natural Gas	28000 SCM/Month	12000 SCM/Month	40000 SCM/Month	From GSPC
HSD	30 L/Hr	30 L/Hr	60 L/Hr	Local Petroleum Dealer
NOTE: As per our existing consent, maximum quantity of Natural Gas permitted is 65,000 SCM/Month. But our actual consumption in existing unit is 28,000 SCM/Month and the same is mentioned in this table.				

X. Quantity of waste to be generated (liquid and solid) and scheme for their Management/disposal:

Quantity of Waste Water (liquid waste) generation and its management:

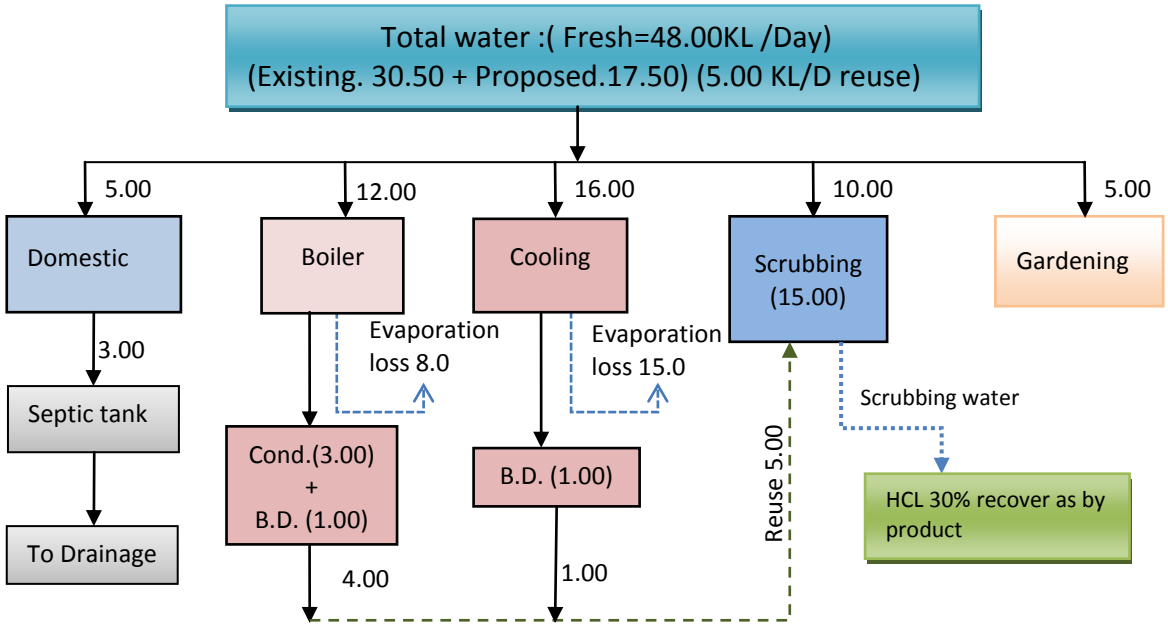
In existing unit, total industrial wastewater generation is measured to be 1.00 KLD on maximum basis whereas sewage generation is also noticed around 1.80 KLD. From proposed unit, the industrial wastewater generation will be around 4.20KLD whereas domestic sewage generation is expected to be around 0.20 KLD additional to the existing. The sewage is disposed off through the septic tank followed by common sewage drainage of the area. The industrial wastewater will be generated from boiler& cooling system blow down. Thus the whole & all effluent generated from existing & proposed unit is identified as non-hazardous/toxic effluent. The blow down from boiler & cooling is utilized for makeup in scrubber and similar practice will be done after proposed project.

The details of wastewater generation are tabulated below whereas the water balance diagram is shown in subsequent figure.

Table 12: Details of Wastewater Generation

Sr. No.	Particulars	Existing Quantity (KL per day)	Proposed Quantity (KL per day)	Total Quantity (KL per day)
1	**Domestic**	**2.30**	**0.70**	**3.00**
2	**Industrial**			
	Process	0.00	0.00	0.00
	Boiler*	0.70	3.30	4.00
	Cooling*	0.30	0.70	1.00
	Sub Total Industrial	**1.00**	**4.00**	**5.00**
	Total	**3.30**	**4.70**	**8.00**
***** Industrial effluent basically from boiler and cooling tower is reused in scrubber, and the recovered HCl solution is sold as by-product.				

