Additional Documents

of

Proposed Project of Dye Intermediates Manufacturing

by

M/s. Jay Ganesh Industries

at

Survey No. 399,

Village: Neja, Tal: Khambhat,

Dist. Anand, Gujarat-388620

Annexure-I	List of Products with Production Quantity & List of Raw materials with quantity
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Annexure-I

List of Products

Sr. No.	Name of the Product	CAS Nos.	Quantity MT/Month	Type of products
1	4-Nitro Toluene-2-Sulfonic Acid (PNTOSA)	121-03-9	**300**	Dye Intermediates
2	Para Nitro Chloro Benzene Ortho Sulfonic Acid (PNCBOSA)	96-73-1		Dye Intermediates
3	Ortho Nitro Chloro Benzene Para Sulfonic Acid (ONCBPSA)	121-18-6		Dye Intermediates
4	Sulfo Tobias Acid (2-Naphthyal Amino 1-5 Disulphonic Acid)	117-62-4		Dye Intermediates
5	Armstrong Acid (1,5-Naphthalenedisulfonic acid)	81-04-9		Dye Intermediates
6	Aniline 2.4 Di-sulfonic Acid	24605-36-5		Dye Intermediates
7	Aniline 2.5 Di-sulfonic Acid	24605-36-5		Dye Intermediates
8	Ortho Anisidine 4 Sulfonic Acid (OA4SA)	98-42-0		Dye Intermediates
9	Schaeffer's Acid (6-Hydroxynaphthalene-2-sulphonic acid)	93-01-6		Dye Intermediates
10	Para Toluidine-2,5-Disulfonic Acid (PT2,5DSA)	26585-57-9		Dye Intermediates
11	Chloro Benzene Sulfonic Acid (CBSA)	98-66-8		Dye Intermediates
12	Para Anisidine 2 Sulfonic Acid (PA2SA)	6470-17-3		Dye Intermediates
13	Para Anisidine 3 Sulfonic Acid (PA3SA)	13244-33-2		Dye Intermediates
14	Sulpho OAVS (1-Amino-2-Methoxy-4-Beta Hydroxy Ethyl Sulphone Sulphate Ester)	121-88-0		Dye Intermediates
15	Sulfo VS (3 Sulphonyl-4-Amino Phenyl Beta Hydroxy Ethyl Sulphone Sulphate Ester)	42986-22-1		Dye Intermediates
16	Para Phenylenediamine 2.5 Disulfonic Acid (PPD2,5DSA)	7139-89-1		Dye Intermediates
17	Meta Phenylene Diamine 4.6 Di-sulfonic Acid (MPD4,6DSA)	137-50-8		Dye Intermediates
18	N-Ethyl-N-Benzyl Aniline Sulfonic Acid (EBAMSA)	101-11-1		Dye Intermediates
19	Para Cresidine Ortho Sulfonic Acid (PCOSA)	6471-78-9		Dye Intermediates
20	Para Nitro Aniline Ortho Sulfonic Acid (PNAOSA)	30693-53-9	**100**	Dye Intermediates
21	Ortho Nitro Aniline Para Sulfonic Acid (ONAPSA)	82324-60-5		Dye Intermediates
22	Para Nitro Aniline (PNA)	100-01-6		Dye

Sr. No.	Name of the Product	CAS Nos.	Quantity MT/Month	Type of products
				Intermediates
23	Ortho Nitro Aniline (ONA)	88-74-4		Dye Intermediates
24	4-Amino Azobenzene-4-Sulfonic Acid (PAABSA)	104-23-4	**100**	Dye Intermediates
25	Sodium Naphthionate (SN)	130-13-2	**70**	Dye Intermediates
26	Alpha Naphthylamine	134-32-7		Dye Intermediates
27	Alpha Naphthol	90-15-3		Dye Intermediates
28	NW Acid	84-87-7		Dye Intermediates
29	C Acid (2- Naphthylamine 4,8 Di Sulfonic Acid)	131-27-1	**40**	Dye Intermediates
30	Epsilon Acid (1-Naphthol 3,8 Di Sulfonic Acid)	117-43-1		Dye Intermediates
31	2-Pyridone	142-08-5	**50**	Dye Intermediates
32	Ethyl Cyano Pyridone (3-Cyano-1-Ethyl-6-Hydroxy-4-Methyl-2-Pyridone)	28141-13-1		Dye Intermediates
33	Diethyl Cyano Pyridone (3-Cyano-6-Methyl-2-Pyridone)	4241-27-4		Dye Intermediates
		Total	**660**	

List of Raw Materials

Sr. no.	Product name	Raw Material Name	Consumption (MT/MT)
1	4-Nitro Toluene-2-Sulfonic Acid (PNTOSA)	Oleum (23%)	0.150
		PNCB	0.800
		65% Oleum	0.600
2	Para Nitro Chloro Benzene Ortho Sulfonic Acid (PNCBOSA)	Oleum (23%)	1.590
		PNT	0.670
3	Ortho Nitro Chloro Benzene Para Sulfonic Acid (ONCBPSA)	Oleum (23%)	0.150
		PNCB	0.800
		Oleum (65%)	0.600
		Salt	0.900
4	Sulfo Tobias Acid	Oleum (23%)	2.400
		Tobias Acid	0.800
5	Armstrong Acid (1,5-Naphthalenedisulfonic acid)	Oleum (23%)	4.450
		Naphthalene	0.800
6	Aniline 2.4 Di-sulfonic Acid	Sulfanilic Acid	0.740
		Oleum (23%)	2.500
7	Aniline 2.5 Di-sulfonic Acid	Metanilic Acid	0.740
		Oleum (23%)	2.500
		Salt	0.460
8	Ortho Anisidine 4 Sulfonic Acid (OA4SA)	Sulphuric Acid 98%	1.100
		O-Anisidine	0.700
		Oleum (65%)	0.700
9	Schaeffer's Acid (6-Hydroxynaphthalene-2-sulphonic acid)	Sulphuric Acid 98%	1.300
		Oleum (23%)	0.550
		Oleum (65%)	1.300
		Pera Toludene	0.550
		Salt	1.200
10	Para Toluidine-2,5-Disulfonic Acid (PT2,5DSA)	Sulphuric Acid 98%	2.500
		MCB	0.600
11	Chloro Benzene Sulfonic Acid (CBSA)	PNTOSA	1.100
		Iron Powder	1.000
		Caustic Lye	0.100
		HCl	1.000
12	Para Anisidine 2 Sulfonic Acid (PA2SA)	PNTOSA	1.100
		Iron Powder	1.000
		Caustic Lye	0.100
		HCl	1.000
13	Para Anisidine 3 Sulfonic Acid (PA3SA)	Para Anisidine	0.625
		Sulphuric Acid	0.812
		ODCB	2.200
		Soda Ash	0.920
14	Sulfo OAVS	OAVS	0.833

Sr. no.	Product name	Raw Material Name	Consumption (MT/MT)
		Oleum (23%)	1.475
		Sulphuric Acid	1.208
		KCl	1.300
15	Sulfo VS	Vinyl Sulphone	0.780
		Oleum Acid (65%)	0.650
		Sulphuric Acid	0.810
		KCl	1.100
16	Para Phenylenediamine 2.5 Disulfonic Acid (PPD2,5DSA)	H_2SO_4 98%	2.000
		Oleum 65%	1.750
		PPD	0.500
17	Meta Phenylene Diamine 4.6 Di-sulfonic Acid (MPD4,6DSA)	H_2SO_4 98%	1.000
		Oleum 23%	0.975
		Oleum 65%	2.300
		MPD	0.675
18	N-Ethyl-N-Benzyl Aniline Sulfonic Acid (EBAMSA)	H_2SO_4 98%	1.000
		Oleum 65%	0.900
		EBA	0.835
		Soda Ash	0.500
19	Para Cresidine Ortho Sulfonic Acid (PCOSA)	Para Cresidine	0.715
		Sulphuric Acid	0.785
		Oleum 23%	1.900
		Salt	0.400
20	Para Nitro Aniline Ortho Sulfonic Acid (PNAOSA)	PNCBOSA	1.200
		Ammonia	0.450
		Caustic Soda	0.115
		Lime	0.500
		Salt	0.650
21	Ortho Nitro Aniline Para Sulfonic Acid (ONAPSA)	ONCBPSA	1.100
		Ammonia	0.500
		Caustic Soda	0.400
22	Para Nitro Aniline (PNA)	PNCB	1.300
		Ammonia	1.300
		Water	5.200
		Lime	0.615
		Salt	0.450
23	Ortho Nitro Aniline (ONA)	ONCB	1.300
		Ammonia	1.300
		Lime	0.615
		Salt	0.450
24	4-Amino Azobenzene-4-Sulfonic Acid (PAABSA)	Liq. Sodium Bi sulfite	1.550
		Aniline Oil	0.500
		Formaldehyde	0.500

Sr. no.	Product name	Raw Material Name	Consumption (MT/MT)
		Salt	1.700
		Sulfanilic acid	0.825
		HCl	0.550
		Sodium Nitrite	0.335
		Sodium Bi carbonate	0.550
		Sulfuric Acid 98 %	0.750
25	Sodium Naphthionate (SN)	Alpha Naphthyl Amine	0.800
		Sulphuric Acid	0.875
		ODCB	2.000
		Soda Ash	1.500
26	Alpha Naphthylamine	Naphthalene	1.100
		Nitric Acid (60%)	2.000
		ODCB	3.500
		Soda Ash	1.000
27	Alpha Naphthol	Alpha naphthyl Amine	1.100
		Sulphuric Acid	0.850
28	NW Acid	Sodium Naphthionate	1.410
		Sodium Bisulphite	1.785
		H_2SO_4 (38%)	1.850
		Caustic Lye	0.910
29	C Acid	Naphthalene	1.250
		Sulphuric Acid(98%)	1.600
		Oleum 65%	1.350
		Nitric Acid	0.375
		Mgo	0.350
		HCl	0.065
		Iron	0.510
30	Epsilon K Acid	Napthalene	1.250
		Oleum (65%)	1.000
		Sulphuric Acid	1.200
		Nitric Acid	0.850
		Lime Stone	1.500
		Soda Ash	0.750
		Iron Powder	1.100
		HCl	0.540
		Sodium Nitrite	0.650
31	2-Pyridone	Ethyl Cyano Acetate	0.750
		Methyl Cyno Acetate	0.800
		Aceto Acetic Methyl Ester	0.735
		H_2SO_4	5.100
32	Ethyl Cyano Pyridone	Ethyl Cyno Acetate	0.750
		Mono Ethyl Amine	0.800

Sr. no.	Product name	Raw Material Name	Consumption (MT/MT)
		Methyl Aceto Acetate Ester	0.750
		H_2SO_4	2.000
33	Diethyl Cyano Pyridone	Diethyl Cyno Acetate	0.750
		Mono Ethyl Amine	0.800
		Methyl Aceto Acetate Ester	0.750
		H_2SO_4	2.000

Annexure-II

Manufacturing Process

1. 4-Nitro Toluene-2-Sulfonic Acid (PNTOSA)

Manufacturing Process:

In a Sulfonator take Oleum 23% Charge PNT at 50-55°C temp in 5 to 6 hrs 100°C temp and maintain for 6 hrs cool to 90°C temp and reaction mass is transferred into an isolation vessel containing water. Temp rise to 70°C Cool to 30°C temp it is filtered and centrifuge to get the product PNTOSA.

