

EC COMPLIANCE REPORT

For

**M/s. Oric Organic
Chemicals Pvt. Ltd,
At AURIC City, Plot
No.9. Sector 1, Village- Shendra,
Aurangabad**

EC Compliance Report

Sr. No.	Conditions	Compliance
1.	PP to submit registered affidavit for not violating any requirement of EIA Notification, 2006 as amended from time to time	Register Affidavit for not violating is attached as Annexure 1 . As per EIA Notification, 2006
2.	PP to relook into the lay out plan, provide green belt all along the periphery with minimum 5 meter width and submit revised layout plan showing internal roads with six meter width and nine meter turning radius, provision of cul-de-sac at dead ends of the internal roads if any, location of pollution control equipment, parking areas, 33% green belt with its dimensions, rain water harvesting structures (locations with dimensions), storm water drain lines, along with index and area statement showing calculations for each area and cross sections of storm water drain and rain water harvesting pits etc.	Revised layout is attached as Annexure 2 .
3.	PP proposes ZLD effluent Treatment Plant. PP get the design of ETP vetted by the reputed institute like IIT, NIT etc. before commissioning of the manufacturing.	The work has been assigned to Dr. Parag Gogate, Professor of Chemical Engineering, ICT, Mumbai. Letter of Acknowledgement is attached as Annexure 3 .
4.	PP to carry out HAZOP for all products/process stages and submit HAZOP report along with proposed mitigation measures/recommendations and undertaking for compliance of all recommendations of the HAZOP study	We undertake that, we will comply all recommendations of the HAZOP Study with particular reference to the action suggested and summarised under section 5 of the study. The HAZOP Study Report was made by Mr. Subhas L. Bonde. Bonde Technical Services, Thane. HAZOP Study Report is attached as Annexure 4 .
5.	PP using many odorous compounds. PP to prepare odor monitoring and control plan including fence monitoring for all such odorous compounds to ensure nuisance to the adjacent areas.	Prepared odor Management and control, plan note attached as Annexure 5 .
6.	PP to provide mobile toilet or bio toilet during construction phase and submit revised EMP costing considering realistic cost	We undertake that, we will provide bio-toilets during construction phase. Undertaking enclosed as Annexure 6 .
7.	PP to ensure to deploy well trained regular employees on all critical/hazardous operations and storages of hazardous chemicals instead of contract workers. Regular safety training to be provided to all such employees.	We undertake that, we will deploy well trained regular employees on all operations & storage of hazardous chemicals & regular safety training will be provided to them.
8.	PP to prepare chemical compatibility chart of all chemicals and finished products handled, stored on site and ensure its storage/handling as per compatibility.	Chemical Compatibility chart given as follows:


COMPATIBILITY/ REACTIVITY HAZARD MATRIX

Chemicals Mixing With →	Acetic Acid, Glacial.	Air, Compressed.	Manganese (II) Sulfate Monohydrate.	Nitrogen.	P-Nitro Toluene.	Sodium Hydroxide Soln.	Sulfuric Acid, Fuming.	Sulfuric Acid, Spent.	Water.
Acetic Acid, Glacial.									
Air, Compressed.	C								
Manganese(II) Sulfate Monohydrate.	C	Y							
Nitrogen.	Y	Y	Y						
P-Nitro Toluene.	C	C	N	Y					
Sodium Hydroxide Soln.	N	C	N	Y	N				
Sulfuric Acid, Fuming.	N	C	C	Y	N	N			
Sulfuric Acid, Spent.	N	C	C	Y	N	N	C		
Water.	Y	Y	C	Y	Y	C	C	C	

9.	PP to provide Continuous Online Monitoring System connected to the servers of CPCB and MPCB, PP to include VOCs monitoring in the schedule ambient air monitoring plan.	We have placed Order for same and the same is under installation
10.	PP to submit VOCs emission control and its management plan.	The only VOC is acetic acid. It is used in small amounts to lower the pH for the reduction reaction. The entire transfer is under closed conditions. VOCs emission control and Management plan enclose as Annexure 7 .
11.	PP ensure to provide adequate space for parking of all types of vehicles including external vehicles carrying raw material and finished products. No vehicle shall be parked on the public road.	A total area of 2130.47 sqm. Is allocated for parking which is 10. % of total plot area. This is in line with the conditions of the AITL.
12.	PP to ensure to prepare and implement On-site and Off-site emergency handling plan. The plan shall be prepared based on the HAZOP and Risk Assessment. Required training to all employees be provided on the emergency handling plans.	The work has been assigned to Mr. Bonde. Letter of acknowledgement is enclose as Annexure 8 .
13.	PP to complete rain water harvesting facility before the commissioning of the manufacturing activity.	We undertake that, rainwater harvesting facility will be completed before commissioning of manufacturing activity. Undertaking is attached as Annexure 9 .
14.	PP to utilize CER funds for the development of public infrastructure in the vicinity of the project area in consultation with District Administration. PP to ensure effective outcome of the CER expenditure.	We undertake that, we will utilize our CER fund i.e. Rs. 1.575 cr. for development of public infrastructure in the vicinity of project in consultation with District administration or the AITL management. Undertaking is enclose as Annexure 10 .
15.	PP to provide solar energy for the illumination of common areas like administrative building, parking areas, streetlight etc.	We are proposing installation of photovoltaic cell based street lights.