Fig. 3: Water Balance Diagram



Note:

The unit of all water requirement & effluent discharge are in KL/Day
B.D - Blowing Down
Cond. - Condensation

- **DETAILS OF AIR POLLUTION CONTROL MEASURES AFTER PROPOSED CHANGE:**

Air Pollution Sources & Control

In existing unit, emissions sources are the three utilities installed in the plant. The utilities include one steam Boiler (550Kg/Hr.) and another steam Boiler (1.00 T/Hr.),Two Thermopack (6lakhs Kcal/Hr and 2 lakhs Kcal/Hr) & one DG set of 125KVA and natural gas is used as fuel for Steam Boiler and Thermopack utilities and HSD is used for D.G.Sets. Now, we are proposing DG set of capacity 125 KVA to meet the power requirement only during failure of power supply from the Electricity Department. Thus, after proposed project the emission load of the utilities, and DG set.

The summarized details of the stationary/utility emissions are presented in tabular form below.

Table 13: Details of Emission & Control Measures

Sr. No.	Particulars	Fuel Type & Quantity	Pollutants & Limits	Control Measures
Existing				
1.	Steam Boiler (2 No.): Capacity : 550 Kg/Hr& 1 T/hr	CNG : 28000 scm/Month	PM <150 mg/Nm^3 SO_2< 100 ppm NO_x< 50 ppm	Stack ht.: 11 mtr. Diameter: 400 mm
2.	Thermopack (2 No.): Capacity : 2 lakh K.Cal/Hr &6 lakh K.Cal/Hr			Stack ht.: 23 mtr. Diameter: 400 mm
3	D.G. Set Capacity: 125 KVA	HSD: 30 L/Hr	PM <150 mg/Nm^3 SO_2< 100 ppm	Stack ht. 11 mtr. Diameter: 200 mm

4.	Glass Line Reactor (3 No.)	N/A	HCl<20 mg/Nm^3	Two stage Water Scrubber Stack ht. 11 mtr. Diameter: 100 mm
Proposed				
1	Steam Boiler Capacity : 1.0T/Hr	CNG : 12000 scm/Month	PM <150 mg/Nm^3 SO_2< 100 ppm NO_x< 50 ppm	Stack ht. 15 mtr. Diameter: 450 mm
2	D.G. Set Capacity: 125 KVA	HSD: 30 L/Hr	PM <150 mg/Nm^3 SO_2< 100 ppm NO_x< 50 ppm	Stack ht. 11 mtr. Diameter: 200 mm
3	Glass Line Reactor (5No.)	N/A	HCl<20 mg/Nm^3	Two stage Water Scrubber and one stage alkali scrubber. Stack ht: 11 mtr. Diameter: 100 mm

Solid & Hazardous Waste Generation & Management

There is no solid &/or hazardous waste generation from the existing unit. Similarly no waste will be generated from proposed project. The hazardous waste generation from existing unit comprises discarded containers & used Oil. Same wastes will be generated from proposed unit. The discarded containers/drums is /will be sold to the authorized scrap dealers or re-conditioners. Company has facility for decontamination of containers with defined operational procedures. The used oil is being recycled indirectly through sell to authorized recyclers. Similar practice of management of used oil will be continued after proposed project. The details of hazardous waste generation and mode of treatment &/or Disposal is tabulated below.

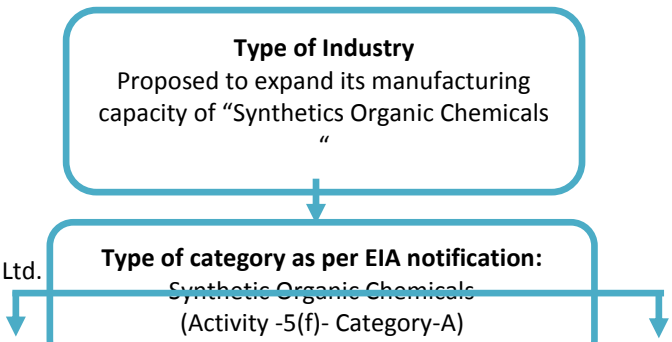
The details of all wastes & their management are tabulated below.

Table 14: Quantity of Hazardous/ Non-hazardous Waste generation and its management

Types of Waste & Category	Source of Generation	Quantity			Storage Method	Method of Disposal
		Exiting	Proposed	Total		
Hazardous Wastes						
Process residue (Schedule-I, 20.3)	From Process	--	10.00 MT	10.00 MT	Will be stored at a separate storage area in a closed container	Will be sent to co incineration or common incinerations.
Used oil (5.1)	From utility	25 L/Annum	10L/Annum	35L/Annum	Stored in to the closed container	Dispose by selling to registered refiners
Discarded containers/barrels/liners (33.1)	Raw Material storage	150 Nos./ Annum	-	150Nos./ Annum	Stored at Specified Storage area as per rules	Decontaminated drum will be sold to authorized reconditioner

XI. Schematic representations of the feasibility drawing which give information of EIA purpose:

A schematic representation of the feasibility drawing



4. SITE ANALYSIS

4.0 Site Analysis

I. Connectivity:

The land use is in GIDC, Vapi , Gujarat which is very well connected to National Highway no.08. And the nearest Surat airport is 85.75 Km NW & Non-Public: Daman- 12.12 Km NW away from the project site by road.