Chemical Reaction:

$C_7H_7NO_2$		$H_2S_2O_7$		$C_7H_7O_5NS$		H_2SO_4
P-Nitro Toluene	+	Oleum	⟶	PNTOSA	+	Sulfuric Acid
137		178		217		98

Mass Balance:

Mass balance of PNTOSA

INPUT	KG		OUTPUT	KG
Oleum (23%)	150	→ Sulphonation		
PNCB	800	→ Sulphonation	→ SO2 Scrubber	35
65% Oleum	600	→ Sulphonation		
		1515 ↓		
Water	3500	→ Isolatation		
Salt	900	→ Isolatation		
		5915 ↓		
		Filtration	→ Spent Sulphuric Acid	3000
		2915 ↓		
Brine Water	500	→ Centrifugation	→ Spent Sulphuric Acid	2106
		1309 ↓		
		Packing	→ Moiture	309
		Packing	→ PNCBOSA	1000
Total	**6450**			**6450**

2. Para Nitro Chloro Benzene Ortho Sulfonic Acid (PNCBOSA)

Manufacturing Process:

In a Sulfonator take OLEUM 23% Charge PNCB at 50-55ºC temp in 3 to 4 hrs Charge Oleum 65% at 80-85ºC temp in 3 to 4 hrs Then contents are heated to 120ºC temp and maintain for 6 hrs cool to 90º c temp and reaction mass is transferred into an isolation vessel containing water & salt. Temp rise to 70ºC Cool to 35ºC temp it is filtered and centrifuge to get the product PNCBOSA.

Chemical Reaction:

$C_6H_4NO_2Cl$		$H_2S_2O_7$		$C_6H_4NO_5SCl$		H_2SO_4
PNCB	+	Oleum	⟶	PNCBOSA	+	Sulfuric Acid
157.5		178		237.5		98

Mass Balance:

Mass balance of PNCBOSA

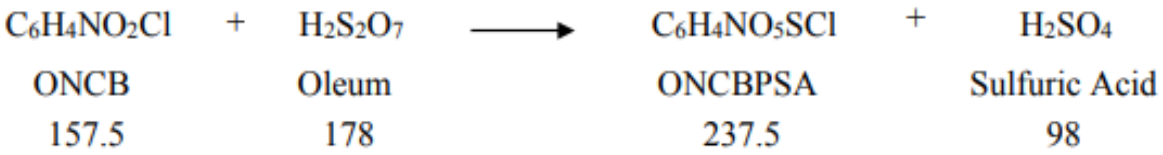
INPUT	KG		OUTPUT	KG
Oleum (23%)	1590	→ Sulphonation		
PNT	670	→ Sulphonation	→ SO2 Scrubber	30
		Sulphonation → 2230		
Water	5000	→ Dumping		
		Dumping → 7230		
		Filtration	→ Spent Sulphuric Acid	5542
		Filtration → 1688		
Water	1000	→ Centrifugation	→ Effluent	1400
		Centrifugation → 1288		
		Packing	→ Moiture	288
		Packing	→ PNCBOSA	1000
Total	**8260**			**8260**

3. Ortho Nitro Chloro Benzene Para Sulfonic Acid (ONCBPSA)

Manufacturing Process:

In a Sulfonator take Oleum 23% Charge ONCB at 50-55ºC temp in 3 to 4 hrs Charge Oleum 65% at 80-85ºC temp in 3 to 4 hrs Then contents are heated to 120ºC temp and maintain for 6 hrs cool to 90ºC temp and reaction mass is transferred into an isolation vessel containing water & salt. Temp rise to 70ºC Cool to 35ºC temp it is filtered and centrifuge to get the product ONCBPSA.

Chemical Reaction:



Mass Balance:

Mass balance of PNCBOSA

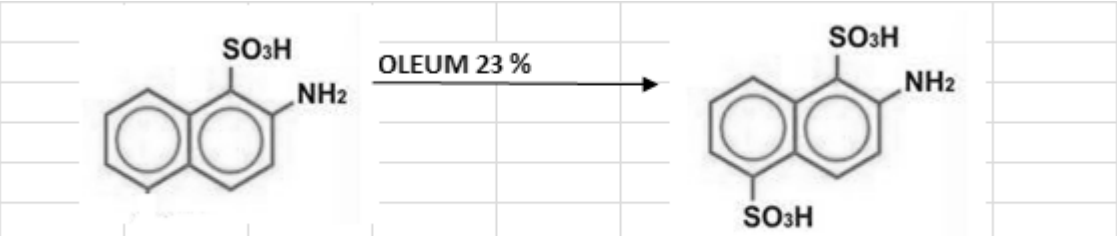
INPUT	KG		OUTPUT	KG
Oleum (23%)	150	Sulphonation	SO2 Scrubber	35
PNCB	800			
Oleum (65%)	600			
		1515		
Water	3500	Isolatation		
Salt	900			
		5915		
		Filtration	Spent Sulphuric Acid	3000
		2915		
Brine Water	500	Centrifugation	Spent Sulphuric Acid	2106
		1309		
		Packing	Moiture	309
			PNCBOSA	1000
Total	**6450**			**6450**

4. Sulfo Tobias Acid

Manufacturing Process:

Oleum & Tobias Acid is charged in Sulphonator vessel. After 12 hrs the reaction completes & the reaction mass is dumped into drowning vessel where ice & salt are added. After drowning, reaction mass is filtered through Nutch filter. The product remains at the top of Nutch filter & the filtrate as spent. The product from the Nutch filter is taken into the centrifuge. After centrifuging, the product is packed & dispatched.

Chemical Reaction:



Mass Balance:

Mass Balance of SULFO TOBIAS ACID

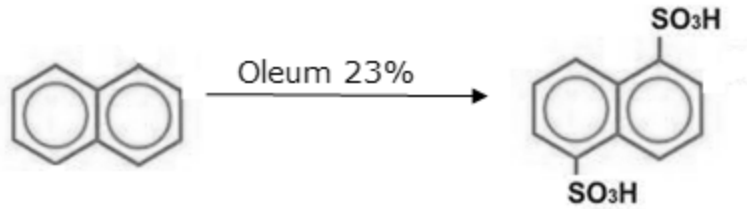
INPUT	KG		OUTPUT	KG
Oleum (23%)	2400	→ sulphonation	SO2 Scrubber	25
TOBIAS ACID	800			
		3175		
Ice	7200	→ Isolation		
Salt	2000			
		12375		
		Nutch Filteration	Spent Acid	9825
		2550		
		Centrifugation	Spent Acid	1020
		1530		
		Packing	SULFO TOBIAS ACID 65 % KGS REAL BASIS-1000	1540
Total	**12400**			**12410**

5. Armstrong Acid (1,5-Naphthalenedisulfonic acid)

Manufacturing Process:

Oleum & Naphthalene is charged in Sulphonator vessel. After 6 hrs the reaction completes & the reaction mass is dumped into drowning vessel where ice are added. After drowning, reaction mass is filtered through Nutch filter. The product remains at the top of Nutch filter & the filtrate as spent. The product from the Nutch filter is taken into the centrifuge. After centrifuging, the product is packed & dispatched.

Chemical Reaction:



Mass Balance:

Mass Balance of Armstrong acid

INPUT	KG		OUTPUT	KG
Oleum (23%)	4450	sulphonation	SO2 Scrubber	38
Naphthalene	800			
		5212		
Ice	2550	Isolation		
		7762		
		Nutch Filteration	Spent Acid	5300
		2462		
		Centrifugation	Spent Acid	1248
		1214		
		Packing	Moiture	214
			Armstrong acid 85 %	1000
Total	**7800**			**7800**

6. Aniline 2.4 Di-sulfonic Acid

Manufacturing Process:

Sulfonation of Sulfanilic Acid

Charge Oleum 23% in a Sulfonator then charge Sulfanilic Acid at 50°C temperature. Heat to 100°C temperature in 6 hours and maintain temperature for 15 hours. Then cool to 90°C temperature.

Isolation

Charge Water in Isolation Vessel, then transfer Sulfo Mass in Isolation Vessel. Temperature will rise to 80°C temperature. Then cool to 35°C temperature.

Filtration

Filter thru Filter Press and then Centrifuge to get the product.

Chemical Reaction:

$C_6H_7NO_3S$		Oleum	⟶	$C_6H_7NO_6S_2$		H2SO4
Sulfanilic acid	+	H2S2O7		Aniline 2-4 DSA	+	H2SO4
173.00		178		253		98

Mass Balance:

Mass Balance of ANILINE 2, 4 DISULFONIC ACID

INPUT	KG		OUTPUT	KG
Sulfanilic Acid	740	→ sulphonation		
Oleum (23%)	2500	→ sulphonation	SO2 Scrubber	22
Ice	4500	→ sulphonation		
		7718 ↓		
		Isolation		
		7718 ↓		
		Nutch Filteration	→ Spent Acid	5000
		2718 ↓		
		Centrifugation	→ Spent Acid	1268
		1450 ↓		
		Packing	→ Moiture	450
		Packing	→ Aniline 2,4 Disulphonic Acid	1000
Total	**7740**			**7740**

7. Aniline 2.5 Di-sulfonic Acid

Manufacturing Process:

Sulfonation of Metanilic acid

Charge Oleum 23% in a Sulfonator then charge Metanilic acid at 50°C temperature. Heat to 100°C temperature in 6 hours and maintain temperature for 15 hours. Then cool to 90°C temperature.

Isolation

Charge Water in Isolation Vessel, then transfer Sulfo Mass in Isolation Vessel. Temperature will rise to 80°C temperature. Then cool to 35°C temperature.

Filtration

Filter thru Filter Press and then Centrifuge to get the product.

Chemical Reaction:

$C_6H_7NO_3S$		Oleum	⟶	$C_6H_7NO_6S_2$		H2SO4
Metanilic acid	+	H2S2O7		Aniline 2-5 DSA	+	H2SO4
173.00		178		253		98

Mass Balance:

Mass Balance of ANILINE 2, 5 DISULFONIC ACID

INPUT	KG		OUTPUT	KG
Metanilic Acid	740	→ sulphonation		
Oleum (23%)	2500	→ sulphonation	SO2 Scrubber	22
Water	5500	sulphonation		
Salt	460	→ sulphonation		
		sulphonation → 9178		
		9178 → Isolation		
		Isolation → 9178		
		9178 → Nutch Filteration		
		Nutch Filteration	Spent Acid	6500
		Nutch Filteration → 2678		
		2678 → Centrifugation		
		Centrifugation	Spent Acid	1225
		Centrifugation → 1453		
		1453 → Packing		
		Packing	Moiture	453
		Packing	Aniline 2,5 Disulphonic Acid	1000
Total	**9200**			**9200**

8. Ortho Anisidine 4 Sulfonic Acid (OA4SA)

Manufacturing Process:

Sulfonation of O-Anisidine:

In a Sulfonator take H_2SO_4 98% Charge OA at 50-55ºC temp in 3 to 4 hrs Charged Oleum 65% At 55-60 temp and maintain for 6 hrs cool to 90ºC temp and reaction mass is transferred into an isolation vessel containing water. Cool to 35ºC temp it is filtered and centrifuge to get the product OA4SA.

