Dorf Ketal Chemicals (I) Pvt. Ltd.
#2 Dorf Ketal Tower, Ramchandra Lane
Kachpada, Malad (W). Mumbai - 400 064
India
Phone +91-22-4297-4888
Fax +91-22-4297-4955
www.dorfketal.com

A Responsible Care® Company

Ref: Date

To,
The Secretary
State Level Expert Appraisal Committee (SEAC)
C/o Gujarat Pollution Control Board,
Paryavaran Bhavan, Sector 10 A,
Block No.14/8,Gandhinagar- 382010

Sub: Environment Clearance under the EIA Notification 2006 for our proposed project at P.No. Z-108, Dahej SEZ (Part 2), Vagra, Bharuch, Gujarat

Ref: EIA-10-2016-7031-E 2616 dated 9 Dec, 2016

Dear Sir.

For the grant of Environmental clearance of subjected project, we have submitted duly filled Form-I along with the desired details. In this regard our proposal was considered in meeting of SEAC, Gujarat.

With reference to the above mentioned subject and the 311th meeting held with SEAC Gujarat on 24th of October 2016 and our data furnished in Form I, EIA Report and Presentation made before SEAC, additional information required was communicated and required to be submitted.

We are herewith submitting the point wise reply to the additional information along with requisite details for your kind perusal.

Humbly request to kindly process our application for Environmental clearance and oblige.

Thanking you,
Yours Sincerely,
For Dorf Ketal Chemicals India Pvt. Ltd.

Naresh Aggarwal
Director Projects

Encl:

1. Copy of desired information/documents.
2. Point wise compliance report.

ENCL-1

COPY OF LETTER FOR ADDITIONAL INFORMATION

HARDIK SHAH, IAS
SECRETARY
State Level Expert Appraisal Committee

STATE LEVEL EXPERT APPRAISAL COMMITTEE, GUJARAT.
Office : Gujarat Pollution Control Board,
"Paryavaran Bhavan", Sector 10-A,
Gandhinagar-382010, GUJARAT
Phone : 079 -23232152,
Fax : 079 -23222784.
Email : ms-gpcb@gujarat.gov.in

Ref. No.: EIA-10-2016-7031-E 2616 - 9 DEC 2016

R.P.A.D

To,
M/s. Dorf Ketal Chemicals India Pvt. Ltd.
#1, Dorf Ketal Tower, D'Monte Lane,
Orlem, Malad(W), Mumbai.

Sub: Environment Clearance under the EIA Notification 2006 for your proposed project at P.No.Z-108, Dahej SEZ, (Part-2), Vagra, Bharuch.

Dear Sir,

This refers to your application on the subject mentioned above and the meeting held with the State Level Expert Appraisal Committee, Gujarat, on 24th October 2016. The relevant information furnished in Form I, EIA report and presentation made before the SEAC was considered and the additional information required was communicated to you by the SEAC immediately after the said presentation. However, a copy of the same is attached herewith for further necessary action at your end. You may please furnish the desired information / documents to enable us to process the application further.

With regards,

Yours sincerely,

(Hardik Shah, IAS)
Secretary, State Level Expert Appraisal Committee

Encl : As above.

15	SIA/GJ/IND2/17412/2015	**M/s: Dorf Ketal Chemicals India Pvt. Ltd.** P.No.Z-108, Dahej SEZ,(Part-2), Vagra, Bharuch	Appraisal

Project / Activity no.: 5(f) & 6(b)

- M/s: Dorf ketal Chemicals (I) Pvt. Ltd. (herein after Project Proponent – PP) has submitted application vide their online proposal no. SIA/GJ/IND2/17412/2015 dated 28/09/2016 regarding grant of Environmental Clearance..
- Project proponent has submitted EIA Report prepared by M/s: Eco-Care Solutions, Vadodara based on the TOR prescribed to the project in SEAC meeting dated 16/07/2015.

Project status: New

Project / Activity Details:

This is a new unit proposes the manufacturing of Synthetic Organic Chemicals and isolated storage & handling of hazardous chemicals as tabulated below:

Sr. no.	Name of the Products	Trade Name	Chemical Name	Production Capacity MT/ Annum
1.	Lubricity Additive	SR 2008	Fatty acid in aromatic solvent	16000
		SR 2010	Fatty Acid Ester	
2.	Antioxidants	UOP-5	Alkylated Phenylenediamine	2000
		Dorf-410C	Alkylated Phenylenediamine	
		DA 2516	Alkylated Phenylenediamine	
		Px3811	Alkylated PANA	
3.	Antifoulants	DA 2313	Quinnone Methide and sebacate ester of 4 Hydroxy Tempo in Aromatic Solvent	6500
		DA 2316		
		DA 2326		
		DA 2338		
		DA 2339		
		SR1289	Reaction adduct of PIB and P2S5 in Aromatic Solvent	
		SR1336	Reaction adduct of PIB, P2S5 and Pentaerythritol in Aromatic Solvent	
		SR1390	Reaction adduct of PIB, P2S5 and Pentaerythritol in Aromatic Solvent	
		SR1347	Reaction adduct of PIB,	

			P2S5 and Pentaerythritol in Aromatic Solvent	
		SR1393	Reaction adduct of PIB, P2S5 and Pentaerythritol in Aromatic Solvent	
		SR1385	Reaction adduct of PIB, P2S5 and Pentaerythritol in Aromatic Solvent	
		SR1303	Reaction adduct of PIB, P2S5 and Pentaerythritol in Aromatic Solvent	
		SR1392	Reaction adduct of PIB, P2S5 and Pentaerythritol	
		Polyflo 130	Amine-Epihydrochlorin Polymer in Aromatic Solvent	
		SR1226	Reaction adduct of PIB, P2S5 and Pentaerythritol	
		F22S	Mixture of Fatty Alcohol Acrylates	
		SR1648	Mixture of Fatty Alcohol Acrylates	
		Px4005	Aminified Polyisobutylene Succinic Anhydride	
		Px4006	Borated Aminfied PIBSA	
		Px3812	Ester of PIBSA	
		Px3824	PIBSA Derivative	
		Px3872	Borated Glycerolmono Oleate	
		Px3871	Mixed Penanol/Tridecanol Borate Ester	
4.	Demulsifies	SR1123	Alkylphenol ethoxylates in Aromatic Solvent	5000
		SR1125	Alkylphenol ethoxylates in Aromatic Solvent	
		SR1153	Alkylphenol ethoxylates in Aromatic Solvent	
		SR1167	Alkylphenol ethoxylates in Aromatic Solvent	
		SR1192	Alkylphenol ethoxylates in Aromatic Solvent	
		SR1106	Alkylphenol ethoxylates in Aromatic Solvent	

		Px3843	EO/PO Block CoPolymer and TricresylPhosphate	
		Px3841	Alkyl Acrylate Polymer	
5.	Plastic Additives	UOP-225/	N-N disecbutyl - diamino diphenyl methane	1200
		PX3805/Unilink 4200	N-N disecbutyl - diamino diphenyl methane	
		Clearlink 1000	N-N disecbutyl - diamino dicyclohexyl methane	
		Clearlink 1080	Alkylated IPDA	
		Clearlink 3000	Alkylated Alkyl PACHm	
6.	Antistatic Additives	SR1795	Polysulfone and Amine-Epihydrochlorin Polymer in Solvent	1800
		1714ND	Polysulfone in Aromatic Solvent	
7.	H2S Scavenger	SR1982	Metal-Alkoxide Salt in Alcohol Base	500
		SR1954	Alkyl Triazine	
8.	Coke Inhibitors	SR1311	Metal Salt in Aromatic Base	10000
		SR1358	Metal Salt in Aromatci Base	
9.	Cold filter plug point	SR1649	Alkyl-vinylacetate Polymer in Aromatic Solvent	5000
		SR1650		
		SR1651		
10.	Octane Boosters	PX3402	Ferrous Organometallic Salt	5000
		SR1200	Imidazoline in Aromatic Solvent	
11.	Corrosion inhibitors	Dorf 5123	Organic Amine in aqueous Base	2000
		DA2215	Imidazoline in Aromatic Solvent	
		SR1206	Imidazoline	
		D5	Mixed Imidazolines	
		FGDU1012	Mixed Imidazolines	
		SR1253	Mixed Amines in aqueous base	
		SR1202	Imidazoline in Aromatic Solvent	

		SR1224	Mixed Imidazolines		
		DA2606	Blend of imidazoline and Amine		
		YSDA2606	Blend of imidazoline and Amine		
		YSDA2606	Blend of imidazoline and Amine		
		Unicor C	Imidazoline in Aromatic Solvent		
		Unicor J	Dimmer Fatty Acid in Aromatic Solvent		
		Dorf 1440	Reaction product of Di-N-Alkyl Amine with Aldehyde in Alcohol Base		
		AW50	Reaction product of alkyldiamine and Aldehyde in aromatic base		
		Px3844	Mixture of Amine Phosphates		
		Px3846	Mixed aminified AlkylPhosphates		
		Px3866	1H-Benzotriazole, methyl-, reaction products with Butyl vinyl ether		
		Px3865	metal saltsof DDSA of amino acetic acid in glycerine		
		Px3861	Imide/amide/imidazoline reaction products of fatty and dodecenyl succinic acids with tertiarty amines		
		Px3864	Imide/amide/imidazoline reaction products of fatty and dodecenyl succinic acids with tertiary amines		
		Px3851	N-Tallow-1,3-diaminopropane dioleate salt		
		Px3845	Mixed Alkyl Phosphate Esters		
		Px3862	Blend of DDSA and Tollytriazole		
		Px3863	Fatty Acid Tollytriazole		
		Px3847	2,5-dimercapto-1,3,4-thiadiazole + Mixed Amines Blend		
		Total Manufacturing Capacity (MT / Annum)		55000 MT/Annum	

Unit has also proposed Storage Terminal for handling and storage of Ethylene Oxide (Class A) – 32 m^3.

The project falls under Category B of project activity 5(f) and 6(b) as per the schedule of EIA

Notification 2006. Total plot area is 86565.06 sq. m & unit has proposed 25040 sq. m. area for the green belt development/Tree plantation. Expected project cost is Rs. 111.55 Crores. Total water consumption for proposed project will be 345 KL/day (20 KL for Domestic, 150 KL for Gardening, 159 KL for Process, Boiler & Cooling and 16 KL for Scrubbers,) which will be sourced from GIDC water supply. Industrial waste water generation will be 118.7 KL/day(9 KL from Process, 5.3 KL from Cooling, 56.4 KL from Boiler, 32 KL from RO reject and 16 KL from scrubber) which will be treated in proposed Primary, Secondary & Tertiary treatment plant and treated waste water will be discharged into GIDC drainage line for Sea disposal. 16 KLD domestic waste water will be treated in the in house STP & will be used for Horticulture & Green belt development within premises.

It is proposed to install two steam boilers having 10 TPH capacity (one working & one stand-by), two TFH (15 Lac Kcal/hr each) and one DG set (500 KVA). Coal (1.7 MT/hr) or FO (760 Kg/hr) for steam boiler, FO/LDO (170 Kg/hr for each) for TFH and HSD (125 ltrs/hr) is proposed as fuel. Multi cyclone separator and bag filter will be provided as APCM for steam Boilers. Unit has proposed to provide scrubbing system for control of process emissions like VOC, H2S and Ethylene Oxide. Hazardous waste generated from the manufacturing activity will be ETP sludge (40 MT/Year), Residue / Process waste (300 MT/Year), Discarded containers/Bags/Liners (500 MT/Year) and used oil (10 MT /Year).

NaHS (1200 MT/Annum) and Spent solvent (1200 MT/Annum) generated will be sent to actual authorised reprocessors.

Observations/Discussion:

Technical presentation made during the meeting by project proponent. The baseline environmental quality has been assessed for various components of the environment viz. air, noise, water, biological and socioeconomic The baseline environmental study has been conducted for the study area of 10 km radial distance from project site for the period December 2015 to February 2016. Ambient Air Quality monitoring was carried out for PM10, PM2.5, SO2, NOx, HCl and NH3 at five locations, including the project site. Values conform to the prescribed standards for Ambient Air Quality. The incremental Ground Level Concentration (GLC) has been computed using ISCST – 3 model. The resultant concentrations are within the NAAQS. Committee noted that PP has not considered VOC for baseline study. While reviewing the EIA report, Committee observed that PP has submitted Risk assessment report and disaster management plan. However, details regarding hazardous waste management, APCM details, spent solvent management, permission for effluent disposal etc. are not properly addressed. After deliberation on various aspects, the Committee sought following additional information for further consideration of the proposal:

1. Compliance of TOR no. 27 & 28 with respect to project specific parameters like VOC.
2. Submit the schematic diagram of all APCM with technical details. Complete mass balance of scrubbing media with qualitative analysis (Characteristics) and mode of disposal.
3. Permission letter from competent authority with effluent discharge quantity – 345 KL/day.
4. Compliance of ToR no. 7 . Give Chemical reactions of all the products & mass balance.
5. Compliance of ToR no. 11 regarding Reuse/ Recycle of waste water.
6. Compliance of ToR no. 39 regarding Solvent / spent solvent management. Explore the possibilities for in-house distillation for spent acid generated from the proposed project.
7. Compliance of ToR no. 33 regarding Hazardous waste management. Give source of hazardous waste, quantity of hazardous waste in MT/Annum, specific mode of disposal etc. as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules 2016.

ENCL-2

POINT WISE CLARIFICATION ON ADDITIONAL INFORMATION

SR. No	Additional Information Required	Justifications/Compliance status
1	Compliance to ToR 27 & 28 with respect to project specific parameters like VOC	This was monitored at site and the values of VOC are found to be Not Detected. This was done with PID sensor based equipment.
2	Submit the Schematic Diagram of all APCM with Technical details. Complete mass balance of scrubbing media with Qualitative analysis (Characteristics) and mode of Disposal.	Kindly find attached the same vide **Annexure I.** 2 Types of scrubber waste water will be generated. One from the process scrubber, other from the EO scrubber. Characteristics of the Scrubbing waste water will be pH 9.0 – 12.5, COD 3,600 – 9600mg/lit, TDS 600 – 39,000mg/lit. H2S scrubber will generate NaHS that will be sold as a by-product as shown in the document. Mode of disposal of this Scrubber waste water will be ETP i.e. treatment of this waste water along with other effluents. Kindly find water balance vide **Annexure III.**
3	Permission letter from Competent authority with effluent discharge quantity – 345 KLD.	We have revised the water consumption and waste water generation data. Cooling tower makeup will be with water supplied directly by SEZ as this quality is very good. Hence RO Capacity reduced. Kindly find attached the Water Balance vide **Annexure II**. Also find attached the Land allotment Agreement letter from SEZ displaying the permissible quantities for water (0.29 MLD) & EDP - Waste water (0.1 MLD) vide **Annexure III, Page No 5, Point 4 (f)**.
4	Compliance of ToR No 7. Give Chemical Reactions of all products and Mass Balance.	Kindly find attached the Chemical Reactions of Products vide **Annexure IV (a)**. Kindly find attached the Mass Balance of Products vide **Annexure IV (b).**
5	Compliance of ToR No 11, Regarding Reuse / Recycle of waste water.	Boiler Condensate of 183.6 KLD will be recycled back to the Boiler. Domestic waste water of 16.0 KLD after being treated will be used for Horticulture & Garden. Kindly find attached Water Balance vide **Annexure II**.