SEIAA Conditions:

1.	PP Submitted that they have obtained plan approval from AITL dated 11.07.2023 and as per the plan the Plot area is 20562 sq. meter (33 %) is provided.	33% land is reserved for green belt.
2.	PP to undertake Miyawaki Plantation of native and indigenous trees such as Banyan, Peepal, Neem, Jamun and other suitable trees as per the Forest Department, Govt. of Maharashtra circular no SaVaVi-2019/C.R.3/F-11, dated 25 th June, 2019. This said plantation to be completed in the first year of operation of Environmental Clearance under expert guidance of Miyawaki experts/arborist.	We Undertaking that, we will completed Miyawaki Plantation of native and indigenous trees under the guidance of Miyawaki expert/arborist in the first year. Undertaking enclose as Annexure 11
3.	PP to strictly observe the Solid Waste Management Rules, 2016 as amended time to time.	Noted and agreed.
4.	PP to strictly observe the Hazardous and other Waste (Management & Trans Boundary Movement) Rules, 2016 as amended time to time.	Noted and agreed.
5.	PP to identify all sources of fugitive air pollution on site and provide pollution control measures to mitigate pollution and meet the standard parameters stipulated in the Environment (Protection) Rules, 1986 amended time to time.	Noted and agreed.
6.	PP to ensure storage of chemicals as per the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 amended time to time to ensure no release of any chemical to the atmosphere and leakage to the soil.	Noted and agreed.
7.	PP to ensure transport, storage, handling and use of the flammable/toxic chemicals as per conditions stipulated in license/approval of the Petroleum & Explosive Safety Organization (PESO).	Noted and agreed.
8.	PP to obtain approval and License from the Directorate of Industrial Health & Safety (DIHS) for proposed project and implement all condition stipulated there in. PP to carry out Safety Audit as stipulated in the Maharashtra Factories Rules, 1963 and ensure compliance of recommendation of the Audit.	As per Directorate of Industrial Health & Safety (DIHS) 1. We will obtain approval and License. 2. We will carry out Safety Audit as per Maharashtra Factories Rules, 1963
9.	PP to provide solar Energy for illumination of Administrative Building, Street Lights and parking Area.	Noted and agreed.
10.	PP to ensure use of briquette/bio coal/pellets/or any such suitable product derived from scientific processing of appropriate stream of dry waste/agricultural waste, not less than 50% of the total fuel requirement to the boiler.	Noted and agreed.
11.	PP to provide roof top Rain water Harvesting Facility.	Unit followed the given condition.
12.	PP to ensure that proposed project is ZLD.	The Project is ZLD
General Conditions:		
1.	The project proponent shall advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in the Marathi language of the local concerned within seven days of issue of this letter, informing that the project has been accorded Environmental Clearance and copies of Environmental Clearance letter are available with the Maharashtra Pollution Control	Unit followed the given condition.

	<p>Board, website of the company and may also be seen at Website at http://parivesh.nic.in</p>	
		
<p>II.</p>	<p>The project Proponent shall upload the status of compliance (soft Copies) of the conditions stipulated Environmental Clearance letter including monitoring data of air, water, soil, noise etc. on their website and shall update the same periodically. The half yearly compliance report shall simultaneously be submitted to the Maharashtra Pollution Controls Board, SEIAA and the Regional Office off MoEF&CC at Nagpur, on 1st June & 1st December of each calendar year.</p>	<p>Noted. Unit shall follow the condition.</p>
<p>III.</p>	<p>Separate fund shall be allocated for the implementation of Environmental Management Plan along with item wise break up and specific time line for its completion. The cost shall be included as part of the project cost. The funds earmarked for the environmental protection measures shall not be diverted for other purpose and year-wise expenditure should be reported to the MPCB and the SEIAA.</p>	<p>Unit has en-marked separate fund for environment management plan. Break-up of the same is as below.</p>

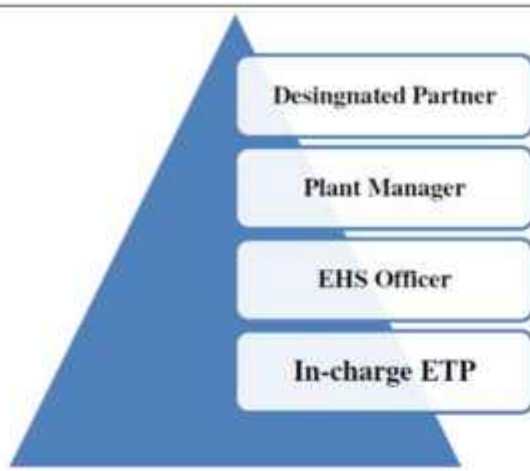
Construction Phase

Sr. no.	Attributes	Specific Measures	Budget in Rs. Lakh	Time line for 1/5 Implement	Responsibility
1.	Air	{ Water sprinkling & Dust suppression)	2.5	12 months or till completion of construction	Factory Manager
2.	Water	(Sanitation facility, Drinking water, Septic tank & Soak pit)	2.5		Factory Manager
3.	Noise	(Personal Protective Equipment's)			Executive
4.	Solid Waste & Hazardous Waste	(Storage facility and disposal as per law)	2		EHS
5.	Safety & Health	(Safety devices like PPE, etc. First aid facility, tie up with ambulance and hospital).	5		Executive EHS