Chemical Reaction:

C_7H_9NO	+	$H_2S_2O_7$	⟶	$C_7H_9NO_4S$	+	H_2SO_4
O-Anisidine		Oleum		OA4SA		Sulfuric Acid
123		178		203		98

Mass Balance:

Mass Balance of Ortho Anisidine 4 Sulfonic Acid

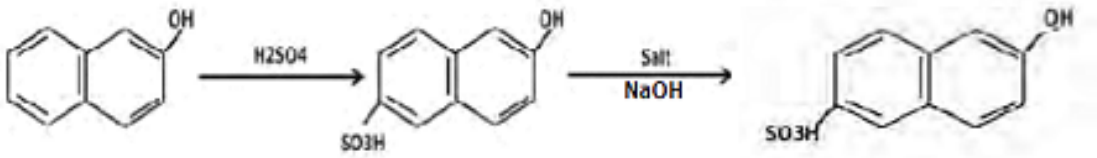
INPUT	KG		OUTPUT	KG
Sulphuric Acid 98%	1100	sulphonation	SO2 Scrubber	30
O- Anisidine	700			
Oleum (65%)	700			
		2470		
Water	3700	Isolation		
		6170		
		Nutch Filteration	Spent Acid	4200
		1970		
		Centrifugation	Spent Acid	500
		1470		
		Packing	Moiture	470
			Ortho Anisidine 4 Sulfonic Aci	1000
Total	**6200**			**6200**

9. Schaeffer's Acid (6-Hydroxynaphthalene-2-sulphonic acid)

Manufacturing Process:

In sulphonator take Sulphuric acid. Cool it to required temp. Add Beta Naphthol. Heat it to elevated temp. Maintain for hours. Dump the mass in water. Add activated carbon. Filter it. Collect filtrate add soda ash or caustic lye and make neutral. Cool it and filter it. Collect wet cake as finished product.

Chemical Reaction:



Mass Balance:

Mass Balance of SCHAEFFER'S ACID

INPUT	KG		OUTPUT	KG
H2SO4 98 %	1100	→ sulphonation		
B-Naphthol	700	→ sulphonation	→ SO2 Scrubber	25
		1775 ↓		
Water	3700	→ Isolation		
Soda Ash	360	Isolation		
		5835 ↓		
		Nutch Filteration	→ Spent Acid	3305
		2530 ↓		
		Centrifugation	→ Spent Acid	530
		2000 ↓		
		Packing	→ Moiture	750
		Packing	→ Chaeffer's Acid	1250
Total	**5860**			**5860**

10. Para Toluidine-2,5-Disulfonic Acid (PT2,5DSA)

Manufacturing Process:

Sulfonation of PT:

In a Sulfonator take H_2SO_4 98% & Oleum 23% Charge PT at 50-55ºC temp in 3 to 4 hrs Charge Oleum 65% at 80-85ºC temp in 3 to 4 hrs Then contents are heated to 120ºC temp and maintain for 6 hrs cool to 90ºC temp and reaction mass is transferred into an isolation vessel containing water & salt. Temp rise to 70ºC Cool to 35ºC temp it is filtered and centrifuge to get the product PT2-DSA.

Chemical Reaction:

C_7H_9N	+	$H_2S_2O_7$	+	H_2SO_4	⟶	$C_7H_9O_6S_2N$	+	H_2SO_4	+	H_2O
PT		Oleum		Sulfuric Acid		PT2-5DSA		Sulfuric Acid		Water
107		178		98		267		98		18

Mass Balance:

Mass Balance of Para Toluidine-2,5-Disulfonic Acid

INPUT	KG		OUTPUT	KG
Sulphuric Acid 98%	1300	→ sulphonation		
Oleum (23%)	550	→ sulphonation		
Oleum (65%)	1300	→ sulphonation		
Pera Toludene	550	→ sulphonation	→ SO2 Scrubber	32
		sulphonation → 3668		
		3668 → Isolation		
Water	6000	→ Isolation		
salt	1200	→ Isolation		
		Isolation → 10868		
		10868 → Nutch Filteration	→ Spent Acid	8000
		Nutch Filteration → 2868		
		2868 → Centrifugation	→ Spent Acid	1428
		Centrifugation → 1440		
		1440 → Packing	→ Moiture	440
			→ Para Toluidine-2,5-Disulfonic Acid	1000
Total	**10900**			**10900**

11. Chloro Benzene Sulfonic Acid (CBSA)

Manufacturing process:

Sulfonation of MCB:

In a Sulfonator take H_2SO_4 98% Charge MCB at 50-55ºC temp in 3 to 4hrs and maintain for 6 hrs cool to 90ºC temp and reaction mass is transferred into an isolation vessel containing water & ice. Cool to 35ºC temp it is filtered and centrifuges to get the product MCBSA.

Chemical Reaction:

C_6H_5Cl		H_2SO_4	⟶	$C_6H_5O_3SCl$		H_2O
MCB	+	Sulfuric acid		MCBSA	+	water
112.5		98		192.5		18

Mass Balance:

Mass Balance of Chloro Benzene Sulfonic Acid

INPUT	KG		OUTPUT	KG
Sulphuric Acid 98%	2500	→ sulphonation	SO2 Scrubber	12
MCB	600	→ sulphonation		
		3088		
Water	1800	→ Isolation		
		4888		
		Nutch Filteration	Spent Acid	3100
		1788		
		Centrifugation	Spent Acid	448
		1340		
		Packing	Moisture	340
			CBSA	1000
Total	**4900**			**4900**

12. Para Anisidine 2 Sulfonic Acid (PA2SA)

Manufacturing Process:

Sulfonation of P-Anisidine:

In a Sulfonator take OLEUM 23% Charge PA at 50-55ºC temp in 5 to 6 hrs 120ºC temp and maintain for 6 hrs cool to 90ºC temp and reaction mass is transferred into an isolation vessel containing water. Temp rise to 70ºC Cool to 35ºC temp it is filtered and centrifuges to get the product PA2SA.

Chemical Reaction:

C_7H_9NO		$H_2S_2O_7$	⟶	$C_7H_9NO_4S$		H_2SO_4
P-Anisidine	+	Oleum		PA2SA	+	Sulfuric Acid
123		178		203		98

Mass Balance:

Mass Balance of Para Anisidine 2 Sulfonic Acid

INPUT	KG		OUTPUT	KG
PNTOSA	1100	→ Reduction Vessel		
Iron Powder	1000	→ Reduction Vessel		
Caustic Lye	100	→ Reduction Vessel		
Water	4000	→ Reduction Vessel		
HCl	1000	→ Reduction Vessel		
		7200 ↓		
		Nutch Filteration	→ Iron Sludge	1500
		5700 ↓		
		Isolation	→ Effluent	3700
		2000 ↓		
		Centrifugation	→ Effluent	650
		1350 ↓		
		Drying & Packing	→ Drying loss	350
		Drying & Packing	→ Para Anisidine 2 Sulfonic Acid	1000
Total	**7200**			**7200**

13. Para Anisidine 3 Sulfonic Acid (PA3SA)

Manufacturing Process:

Sulfonation of P-Anisidine:

In a Sulfonator take Oleum 23% Charge PA at 50-55ºC temp in 5 to 6 hrs 120ºC temp and maintain for 8 hrs cool to 90ºC temp and reaction mass is transferred into an isolation vessel containing water. Temp rise to 70ºC Cool to 35ºC temp it is filtered and centrifuges to get the product PA2SA.

Chemical Reaction:

C_7H_9NO		$H_2S_2O_7$	⟶	$C_7H_9NO_4S$		H_2SO_4
P-Anisidine	+	Oleum		PA2SA	+	Sulfuric Acid
123		178		203		98

Mass Balance:

Mass Balance of Para Anisidine 3 Sulfonic Acid

INPUT	KG		OUTPUT	KG
Para Anisidine	625	→ Sulphonation Vessel		
Sulphuric Acid	812	→ Sulphonation Vessel		
ODCB	2200	→ Sulphonation Vessel		
Soda Ash	920	→ Sulphonation Vessel		
		Sulphonation Vessel → 4557		
Water	5600	→ Distillation	→ ODCB Recovered	2110
		Distillation → 8047		
		→ Isolation		
		Isolation → 8047		
		→ Filteration	→ Effluent	6170
		Filteration → 1877		
		→ Drying & Packing	→ Drying loss	877
		→ Drying & Packing	→ Para Anisidine 3 Sulfonic Acid	1000
Total	**10157**			**10157**

14. Sulfo OAVS

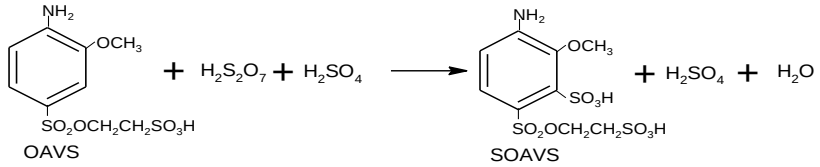
Manufacturing Process:

Sulphonation: The sulphonation is carried out in a C.I. Sulphonator; Ortho anicidine Sulfo VS is heated with Sulfuric Acid and Oleum (65%) at a temperature of 50°C, Sulphonation takes place and Sulpho orthoanicidinevinyl sulphone is formed. Check acidity of S/mass and the sulphonated mass is blown in to the drawning vessel.

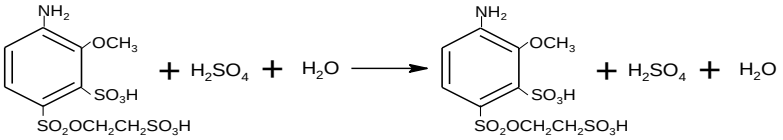
Drawning: The drowning is carried out in MSRLTL vessel. Take water and ice in drowning vessel and charge s/mass dumping in at 5 C temperatures the ice and water then charge KCl in it and precipitate the SOAVS and then filtrate it in MSRLTL nutch.

Chemical Reaction:

Sulphonation



Drawning



[Aniline-(2-methoxyphynyl 3- Ethyl sulfonyl sulphate-2-Sulfonic Acid]

Mass Balance:

Mass Balance of Sulfo OAVS

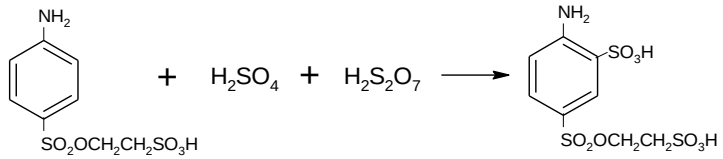
INPUT	KG		OUTPUT	KG
OAVS	833	→ Sulphonation Vessel		
Oleum (23%)	1475	→ Sulphonation Vessel		
Sulphuric Acid	1208	→ Sulphonation Vessel		
		Sulphonation Vessel → 3516		
KCl	1300	→ Drawing		
Ice	6654	→ Drawing		
		Drawing → 11470		
		Filteration & Centrifusing →	Spent Acid	9760
Water	1000	→ Filteration & Centrifusing	Effluent	1170
		Filteration & Centrifusing → 1540		
		Drying & Packing →	Drying loss	540
		Drying & Packing →	Sulfo OAVS	1000
Total	**12470**			**12470**

15. Sulfo VS

Manufacturing Process:

Vinyl Sulphone Ester is charged in to sulphuric acid below 30°C. Then charge Oleum 65% in it & dumps this sulpho mass in ice and water & salted out by potassium chloride. Then filter it and centrifuge it. The final product is packed as a Sulpho VS.