6	Compliance of ToR No. 39 Regarding Solvent / Spent Solvent management. Explore the possibilities for in-house distillation of spent acid generated from the proposed project.	Kindly find attached **Annexure V** regarding Solvent management. After recovery the quality of solvent will not be meeting our quality requirements, hence solvent recovery is not feasible at our end hence, will have no internal consumption and will be therefore sold to authorised processors for use in their respective product manufacturing.
7	Compliance of ToR no 33, Regarding Hazardous waste management. Give source of Hazardous waste, Quantity of Hazardous waste in MT/Annum, specific mode of disposal, etc as per Hazardous and other wastes (Management & Transboundry movement) Rules 2016	Kindly find attached **Annexure VI** regarding Hazardous Waste Management.

ANNEXURE - 1

APCM

Air Pollution and Control System

The main sources of air pollution will be flue gas emission& process gas emission. Flue gas emission will be from three flue gas stacks. One common stack will be attached two boilers (1 working + 1 stand by). Coal/FO will be used as a fuel. Cyclone & Bag filter will be provided as APCM on stack attached to boiler. Second stack attached to Thermic Fluid Heater-1 & Third stack attached to Thermic Fluid Heater-2. FO/LDO will be used as a fuel. Fourth stack will be attached to one stand by D. G. set, in which HSD will be used as a fuel. Acoustic enclosure will be provided on D. G. set as pollution control measure. PM, SO_2& NO_X are the main pollutants generated from the flue gas stack.

Process gas emission will be from three stacks attached to process scrubber, H2S scrubber & Ethylene oxide scrubber. For that Scrubber will be provided as APCM. VOC, H_2S & EO will be main pollutants generated from the process gas stack. Moreover, proper stack height will control emission from flue gas stack & process gas stack.

Detail of flue gas emission & process gas emission along with stack height, type of fuel, expected pollutants & air pollution control measures is given in below table;

Table 2.18 Details of Stacks

Sr. No.	Stacks attached to	Stack Ht.(m)	Fuel & its requirement	APCM	Expected Concentration Pollutant
Flue gas stack					
1	Boiler-1 (10 TPH) (1 stand by + 1 working)	38 m	Coal-1.7 TPH or FO-760 kg/hr	Cyclone & Bag Filter	PM < 150 mg/Nm^3 SO_2< 100 ppm NO_x< 50 ppm
2	Thermic Fluid Heater – 1.	38 m	FO-170 kg/hr/LDO	--	
3	Thermic Fluid Heater – 2.	38 m	FO-170 kg/hr/LDO	--	
4	D. G. set (500 kVA)	10 m	HSD-125 lit/hr	--	
Process Gas stacks					
1	Process	11 m	--	Scrubber	VOC
2	H_2S	11 m	--	Scrubber	H_2S < 45 mg/Nm^3
3	Ethylene oxide	11 m	--	Scrubber	EO

2.9.2.1 Details of Cyclone & Bag Filter

DUST COLLECTION SYSTEM

Mechanical Dust Collector

Type / Model / Make : THERMAX
No. / dia. of cones : NA
Coal fired Steam Boiler Sheet No. : 4 of 15
(Fluidized Bed Combustion Twin Furnace type)
Project : Specialty Chemicals
RAV Capacity : 30 KG/HR
RAV Size : 200 NB
RAV Motor : 0.5 HP
MOC : IS 2062
Shell thickness : Casing 5mm Thick (IS 2062)

BAG FILTER with RAV

Type : Bag Fabric Band Type
Gas volume : 26500
Max. Operating Temp. : 230
Expected pressure drop across BF : 175
No. of Bags : 196
Bag Filter MOC : Fabric Band Type
Filtration Area : 425
Type of Solenoid Pulse valve : PULSE SOLENOID VALVE
No. & size of solenoid pulse valves : 14/40 NB
No. of bags per pulse valve : 14
Bag filter length : 4560 mm
Bag filter diameter : 149 mm
Air to cloth Ratio : 1.04
Filter media weight : 700 +/- 50
Air permeability(l/dm2/min) @ 200 pa : 10-20
No. of Gas Inlet cone : NA
No./ Type of hopper : 1/ Pyramid cal
Hopper valley angle : 65
RAV size : 200
RAV Capacity : 2 TPH
RAV motor : Geared motor 0.50 HP
Cage MOC : CS
Cage dia. x length : 143 mm dia.
No. of Vertical wires : 20
Horizontal ring spacing : 150 mm
Compressed Air requirement : 50 m3/hr
Bag Filter System (L x W x H) : 3.8 X 3.2 X 9.5
Support structure, working platform,

Ladder IS 2062
MOC & Thickness: IS 2062
Tube sheet IS 2062
Hopper IS 2062
Casing IS 2062
Access Doors-top IS 2062

Painting : RED OXIDE

Scrubber details

1. H2S scrubber details

H2S is generated in the production of SR-1347 and SR-1289

~0.043 kgs of H2S is generated per kg of SR1347 produced.

Process description

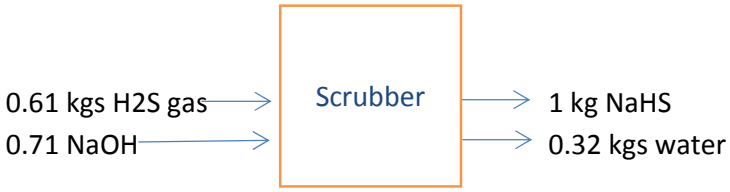
The H2S produced in the reaction is absorbed in ~30% NaOH solution till the NaOH is converted into NaHS and Na2S (>25% and <5% resply)

The reaction for NaHS is in 2 steps as below.

$2NaOH + H2S \rightarrow Na2S + 2H2O$

$Na2S + H2S \rightarrow 2NaHS$

Flow sheet with MB



As explained earlier we have 2 primary scrubbers, one of which is in line and the other is kept ready as standby. An additional secondary scrubber is also in line to ensure that no H2S escapes to the atmosphere.

As soon as the in line scrubber is depleted, the standby scrubber is taken in line and the depleted scrubber is emptied and filled with fresh 30% NaOH solution so that this becomes the standby.

2. Process scrubber

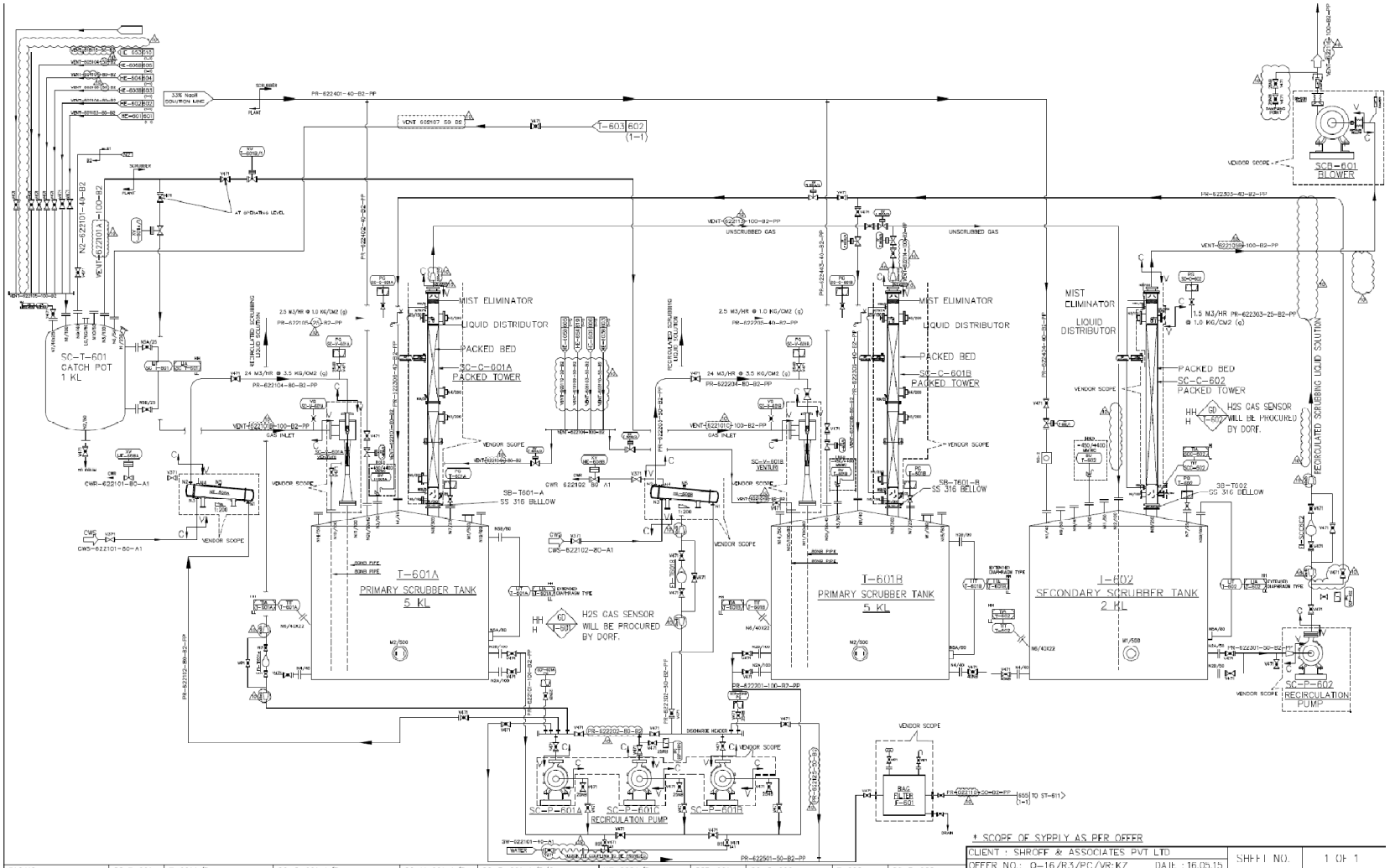
All the reactor vents excluding H2S generating streams are connected to a process scrubber that has circulation via column of dilute NaOH solution. This is used for scrubbing the N2 venting and acidic fumes if any. The scrubber pH is monitored regularly and fresh solution is prepared whenever the NaOH is depleted. The waste soln is sent to ETP for treatment.

3. Ethylene Oxide scrubber

The vent of the EO storage tank is connected to a scrubber having water. This water is circulated via a column whenever required during unloading of EO tanker or depressurising of the storage tank.

The water is replaced after decided intervals. The waste water is separately sent to ETP for treatment.

Figure 2.4H_2S Scrubber

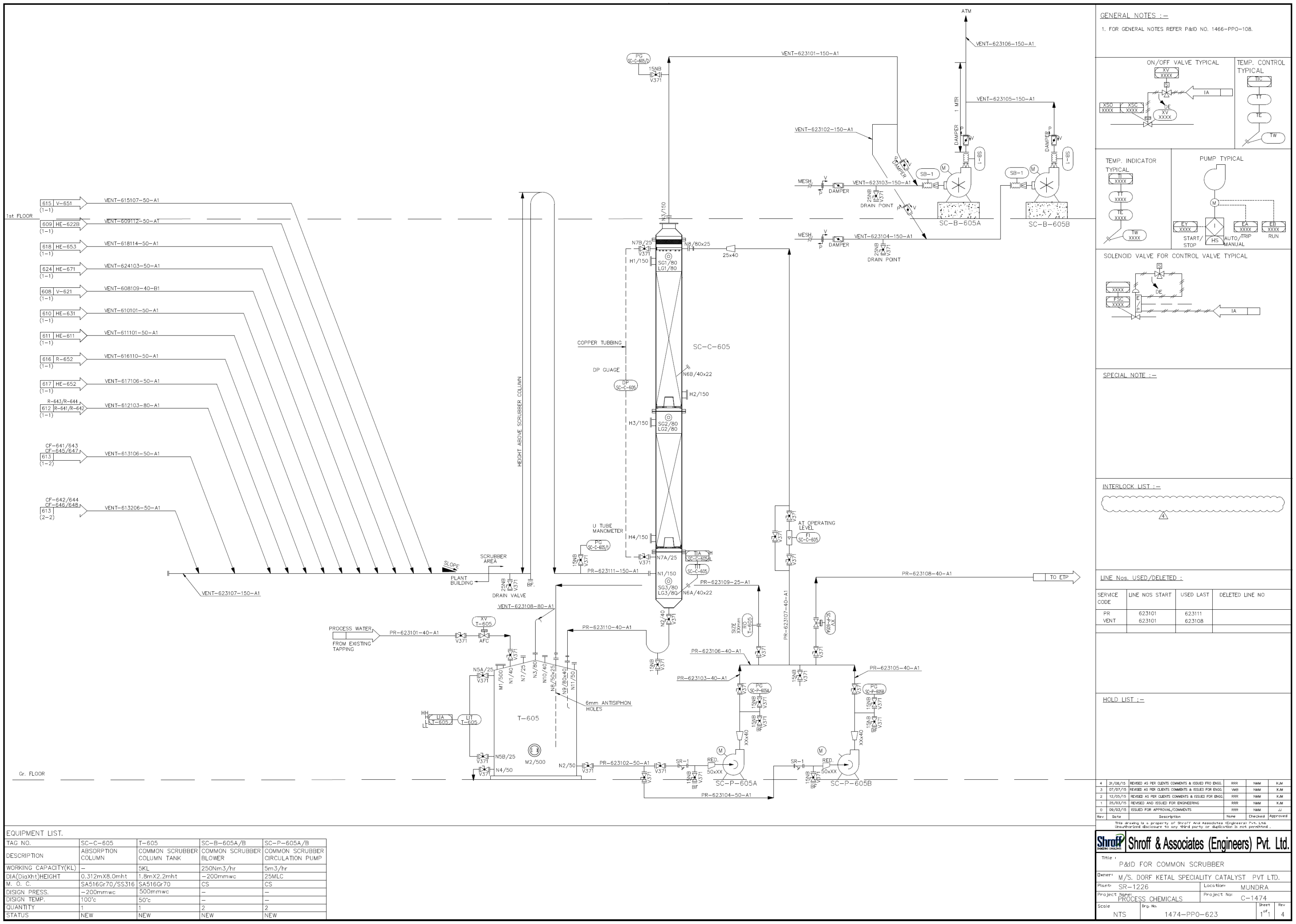


TAG.NO.	SC T-601	T-601A/B	SC-C-601 A/B	SC-V-601 A/B	SC-P-601 A/B/C	HE-505A/B	SCB-601	SC-C-602	T-602	SC-P-502
DESIGNATION	CATCH POT	PRIMARY SCRUBBER TANK	PRIMARY SCRUBBER COLUMN	VENTURY EJCTOR	PRIMARY SCRUBBER PUMPS	HEAT EXCHANGER	BLOWER	SECONDARY COLUMN	SECONDARY TANK	SECONDARY PUMP
TYPE	DISH END	TOP CONICAL,FLAT BOTTOM	PACKED BED TYPE	WATER JET	CENTRIFUGAL	CAUSTIC COOLER	CENTRIFUGAL	PACKED BED TYPE	TOP CONICAL,FLAT BOTTOM	CENTRIFUGAL
WORKING CAPACITY	2 KL	5 KL	--	--	27 M3/HR	6 M2	185 CFM	--	2 KL	5 M3/HR
DIA X HEIGHT/SIZE	1300X1600 MM	1800 MM X 2200 MM	300 MM X 6500 MM	1" X 1"	---	---	---	250MM X 4600 MM	1200 X1800	---
MOC.	SS 316	SS 316	SS 316	SS 316	SS 316	TUBE-SS316/SHELL-SS304	SS 316	SS 316	SS 316	SS 316
MOTOR HP/RPM	--	--	--	--	10 HP/2900 RPM	--	3 HP/2900 RPM	---	---	2 HP/2900 RPM
QTY.	1	2	2	2	3	2	1	1	1	1
STATUS	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW

* SCOPE OF SYPPLY AS PER OFFER

CLIENT : SHROFF & ASSOCIATES PVT LTD		SHEET NO.	1 OF 1
OFFER NO.: Q-16/R3/PC/VR:KZ DATE : 16.05.15			
TITLE : P & ID FOR H2S SCRUBBER SYSTEM	SCALE	DRN.	P.C.P. 27.08.15
	N.T.S.	DESIGN.	P.R.D.
		CHD.	V.V.R.
		APPD.	P.R.D.
DESIGNED & MANUFACTURED BY: MAZDA LIMITED AHMEDABAD INDIA	DRG.NO. 1474 PPO 622		REV.NO. 10

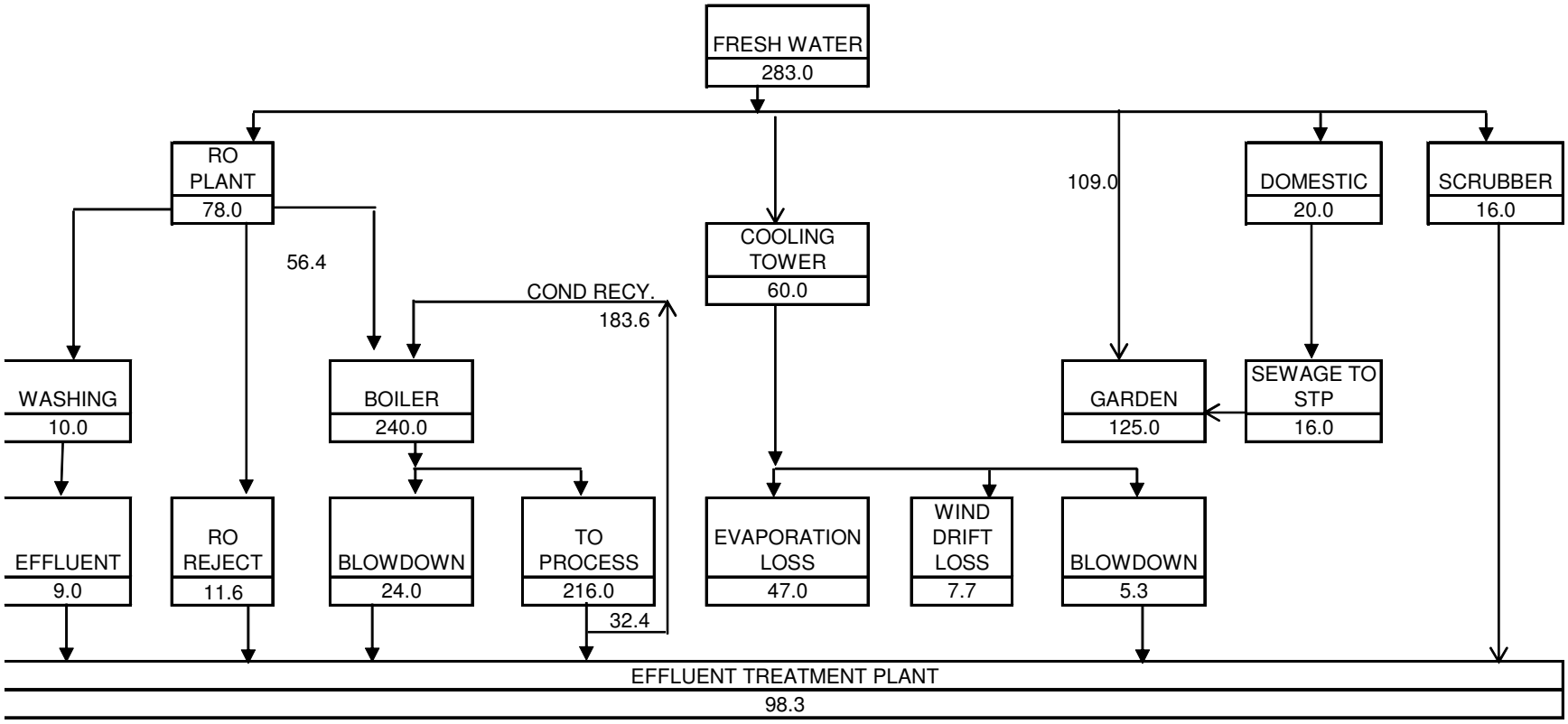
Figure 2.5 Process Scrubber



EQUIPMENT LIST.

TAG NO.	SC–C–605	T–605	SC–B–605A/B	SC–P–605A/B
DESCRIPTION	ABSORPTION COLUMN	COMMON SCRUBBER COLUMN TANK	COMMON SCRUBBER BLOWER	COMMON SCRUBBER CIRCULATION PUMP
WORKING CAPACITY(KL)	–	5KL	250Nm3/hr	5m3/hr
DIA(DiaXht)HEIGHT	0.312mX8.0mht	1.8mX2.2mht	–200mmwc	25MLC
M. O. C.	SA516Gr70/SS316	SA516Gr70	CS	CS
DISIGN PRESS.	–200mmwc	500mmwc	–	–
DISIGN TEMP.	100°c	50°c	–	–
QUANTITY	1	1	2	2
STATUS	NEW	NEW	NEW	NEW

ANNEXURE - 2
WATER & WASTE WATER



Note: All Figures in KLD

Sr. No	Activity/area	Revised Fresh Water consumption (KLD)	Revised Domestic Waste Water Recycled (KLD)	Revised Total Water Consumption incl recycle (KLD)	Revised W/W generation (KLD)
1	Domestic	20	0	20	16
2	Gardening	109	16	125	0
3	RO Plant	78	0	78	11.6
	Process	10	0	10	9
	Boiler	56.4	0	56.4	56.4
4	Cooling tower	60	0	60	5.3
5	Scrubber	16	0	16	16
	Total Water Consumption (KLD)	**283**	16	299	-
	Total Industrial Waste Water Generation (KLD)	-	-	-	**98.3**
	Total Domestic Waste Water Generation (KLD)	-	-	-	**16**

ANNEXURE - 3

SEZ AGREEMENT SHOWING WATER & WASTE WATER QUANTITY

INDIA STAMP DUTY GUJARAT

AGREEMENT
(FOR PLOT)

AN AGREEMENT made at Gandhinagar on 10th day of November of the year Two Thousand Fourteen between

Dahej SEZ Limited (DSL) (A company incorporated under the Companies Act, 1956) and **having its Registered Office at 3rd Floor, Block No. 14, Udyog Bhavan, Sector-11, Gandhinagar - 382 017, Gujarat, India** (Hereinafter called the "Licensor" which expression shall unless the context does not so admit, includes its successors and assignees) of the one part and

Dorf Ketal Chemicals (I) Pvt Ltd. (A Company incorporated under the Companies Act, 1956) **having its Registered Office at #1, Dorf Ketal Tower, D'Monte Lane, Orlem, Malad (West), Mumbai- 400 064, Maharashtra, India** (hereinafter called a Licensee", which expression shall unless the context does not so admit includes his heirs, executors, administrators and assignees/its successors in business and assignees of the other part.

DAHEJ SEZ LTD. GUJARAT

.....
Licensor

DORF KETAL CHEMICALS (I) PVT LTD. MUMBAI 64.

.....
Licensee

State the purpose

WHEREAS the Licensor as a developer of a multi product Dahej Special Economic Zone is seized and possessed of the land described in the Schedule hereunder written (hereinafter referred to as the said land.

AND WHEREAS the Development Commissioner, Government of India, Ministry of Commerce & Industry, 4th Floor, Fadia Chambers, Ashram Road, Ahmedabad-380009 has issued a **Letter of Approval No. Dahej SEZ/II/04/2014-15/314** dated **02-09-2014** in favor of the licensee to set up a unit within Dahej SEZ.

AND WHEREAS THE Licensee has applied to the Licensor to allot the said land to the Licensee **manufacturing of Lubricity Additive, Antioxidant, Antifoulant, Demulsifier, Plastic Additive, Antistatic Additive, H2S Scavenger, Coke Inhibitor, Lubercity & cold filter plug point.**

AND WHEREAS THE Licensor has agreed to grant to the Licensee for the aforesaid purpose a License in the first instance in respect of the said land on the terms and conditions hereinafter appearing.

AND WHEREAS the parties hereto are desirous of recording the terms of License in writing.

Now it is hereby agreed and declared between the parties as follows:

1. On the Licensee paying an amount of **Rs. 11,42,65,879/- (Rupees Eleven Crore Forty Two Lac, Six Five Thousand Eight Hundred Seventy Nine Only**) being an amount equal to 100% percent of the allotment price of the **86,565.06 sq. mts.** land, the Licensor will permit Licensee to enter upon the said land for the purpose and on the terms and hereinafter condition, appearing.

(Strike off where not applicable)

2. The Licensee further agrees that he will pay to the Licensor such additional sum **on account of land cost due to increase in the area, if any, recoverable as and when required as may be determined by the Licensor.** The additional sum shall be paid in lump sum or in such installment with interest at 13% per annum as may be allowed by the Licensor. The Licensee further agrees that payment if delayed he shall pay penal interest at 3% above the normal rate of the interest on the amount in default, provided that if the payment as so delayed is not made within a period of two months from the date on which it was required to be made the, Licensee shall be liable to be evicted from the plots. During the currency of this agreement it shall be open to the Licensee to pay at any time to the Licensor in lump sum amount of the price that due from him together with the amount of interest if any due thereon. Until the entire amount payable under this clause is paid by the Licensee to the Licensor; the Licensee will in each year within

DAHEJ SEZ LTD. GUJARAT

Licensor

DORF KETAL CHEMICALS (I) PVT. LTD. MUMBAI

Licensee

two months from the expiry of his accounting year supply to the Licensor a copy of his profit and loss account pertaining to the accounting year and of business run by him in the land.
The Licensee shall have license and authority only to enter upon the said land described in the schedule hereunder written for the purpose building and executing work thereon for **manufacturing of Lubricity Additive, Antioxidant, Antifoulant, Demulsifier, Plastic Additive, Antistatic Additive, H2S Scavenger, Coke Inhibitor, Lubercity & cold filter plug point in Dahej SEZ** only and for no other purpose whatsoever. If the Licensee commits any breach within a period of 3 years, the Licensor will be entitled to terminate this license and evacuate the Licensee without prejudice to the other rights which the Licensor may have.

3. Nothing in these present contained shall be construed as a demise in law of the said land so as to give to the Licensee any legal interest therein but the Licensee shall only have license to enter upon the said land for the purpose of performing this Agreement **till a lease deed is duly executed, in accordance with clause (10) of this Agreement.**

Submission of Plans for approval

4. The Licensee hereby agrees to observe and perform the following stipulations that is to say:

a) That the Licensee will within three months of the date hereof submit to the Director of the Licensor (hereinafter called the Director, DSL) which expression shall include any other officer to whom the duties and function of the said Director, DSL may be assigned for his approval. The specifications, plans, elevations, sections and details of the factory building hereby agreed by the Licensee shall be erected on the said land and Licensee shall at his own cost and as often as he may be called upon to do so amend all or any such plans and elevation and if so required will produce the same before the Licensor and will supply him such details as may be called for. The specification shall be finally approved by the SEZ Development Committee and an approval letter will be issued by the Licensor and signed by him. The Licensee shall sign and leave with him three copies thereof and also three signed copies of any further conditions or stipulations which may be agreed upon between the Licensee and the Licensor provided that the Licensor shall within two months from the date of the receipt of the plans, specifications elevations and sections as aforesaid, communicate to the Licensee his approval or any objection thereof.

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Licensor

BORF KETAL CHEMICALS (I) PVT. LTD. MUMBAI 64.

Licensee

Fencing during construction

b) The said land shall be fenced during construction by the Licensee at his own expense in every respect as has to demarcated by the Licensee, and the boundary wall must be constructed, in case of the plot having compound wall, SEZ Boundary as per SEZ Act, 2005. In case, the developer has constructed the boundary wall, as needs to construct, the cost will be recovered from the allottee.

No work to commence until plans are approved.

c) No work shall be commenced which infringes any of the building condition and also other regulations so far as same may be applicable to the said land until the said plans/elevations shall have been so approved as aforesaid and thereafter the Licensee shall not make any alteration or addition thereto unless such alterations and additions shall have been previously in like manner approved.

Time Limit for Commencement and completion of construction

d) The Licensee shall, within a period of six months from the date hereof commence and within a period of **three** years from the said date at his own expense and in a substantial and workmanlike manner and with all rules, bye-laws and regulations applicable thereof an in strict accordance with the plans, elevation, details and specification to the satisfaction of the Licensor and in accordance with building conditions of Licensee build and completely finish fit for occupation a building to be used as industrial factory with all requisite drains and other conveniences thereto as may be necessary under the Factories Act. The area of the plot allotted to the Licensee is **86565.06 sq. mts.** It shall be permissible to him to utilize it within the period and the manner aforesaid a part of the area for the construction of the building to be used as an industrial factory and retain the remaining area of the plot for future expansion of his project subject to the following conditions:

Strike off in area if plot is more than 20,0000 sq.mts.

i) The remaining area of the plot shall be fully utilized for the expansion of this project within a period of ten years from the date of this agreement.

ii) It shall be open to the Licensor to review the progress of the utilization at the interval of every three years and to resume the possession of unutilized portion of the plot. **Surrender policy of DSL will be applied mutatis mutandis.**

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Licensor

DORF KETAL CHEMICALS (I) PVT. LTD. MUMBAI 64.