Operation Phase

Sr. no.	Attributes	Specific Measures	Budget in Rs. Lakh	Time line for 1/5 Implement	Responsibility
6.	Air Pollution	Bag Filter & stack	1500	Start of commissioning to end of life of project	Factory Manager
7.	Water Pollution Control	ETP, STP	1700		Factory Manager
8.	Environment monitoring	Laboratory Equipment			Factory Manager
9.	Rain water Harvesting	RWH Tank & Piping network	15		Factory Manager
10.	Occupational Health	OHC Centre	8		Factory Manager
11.	Green Belt Development	Sampling, Manure & Land preparation			Executive
12.	Solid Waste Management		150		EHS
13.	Energy Saving Devices and Solar Power	Energy efficient Electric Motors, LED Bulbs	35		Factory Manager
14.	Solar Power	Solar panels and system	30		Factory Manager
15.	Safety & Fire Fighting	Fire Hydrants, Safety devices, Sensors, Fire pump & ambulance	100		Executive EHS

IV.	A Separate Environmental Management Cell with qualified personal shall be set up for implementation of the stipulated environmental safeguards.	Unit has formed separate environment management cell as below.
-----	---	--



S. No.	Designation	Proposed Responsibility
1.	Designated Partner	Overall Responsibility for Environment Management and legal compliance related to pollution control and environment safety.
2.	Plant Manager	Daily feedback from production team and keeping control on emissions to keep them within prescribed norms
3.	EHS Officer	Environmental health and safety (EHS) officers are responsible for all aspects of an organizations compliance with occupational and environmental laws and regulations.
4.	In-charge ETP	Monitoring to the efficiency of Effluent Treatment Plant & reporting higher authority time to time.

V.	In the event of failure of any pollution control equipment, the manufacturing activity shall be immediately stopped safety till the effective functioning of pollution control equipment's is regained.	Noted. Unit shall strictly follow the given condition.
VI.	PP to strictly follow conditions stipulated in the Consent to Establish/Operate issued by the Maharashtra Pollution Control Board.	Noted. Unit shall strictly follow the given condition.
VII.	PP to provide separate drains for storm water and effluent, and ensure that, the storm water drains are dry all the time and in no case the effluent shall mix with the storm water drain.	The provision of sperate Strom water and effluent drainage has been made.
VIII.	Periodic Monitoring of ground water in the study area as marked in the Environmental Impact Assessment Report shall be undertaken and results analyzed to ascertain any change in the quality of water. Results shall be regularly submitted to the Maharashtra Pollution Control Board.	Noted. Unit shall follow the given condition thoroughly.
IX.	The overall noise levels in and around the factory premises shall be kept within the prescribed standard under the Environment (Protection) Act, 1986 and Rule, 1989 as amended from time to time by providing adequate noise control measures and protective equipment's like ear muff and ear plug etc.	Unit is following the given condition thoroughly by providing proper acoustic hoods, enclosures over the sources of noise generation.
X.	Adequate Safety measures shall be ensured to limit the risk zone within the factory premises. Leak detection system shall be installed for early detection and mitigation purpose.	Unit is following the condition thoroughly.

XI.	PP to scrupulously follow the requirements of Maharashtra Factories Act, 1948 & Rules 1963 as amended from time to time.	Noted. Unit shall follow the given condition thoroughly.
XII.	The Environmental Statement for each financial year ending on 31 st March in Form-V as is mandated to be submitted by the Project Proponent to the concerned Pollution Control Board as prescribed under the Environment (Protection) Rule, 1989 as amended from time to time, it shall also be put on the website of the company along with the status of the compliance of the conditions stipulated in the Environmental Clearance letter.	Noted. Unit shall follow the given condition.

ANNEXTURE I



महाराष्ट्र MAHARASHTRA

2023

56AA 125250



Registered Affidavit

श्रीमती प्रियांका छाजेड

We, M/s Oric Organics Chemicals Pvt. Ltd, state that our proposal is in consideration for Environmental Clearance for our project situated at Plot no. 9, Sector 1, AURIC City, Chh. Sambhajinagar (MH).

We hereby submit our affidavit that we will not violate any requirement of EIA Notification 2006 as amended from time to time.

For Oric Organic Chemicals Pvt. Ltd.

Dr. Shevak K. Bhungara
Dr. Shevak K. Bhungara
Chairman and Managing Director

ATTESTED

G. H. Shukla
G. H. SHUKLA,
NOTARY GREATER MUMBAI
Jagdamba Bhavan, Ground Floor,
Ganpatrao Kadam Marg, Lower Park,
MUMBAI 400 013

16 JUN 2023



ANNEXTURE III



INSTITUTE OF CHEMICAL TECHNOLOGY

रसायन तंत्रज्ञान संस्था

Deemed to be University under Section-3 of UGC Act 1956

Elite Status & Centre of Excellence - Government of Maharashtra



To,

ORIC Organic Chemicals Ltd.