Chemical Reaction:



Mass Balance:

Mass Balance of Sulfo OAVS

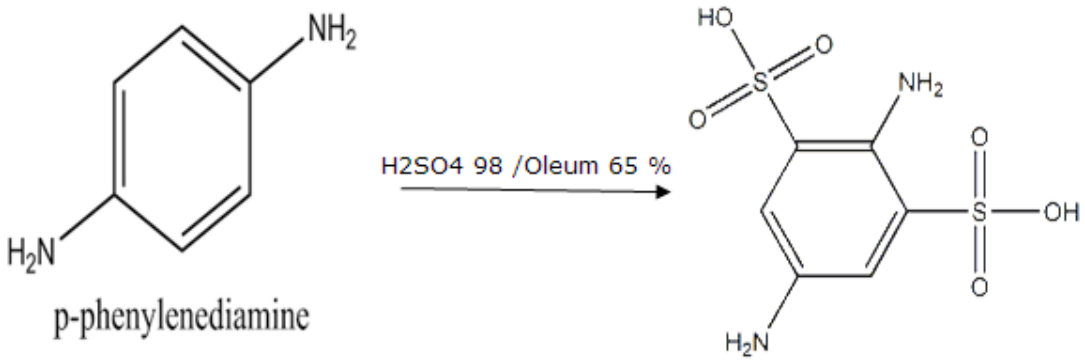
INPUT	KG		OUTPUT	KG
Vinyl Sulphone	780	→ Sulphonation Vessel		
Oleum Acid (65%)	650	→ Sulphonation Vessel		
Sulphuric Acid	810	→ Sulphonation Vessel		
		2240		
KCl	1100	→ Drawing		
Ice	2500	→ Drawing		
		5840		
		Filteration & Centrifusing	→ Spent Acid	4300
Water	1000	→ Filteration & Centrifusing	→ Effluent	1000
		1540		
		Drying & Packing	→ Drying loss	540
		Drying & Packing	→ Sulfo OAVS	1000
Total	**6840**			**6840**

16. Para Phenylenediamine 2.5 Disulfonic Acid (PPD2,5DSA)

Manufacturing Process:

H_2SO_4 98% is charged in Sulphonator vessel Charged PPD & Oleum 65. After 8 hrs at temp 130 the reaction completes & the reaction mass is dumped into drowning vessel where water are added. After drowning, after cooling mass is filtered through Nutch filter. The product remains at the top of Nutch filter & the filtrate sent to effulent treatment plant. The product from the Nutch filter is taken into the centrifuge. After centrifuging, the product is packed & dispatched.

Chemical Reaction:



Mass Balance:

Mass Balance of Para Phenylenediamine 2.5 Disulfonic Acid

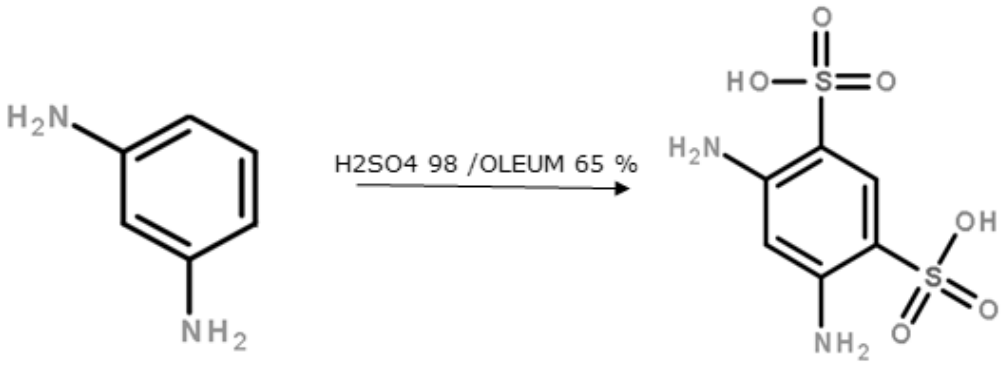
INPUT	KG		OUTPUT	KG
H2SO4 98 %	2000	→ Sulphonation Vessel		
OLEUM 65 %	1750	→ Sulphonation Vessel		
PPD	500	→ Sulphonation Vessel		
		Sulphonation Vessel → 4250		
Water	2000	→ Drawing		
Ice	2000	→ Drawing		
		Drawing → 8250		
		Filteration & Centrifusing	→ Spent Acid	6300
Water	1000	→ Filteration & Centrifusing	→ Effluent	1500
		Filteration & Centrifusing → 1450		
		Drying & Packing	→ Drying loss	450
		Drying & Packing	→ PPD2,5DSA	1000
Total	**9250**			**9250**

17. Meta Phenylene Diamine 4.6 Di-sulfonic Acid (MPD4,6DSA)

Manufacturing Process:

H_2SO_4 98% is charged in Sulphonator vessel Charged MPD & Oleum 65%. After 8 hrs AT TEMP 130 the reaction completes & the reaction mass is dumped into drowning vessel where water are added. After drowning, after cooling mass is filtered through Nutch filter. The product remains at the top of Nutch filter & the filtrate sent to effluent treatment plant. The product from the Nutch filter is taken into the centrifuge. After centrifuging, the product is packed & dispatched.

Chemical Reaction:



Mass Balance:

Mass Balance of Meta Phenylene Diamine 4.6 Di-sulfonic Acid

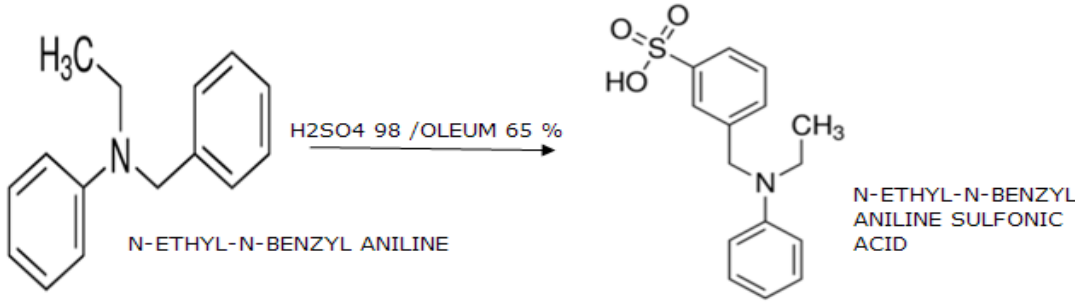
INPUT	KG		OUTPUT	KG
H2SO4 98 %	1000	→ Sulphonation Vessel		
OLEUM 23 %	975	→		
OLEUM 65 %	2300	→		
MPD	675	→		
		4950 ↓		
Water	4000	→ Drawing		
Ice	1000	→		
		9950 ↓		
		Filteration & Centrifusing	→ Spent Acid	8000
Water	1000	→	→ Effluent	1500
		1450 ↓		
		Drying & Packing	→ Drying loss	450
			→ MPD4,6DSA	1000
Total	**10950**			**10950**

18. N-Ethyl-N-Benzyl Aniline Sulfonic Acid (EBAMSA)

Manufacturing Process:

H_2SO_4 98% is charged in Sulphonator vessel Charged EBA [Ethyl Benzyl Aniline] & Oleum 65%. After 12 hrs AT temp 60 the reaction completes & the reaction mass is dumped into drowning vessel where ice are added. After drowning, added caustic lye or soda ash to bring acidity to 15 to 18% after cooling mass is filtered through Nutch filter. The product remains at the top of Nutch filter & the filtrate sent to effluent treatment plant. The product from the Nutch filter is taken into the centrifuge. After centrifuging, the product is packed & dispatched.

Chemical Reaction:



Mass Balance:

Mass Balance of EBAMSA(N-Ethyl -N-Benzyl Anilinne Sulphonic Acid)

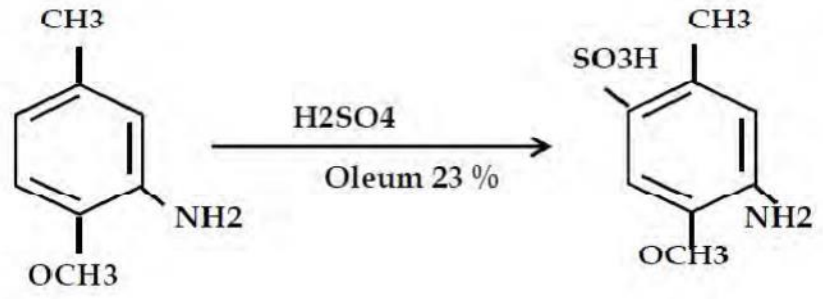
INPUT	KG		OUTPUT	KG
H2SO4 98 %	1000	→ Sulphonation Vessel		
OLEUM 65 %	900	→		
EBA	835	→		
		2735 ↓		
Water	3000	→ Drawing		
Ice	1000	→		
Soda Ash	500			
		7235 ↓		
		Filteration & Centrifusing	→ Spent Acid	6435
Water	1000	→	→ Effluent	500
		1300 ↓		
		Drying & Packing	→ Drying loss	300
			→ EBAMSA	1000
Total	**8235**			**8235**

19. Para Cresidine Ortho Sulfonic Acid (PCOSA)

Manufacturing Process:

In a sulphonator charge sulphuric acid and add PCD. Cool the mass and slowly charge Oleum 23% at elevated temp. Stir for a hr. and heat to required temp. Dump the mass in ice water. Free stir and filter the mass. Collect wet cake as finished product.

Chemical Reaction:



Mass Balance:

Mass Balance of Para Cresidine Ortho Sulfonic Acid(PCOSA)

INPUT	KG		OUTPUT	KG
Para Cresidine	715	→ Sulphonation Vessel		
Sulphuric Acid	785	→ Sulphonation Vessel		
OLEUM 23 %	1900	→ Sulphonation Vessel		
		3400 ↓		
Water	1425	→ Drawing		
Ice	4000	→ Drawing		
Salt	400	→ Drawing		
		9225 ↓		
		Filteration & Centrifusing	→ Spent Acid	9370
Water	1500	→ Filteration & Centrifusing		
		1355 ↓		
		Drying & Packing	→ Drying loss	355
		Drying & Packing	→ PCOSA	1000
Total	**10725**			**10725**

20. Para Nitro Aniline Ortho Sulfonic Acid (PNAOSA)

Manufacturing Process:

Ammonolysis of PNCBOSA

Take Liquor Ammonia in an Autoclave. Then charge PNCBOSA and stir for 1 Hour. Close all valves & vents then heat to 135°C temperature and maintain for 12 hours. Then cool the mass to 100°C temperature and recover excess Ammonia.

Isolation & Filtration

Cool the mass to 35°C temperature and filter thru Nutsche Filter and then Centrifuge to get the product.