Licensee

iii) While utilizing a part of the plot for the construction of a building as aforesaid and retaining the remaining part of the plot for future expansion, the part to be utilized for construction of the building shall be so demarcated as to make a sub-division of the remaining part feasible in the event of the Licensor deciding to resume the possession of the unutilized portion of the plot.

Licensee to pay rates taxes etc.

e) The Licensee will pay rates taxes and cess payable in respect of the said land and any building erected thereon and will also pay the charges of whatever description including charges for supply of water and his share of expenses of maintenance of road and other common facilities and the claims and out goings chargeable against owner or occupier in respect of the said land and any building erected thereon.

Provided that if the Licensor demands in writing that any of such payments should be made to the Licensor for remittance shall make such payments to the Licensor within the period specified by the Company thereof.

Water Supply

f) As regards supply of water, the Licensee shall abide by the condition laid down in that behalf by the Licensor from time to time. The Licensee shall consume water for his unit at following rates from year to year:

Year	Consumption per day (MLD)
2014	0.29 MLD
2015	0.29 MLD
2016	0.29 MLD
2017	0.29 MLD

It may be noted that DSL has considered water supply capacity of 33,000 litres per day/hect. and Effluent Disposal Pipeline (EDP) facility at 30,000 litres per day/hect. under the allotment price charged to Licensee and accordingly the Licensee is allowed to utilize **water supply of 0.29 MLD and EDP of 0.10 MLD.** There is no provision for additional facility for EDP. Any higher requirement over and above entitlement under the allotment price is on Licensee's account. In case, Licensee's requirement is higher than entitled capacity, Licensee will have to make his own arrangements.

For 1st three years from date of allotment, Licensee shall pay water charges as per actual use. Thereafter, even if the Licensee fails to consume water to the extent mentioned above, the Licensee would pay the water charges for the agreed quantity from the first day of April in each year on completion of two years or three years

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Licensee

respectively for plot size of upto 10,000 M^2 & above 10,000 M^2 from the date of allotment, irrespective of actual use. The water charges would be payable at the prevailing water rate of the Co-developer / DSL for the financial year as may be fixed by the SEZ Development Committee from time to time. The failure to pay water charges including the minimum charges, the Licensee shall be liable to penal actions such as discontinuation of water supply by the Co-developer including termination of this agreement. Gujarat Industrial Development Corporation (Supply of Water to the Industrial Estate) Regulation, 1991 and its amendment from time to time by the Co-developer will be binding and applicable to the Licensee;

1. Plot - having area upto 10,000 sq.mtr._____ 2 years
2. Plot - having area more than 10,000 sq.mtr _____3 years
   or from the date of commencement of actual consumption of water whichever is earlier. On failure to pay the minimum charges, the purchaser shall be liable to the actions including Termination of Agreement and subsequent steps.

Indemnity

g) The Licensee will keep the Licenser indemnified against any and all claims for damage which may be caused to any adjoining building or other premises by such building or in consequence of the execution of the aforesaid work and also against all payments whatsoever which during the progress of the work may become payable or be demanded by the local authority in respect of said plot No. **Z/108 in Dahej SEZ part-II.**

Sanitation

h) The Licensee shall observe and conform to all rules regulations and bylaws of Licensor and of the local authority concerned or any other statutory regulation in any way relating to public health, effluent treatment and disposal accommodation and other sanitary arrangement for the labourers and workmen employed during the construction of the building on the said land in order to keep the said land and its surrounding, clean and in good condition to the entire satisfaction of the Director, DSL, and shall not without the consent in writing of the Director, DSL permit any labourers or workmen to reside upon the land and in event of such consent being given shall comply strictly with the terms thereof. As regards the industrial effluent produced in the course of the industry carried on the said land, the licensee shall have to Produce NOC from G.P.C.B., Gandhinagar before commencement of civil work/Applying for Power Supply.

DAHEJ SEZ LTD. GUJARAT

Licensor

DORF KETAL CHEMICALS (I) PVT. LTD. MUMBAI

Licensee

Excavation	i)	The Licensee will not make any excavation upon any part of the said land and or remove any stone, earth of material there from except so far as may, in the opinion of the officer authorized by the Licensor be necessary for the purpose of construction of the buildings and compound walls as per the plan approved by DSL.
Insurance	j)	The Licensee will keep the building to be erected on the said land, excluding foundation and plinth, insured in the name of Licensor against loss or damage by private land acquired by GIDC/Govt. of Gujarat as a result of Land Reference Case/s preferred by the original land owners, the Licensee shall be bound to pay the additional land compensation along with interest as may be decided by the Licensor.
Nuisance	k)	The Licensee shall not at any time do, cause or permit any nuisance in or upon the said land in particular shall not cause or permit the said land to be used for any industry specified by the Licensor as obnoxious. The Licensee shall not interfere or cause damage to the properties belonging to the Licensor whether located outside or inside the premises, such as water supply lines, drainage lines, water meters, street-lights and such other properties. In case he is found interfering or causing damage to the properties of the Licensor it would amount to breach of the conditions of the agreement and he would be liable to be evicted from the premises occupied by him and Licensor shall be entitled to recover the cost of making good such damages with penalty as it may determine and such amount would be recoverable as an arrears of land revenue.
Access Roads	l)	The Licensee shall at his own cost construct and maintain an access road leading from the Estate road to the said land in strict accordance with specifications and details prescribed by Director of the Licensor.
Implementation of new Employment Policy	m)	The Licensee shall engage to the maximum extent possible local persons in their industrial unit. The expression "Local Person" shall mean a person domiciled in Gujarat State for minimum 15 years shall be considered as local person. So far as menial workers such as watchmen, labour, sweepers, drivers, etc. are concerned, preference should be given to land-losers (including their family members) or local villagers. This is as per Government of Gujarat Employment Policy.
Fire Fighting	n)	The Licensor will not provide fire fighter services in the SEZ as an amenity. In case of any delay or non-availability of fire fighter, at the time of fire, the Licensee will not claim any losses/damages due to this with the Licensor.

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Pollution Control

o) Licensee shall not start construction or production activity in the allotted plot/shed unless and until it has effectively and completely complied with the pollution control measures required to be undertaken by the Licensee under any permission which may have been granted by the GPCB. For any breach of conditions stipulated by GPCB or such agency, the Licensor shall be duty bound to disconnect water and/or power supply, and also stop all services provided in SEZ of the Licensee on receipt of appropriate written directives of GPCB or such environmental monitoring statutory/Govt. agency.

p) "The Licensor allots land/plot in "as it is where it is" condition and there is no scope for change in price of the allotted land. In the unlikely event of payment of any additional compensation to the original land owners in respect of plot No. **Z/108** the pro-rata additional compensation in respect of affected land only will be recovered from the Licensee.

Power Supply

q) For obtaining power supply, the Licensee has to apply to Torrent Energy Limited, which is power supply agency in Dahej SEZ. The Licensee/allottee of plot in SEZ is to follow procedure as under:

(i) the allottee has to complete formalities of signing Agreement, payments of Security Deposit and complete wiring of electrical installation as per I.E. rules and submit the test report for wiring from licensed electrical contractor before release of power connection;

(ii) the allottee is liable to pay the charges for the power supply to the co-developer as per applicable rules and regulations.

(iii) the supply of voltage and source of power supply shall be decided by the Co-developer;

(iv) the allottee has to pay for cost of augmentation of sub - station on its pro-rata demand basis and at the rate and policy prevalent in the Licensor / Co-Developer;

(v) the allottee will not hold DSL responsible for delay in availability of power.

DAHEJ SEZ LTD. GUJARAT

Licensor

DURF KETAL CHEMICALS (I) PVT LTD. MUMBAI 64.

Licensee

Power to terminate

6. Should the Director/Authorized Officer of the Licensor not approve the plans, elevations, details and specifications whether originally submitted or subsequently required or if the same shall not be submitted within the time therein before stipulated the Licensor may give notice **giving reasons** in writing to the Licensee to terminate this Agreement and if possession as a Licensor has been given to the Licensee, may re-enter upon the said land and there upon the said land shall stand resumed to the Licensor. The Licensee will be allowed to remove the building materials and machinery, if any, of the Licensee.

Rights of Licensor

7. Until the factory building and works have been completed and certified as completed in accordance with clause 9 hereof and the price is paid full or the Lease Deed is executed in accordance with clause 10 hereof, the Licensor shall have the following rights and powers, namely:

a) The right for the Licensor and his officers and servants at all reasonable time to enter upon the said land to review the state and progress of the work and for all other reasonable purposes.

b) Power:

i) In spite of the Licensor having approved the plans, if the Licensee shall fail to complete the said factory building

within the time aforesaid and in accordance with the stipulation herein before contained (time in this respect being the essence of the contract) or shall commit default in payment of installment with interest as agreed to be paid by the Licensee to the Licensor as provided in clauses 2 hereof or shall not proceed with the works with due diligence and shall fail to observe any of the stipulations on his part herein contained, the Licensor shall without prejudice to the remedy available under this agreement against non payment of dues payable to the Licensor have right to forfeit the amounts already paid by the Licensee and to terminate this agreement by giving 24 hours notice and thereupon to re-enter and resume possession of the land and everything thereon and thereupon this agreement shall cease and Licensee shall be allowed to remove materials land things after the expenses and dues of the Licensor are paid.

ii) To continue the said land in occupation of the Licensee on payment of such fine as may be decided by the Licensor.

DAHEJ SEZ LTD. GUJARAT

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Licensor

DORF KETAL CHEMICALS (I) PVT. LTD. MUMBAI 64.

.....
Licensee

iii) To direct removal or alteration of any building or structure erected or used contrary to conditions of the grant within the time prescribed in that behalf and on such removal or alterations not been carried out within the time prescribed cause the same to be carried out and recover the cost of carrying out same from the Licensee as an arrears of land revenue.

Extension of time

8. Notwithstanding any such default as aforesaid, the Licensor may in his discretion give notice to the Licensee of intention to enforce the Licensee agreement herein contained or may with reference clause 5(d) fix any extended period for the completion of the factory building and the works, if he is satisfied that the building and works could not be completed within the prescribed time for reason beyond the control of Licensee and thereupon the obligations hereunder of the Licensee to complete the factory building shall be taken to refer to such extended period.

Grant of Lease

9. If the Director, DSL of the Licensor has certified that the factory building and works have been erected in accordance with the terms thereof and if the Licensee shall have observed all the stipulations and conditions herein before contained the Licensor will grant & execute a lease and the licensee will accept a lease (Which shall be executed by the parties in duplicate) of the said land for a term of 30 years from the date of possession being given to the Licensee or execution of the agreement, which is earlier, at yearly rate as may be fixed by the Licensor from time to time. The present rate of lease rent is fixed at

Rs.1/- per square meter per year for initial period of 5 years and as modified from time to time thereafter. The lease-deed is extendable for a further period of 30 years on expiry of initial tenure of 30 years on payment of such lease-rent as may be then decided by the Licensor.

The Licensee has to carry out following procedure to execute a lease deed agreement :-

- Fenced/completed boundary wall of the said **Plot No. Z/108** demarcated by DSL.
- obtained approval of the Development Plan for the project in the said land from the SEZ Development Committee / DSL.
- obtained necessary statutory clearances / approvals as may be required including environmental, CRZ, Safety clearances etc.
- carry out construction of the building for the approved project in the plot allotted as per the approved building plan, and;
- Tie up of financial resources for the project.
- Certificate from D.C. for eligibility of State incentive

DAHEJ SEZ LTD. GUJARAT

..... Licensor

DORF KETAL CHEMICALS (I) PVT. LTD. MUMBAI 64.

..... Licensee

10. The Deed of Lease shall be prepared in duplicate in accordance with the form prescribed by the Licensor and all cost, charges and expenses of and incidental to the execution of the agreement and its registration charges shall be borne and paid by the Licensee alone. The Deed of Lease shall be registered at a place within the State of Gujarat where such registration is permissible under the provision of the Indian Registration Act.

Notices

11. All notice, consents and approvals to be given under this Agreement shall be in writing and shall unless otherwise provided therein signed by the Director, DSL or any other Office authorized by him and notice to be given to the Licensee shall be considered as duly served, if the same shall have been delivered to, left or posted or addressed to the Purchaser at the usual or last known place of residence or business or sent to the Licensee by electronics media, such as e-mail etc. or the said land or same shall been affixed or any building or erection temporary or otherwise upon the said land.

Licensor may Alter estate

12. The Licensor may at any time and from time to time alter the layout, building conditions, General Development Control Regulation and other conditions to the other conditions to the other parts of the SEZ of the Licensor of which the said land forms part and the Licensee shall have no right to require the enforcement thereof or any of them at any time against the Licensor or any person claiming under the Licensor.

Breach of Conditions

13. In the event any breach of any condition or covenant of these present by the Licensee, the Licensor shall be entitled to terminate this Agreement by giving 24 hours notice.

Exercise of right etc. by Officers servant of Licensor

14. The right, power etc. of the Licensor and/or the Authorized Officer of the Licensor under this presents may be exercised by any officer or servant or agent of the Licensor duly authorized by the Licensor or the Authorized Officer.

Conflict between Agreement

15. Should there be any conflict between the terms contained in this Agreement and terms contained in the Building conditions and General Development Control Regulations, the former shall prevail.

16. The Licensor has issued in respect of the said land and allotment letter No. **DSL/ALT/PLT/DKCPL/2014/01074** dated **12-09-2014**. The terms of the said allotment letter will form a part of this Agreement.

Marginal Notes

17. The marginal notes do not form part of this Agreement and they shall not be referred for construction and interpretation thereof.

DAHEJ SEZ LTD. GUJARAT

Licensor

DORF KETAL CHEMICALS (I) PVT. LTD. MUMBAI 64.

Licensee

SCHEDULE

(Description of plot

ALL THAT piece of land known as **Plot No. Z/108** in the Dahej SEZ consisting of revenue Survey Nos. 556(P), 551(P), 550(P), 549(P), 548(P), 547(P), 539(P), 538(P), 537(P), 536(P), 529(P), 528(P), 527, 526(P) 525(P), 232 (P) & 231(P) within the village limits of Lakhigam & Luvara, Taluka: Vagara Dist. Bharuch containing by admeasurements **86,565.06. mtrs.** (Tentative) or other about a bounded as follows that is to say:

On or towards the North by	:- 10 Mt. wide Corridor & 30 Mt. wide Road
On or towards the South by	:- 35 Mt. Wide Corridor
On or towards the East by	:- Plot No. Z/107
On or towards the West by	:- Dahej SEZ Boundary

IN WITNESS WHERE OF the Licensor has caused Shri S. N. Patil, Chief Executive Officer, Dahej SEZ Ltd., Gandhinagar, an officer authorized by it, to set his hand an affix the common seal here to and the Licensee has hereinto set his hand seal on the day and year first above written.