205, 2nd Floor, 22-D

Motlibai Wadia Building,

Fort Mumbai – 400 001

Subject: Acceptance of assignment of Design adequacy of ETP for ZLD facility

Dear Sir

In reference to your letter regarding the assignment of exploring the Design adequacy of ETP for ZLD facility at your proposed plant near Aurangabad, this is to confirm that I am accepting the assignment. I have received all the requested documents including the details of Effluent treatment plant and the production processes. I will be able to supply the report in about 3 weeks.

Thanking you with best regards

Sincerely yours


Dr. P. R. Gogate

Professor of Chemical Engineering

Department of Chemical Engineering

ICT, Mumbai – 400 019, India

HAZOP STUDY



ORIC
ORIC ORGANIC CHEMICALS PVT. LTD.
AURIC CITY, PLOT NO.: 9, SECTOR 1, VILLAGE: SHENDRA,
DISTRICT: AURANGABAD, MAHARASHTRA - 431 154.

JUNE 2023

HAZOP STUDY TEAM	
Chairman	Dr. Shavak K. Bhungara.
Administration	
Process & Technology	Mr. Rashad S. Bhungara.
Production	
Engineering	
Instrumentation	
Coordinator LHS Manager	
Moderator	Mr. Subhash I. Bonda Bonda Technical Services, Thane.

Contents

SECTION	DESCRIPTION	PAGE NO.
1	EXECUTIVE SUMMARY.	04
2	THE PROPOSAL	09
3	PRELIMINARY HAZARD ANALYSIS.	10
4	HAZOP WORK SHEETS;	26
	Node 1 Sulfonation;	27
	Sub Node 1.1: P & ID - Sulfonation SR1 & SR2.	27
	Sub Node 1.2: P & ID - Sulfonation CR 1 & CR2.	34
	Sub Node 1.3: P & ID - Sulfonation HT1, HT2 & HT3.	38
	Node 2 Oxidation;	41
	Sub Node 2.1: P & ID - Oxidation Crystallizers.	41
	Sub Node 2.2: P & ID - Oxidation Dissolver.	46
	Sub Node 2.3: P & ID - Oxidation Vats.	40
	Node 3 Reduction;	56
	Sub Node 3.1: P & ID - Reduction reactors and P25 & P26.	57
	Sub Node 3.2: P & ID - Reduction Crystallizer	66
	Sub Node 3.3: P & ID - Reduction ANF	69
	Sub Node 3.4: P & ID - Reduction spin flash dryer.	72
5	LIST OF ACTION SUGGESTED	78

DISCLAIMER

Information contained in this report is believed to be reliable but no representation, guarantee or warranty of any kind are made as to its accuracy, suitability for a particular application or results to be obtained from them. It is up to the manufacturer to ensure that the information contained in the report is relevant to the product manufactured/ handled or sold by him as the case may be. We make no warranties expressed or implied in respect of the adequacy of this document for any particular purpose.

3

SECTION 1: EXECUTIVE SUMMARY

The proposed synthetic organic chemical manufacturing plant by M/S. Oris Organic Chemicals Private Limited, is located at AURIC City, Plot No.: 9, Sector 1, Village: Shenbra, District: Amangabad, Maharashtra - 431 154.

LIST OF PRODUCTS

SN	Name	CAS NO.	TMP
1	p-Nitrotoluene-o-Sulphonic acid (PNTOSA).	121-03-9	689
2	4,4'-Dinitrostilbene-2,2'-disulphonic acid (DNS).	128-42-7	562
3	4,4'-Diaminostilbene-2,2'-disulphonic acid (DAS).	81-11-8	440
4	Dilute Sulphuric Acid.	-	650
5	Iron oxide.	-	750

Details of process and flow chart given in the Section 2 of this report.

THE ASSIGNMENT

Manufacturing activity involves of hazardous chemicals, as listed in the Schedule I Part II of "The Manufacture, storage and import of Hazardous Chemicals Rules 1989". The occupier has obligations/ general responsibilities to fulfill

- > Identification of major accident hazard and taking adequate steps
- > To prevent such major accidents and to limit their consequences to person and the environment.

In compliance to this requirement this HAZOP study is initiated by the management to identify the hazards at the site. M/S. Braide Technical Services (BTS) - Thane is consulting organization in the field of safety and conducts HAZOP studies for such installations regularly. On the request of management, BTS - Thane undertook this Hazards and Operability study (HAZOP).

OBJECTIVES

The objectives of the study are as follows;

- > To carry out a systematic critical appraisal of all potential hazards involving personnel, plant, services and operation methods.

4

- To ensure that occupational health and safety standards fully satisfy the legal requirements and those of the company's written safety policies, objectives and programs.
- To determine the adequacy of instrumentation/ controls/ inter locks for safe, smooth start up and operation of the plants.

HAZOP METHODOLOGY

HAZOP (Hazard and Operability studies) methodology adopted is as per the techniques of "Hazard Identification And Risk Analysis" Code of Practice (IS 15656: 2006).