Chemical Reaction:

$C_6H_4NO_5SCl$		$2NH_3$	$NaOH$		$C_6H_5N_2O_5SNa$		NH_4Cl	$H2O$
PNCBOSA	+	Ammonia	Sodium Hydroxide	⟶	PNAOSA	+	Ammonium Chloride	water
237.5		34.00	40		240		53.50	18

NH_4Cl		$Ca(OH)_2$		$2NH_3$		$CaCl_2$		$2H_2O$
Ammonium Chloride	+	Calcium Hydroxide	⟶	Ammonia	+	Calcium Chloride	+	Water
53.50		74.00		34		111		36

Mass Balance:

Mass Balance of PNAOSA(4-Nitro Aniline-2-Sulphonic Acid)

INPUT	KG		OUTPUT	KG
PNCBOSA	1200	→ Ammonolysis Auto Clave		
Ammonia	450	→		
Caustic Soda	115	→		
Water	2200	3965 ↓		
Lime	500	→ Filteration		
Salt	650	→	→ Effluent	2900
		2215 ↓		
		Centrifuse	→ Effluent	785
		1430 ↓		
		Drying & Packing	→ Drying loss	430
			→ PNAOSA	1000
Total	**5115**			**5115**

21. Ortho Nitro Aniline Para Sulfonic Acid (ONAPSA)

Manufacturing Process:

Amidation of ONCBPSA

In an Autoclave take Ammonia liquor Charge ONCBPSA stir for 1 hr close all valves & vents & Then contents are heated to 155ºC temp and maintain for 10 hrs cool to 100ºC temp and recover excess ammonia.

Isolation

Reaction mass is transferred into an isolation vessel containing water and Alkali. Cool to 35ºC temp it is filtered and centrifuge to get the product ONAPSA.

Chemical Reaction:

$C_6H_4NO_5SCl$		$2NH_3$	⟶	$C_6H_6N_2O_5S$		NH_4Cl			
ONCBPSA	+	Ammonia		ONAPSA	+	Ammonium Chloride			
237.5		34.00		218		53.50			
NH_4Cl		$Ca(OH)_2$	⟶	$2NH_3$		$CaCl_2$		$2H_2O$	
Ammonium Chloride	+	Calcium Hydroxide		Ammonia	+	Calcium Chloride	+	Water	
53.50		74.00		34		111		36	

Mass Balance:

Mass Balance of ONAPSA-(Ortho Nitro Aniline Para Sulfonic Acid)

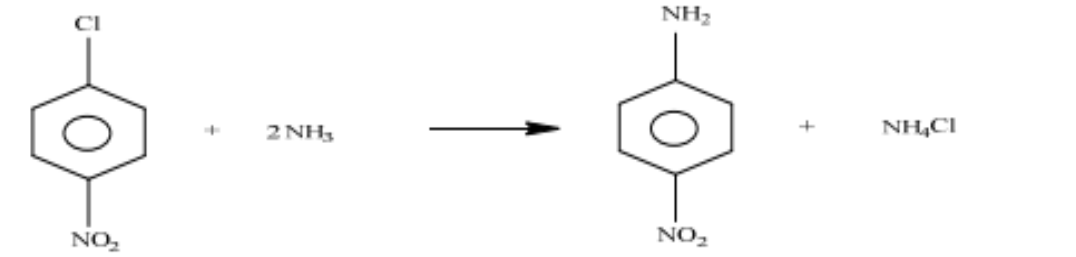
INPUT	KG		OUTPUT	KG
ONCBPSA	1100	→ Ammonolysis Auto Clave		
Ammonia	500	→		
Caustic Soda	400	→		
Water	2500			
		4500 ↓		
		Isolation		
		4500 ↓		
		Filteration	→ Effluent	2290
		2210 ↓		
		Centrifuse	→ Effluent	890
		1320 ↓		
		Drying & Packing	→ Drying loss	320
			→ ONAPSA	1000
Total	**4500**			**4500**

22. Para Nitro Aniline (PNA)

Manufacturing Process:

Para Nitro Chloro Benzene, recycled liquor Ammonia & anhydrous Ammonia are taken together in an autoclave for manufacturing of Para Nitro Aniline. Desired temperature and pressure maintain are 15 to 16 hours to complete then reaction. When reaction is over & excess of Ammonia is blown off through vent valve and scrubber in water to from 32% w/w Ammonia solution.

Chemical Reaction:



Mass Balance:

Mass Balance of PNA-(Para Nitro Aniline)

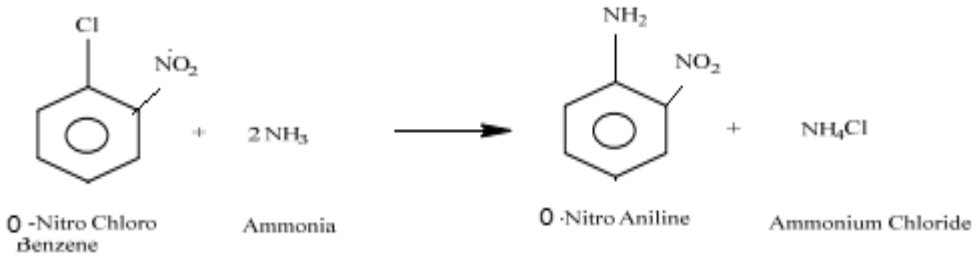
INPUT	KG		OUTPUT	KG
PNCB	1300	→ Ammonolysis Auto Clave		
Ammonia	1300	→		
Water	5200	→		
Lime	615	→		
		8415 ↓		
		Filtration	→ Process Waste	1282
		7133 ↓		
Salt	450	→ Isolation		
		7583 ↓		
		Filteration	→ Effluent	5323
		2260 ↓		
		Centrifuse	→ Effluent	940
		1320 ↓		
		Drying & Packing	→ Drying loss	320
			→ PNA	1000
Total	**8865**			**8865**

23. Ortho Nitro Aniline (ONA)

Manufacturing Process:

Ortho Nitro Chloro Benzene, recycled liquor Ammonia & anhydrous Ammonia are taken together in an autoclave for manufacturing of Para Nitro Aniline. Desired temperature and pressure maintain are 15 to 16 hours to complete then reaction. When reaction is over & excess of Ammonia is blown off through vent valve and scrubber in water to from 32% w/w Ammonia solution.

Chemical Reaction:



Mass Balance:

Mass Balance of ONA-(Ortho Nitro Aniline)

INPUT	KG		OUTPUT	KG
ONCB	1300	→ Ammonolysis Auto Clave		
Ammonia	1300	→		
Water	5200	→		
Lime	615	→		
		8415 ↓		
		Filtration	→ Process Waste	1282
		7133 ↓		
Salt	450	→ Isolation		
		7583 ↓		
		Filteration	→ Effluent	5323
		2260 ↓		
		Centrifuse	→ Effluent	940
		1320 ↓		
		Drying & Packing	→ Drying loss	320
			→ ONA	1000
Total	**8865**			**8865**

24. 4-Amino Azobenzene-4-Sulfonic Acid (PAABSA)

Manufacturing Process:

Aniline OMEGA: Take Sodium Bi Sulfite solution and add Formaldehyde solution in it. Adjust pH 7, stir 1 hour. Charge Aniline oil at RT and raise temp 50c. Maintain temp for 2 hours. Check TLC. Ok. Cool it RT.

Filtration: Filter through Nutch and then Centrifuge to get the material.

Diazotization: Take water + HCl, add sulfanilic acid. Stir 30 min. cool it 0-5C with ice and add sodium nitrite solution in it with maintain temp below 5C. Stir 2 hours with SI and CR +ve.

Coupling: Take water in vessel and dissolve Aniline Omega in it. Cool it below 5C. Add above diazo in it with maintain pH 6.5 with bicarb and temp below 10C. Stir 4-5 hours, check spot and isolate with salt.

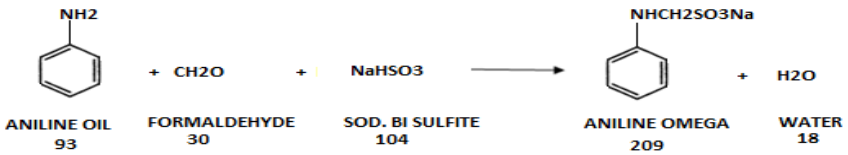
Filtration: Filter through Nutch and then Centrifuge to get the material.

Hydrolysis: Take water and add Sulfuric acid in it. Raise temperature 95^0C. Charged coupled mass in it with maintain temperature 95-100C. After charging maintain temp for 4 hours, check TLC. Ok.

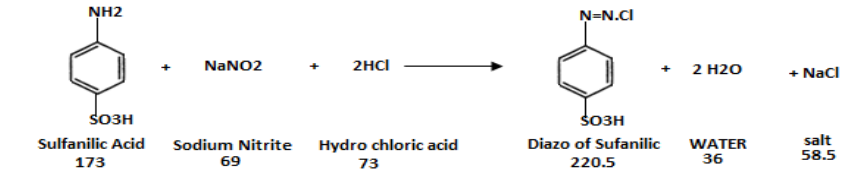
Filtration: Filter through Nutch and then Centrifuge to get the material.

Chemical Reaction:

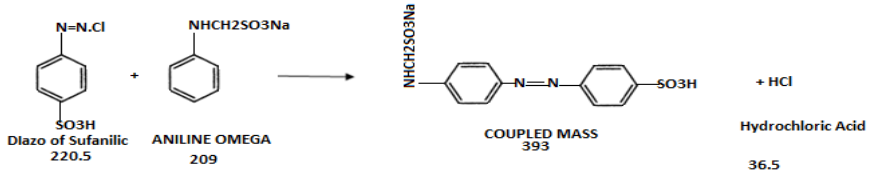
STAGE 1 ANILINE OMEGA



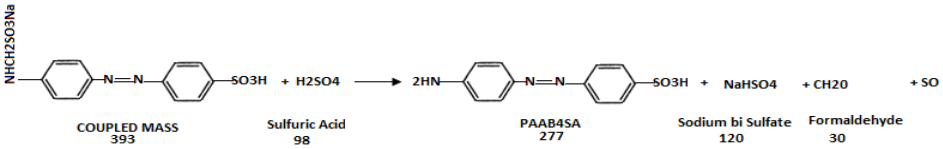
STAGE 2 DIAZO OF SULFANILIC



STAGE 3 COUPLING



STAGE 4 HYDROLYSIS



Mass Balance:

Mass Balance of 4-Amino Azobenzene-4-Sulfonic Acid

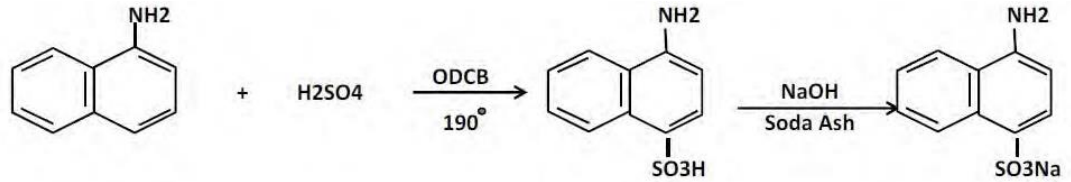
INPUT	KG		OUTPUT	KG
Liq. Sodium Bi sulfite	1550	→ Dumping Reactor		
Aniline Oil	500	→		
Formaldehyde	500	→		
Salt	500	→		
		3050 ↓		
		Filteration	→ Effluent	1450
		1600 ↓		
Water	450	→ Diazotization		
Sulfanilic acid	825	→		
HCl	550	→		
ICE	1500	→		
Sodium Nitrite	335	→		
		5260 ↓		
Water	900	→ Coupling		
Sodium Bi carbonate	550	→		
ICE	1500	→		
Salt	1200	→		
		9410 ↓		
Water	900	→ Hydrolysis		
Sulfuric Acid 98 %	750	→		
Steam	500	→		
		11560 ↓		
		Filteration	→ Effluent	9860
		1700 ↓		
		Drying & Packing	→ Drying loss	700
			→ PAAB4SA	1000
Total	**13010**			**13010**

25. Sodium Naphthionate (SN)

Manufacturing Process:

Alpha Naphthyl Amine is Sulphonated with Sulphuric Acid in ODCB at higher temp convert Naphthionic acid. Distill ODCB with water as azeotropic mixturs, followed by neutralization with sodium Carbonate (Soda Ash). Collect 1st cut ODCB from bottom and send for Acid treatment (AT). Filter the mass. Collect in isolation vessel and Cool the mass. Filter it in Nutch & CF it gives cold water wash to get Sodium Naphthionate. Collect filtrate take in Naphthionate isolation vessel add dil. Sulphuric acid. Filter the mass and collect W/C as NA. Charge collected NA in a vessel.