SIGNED, SEALED AND DELIVERED
By Shri S. N. Patil
Chief Executive Officer
Dahej SEZ Limited

Signature
(S. N. Patil)

DAHEJ SEZ LTD. GUJARAT

In the Presence of

1. Ankit B. Brahmakshatriya ( )

2. SUSHMITA SUR ( )

SIGNED, SEALED AND DELIVERED
By the above named Licensee
in the presence of

DORF KETAL CHEMICALS (I) PVT. LTD. MUMBAI 64.

For DORF KETAL CHEMICALS (I) PVT. LTD.

Authorised Signatory

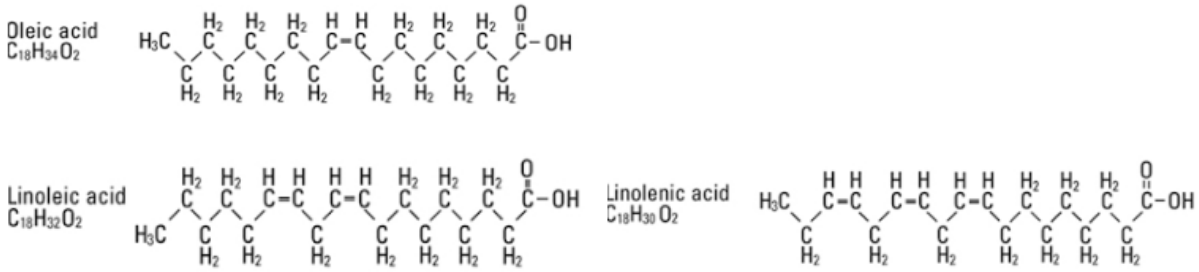
Signature
(Full name in block letters)

1. GAURANG K-DESAI NARESH AGGARWAL ( )

2. BHUVAN CHANDRA ( )

ANNEXURE – 4a
CHEMICAL REACTIONS OF PRODUCTS

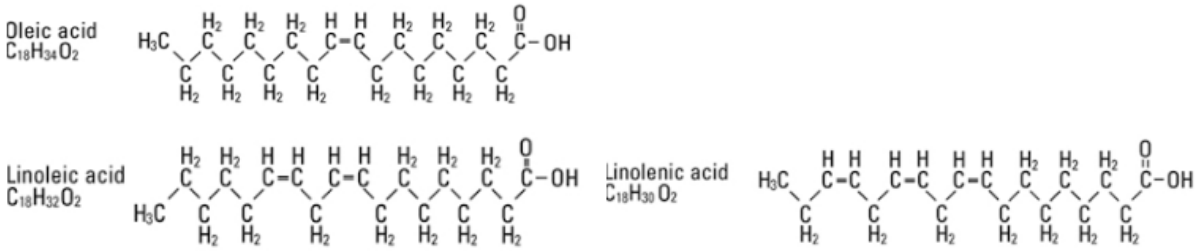
1. **Blend details for SR-2008**



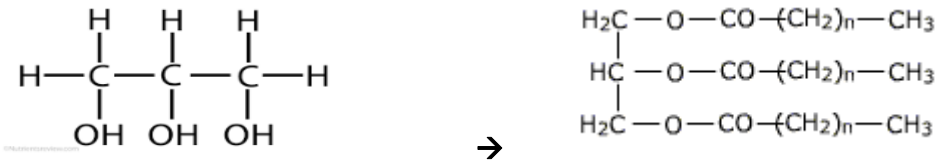
Fatty acid +

HAR/MC-10A/Garasol/Remax/C9 solvent → SR-2008 Mixture of Fatty acids and solvent

2. **Reaction for SR2010**



Fatty acid +

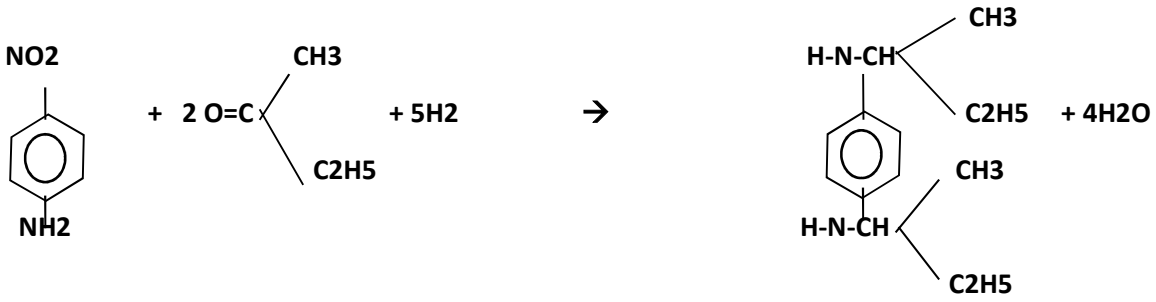


Glycerine **Mixture of mono, di & tri glycerol**

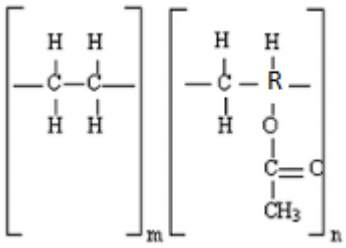
3. **Reaction for Dorf-410C, UOP-5, DA-2516**

PNA + 2MEK + 5H2 → UOP-5 + 4H2O

C6H4NO2NH2 + CH3COC2H5 + H2 → C6H4HNCHCH3C2H5HNCHCH3C2H5 + H2O



4. **Blend details for SR-1649, SR-1650, SR-1651**

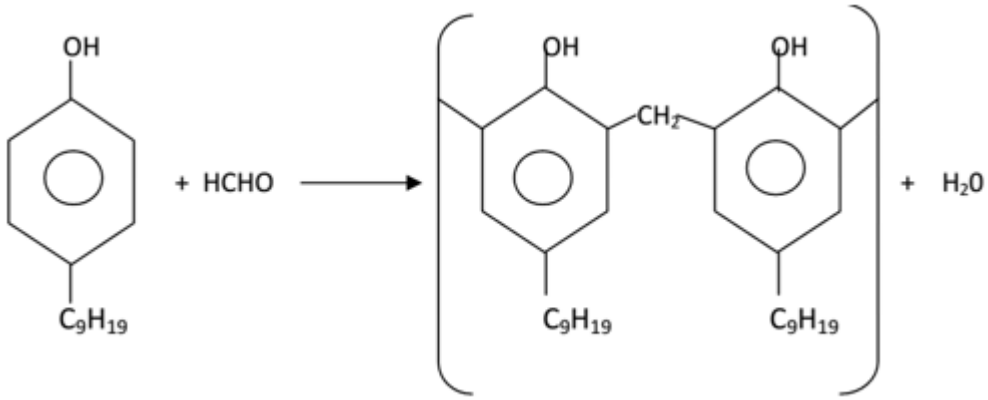


Ethylene co polymer + HAR/MC-10A/Garasol/Remax/C9 solvent

→ **SR-1649, SR-1650, SR-1651 Mixture of Ethylene co polymer and solvent**

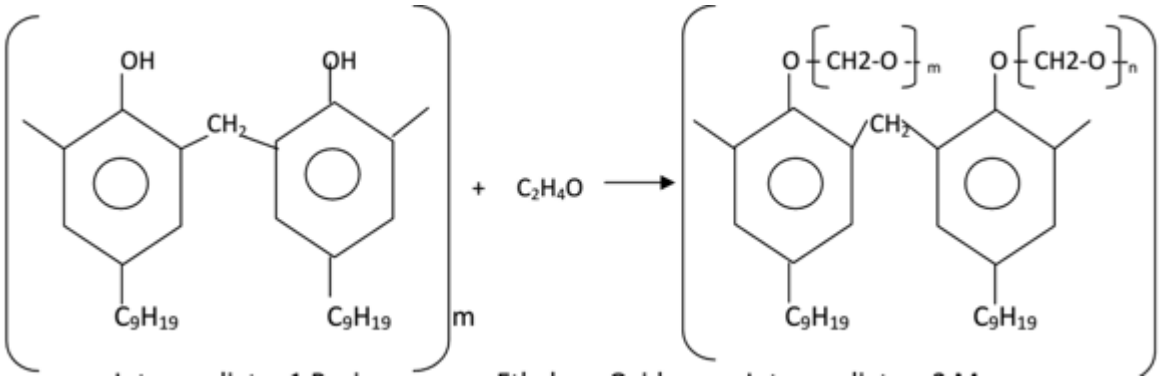
5. **<u>Reaction for SR-1123, SR-1125, SR-1153, SR-1167, SR-1192</u>**

Step-1



Nonyl phenol + Formaldehyde + HAR/MC-10A/Garasol/Remax/C9 solvent → Resin + Water

Step-2



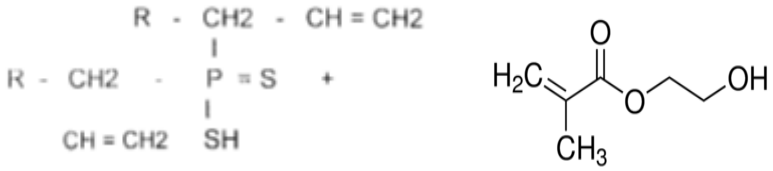
Resin + HAR/MC-10A/Garasol/Remax/C9 solvent + Ethylene oxide + Methanol→ SR-1123,SR-1125, SR-1153, SR-1167, SR-1192

6. **Reaction for SR-1289**

Step-1

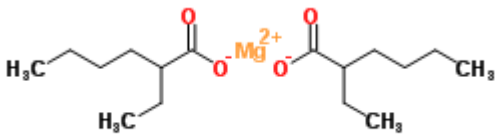
C4 polymer + P2S5 → Intermediate

Step-2



Intermediate + Phosphate ester → SR-1289

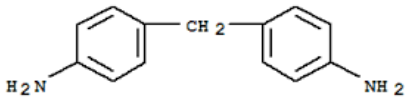
7. **Blend details for SR-1311**

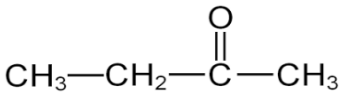


Organometallic complex + HAR/MC-10A/Garasol/Remax/C9 solvent

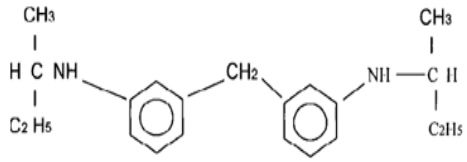
→ SR-1311 Mixture of Organometallic complex and solvent