II. Land Form, Land use and Land ownership:

The total plot area (2197.00 sq.m.) is belonging to M/s. S. M. Chemical Vapi Pvt. Ltd. The existing land is located in GIDC, VApi Area.

III. Existing Infrastructure/ land use pattern

Proposed project will be located in GIDC, Vapi area. It is very well connected to national highway NH-08. Proposed project will be located within the GIDC notified industrial area of Vapi which has available infrastructure like water, electricity, roads, rail, transportation and drainage system, CETP and TSDF Site. Surrounding area is consisting with agriculture, other industrial units.

IV. Soil classification and Land use classification:

The area, being of basaltic formation, falls under the broad soil group of red loams and black clay soils. The transmission of water through similar parent material seems to have influenced the development of different physiographic characteristics of the soils in the area. The area in between the hills with sloping lands contains dark yellowish brown to very dark grayish brown gravelly clay loam to clayey soils of shallow to moderate thickness. The dissected hill and steep slopes suffer from severe erosion hazards. The steep hill slopes are almost devoid of soil.

V. Climate data from secondary sources:

The climate here is tropical. The winter months are much rainier than the summer months in Valsad. This climate is considered to be as according to the Köppen-Geiger climate classification. The temperature here averages 26.9 °C. Rain fall about 1500 mm approximately of precipitation falls annually during 2015.

VI. Social Infrastructure available:

LAND & BUILDINGS

As mentioned in earlier section the proposed project would be set up in existing premises of M/s S.M. Chemical Vapi Pvt. Ltd., which is situated in Plot No. 313/1,40 Shed Area, GIDC Estate, Vapi - 396195, Dist. Valsad, of Gujarat state. The plots of existing premises measure 2197.00 m^2, out of which897 m^2planned for industrial use for existing &proposed facilities. Further,330 m^2 land is already developed as greenbelt within premises and 406 $m^2$is developed as additional greenbelt in common space of GIDC allocated for greenbelt. Remaining 970 m^2 land area of the site is kept open.

The plant layout showing all necessary details of existing & proposed land utilization and built-up area are shown in subsequent figure whereas the details of total land, land area allocated for each type of building, structure & facilities of existing & proposed unit are tabulated below.

The layout of project premises /site showing existing & proposed buildings & infrastructures including raw materials storage area, production area, utility area, ETP, Stacks, Hazardous waste storage area, office area, greenbelt area, internal roads and parking area etc. is shown in subsequent figure of plant layout.

5. Planning Description

5.0 Planning Brief.

I. Planning Concept (Type of industries, facilities, transportation etc.) Town and Country Planning /Development authority Classification:

The project site is located at Vapi, GIDC, Gujarat.

II. Population Projection:

Not applicable

III. Land use planning (breakup along with green belt etc.):

The project is located Industrial notified area and due to the proposed project there will not be any change in the land use pattern of the region.

Area Statement	Existing (in m^2)	Proposed (in m^2)	Area After Proposed Expansion(in m^2)
Production plant[consider only ground floor area but actually it is three layer plant]	576.00	00.00	576.00
Storage Shed/ Godown Area	221.00	00.00	221.00
Office & other built-up Area	100.00	00.00	100.00
Open area and Road & Parking Area	970.00	00.00	970.00
Green Belt* Area[o/s adjoining common area place 206sq.mt. not consider]	330.00	00.00	330.00
Total Area	**2197.00**	**00.00**	**2197.00**

IV. Assessment of Infrastructure demand (Physical & Social):

The proposed infrastructure to manufacture products will be built with standard engineering design considering all the relevant parameters related to environment, health and safety.

Facilities like road and communication are good. Banks, ATM's and medical facilities are also adequate.

V. Amenities/ Facilities:

Education- schools including middle, secondary and higher secondary schools, Colleges, social welfare hostels.

Medical and Health- M/s. S. M. Chemical Vapi Pvt. Ltd., as an existing unit, has formulated well defined safety procedures & code as well as on-site emergency plan. The company is maintaining good workplace condition to ensure good status of occupational health & safety. Similar arrangement with necessary modification in established procedure, codes and on-site emergency plan will be made for proposed project. The details of occupational health & safety related information are presented below under respective headings.

Power and water- All the villages are electrified and drinking water facilities are extended to all villages.