Chemical Reaction:



Mass Balance:

Mass Balance of Sodium Naphthionate(SN)

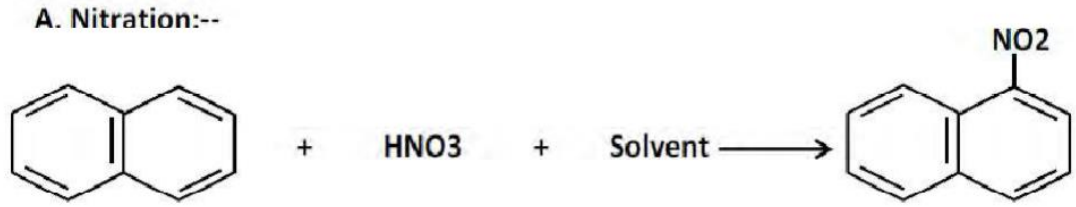
INPUT	KG		OUTPUT	KG
Alpha naphthyl Amine	800	→ Sulphonation		
Sulphuric Acid	475	→ Sulphonation		
ODCB	2000	→ Sulphonation		
		3275		
Soda Ash	1100	→ Neutralization		
Water	4000	→ Neutralization		
		8375		
		Sepration	→ Water	4500
		3875		
Sulphuric Acid	400	→ Acid Treatment		
		4275		
Soda ash	400	→ Netralization		
Water	2000	→ Netralization		
		6675		
		Isolation		
		6675		
		Sepration	→ Water	3230
		3445		
		Distillation	→ ODCB	1950
		1495		
		Drying & Packing	→ Drying loss	495
			→ Sodium Naphthionate	1000
Total	**11175**			**11175**

26. Alpha Naphthylamine

Manufacturing Process:

Alpha Naphtyl Amine is synthesis by nitration of Naphthalene in inert solvent with weak Nitric Acid, separate excess Nitric Acid and water. Neutralize Nitromass with alkali and use for further step. Generated weak Nitric Acid concentrated up to required concentration and use for further Nitration by addition of required excess quantity for the further batches.

Chemical Reaction:



Mass Balance:

Mass Balance of Alpha Naphthyl Amine

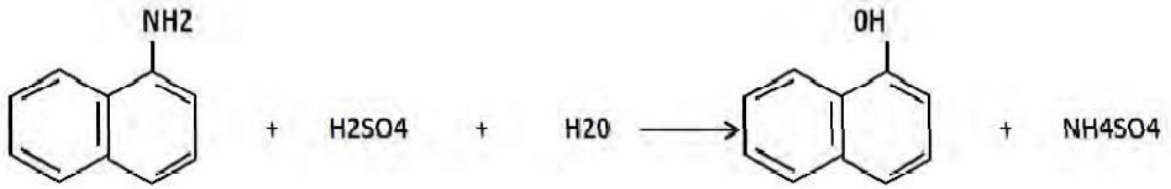
INPUT	KG		OUTPUT	KG
Naphthalene	1100	→ Nitration		
Nitric Acid (60%)	2000	→ Nitration		
ODCB	3500	→ Nitration		
Water	1000	→ Nitration		
		Nitration → 7600		
		Sepration	→ Weak Nitric Acid	3000
		4600		
Soda Ash	1000	→ Neutralization		
Water	3000	→ Neutralization		
		Neutralization → 8600		
		Sepration	→ Water	3730
		4870		
		Distillation	→ ODCB	3410
		1460		
		Drying & Packing	→ Drying loss	460
		Drying & Packing	→ Alpha Naphthyl Amine	1000
Total	**11600**			**11600**

27. Alpha Naphthol

Manufacturing Process:

Take ANA in GLR or Lead line vessel melt it. Add Sulphuric acid and slowly add water, heat it at elevated temperature. Maintain temp for several hours. Cool it and Filter it in nutch as finished crude alpha Naphthol. Make vacuum distillation to get pure Alpha Naphthol.

Chemical Reaction:



Mass Balance:

Mass Balance of Alpha Naphthol

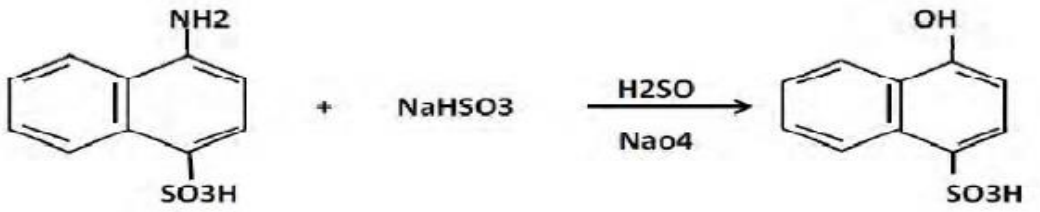
INPUT	KG		OUTPUT	KG
Alpha naphthyl Amine	1100	→ Sulphonation		
Sulphuric Acid	850	→ Sulphonation		
Water	5500	→ Sulphonation		
		7450 ↓		
Water	1500	→ Filter & Washing	→ Effluent	5750
		3200 ↓		
		Centrifuge	→ Effluent	1650
		1550 ↓		
		Drying & Packing	→ Drying loss	550
		Drying & Packing	→ Alpha Naphthol	1000
Total	**8950**			**8950**

28. NW Acid

Manufacturing Process:

Sodium Naphthionate is condensed with Sodium Bisulphite at reflux temp for 48 hrs. Followed by Hydrolysis with Sulphuric acid to remove SO_2. SO_2 is scrubbed in soda ash solution and reuse for further batch. Hydrolyzed mass is neutralize and alkaline with Sodium Hydroxide (Caustic Lye) boil for removal of Ammonia. Cool it and remove isolated salt. Than isolate N. W. acid with dil. sulphuric acid/Hydrochloric acid. Filter it. Collect W/C and then dry the mass as N. W. Acid.

Chemical Reaction:



Mass Balance:

Mass Balance of N W Acid

INPUT	KG		OUTPUT	KG
Sodium Naphthionate	1410	→ SS vessel		
Sodium Bisulphite	1785			
Water Recycle	1800			
		↓		
H_2SO_4 (38%)	1850	→ Hydrolysis	→ SO2 gas	465
		↓		
		Separation SN	→ SN Reuse	65
		↓		
Caustic Lye	910	→ Expel of NH_3	→ NH3 gas	54
Water Recycle	1000	→		
		↓		
		Concentration	→ Water Recycle	1000
		↓		
		Filter	→ Process Sludge	55
		↓		
Hydrochloric Acid	955	→ Isolation		
		↓		
		Filter/CF	→ Waste Water	6576
		↓		
		Drying	→ Drying loss	495
			→ N W Acid	1000
Total	**9710**			**9710**

29. C Acid

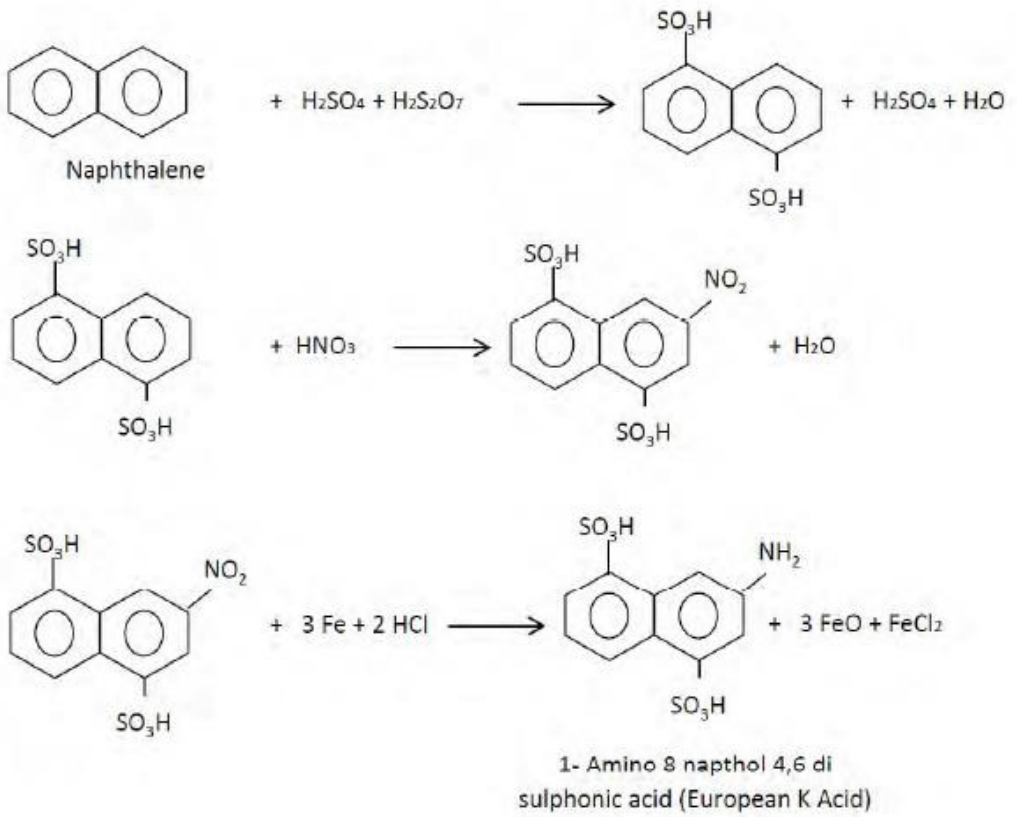
Manufacturing Process:

In this process sulphuric acid will be mixed with Naphthalene and oleum, then added in to Sulphonation reactor. The sulpho mass will be nitrated with nitric acid. This will be an exothermic reaction. It is necessary to keep the temperature maintain using chilling water in to the jacket. At the end of the reaction prepared Nitro mass will be neutralized.