8. **Reaction for Unilink 4200, UOP-225, PX-3805**

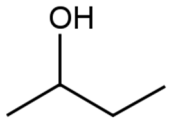




Methylene di aniline + Methyl ethyl ketone + Hydrogen →

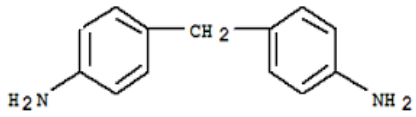


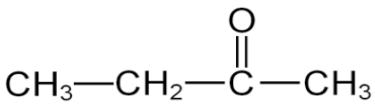
+ 2H2O +



Unilink 4200, UOP-225, PX-3805 Water sec- Butanol

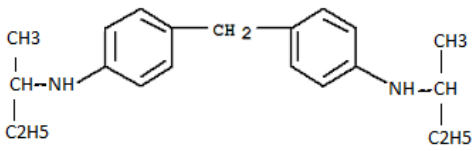
9. **Reaction for Clearlink 1000**

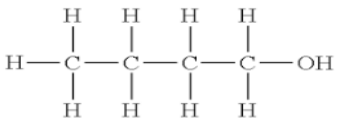




H2

PACM + Methyl Ethyl Ketone + Hydrogen →





2H2O

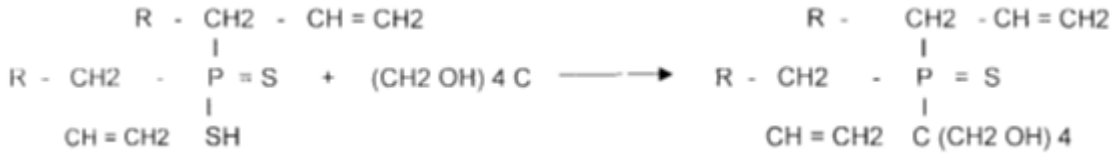
Clearlink 1000 + Butanol + Water

10. **Reaction for SR-1347, SR-1393, SR-1385, SR-1303**

Step-1

C4 polymer + P2S5 → Intermediate

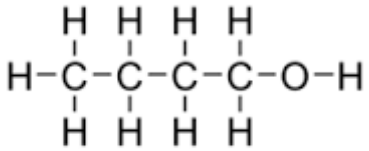
Step-2



Intermediate + Phosphate ester → SR-1347, SR-1393, SR-1385, SR-1303

11. **Reaction and blending for SR-1982**

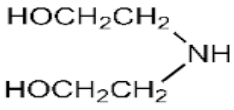
Reaction step



C4H9O$^-$– K$^+$

butanol + KOH → Potassium butoxide

Blending step

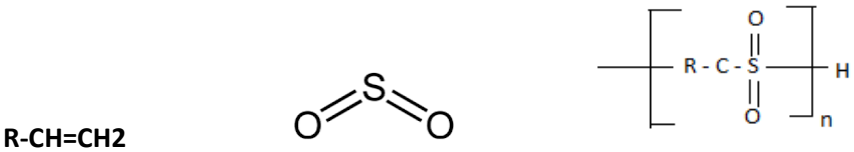


C4H9O$^-$– K$^+$

Potassium butoxide + Diethanolamine → SR-1982 + H2O

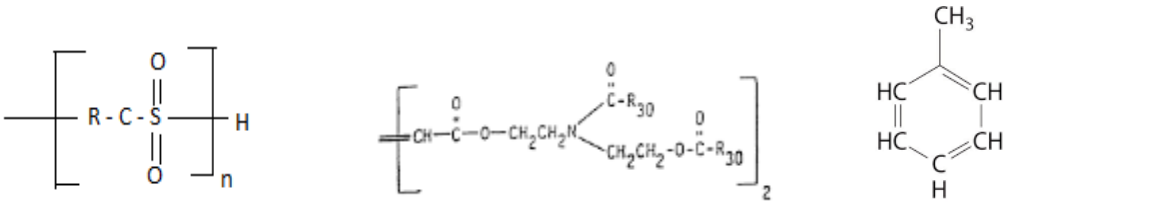
12. Reaction and blending for SR1795

Reaction step

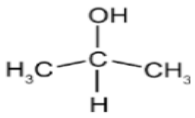


Alkene + SO2 → Intermediate

Blending step



Intermediate + SKO + Toluene +



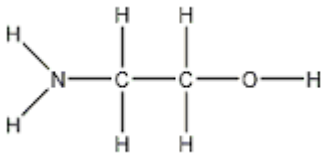
IPA → SR-1795

13. Blend details for SR-1358

Organometallic complex + Dispersant + Alkylated phenol →

SR-1358 Mixture of Organometallic complex dispersant & alkylated phenol

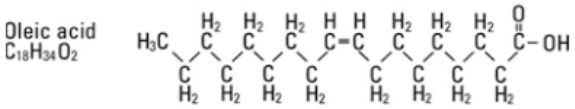
14. <u>Blend details for DORF-5123</u>

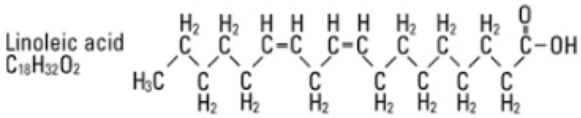


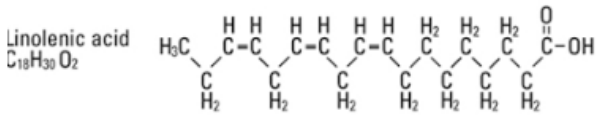
+ H2O + Dorf 5123

Monoethanolamine + Water → DORF-5123 Mixture of MEA and water

15. <u>Blend details for PX-3402</u>



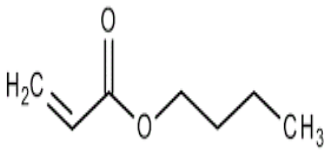


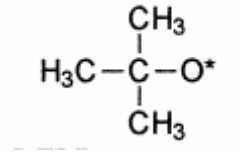


Fatty acid +

C9 solvent → PX-3402 Mixture of Fatty acid and C9 solvent

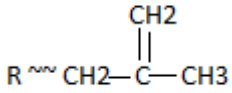
16. **Blend details for PX-3841**

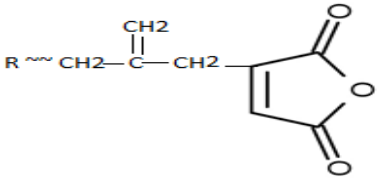




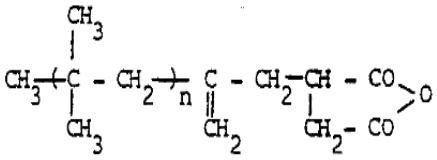
Butyl acrylate + DTBP + White spirit → PX-3841

17. **Reaction for PX-4005**

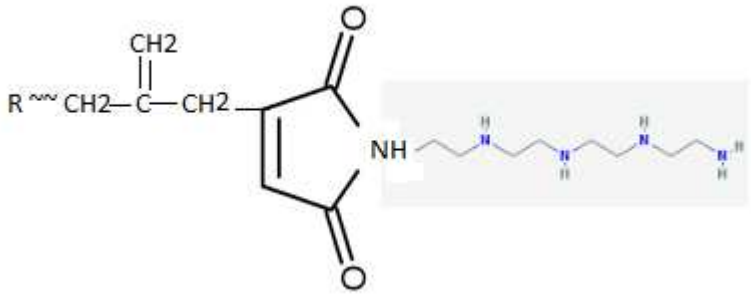




C4 polymer + Maleic anhydride → Intermediate

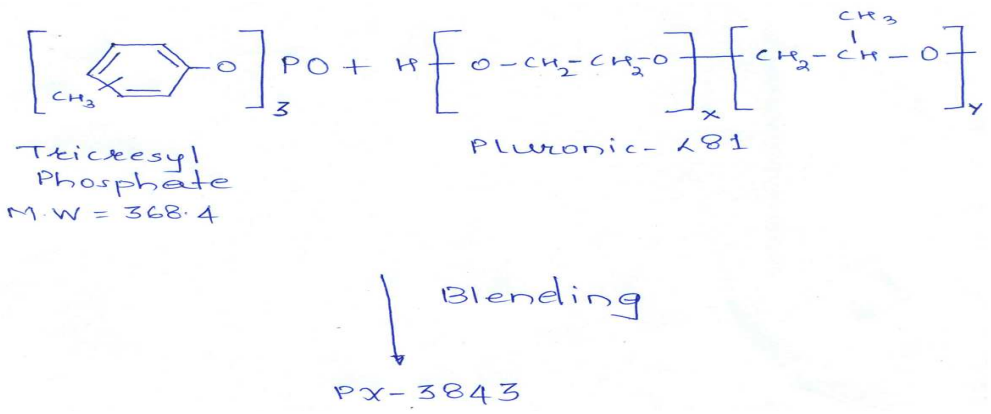


Intermediate + TEPA + America core oil



→ PX-4005

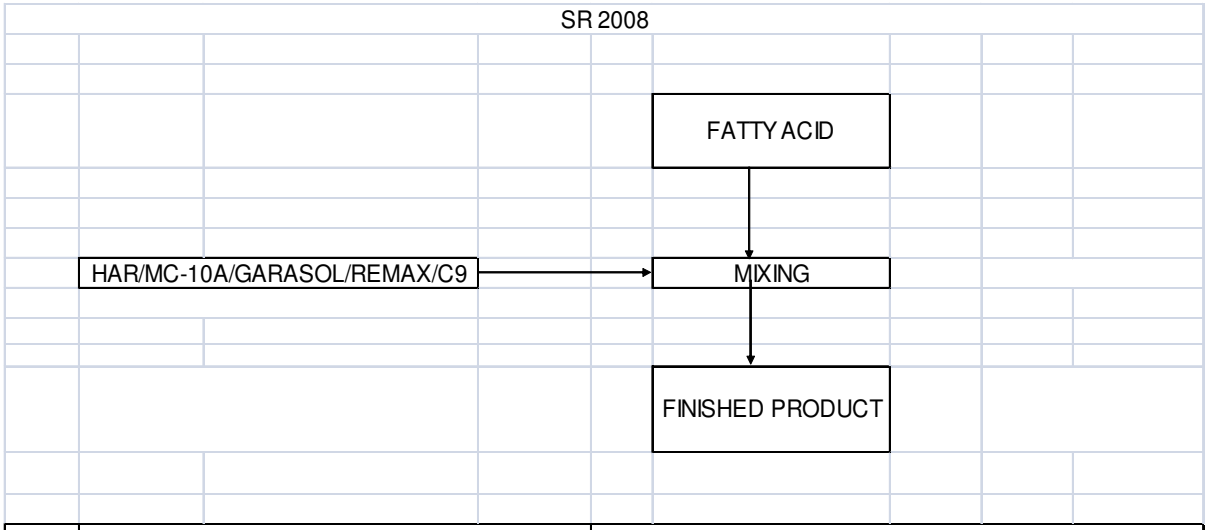
18. <u>Blend details for PX-3843</u>



ANNEXURE – 4b
MASS BALANCES OF PRODUCTS

Mass Balance

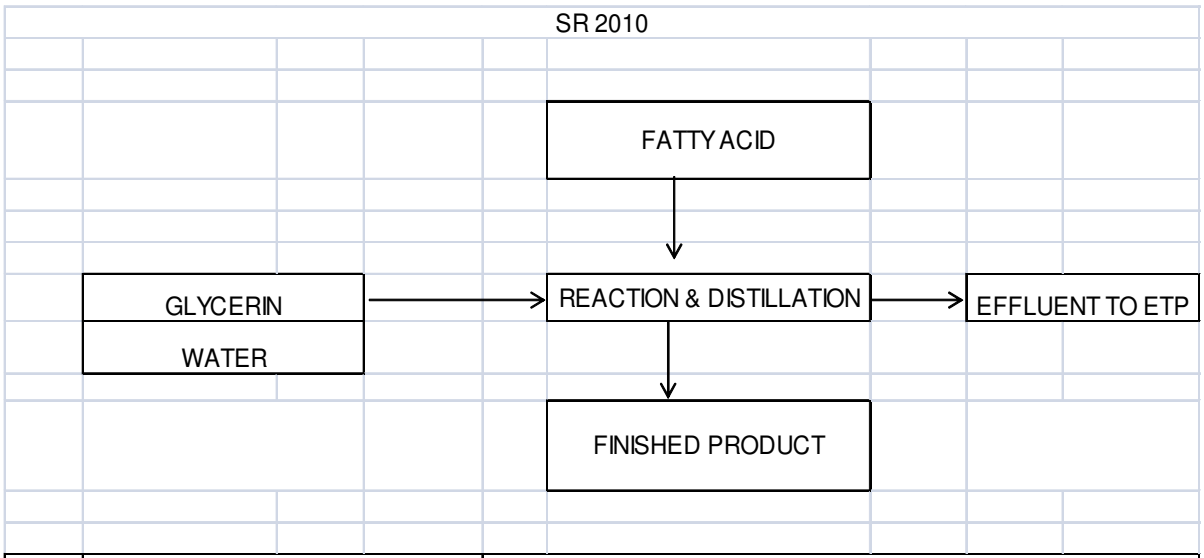
1. SR2008.



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	FATTY ACID	0.8	SR-2008 FINISHED PRODUCT	1
2	HAR/MC-10A/GARASOL/REMAX/C9	0.2		
	TOTAL	1	TOTAL	1.00

**Note: Per Kg of Product Basis*

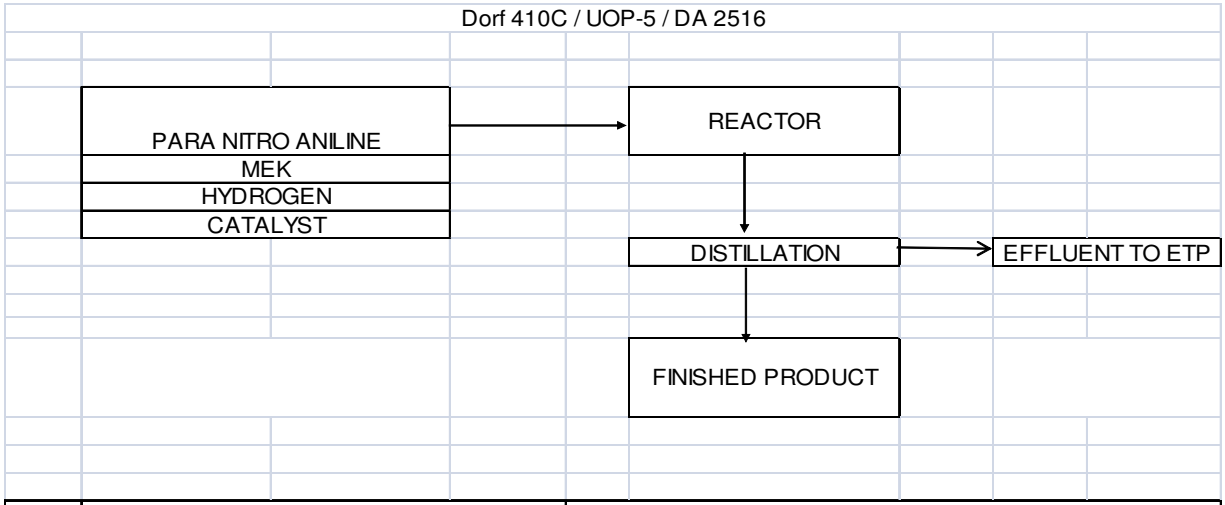
2. SR2010.



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	FATTY ACID	0.85	SR-2010 FINISHED PRODUCT	1
2	GLYCERIN	0.25	EFFLUENT TO ETP	0.23
3	WATER	0.13		
	TOTAL	1.23	TOTAL	1.23

**Note: Per Kg of Product Basis*

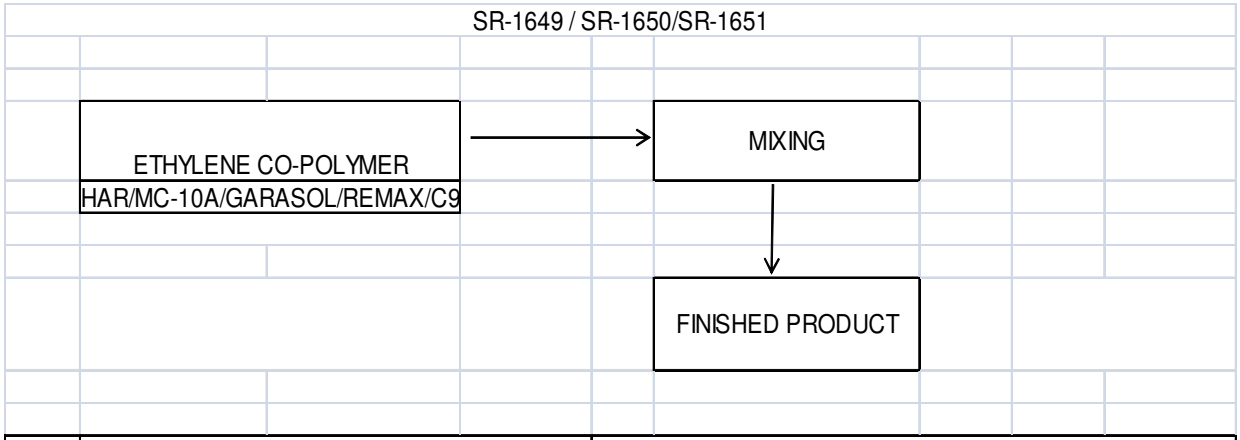
3. Dorf-410C; UOP-5; DA2516.



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	PARA NITRO ANILINE	0.65	FINISHED PRODUCT	1
2	MEK	0.82	EFFLUENT TO ETP	0.52
3	HYDROGEN	0.05		
4	CATALYST			
	TOTAL	1.52	TOTAL	1.52

**Note: Per Kg of Product Basis*

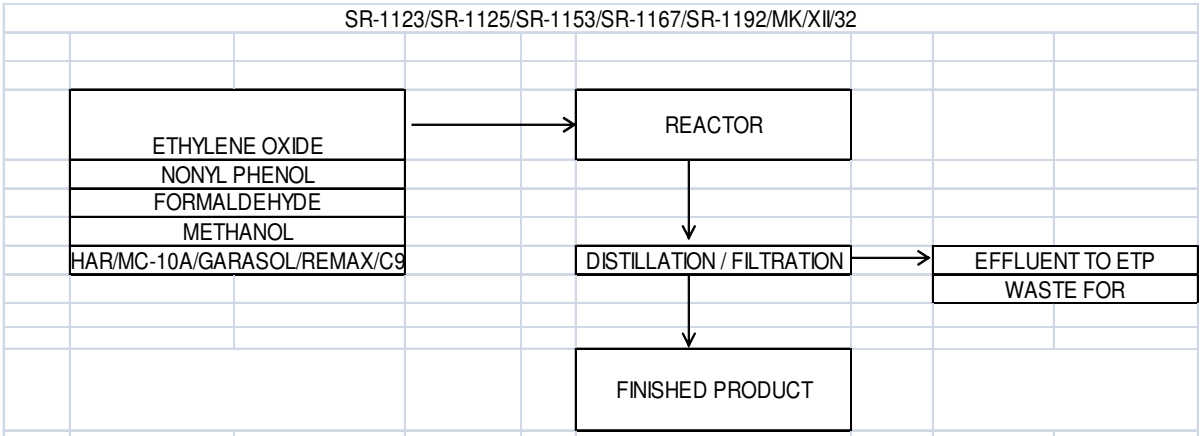
4. SR1649; SR1650; SR1651.