Rail and Road- The project site is very well connected by road through Natinal Highway no. 08.

6.0 Proposed Infrastructure:

I. Industrial Area (Processing Area):

Basic infrastructure developed already and the required additional plant and machineries will be installed after getting statutory clearance.

II. Residential Area (Non Processing Area):

No residential area is involved in the proposed project as it is located in GIDC area. The employs are accommodated in nearby Residential areas.

III. Green Belt:

Along with 330m^2green belt area within premises, additional 406m^2 greenbelt area will also be developed in common space of GIDC, Vapi, totalling to 736 m^2 of greenbelt area.

Greenbelt Development:

Green belt form a surface capable of absorbing air pollutants and forming sinks for pollutants. Plants grown in such a way as to function as pollutants sinks are collectively referred to as green belts. Apart from functioning as a pollutant sink, green belts provide other benefits like:

- Green belt helps in noise abatement for the surroundings area. Thus, it is recommended as noise barriers.
- Green belt helps in achieving bio diversity by providing possible habitats for birds and animal, thus recreating hospitable nature in an otherwise drab urban industrial scene.
- Green belts increase the aesthetic value of the site.

It may be noted that SM Chemical is an existing unit located in the notified industrial estate of GIDC Estate Vapi. The unit has already developed a green belt in its premises admeasuring 330 m^2. Company has also developed 406 m^2area available in common space of GIDC allocated for greenbelt as additionally greenbelt.

IV. Connectivity (Traffic and Transportation Road/ Rail/ Metro/ Water ways etc):

The project site is very well connected by road through National Highway no. 8 and western railways.

V. Drinking Water management (Source& Supply of water):

Water requirement will be fulfilled through GIDC Water Supply Department, Vapi GIDC.

VI. Sewerage System:

Sewerage water is disposed off to soak pit through septic tank.

VII. Industrial Waste Management:

- Industrial effluent basically from boiler and cooling tower is reused in scrubber, and the recovered HCl solution is sold as by-product.
- Generated domestic liquid waste is being disposed off through soak pit system to drainage.

7 Rehabilitation and Resettlement (R&R) Plan:

II. Policy to be adopted (Central/ State) in respect of the project affected persons including home oustees, land oustees and landless laborers (a brief outline to be given):

The proposed Industry does not envisage any disturbance to local community or the village since the land is located in notified industrial area, GIDC. The proposed project will not affect the home oustees, land oustees and landless laborers. Hence there is no R & R plan required.

8. Project Schedule & Cost Estimates:

I. Likely date of start of construction and likely date of completion (Time schedule for the project to be given):

After obtaining Environmental clearance and Consent to Establish from GPCB, the company shall start the proposed additional manufacturing product and commissioning of the project.

II. Estimated project cost along with analysis in terms of economic viability of the project:

Estimated project cost along with the analysis in terms of economic viability of the project

Plant & Machinery, Pipeline & Fittings, Electrical Installation, Safety systems, etc. are the major heads considered in the Capital Cost Projection for the proposed expansion project. Environment Protection has also been considered in planning the Cost Projection, which will include Green belt development, safety systems, etc.

The capital of proposed project has been estimated & budgeted with costs of Rs. 414.63 lakhs after proposed expansion. The proposed capital includes Rs. 12.75 Lakhs for environmental protection measures. The details of proposed capital costs estimation including land, buildings, plant machineries & equipment, environmental protection measures etc. is presented below in tabulated form.

Table 15: Capital Cost

Sr. No.	Purpose	Existing Cost (Rs. In Lakhs)	Proposed Cost (Rs. In Lakhs)	Total Cost (Rs. In Lakhs)
1.	Land	6.75	-	6.75
2.	Building and Civil Works	31.68	30.00	61.68
3.	Plant, Machinery and other fittings	293.15	40.00	333.15
4.	Environmental protection measures& CSR	9.75	3.00	12.75
5.	Safety & Emergency Measures	0.15	0.15	0.30
	TOTAL :	**341.48**	**73.15**	**414.63**

Recurring Cost per Annum

Sr. No.	Purpose	Cost (Rs. In Lakhs)
1.	Environment and safety management	11.00
2.	Greenbelt Maintained	1.00
3.	Expansion for common solid waste disposal facilities	5.00
4.	CSR activities	2.00
	TOTAL :	**19.00**

9. Analysis of Proposal (Final Recommendations):

I. Financial and social benefits with special emphasis on the befit to the local people including tribal population, if any, in the area:

Proposed expansion activity will provide benefits to the local people in terms of financial and social welfare.

- Local people will get direct financial benefit by way of employment.
- Local people will get some contracts of supply and services to get indirect income.
- Company will contribute in improving education and health facilities in nearby area.