Reduction of nitro solution will be done using iron powder, HCl and Water. Iron powder will be added during the reaction. Gradually nitro solution will be added into the reduction vessel. During the reaction Iron sludge will be generate.

Mass isolated with sulphuric acid. The final mass is filtered in a filter nutch and goes to centrifuge after wet cake is dried by centrifuging to get the product.

Chemical Reaction:



1- Amino 8 napthol 4,6 di sulphonic acid (European K Acid)

Mass Balance:

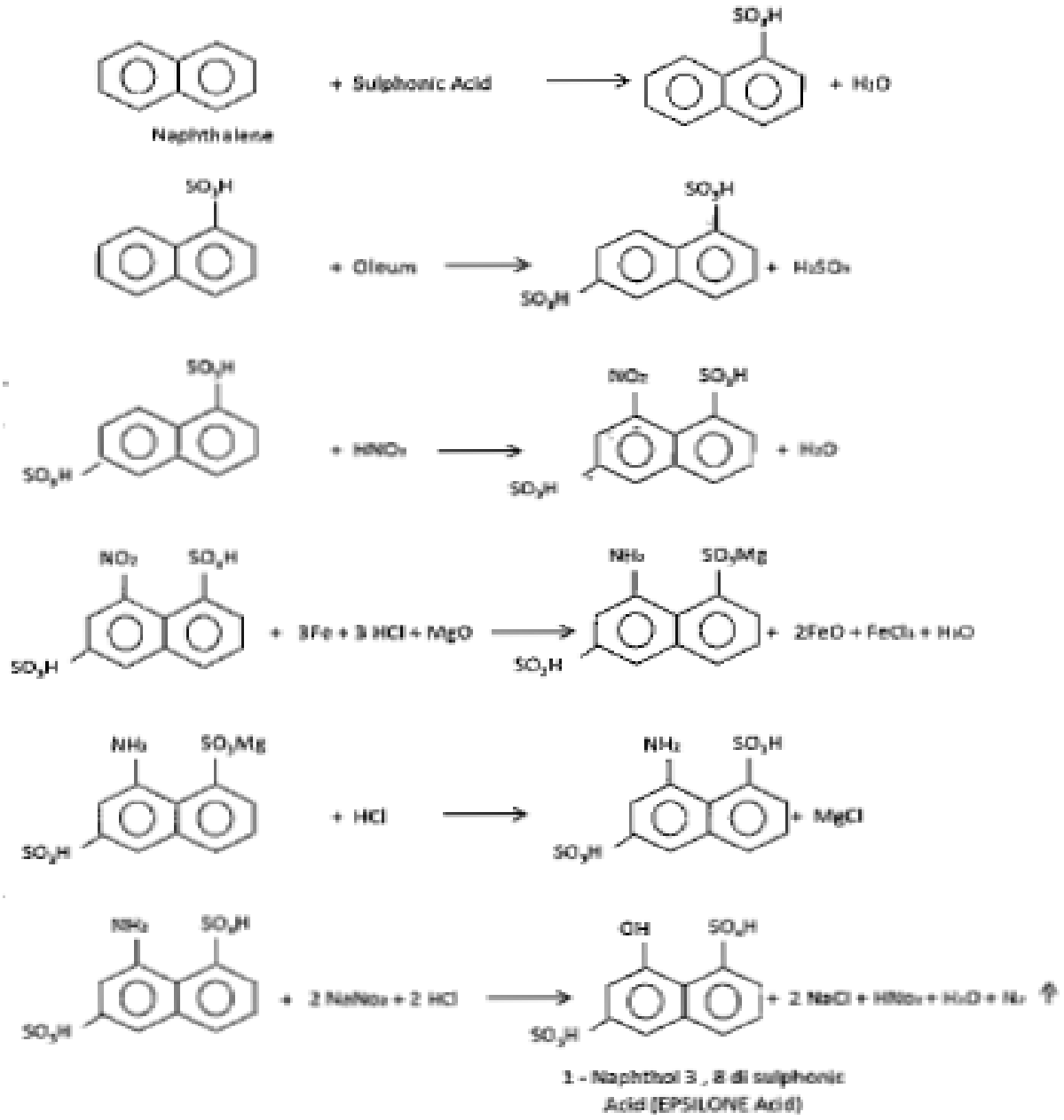
Mass Balance of C-Acid				
INPUT	**KG**		**OUTPUT**	**KG**
Naphthalene	1250	Sulfonation	SO2 gas	50
Sulphuric Acid(98%)	1250			
Oleum 65%	1350			
Nitric Acid	375	Nitration	NOx Gas	18
Water	2200	Drowning		
Mgo	350			
		Filter	Spent Acid (50-55%)	4150
		Centrifuge		
Water	2200	Reduction		
HCl	65			
Iron	510			
		Filtration	Iron Sludge	1875
Sulphuric Acid	350	Isolation		
		Filtration	Waste Water	2057
		Centrifuge	C Acid (1000 Kg Real)	1750
Total	**9900**			**9900**

30. Epsilon Acid

Manufacturing Process:

Sulphonation of Napthalene is carried out in presence of Sulphuric acid and Oleum. Nitric acid is reacted in presence of sulfo mass using Nitration. Nitro mass is reacted in presence of lime stone and Mgo by using neutralization, then filtration, reduction, Isolation, Centrifuge and Diazotization gives Epsilon Acid.

Chemical Reaction:



1 - Naphthol 3 , 8 di sulphonic Acid (EPSILONE Acid)

Mass Balance:

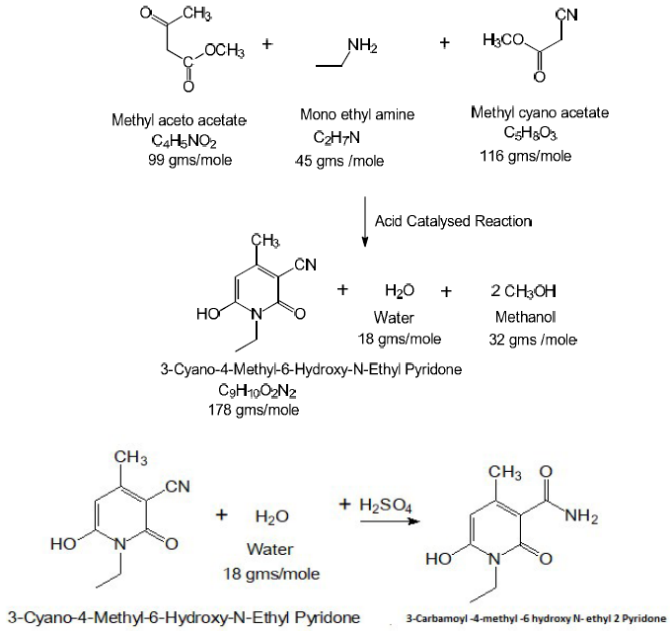
Mass Balance of Epsilon Acid								
INPUT	**KG**						**OUTPUT**	**KG**
Napthalene	1250	→	Sulfonation			→	SO2 gas	65
Oleum (65%)	1000	→						
Sulphuric Acid	1200	→						
			↓					
Nitric Acid	850	→	Nitration			→	NOx	15
			↓					
Lime Stone	1500	→	Neutralization					
Soda Ash	750	→						
Water	1000	→						
			↓					
Water	1200	→	Filter			→	Gypsum	3000
			↓					
Iron Powder	1100	→	Reduction					
HCl	225	→						
Water	1000	→						
			↓					
			Filtration			→	Iron Sludge	2250
			↓					
Sodium Nitrite	650	→	Diazotization					
HCl	315	→						
			↓					
			Filtration			→	Waste Water	5000
			↓					
			Centrifuge			→	Epsilon K Acid (1000 Kg Real)	1710
Total	**12040**							**12040**

31. 2-Pyridone

Manufacturing Process:

In the reactor mono ethyl amine and Methyl Cyano Acetate is added for condensation. Then mass is further condensate by Methyl Aceto Acetate Ester. Mass is sent for hydrolysis where it is hydrolyzed by Sulphuric acid. Then filter is sent into washing and filtration. Waste water is sent into ETP and then product is charged into dryer.

Chemical Reaction:



Mass Balance:

Mass balance of 2 Pyridone				
INPUT	**KG**		**OUTPUT**	**KG**
Ethyl Cyano Acetate	750	→ Condensation		
Methyl Cyno Acetate	800	→ Condensation		
Aceto Acetic Methyl Ester	735	→ Condensation		
		↓		
H_2SO_4	2550	→ Isolation		
		↓		
		Filteration	→ Spent Acid(60-65%)	3385
		↓		
H_2SO_4	2550	→ Hydrolysis		
		↓		
Ice	2200	→ Isolation		
		↓		
Water	1000	→ Filtration & Centrifuge	→ Spent Acid(60-65%)	4350
			→ Waste Water	1165
		↓		
		Drying & Packing	→ Drying Loss	685
			→ 2 pyridone	1000
Total	**10585**			**10585**

32. Ethyl Cyano Pyridone

Manufacturing Process:

In the reactor Mono Ethyl Amine and Ethyl Cyano Acetate is added for condensation. Then mass is further condensate by Methyl Aceto Acetate Ester. Then mass is sent for hydrolysis where it is hydrolyzed by Sulphuric acid. Then filter is sent into washing and filtration. Waste water is sent into ETP and then product is charged into dryer.

Mass Balance:

Mass balance of Ethyl Cyano Pyridone

INPUT	KG		OUTPUT	KG
Ethyl Cyno Acetate	750	→ Condensation		
Mono Ethyl Amine	800	→ Condensation		
		↓ 1550		
Methyl Aceto Acetate Ester	750	→ Condensation		
		↓ 2300		
H_2SO_4	2000	→ Hydrolysis		
		↓ 4300		
		Filteration	→ Spent Acid(60-65%)	2685
		↓ 1615		
Water	1000	→ Centrifuge	→ Waste Water	1265
		↓ 1350		
		Drying & Packing	→ Drying Loss	350
			→ Ethyl Cyano Pyridone	1000
Total	**5300**			**5300**

33. Diethyl Cyano Pyridone

Manufacturing Process:

In the reactor Mono Ethyl Amine and Diethyl Cyano Acetate is added for condensation. Then mass is further condensate by Methyl Aceto Acetate Ester. Then mass is sent for hydrolysis where it is hydrolyzed by Sulphuric acid. Then filter is sent into washing and filtration. Waste water is sent into ETP and then product is charged into dryer.