HAZOP STAGE

Hazard study systems used in Mond Division of ICI involves six hazard studies depending upon the stage of project such as Pre-design, Design/ Modification, Construction, Commissioning, Operation & maintenance and Decommissioning/ Shutdown. This is done systematically by applying suitable guidewords in the study which varies according to the desired purpose. (Refer. Lee's Loss Prevention in the Process Industries, *Hazard Identification, Assessment and Control, 5th Edition*).



The project is at stage 3 and the guide words are used accordingly HAZOP work sheet. Identification of hazards carried out and potential failure cases of significant consequences. Events are recorded in the HAZOP work sheet.

While identifying the hazard(s) a filtering process is carried and only portions with potential risk are involved for risk analysis. Hazard is not considered for further analysis, if it is:

- Unrealizable, and
- Not very significant

HAZARD RATING

As indicated in the IS 15656: 2006, the technique updating is required whenever improved plant operational information and equipment/ human failure data becomes available. Further, it advises to improve risk calculations using newer analytical methods as and when they are developed.

As large number of hazard/ events are normally generated during HAZOP Study and it is important to select the significant hazard rating events. The classification of the hazards necessary for designing effective action plan. A risk evaluation matrix is required, hence following risk rating matrix is used for classifying the identified hazards.

HAZARD RATING MATRIX

Hazards are identified each event Severity and Probability was evaluated on scale 1 to 5 to generate risk rating (R) on the scale 1 to 25 using following hazard rating matrix.

HAZARD RISK RATING MATRIX

		SEVERITY					
		Very High 5	High 4	Moderate 3	Slight 2	Nil 1	
PROBABILITY	Very Likely.	5	25	20	15	10	05
	Likely.	4	20	16	12	08	04
	Quite Possible.	3	15	12	09	06	03
	Possible.	2	10	08	06	04	02
	Not Likely.	1	05	04	03	02	01

According to the rating of each risk, it is necessary to evaluate it according to the following.

- Urgent situations (16 to 25) that require action immediately
- High-risk situations (10 to 15) that require action in the short and medium-term
- Medium-risk situations (5 to 9) that require action or further evaluation within an appropriate period.
- Low-risk situations (less than 5) that may require relatively little or no action.

SCOPE OF WORK

The scope of this report is limited to the P & I Diagrams for the installation.

Any release of hazardous chemicals to environment in air/ water/ soil/ causing unsafe conditions in the operations for site and surroundings community are considered as thrust area for HAZOP Study.

The battery limits of this study are restricted to the equipment's and necessary utilities as per the P & ID and covers activities at the above-mentioned installation.

Exclusion: Every other activity and installations.

If the HAZOP leader or any team member believed that a particular system or P & ID should not be studied by the team either because it is identical to the system already studied or because it involves no additional hazards, this was agreed upon by the team and the reasons recorded in the report.

The study conducted following P & I Diagrams wise nodes.

SN.	NUMBER	SHEET	NAME	Rev
1	AE/OOC/350/PID/001	1 OF 3	P & I D for Sulfonation SR1& SR2.	1
2	AE/OOC/350/PID/001	2 OF 3	P & I D for Sulfonation UR1 & UR2.	1
3	AE/OOC/350/PID/001	3 OF 3	P & I D for Sulfonation HT1, HT2 & HT3.	1
4	AE/OOC/350/PID/002	1 OF 3	P & I D for Oxidation Crystallizers.	1
5	AE/OOC/350/PID/002	2 OF 4	P & I D for Oxidation dissolver (repeated).	1
6	AE/OOC/350/PID/002	3 OF 3	P & I D for Oxidation vats.	1
7	AE/OOC/350/PID/003	1 OF 4	P & I D for Reduction reactors and P25 & P26.	1
8	AE/OOC/350/PID/003	2 OF 4	P & I D for Reduction Crystallizer.	1
9	AE/OOC/350/PID/003	3 OF 4	P & I D for Reduction ANF.	1
10	AE/OOC/350/PID/003	4 OF 4	P & I D for Reduction spin flash dryer.	1

CONCLUSION

Hazards are identified at site operations considered for study. The company has already taken considered series of measures as listed in the hazop worksheets as per safety philosophy adopted.

The identified hazards and action suggested are divided in three categories as follows:

- Immediate implementation and providing hardware support to minimise consequence.
- Adopting administrative measures by way of SOP's, work permits, training etc.
- Open questions which need further work and evolution of suitable solution in future.

After through brain storming session with the concerned stake holders as a outcome of entire study Action suggested in the form of recommendations are finalized.

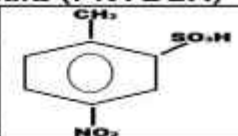
RECOMMENDATIONS

To Analyze from Section No. 5 after meeting.

MANAGEMENT CO-OPERATION

We thank the HAZOP committee and management for positive approach shown and excellent co-operation extended throughout the studies to complete the studies in scheduled time frame.