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	ETHYLENE CO-POLYMER	0.4	FINISHED PRODUCT	1
2	HAR/MC-10A/GARASOL/REMAX/C9	0.6		
	TOTAL	1	TOTAL	1.00

**Note: Per Kg of Product Basis*

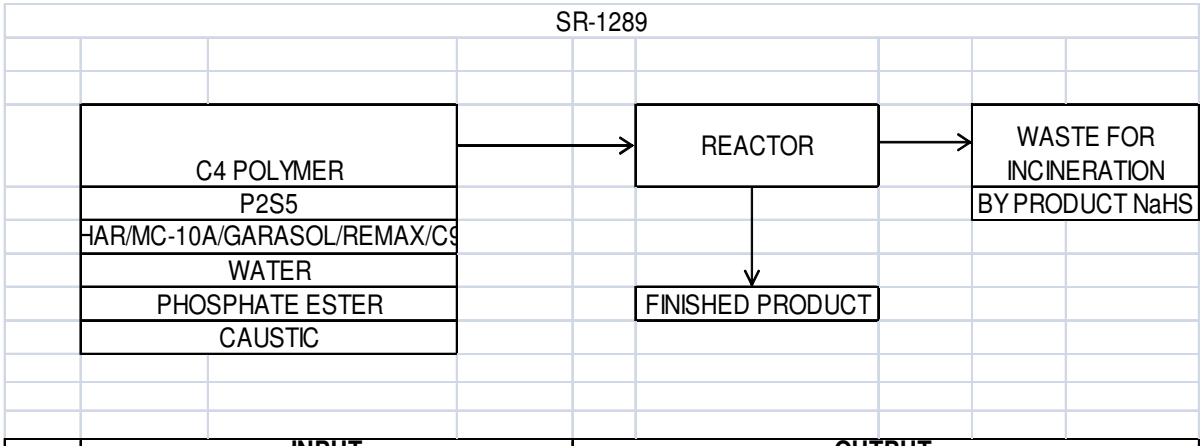
5. SR 1123, SR1125, SR1153, SR1167, SR1192, MK/XII/32.



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	ETHYLENE OXIDE	0.3	FINISHED PRODUCT	1
2	NONYL PHENOL	0.21	EFFLUENT TO ETP	0.04
3	FORMALDEHYDE	0.03	WASTE FOR INCINERATION	0.05
4	METHANOL	0.24		
5	HAR/MC-10A/GARASOL/REMAX/C9	0.31		
	TOTAL	1.09	TOTAL	1.09

**Note: Per Kg of Product Basis*

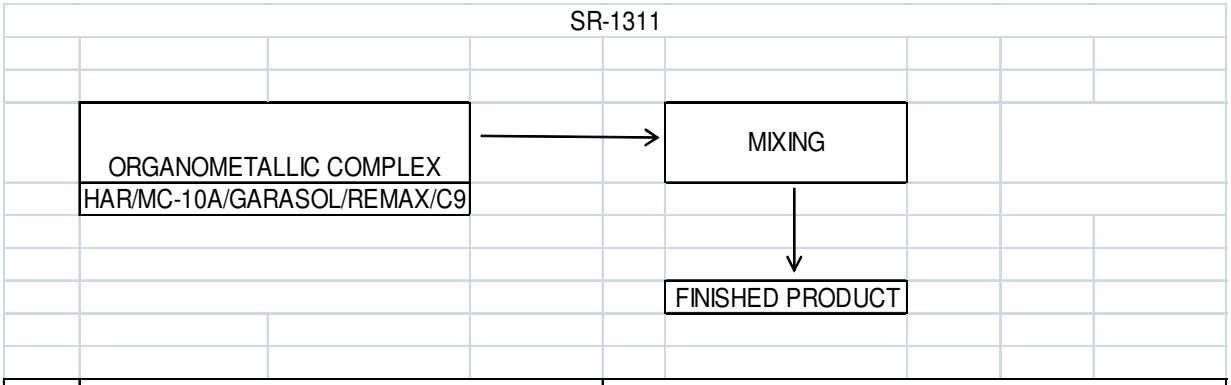
6. SR1289.



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	C4 POLYMER	0.26	FINISHED PRODUCT	1
2	P2S5	0.11	WASTE FOR INCINERATION	0.17
3	HAR/MC-10A/GARASOL/REMAX/C9	0.37	BY PRODUCT NaHS	0.1
4	WATER	0.1		
5	PHOSPHATE ESTER	0.3		
6	CAUSTIC	0.13		
	TOTAL	1.27	TOTAL	1.27

**Note: Per Kg of Product Basis*

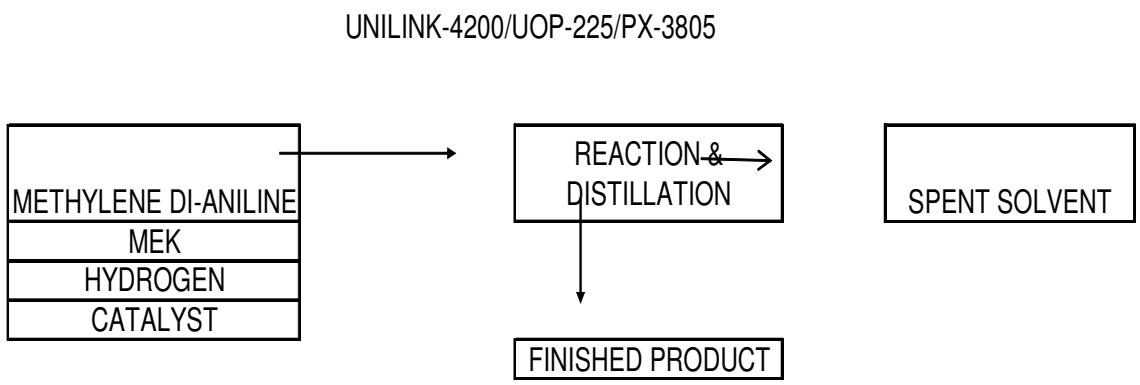
7. SR1311.



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	ORGANOMETALLIC COMPLEX	0.8	FINISHED PRODUCT	1
2	HAR/MC-10A/GARASOL/REMAX/C9	0.2		
	TOTAL	1	TOTAL	1.00

**Note: Per Kg of Product Basis*

8. Unilink 4200; UOP-225; PX-3805.

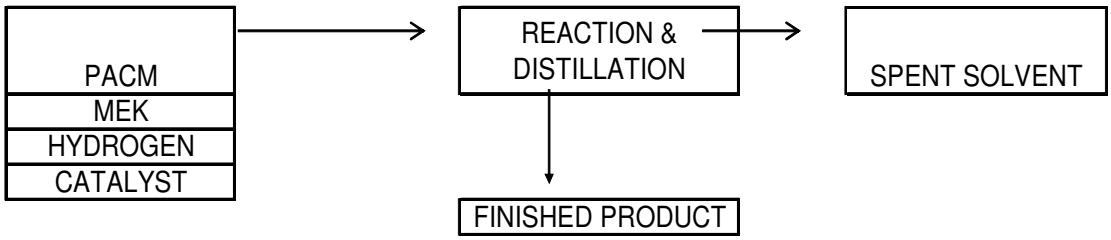


	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	METHYLENE DI-ANILINE	0.67	FINISHED PRODUCT	1
2	MEK	1.16	SPENT SOLVENT	0.84
3	HYDROGEN	0.014		
4	CATALYST			
	TOTAL	1.84	TOTAL	1.84

**Note: Per Kg of Product Basis*

9. Clearlink 1000

CLEARLINK-1000

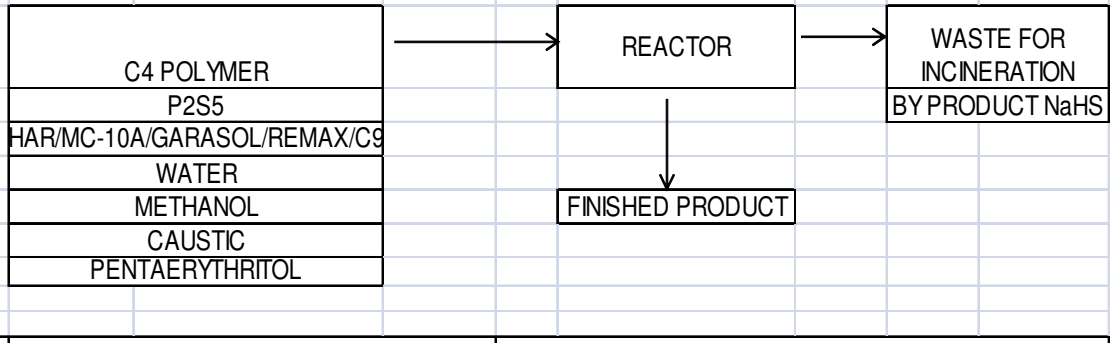


	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	PACM	0.67	FINISHED PRODUCT	1
2	MEK	0.8	SPENT SOLVENT	0.49
3	HYDROGEN	0.014		
4	CATALYST			
	TOTAL	1.49	TOTAL	1.49

**Note: Per Kg of Product Basis*

10. SR1347, SR1393, SR1385, SR1303.

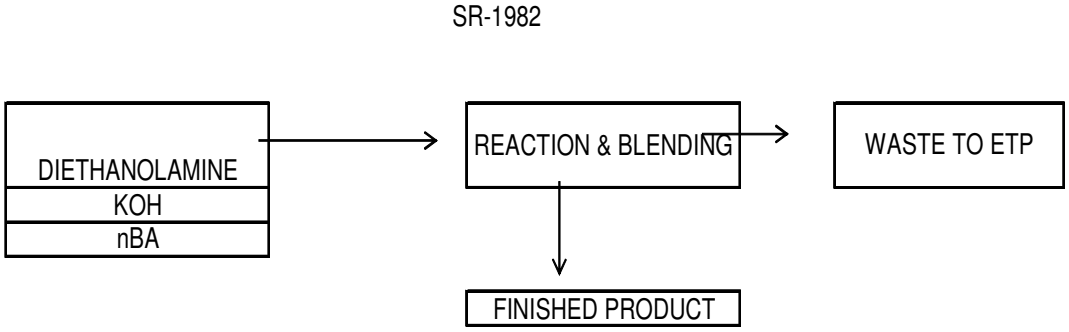
SR-1347/SR-1393/SR-1385/SR-1303



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	C4 POLYMER	0.47	FINISHED PRODUCT	1
2	P2S5	0.07	WASTE FOR INCINERATION	0.19
3	HAR/MC-10A/GARASOL/REMAX/C9	0.5	BY PRODUCT NaHS	0.23
4	WATER	0.06		
5	METHANOL	0.12		
6	CAUSTIC	0.16		
7	PENTAERYTHRITOL	0.04		
	TOTAL	1.42	TOTAL	1.42

**Note: Per Kg of Product Basis*

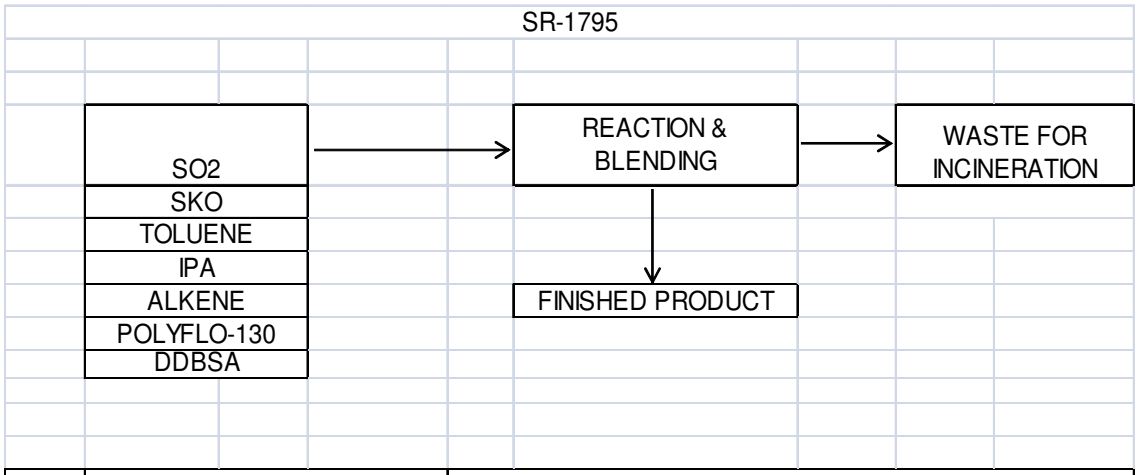
11.SR1982.



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	DIETHANOLAMINE	0.11	FINISHED PRODUCT	1
2	KOH	0.13	WASTE TO ETP	0.1
3	nBA	0.86		
	TOTAL	1.1	TOTAL	1.10

**Note: Per Kg of Product Basis*

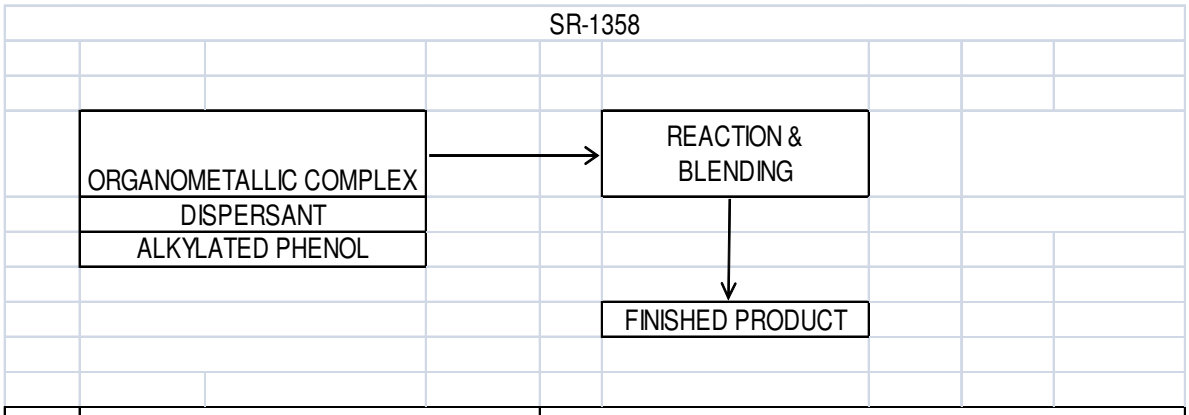
12.SR1795.