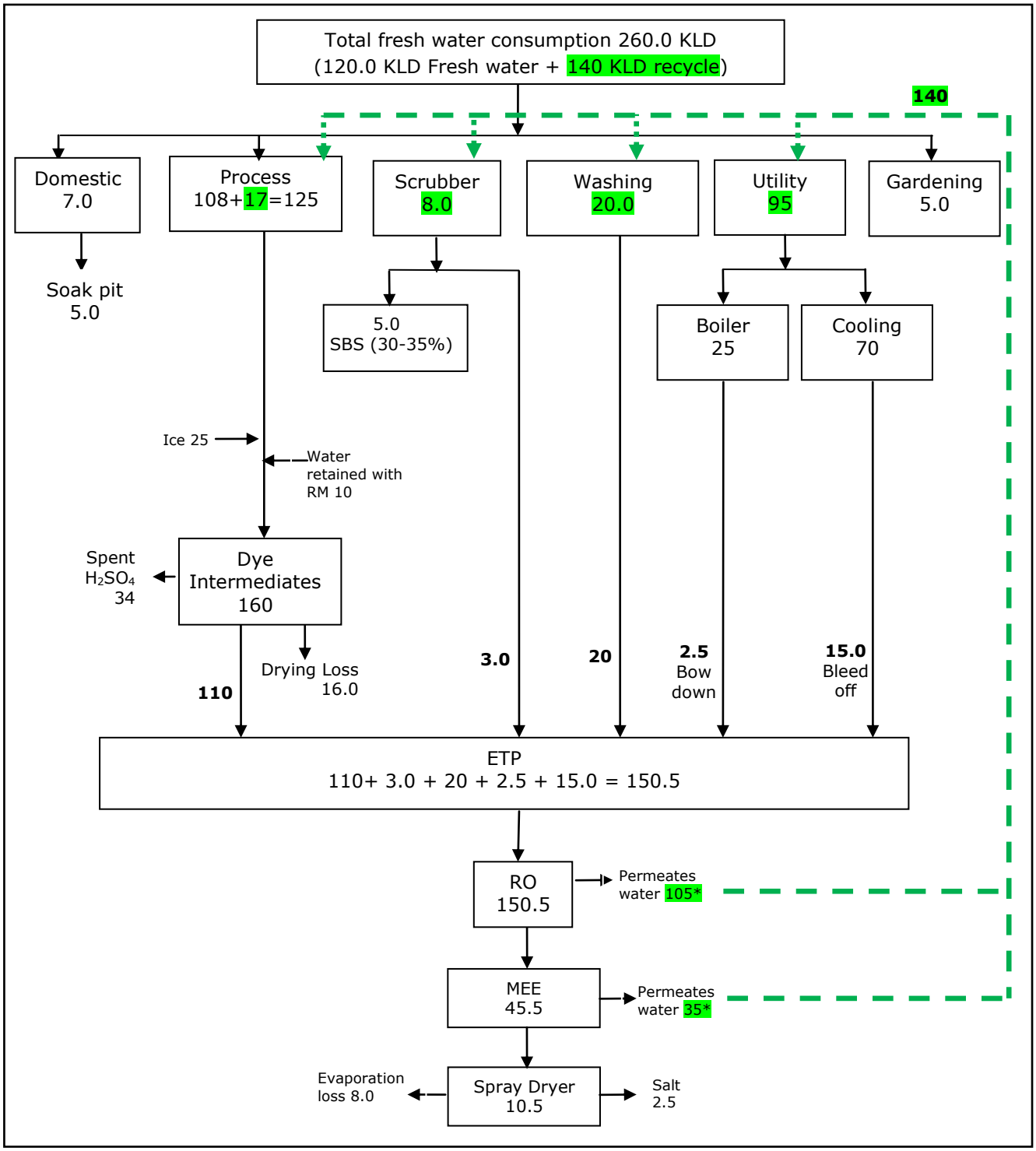
Mass Balance:

Mass balance of Di ethyl Cyano Pyridone

INPUT	KG		OUTPUT	KG
Di-Ethyl Cyno Acetate	910	Condensation		
Mono Ethyl Amine	800			
		1710		
Methyl Aceto Acetate Ester	750	Condensation		
		2460		
H_2SO_4	2100	Hydrolysis		
		4560		
		Filteration	Spent Acid(60-65%)	2945
		1615		
Water	1000	Centrifuge	Waste Water	1265
		1350		
		Drying & Packing	Drying Loss	350
			Di ethyl Cyano Pyridone	1000
Total	**5560**			**5560**

Annexure-III

Water Balance



Break up of Water Consumption& Waste Water Generation

Sr. No.	Source	Water Consumption (KLD)	Waste Water generation (KLD)
1.	**Domestic**	7.0	5.0
2.	**Green Belt**	5.0	--
3.	**Industrial**		
A	Process	125	110
B	Scrubber	7.0	3.0
C	Boiler	25	2.5
D	Cooling	70	15.0
E	Washing	20	20.0
	Total Industrial	**248**	**150.5**
	Total (1 +2 + 3)	**260**	**155.5**
	Less recycle	**140**	**--**
	Actual fresh water consumption	**120**	**155.5**

Annexure-IV

Hazardous waste generation and management

Sr. No.	Type of Waste	Category No. as per HWM rules, 2016	Quantity	Method of Disposal
1.	ETP Waste	35.3	100 MT/month	Collection, Storage, Transportation, Disposal at TSDF site.
2.	Salt of Spray Dryer	35.3	65 MT/month	Collection, Storage, Transportation, disposal at TSDF site.
3.	Iron Sludge	26.1	350 MT/month	Collection, Storage, Transportation, disposal at TSDF site or to Cement industries for co-processing.
4.	Gypsum Waste	26.1	225 MT/month	Collection, Storage, Transportation, disposal at TSDF site or to Cement industries for co-processing.
5.	Used Oil	5.1	1.0 KL/Year	Collection, Storage, Transportation, sell to registered re-processors or use for lubrication within premises.
6.	Discarded Containers/ Liners/Bag	33.1	10.0 MT/month	Collection, Storage, Transportation, Sell to registered recyclers.
7.	Spent Acid	B-15	885 MT/month	Collection, Storage and partly reuse in-house and partly will be sold to actual users under Rule-9.

Annexure-V

Details of stack and APCM

Sr. No.	Stack attached to	Fuel Type	Stack Height, in m	APC measures	Probable emission
Flue Gas Stacks					
1.	Steam Boiler-1 (3 TPH)	Imported Coal / Briquette 15 TPD	30	Cyclone separator & Bag Filter	SPM<150 mg/Nm^3 SO_2<100 ppm NO_x<50 ppm
2.	Steam Boiler-2 (3 TPH)	Imported Coal / Briquette 15 TPD	30	Cyclone separator & Bag Filter	SPM<150 mg/Nm^3 SO_2<100 ppm NO_x<50 ppm
3.	Thermic Fluid Heater 2.5 Lakhs Cal/hr.	Imported Coal / Briquette 2.0 TPD	30	Cyclone separator & Bag Filter	SPM<150 mg/Nm^3 SO_2<100 ppm NO_x<50 ppm
4.	Hot Air Generator-1 (10 Lakhs Kcal/hr.)	Imported Coal / Briquette 7.5 TPD	30	Cyclone separator& Bag Filter	SPM<150 mg/Nm^3 SO_2<100 ppm NO_x<50 ppm
5.	Hot Air Generator-2 (15 Lakhs Kcal/hr.)	Imported Coal / Briquette 12.0 TPD	30	Cyclone separator& Bag Filter	SPM<150 mg/Nm^3 SO_2<100 ppm NO_x<50 ppm
6.	D G Set (250 kVA)	HSD – 50 lit/hr.	11	Adequate Stack Height	SPM<150 mg/Nm^3 SO_2<100 ppm NO_x<50 ppm
Process Gas Stacks					
1.	MPP-1* (Sulphonation)	--	11	Two stage Alkali Scrubber	SO_2<40 mg/Nm^3
2.	MPP-2* (Sulphonation)	--	11	Two stage Alkali Scrubber	SO_2<40 mg/Nm^3
3.	MPP-3* (Other Products)	--	11	Two stage Alkali Scrubber	SO_2<40 mg/Nm^3 NO_X<25 mg/Nm^3
4.	Spin Flash Dryer-2 Nos. (300 Kg/hr. each)	--	21	In built cyclone & bag filter	PM<45 mg/Nm^3
5.	Spray Dryer For effluent (500 lit/hr.)	White Coal/ Imported Coal 4.0 TPD	21	In built cyclone & bag filter	SPM<150 mg/Nm^3 SO_2<100 ppm NO_x<50 ppm

*Multipurpose Plant

અનુક્રમણિકા નંબર - ૨

સબ-રજીસ્ટ્રાર કચેરી

S.R.O - KHAMBHAT

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ગામનુ નામ	દસ્તાવેજનો પ્રકાર અને અવેજ (ભાડા પટાના કિસ્સામાં આકાર પટે આપનાર અથવા પટે રાખનાર આપે છે તે જણાવવું)	સર્વે નંબર પેટા વિભાગ નંબર અને ઘર નંબર (જો કંઈ પણ હોય તો)	ક્ષેત્રફળ	આકાર અથવા જુડી આપવામાં આવે ત્યારે તે.	દસ્તાવેજ કરી આપનાર પક્ષકારનું નામ અથવા દિવાની કોર્ટના હુકમનામા અથવા આદેશના સંબંધમાં પ્રતિવાદીનું નામ	દસ્તાવેજ કરી લેનાર પક્ષકારનું નામ અથવા દિવાની કોર્ટના હુકમનામા અથવા આદેશના સંબંધમાં વાદીનું નામ	સહીની તારીખ નોંધણીની તારીખ	અનુક્રમ, વોલ્યુમ અને પૃષ્ઠ નંબર	શેરો
નેજા	માલિકી ફેરફાર/વેચાણ રૂ.1815500.00	ખાતા નં.731 જુનો રે.સ.નં. 444 જેનો નવો રે.સ.નં. 399 જેનુ કુલ ક્ષે. 3.49.99 હે.આરે.ચો.મી પૈકી ભોપાભાઈ ગગજીભાઈ ભરવાડ વાળુ ક્ષે. 0.50.00 હે.આરે.ચો.મી. દક્ષીણ પશ્ચીમ ભાગ તરફનુ (ઔધોગીક હેતુ) માટેની બીન ખેતીની જમીન Survey No-399, Total Land area, 34999 m^2, out of which 5000 m^2 towards West side land for Industrial NA			ભોપાભાઈ ગગજીભાઈ ભરવાડ Sale by: Bhopabhai Gagajibhi Bharvad	જય ગણેશ ઇન્ડસ્ટ્રીઝ ના ભાગીદારોઃ- રવિ જયકિષ્ના પટેલ ભરતભાઇ ભોપાભાઇ ભરવાડ પીયુષ રતીલાલ શાહ Buyer : Ravi Jaykrishna Patel on behalf of Jay Ganesh Industries	07/06/2021 07/06/2021	1160	

ઈ-પેમેન્ટ થી ટ્રાન્ઝેક્શન ID No. **20210608641456073** Date. **08-06-2021** થી મળેલ છે.

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નકલ ફી	રૂ. ૨૦

BHARATBHAI BHOPABHAI BHARVAD ની તારીખ 08/06/2021 ના રોજની

અરજી નંબર : 8012021228221

તારીખ : 08/06/2021

THE SEAL OF THE SUB-REGISTRAR ... BOMBAY

આ નકલ સીસ્ટમ જનરેટેડ હોવાથી સબરજીસ્ટ્રારની સહીની જરૂરિયાત નથી. કોમ્પ્યુટર જનરેટેડ અનુક્રમણિકા નં :૨ ની નકલમાં કોઈ ફેરફાર/ચેડા કરવા કે ખોટી નકલ બનાવવી ફોજદારી ગુન્હો બને છે.

Self attested/સ્વ-પ્રમાણિત :

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