SECTION 2: THE PROPOSAL

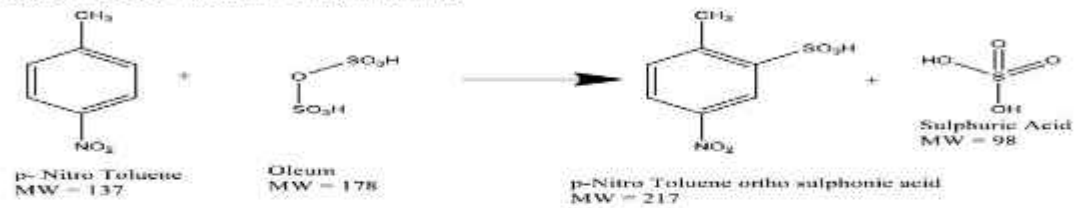
PRODUCT: Para Nitro Toluene Ortho Sulphonic Acid (PNTOSA)		
Synonyms	4-Nitrotoluene-2-Sulfonic Acid.	
CAS NO.	121-03-09	
Molecular Formula	C ₇ H ₇ S O ₅ N	
Molecular Weight	217 g/mol	

Quantity	Quantity	Working Day	Batch Output	Batches	Batches	Production
Mt/m	Kg/m	No./m	g.	No./m	No./day	Kg/day
6,88,68	6,88,688	26	3,311	208	8	26,488

BRIEF MANUFACTURING PROCESS

In the agitated reactor, PNT is added & then Oleum is added at the controlled rate to complete the reaction. After stirring these materials are transferred to a vessels with Water. In an ANF filtered off. The solid is the required product (PNTOSA) and the filtrate is dilute sulphuric acid which is collected & stored for reuse & sale.

REACTIONS - (Route of Synthesis):



9

PRODUCT: 4,4'-DI Nitrostilbene-2,2'- Disulphonic Acid (DNS)		
Synonyms	DI Nitro Stilbene (DNS).	
CAS NO.	128-42-7	
Molecular Formula	C ₁₄ H ₁₀ N ₂ O ₁₀ S ₂	
Molecular Weight	430.4 g/mol	

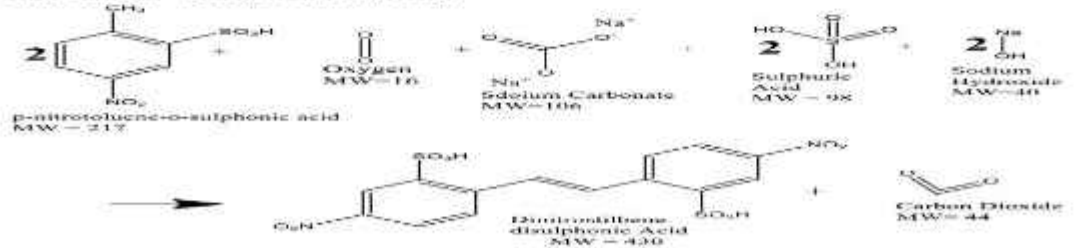
Quantity	Quantity	Working Day	Batch Output	Batches	Batches	Production
Mt/m	Kg/m	No./m	Kg.	No./m	No./day	Kg/day
581.184	5,81,184	28	2,698	208	8	21,684

BRIEF MANUFACTURING PROCESS

1st stage intermediate is pumped into the oxidation reactor and further diluted with water. pH adjusted with Sodium Hydroxide and purged with air. After completion of reaction the reaction mass is concentrated in a process evaporator and then dropped into crystallizer. Crystallized reaction mass is filtered in the ANF. Filtrate is collected in the holding tank and sent to the LTP holding tanks.

Residue is dropped into the dissolver tanks and stored for feeding to reduction vessels.

REACTIONS - (Route of Synthesis):



10

PRODUCT: 4,4'-diaminostilbene-2,2'-disulphonic acid (DAS)		
Synonyms	Amsonic acid.	
CAS NO.	81-11-8	
Molecular Formula	C ₁₄ H ₁₄ N ₂ O ₆ S ₂	
Molecular Weight	370.39 g/mol	

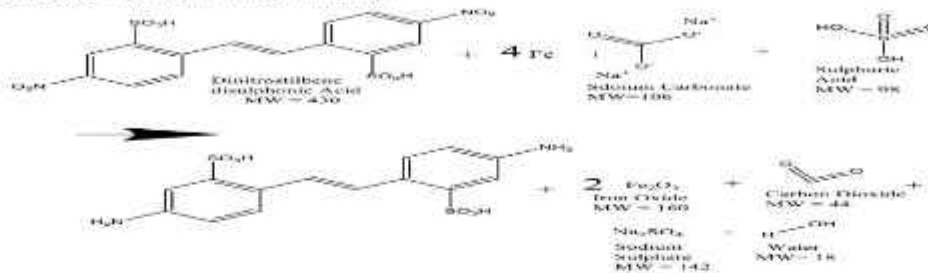
Quantity	Quantity	Working Day	Batch Output	Batches	Batches	Production
M/tn	Kg/tn	No./tn	Kg	No./tn	No./day	Kg/day
440	4,40,000	26	2112	208	8	16,880

BRIEF MANUFACTURING PROCESS

Intermediate from 2nd Stage is dissolved and pumped to reduction reactor. Iron powder, acetic acid and water are charged and reaction is run under reflux as per process parameters. On reaction completion, reaction mass is filtered free of Iron oxide and sent to crystallizers. Crystallized mass is filtered in a vertical press and dried cake is fed to spin flush dryer. Dry powder obtained is the final product.