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	SO2	0.04	FINISHED PRODUCT	1
2	SKO	0.58	WASTE FOR INCINERATION	0.11
3	TOLUENE	0.21		
4	IPA	0.02		
5	ALKENE	0.07		
6	POLYFLO-130	0.12		
7	DDBSA	0.07		
	TOTAL	1.11	TOTAL	1.11

**Note: Per Kg of Product Basis*

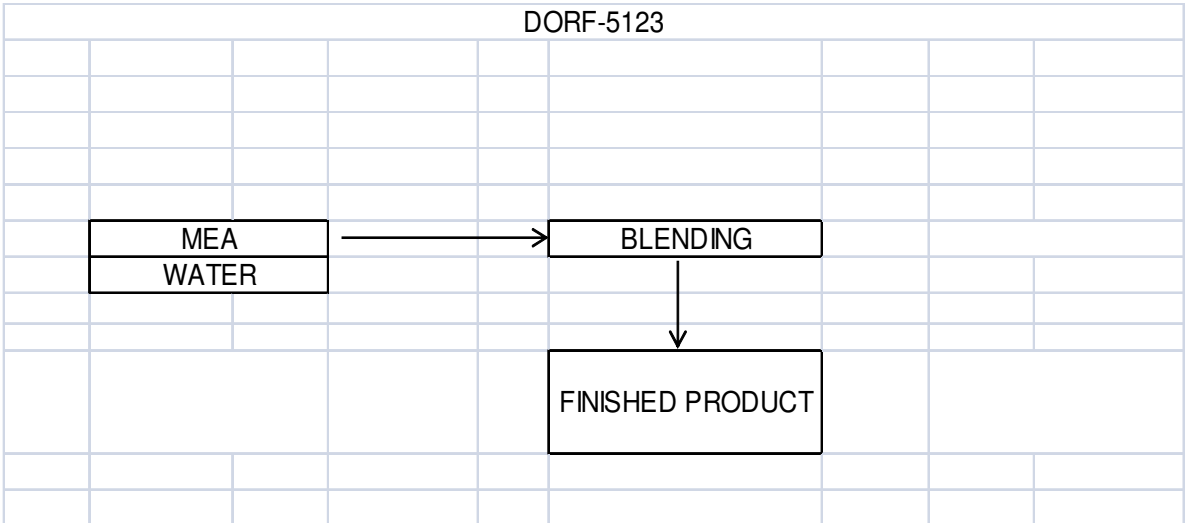
13. SR1358



	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	ORGANOMETALLIC COMPLEX	0.2	FINISHED PRODUCT	1
2	DISPERSANT	0.64		
3	ALKYLATED PHENOL	0.16		
	TOTAL	1	TOTAL	1.00

**Note: Per Kg of Product Basis*

14. Dorf 5123

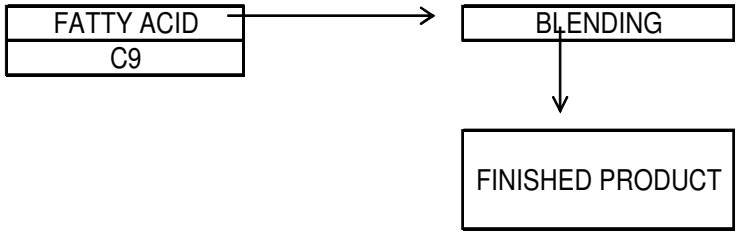


	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	MEA	0.6	SR-2008 FINISHED PRODUCT	1
2	WATER	0.4		
	TOTAL	1	TOTAL	1.00

**Note: Per Kg of Product Basis*

15. Px3402

PX-3402

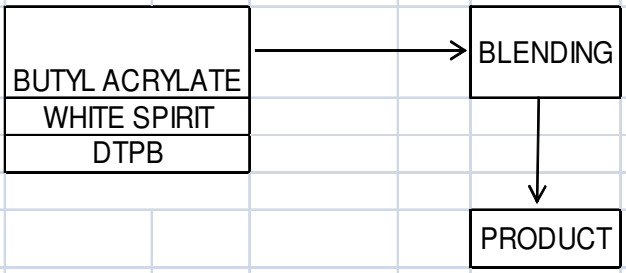


SR NO	INPUT		OUTPUT	
	INPUT	PER KG	OUTPUT	PER KG
1	FATTY ACID	0.09	SR-2008 FINISHED PRODUCT	1
2	C9	0.91		
	TOTAL	1	TOTAL	1.00

**Note: Per Kg of Product Basis*

16. Px3841

PX-3841

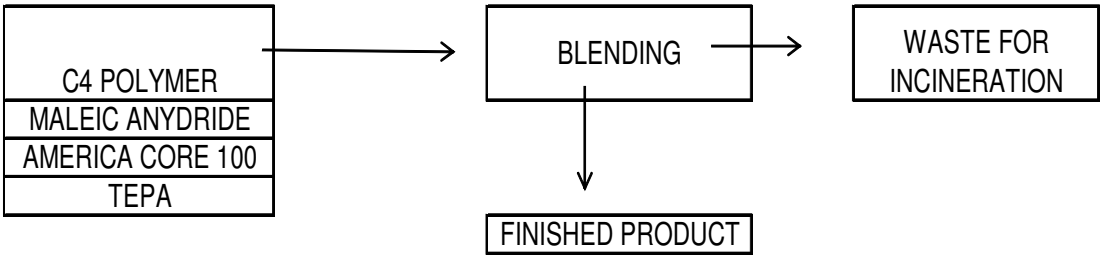


SR NO	INPUT		OUTPUT	
	INPUT	PER KG	OUTPUT	PER KG
1	BUTYL ACRYLATE	0.56	FINISHED PRODUCT	1
2	WHITE SPIRIT	0.44		
3	DTPB	0.005		
	TOTAL	1.0	TOTAL	1.0

**Note: Per Kg of Product Basis*

17. Px4005

PX-4005

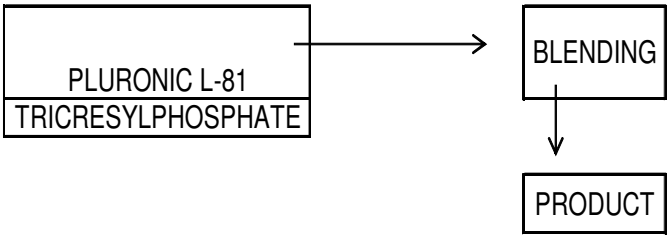


	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	C4 POLYMER	0.68	FINISHED PRODUCT	1
2	MALEIC ANYDRIDE	0.08	WASTE FOR INCINERATION	0.06
3	AMERICA CORE 100	0.24		
4	TEPA	0.06		
	TOTAL	1.06	TOTAL	1.06

**Note: Per Kg of Product Basis*

18. Px3843

PX-3843



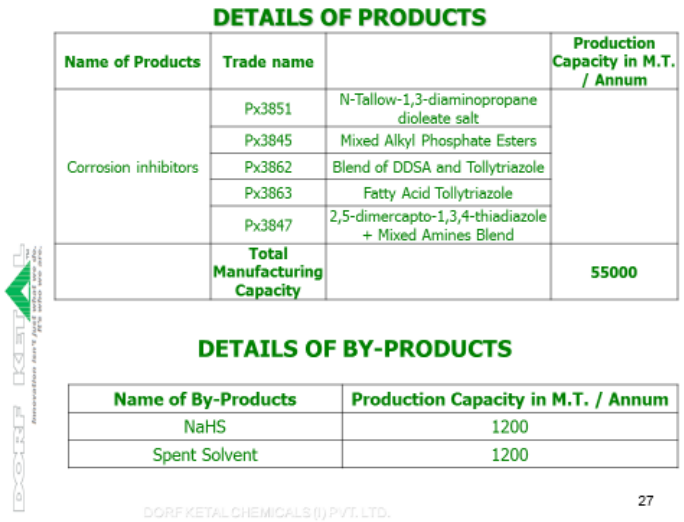
	INPUT		OUTPUT	
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	PLURONIC L-81	0.1	FINISHED PRODUCT	1
2	TRICRESYLPHOSPHATE	0.9		
	TOTAL	1	TOTAL	1.00

**Note: Per Kg of Product Basis*

ANNEXURE – 5
SOLVENT MANAGEMENT

Reply and Clarifications pertaining to TOR No.39 on Spent Solvent Management

The relevant slide presented to the SEAC Committee is reproduced below (Slide No.27)



DETAILS OF PRODUCTS

Name of Products	Trade name		Production Capacity in M.T. / Annum
Corrosion inhibitors	Px3851	N-Tallow-1,3-diaminopropane dioleate salt	
	Px3845	Mixed Alkyl Phosphate Esters	
	Px3862	Blend of DDSA and Tollytriazole	
	Px3863	Fatty Acid Tollytriazole	
	Px3847	2,5-dimercapto-1,3,4-thiadiazole + Mixed Amines Blend	
	Total Manufacturing Capacity		**55000**

DETAILS OF BY-PRODUCTS

Name of By-Products	Production Capacity in M.T. / Annum
NaHS	1200
Spent Solvent	1200

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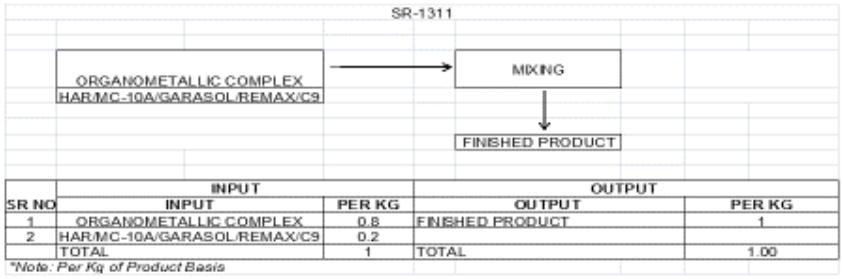
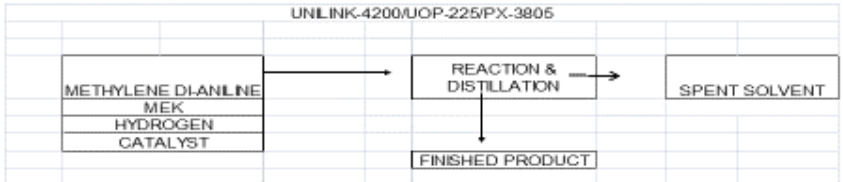
As Noted we have provided details of the By-Products that are generated during the manufacturing process. We have provided for 1200 T/Annum of By-Products spent solvent that are generated in addition to 1200 T of NaHS.

However, we have erroneously used the term “Spent Solvent” to designate the by-products of the reaction process that are made in the manufacturing of the listed products. These By-Products are the reaction derivatives stemming from the reaction chemistry and cannot be recycled. A typical example is highlighted below for the Plastic Additive Family using the PFD of Unilink 4200 (Slide No.16 of the presentation to SEAC)



SR NO	INPUT	PER KG	OUTPUT	PER KG
1	ORGANOMETALLIC COMPLEX	0.8	FINISHED PRODUCT	1
2	HAR/MC-10A/GARASOL/REMAX/C9	0.2		
	TOTAL	1	TOTAL	1.00

Note: Per Kg of Product Basis

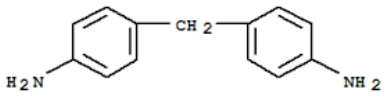


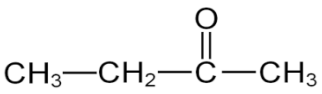
SR NO	INPUT	PER KG	OUTPUT	PER KG
1	METHYLENE DI-ANILINE	0.67	FINISHED PRODUCT	1
2	MEK	1.16	SPENT SOLVENT	0.84
3	HYDROGEN	0.014		
4	CATALYST			
	TOTAL	1.84	TOTAL	1.84

Note: Per Kg of Product Basis

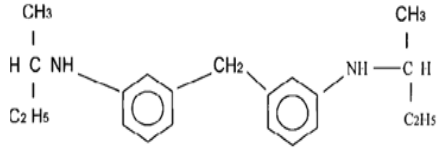
16

And the Chemical Equation of the reaction presented below

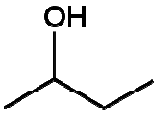




Methylene di aniline **+** **Methyl ethyl ketone** **+ Hydrogen** →



+ **2H2O** **+**



Unilink 4200, UOP-225, PX-3805 **Water** **sec- Butanol**

We note that 0.84 this spent solvent is simultaneously available as a “BY Product” of reaction when making 1 kg of Unilink 4200/UOP225/Px3805.

After recovery the quality of this solvent will not be meeting our quality requirements, hence solvent recovery is not feasible at our end. These By-Products will have no internal consumption and will be therefore sold to authorised processors for use in their respective product manufacturing.

Spent solvents are now named as reaction by-products and added to Hazardous waste list. This will be given to authorized re-processors.

ANNEXURE – 6
HAZARDOUS WASTE MANAGEMENT

Hazardous Waste Generations and Disposal System

Main sources of hazardous waste generation will be ETP waste, Residue/side products, discarded container/ bags/ Drums & Used oil/Spent Oil. ETP waste will be is Collected, Stored, Transported and Disposed at Common TSDF site. Residue/side products will be Collected, Stored, Transported and Disposed at Common CHWIF site. Discarded container/ bags/ Drums will be Collected, Stored, decontaminated &sold to approved vendor/ recycler. Used oil/Spent Oil will be Collected, Stored &sold to authorized Re-processors. Hazardous waste generation quantity, physical characteristics and mode of disposal are given in **Table-2.19**.

Table 2.19 Details of Hazardous Waste and its Mode of Disposal

Sr. No	Detail of Hazardous Waste	SCH-I	Total quantity	Management of Waste
1	ETP Sludge	34.3	40 MTPA	Collection, Storage, transportation and Disposal at Common TSDF site
2	Residue/Side Products	20.3	300 MTPA	Collection, Storage, transportation and Disposal at Common Hazardous waste Incinerator Facility (CHWIF).
3	Discarded container/ bags/ Drums	33.3	500 MTPA	Collection, Storage, decontaminate &sell to approved vendor/ recycler
4	Used oil/Spent Oil	5.1	10 MTPA	Collection, Storage & sold to authorized Re-Processors.
5	Reaction By-Products (Spent Solvent)	20.2	1200 MTPA	Collection, Storage & sold to authorized Re-Processors.

Hazardous waste will be stored in proper storage room and handed over to GPCB/CPCB approved vendor for final disposal. The collection, Storage and disposal of hazardous waste will be done as per Hazardous waste (Management and Handling) Rules 2016.

The unit will get the membership of common facility for TSDF, CHWIF.