Filtered iron oxide is collected in sudge beds and packed for selling to recyclers.

REACTIONS - (Route of Synthesis):



11

SECTION 3: PRELIMINARY HAZARD ANALYSIS

CAUSES	HAZARD DURING OPERATING STAGE OF THE PLANT	STATUS
Natural Causes	Cyclone.	✓
	Earthquake.	✓
	Land slide.	✓
	Flooding - heavy rain.	✓
Physical Hazards	Noise.	✓
	Radiation (UV, radioactive materials).	X
	Extreme temperatures.	✓
	Vibration.	✓
	Material handling operations.	✓
	Steam pressure piping failure/ boiler drum failure.	✓
	Boiler explosion.	✓
Bio Hazards	Pandemics/ epidemics/ communicable diseases by pests, insects, rodents.	✓
	Animal/ snake bites.	✓
	Occupational health hazards at industry	✓
Electrical Hazard	Transformer oil fire/ explosion.	✓
	Lightening strike.	✓
	Fires due to short circuit.	✓
	Power outage.	✓
Mechanical	Failure of machinery and equipment.	✓
	Lack of safety guards in machines.	✓
	Poor maintenance of machinery and equipment.	✓
	Power driven tools, saws, grinders, abrasive cutting wheels.	✓
	Scaffolding - fixed and portable failure.	✓
	Structural failure.	✓
Hazardous Substances And Wastes	Hazardous waste uncontrolled storage and disposal.	✓
	Site decontamination.	✓
Storages & Process Operations	Accidental release of flammable/ toxic gas fire/ explosion/ health hazard.	✓
	Uncontrolled Reaction exotherm pressurization/ explosion.	✓
	Static charge as source of ignition leading to fire/ explosion.	✓
	Toxic gas release at scrubber vent	✓
	Dust explosion.	✓
	Hazardous waste spill hazard.	✓
	Compatibility and reactivity hazard at chemical storages	✓

12

CAUSES	HAZARD DURING OPERATING STAGE OF THE PLANT	STATUS
Frequent Causes Of Accidents During Construction Activity	Being struck by falling object.	✓
	Caught in or compressed.	✓
	Cranes, winches, hoisting and hauling equipments failure.	✓
	Dusting.	✓
	Electricity (electrocution).	✓
	Fall from height.	✓
	Uncontrolled explosion during demolition/ land development.	X
	Hit by sharp objects.	X
	Injuries during handling heavy objects.	X
	Lack of PPE, housekeeping practices, safety signs.	✓
	Oxygen deficiency in confined spaces.	✓
	Paint/ thinner cleaners, pesticides, waste oil, flammable combustible materials fire at store.	✓
	Poor illumination.	✓
	Slipping on wet surfaces.	✓
Snapping cables, ropes, chains, slings, hooks, chains.	✓	
Struck by moving objects.	✓	
Welding fumes and radiations.	X	
Ergonomics & Psychosocial Hazards	Repetitive, monotonous, excessive workload, strain injuries.	✓
	Mental stress, human relations (aggressive behavior, alcohol and drug abuse, violence).	✓
	Poverty, low wages, lack of education.	✓
	Long working hours, shift work, temporary employment, Security threats.	✓
Others	Escalating the designed event during Mock Drill.	✓
	Power outage to emergency equipments/ cable failure.	✓
	Stampede during evacuation at assembly point.	✓
	Spreading rumors.	✓
	Organic contaminated water generated during fire fighting operations, sprinkler operation, spill/ floor washing may enter storm drain.	✓

HAZARDOUS CHEMICALS

The chemicals as marked * in following table are hazardous chemicals having Ref. No. listed in Column 2 of Part II of Schedule I of "The Manufacture Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989". NFPA - hazard rating of Health, Flammability and Reactivity are also considered for quick hazard identification of by using MSDS.

13

INITIAL SCREENING OF THE CHEMICALS

Sr. No.	Name	CAS No.	NFPA Hazard Rating			Ref. No.
			Health	Flammability	Reactivity	
1	4,4'-Diaminostilbene-2,2'-disulphonic acid (DAS)	01-11-0	-	-	-	-
2	4,4'-Dinitrostilbene-2,2'-disulphonic acid (DNS)	126-42-7	-	-	-	-
3	Acetic Acid	64-10-2	3	2	0	2
4	Diamine Stilbene Disulphonic Acid (DASDA)	61-11-6	2	0	0	-
6	Diesel	68378-33-6	0	2	0	-
6	Iron Powder	2535-89-6	-	-	-	-
7	Manganese Sulphate	10034-26-6	-	-	-	-
8	Oleum (63% SO ₃)	8014-95-2	3	0	2	444
9	Para Nitro Toluene	99-09-0	3	1	1	-
10	p-Nitrotoluene-o-Sulphonic acid (PNTOSA)	121-03-0	-	-	-	-
11	Sodium Carbonate	497-19-8	2	0	0	-
12	Sodium Dichlorate	7775-14-6	2	0	1	-
13	Sodium Hydroxide *	1310-73-2	3	0	1	571
14	Sulphuric Acid (70%) *	7664-93-2	3	0	2	591

The chemicals as marked * in above table are hazardous chemicals as per criteria laid down in Part I (b) of Schedule I of "The MSIHC" Rules, 1989."

INVENTORY (HAZARDOUS CHEMICALS)

Sr. No.	Name	Physical State	Maximum Quantity Stored	Consumption (t/yr)	Mode Of Storage
1	PNL	Solid below 350C	400 MT	457.74	200 Kl., 5 m dia. > 10.5 m ht. 2 nos. of Mt over ground tanks.
2	Oleum (63% SO ₃)	Liquid	120 MT	1189.26	60 Kl., 4 m dia. > 5 m ht. 2 nos. of Mt over ground tanks.
3	Spirit Acid	Liquid	400 MT	6.32	100 Kl., 5 m dia. > 5.5 m ht. 2 nos. of Mt spiral wound over ground tanks.
4	Acetic Acid	Liquid	12 Mt	8.32	12 Kl., 2 m dia. = 4 m ht. 2 nos. of SS 316 over ground tanks.
5	Iron Powder			480	
6	Manganese Sulphate			5	
7	Sodium Dichlorate			0	
8	Sodium Carbonate			255	
9	Sodium Hydroxide			177	
10	Diesel		0.5	None/limited	Drums

Chemicals marked with * are listed in Schedule I, Part II of "The Manufacture, Storage and Import of Hazardous Chemicals (Manufacture) Rules, 2000".

14

APPLICABILITY OF "THE MSIHC RULES, 1989"

Group	Material	Maximum Storage Capacity	Threshold Quantity (Mt.) For application of Rule		
		Mt.	5,7-9,13-15	10 - 12	
2	Toxic chemicals	Sulfuric Tri Oxide.	**	15	75
5.3	Very Highly Flammable Liquids.	Having: Flash Point ≤ 23°C & Initial Boiling Point >35°C	< threshold	1,500	10,000
5.5	Highly Flammable Liquids.	Having: 23°C < Flash Point ≤ 60°C	< threshold	2,500	20,000
5.6	Flammable Liquids.	Having: 60°C < Flash Point < 90°C	< threshold	5,000	50,000

*Criteria used: "The Manufacture Storage and Import of Hazardous Chemicals Rules, 1989".
 ** Sulfuric Tri Oxide equivalent in Oleum.

The site is a Major Accident Hazards (MAH) installation.

COMPATIBILITY/ REACTIVITY HAZARD MATRIX

Chemicals Mixing With →	Azotic Acid, Gaseous	Air, Compressed	Manganese (II) Sulfate Monohydrate	Nitrogen	P-Nitro Toluene	Sodium Hydroxide Soln.	Sulfuric Acid, Fuming	Sulfuric Acid, Spent	Water
Acetic Acid, Glacial.									
Air, Compressed.	C								
Manganese(II) Sulfate Monohydrate.	C	Y							
Nitrogen.	Y	Y	Y						
P-Nitro Toluene.	C	C	N	Y					
Sodium Hydroxide Soln.	N	C	N	Y	N				
Sulfuric Acid, Fuming.	N	C	C	Y	N	N			
Sulfuric Acid, Spent.	N	C	C	Y	N	N	C		
Water.	Y	Y	C	Y	Y	C	C	C	

Y
N
C
SR

Compatible
 Incompatible
 Caution
 Self Reactive

CHART LEGEND:

- No hazardous reactivity issues expected.
- Hazardous reactivity issues expected.
- May be hazardous under certain conditions.
- Potentially self reactive e.g. polymerizable.

Incompatibility implies as the equimolar mixing of two materials under ambient temperature and pressures that will produce heat (10 Kcal per mole), gases or other real and immediate hazards.

PREDICTED HAZARDS REPORT

Chemicals and Reactive Groups in this Mixture:

- > ACETIC ACID, GLACIAL
- > AIR, COMPRESSED
- > MANGANESE(II) SULFATE MONOHYDRATE
- > NITROGEN
- > P-NITROTOLUENE
- > SODIUM HYDROXIDE SOLUTION
- > SULFURIC ACID
- > SULFURIC ACID, FUMING
- > SULFURIC ACID, SPENT
- > WATER

ACETIC ACID, GLACIAL mixed with itself -

- INTRINSIC REACTIVE HAZARDS:
 - ⇒ No reaction expected.
- END OF HAZARDS FOR THIS ITEM ---

AIR, COMPRESSED mixed with

ACETIC ACID, GLACIAL -

- PREDICTED HAZARDS:
 - ⇒ May be hazardous but unknown
- POTENTIAL GASES:
 - ⇒ No gases predicted.

AIR, COMPRESSED mixed with itself -

- INTRINSIC REACTIVE HAZARDS:
 - ⇒ No reaction expected.
- END OF HAZARDS FOR THIS ITEM ---

MANGANESE(II) SULFATE MONOHYDRATE mixed with

ACETIC ACID, GLACIAL -

- PREDICTED HAZARDS:
 - ⇒ Exothermic reaction at ambient temperatures (releases heat)
- POTENTIAL GASES:
 - ⇒ No gases predicted.

AIR, COMPRESSED -

- PREDICTED HAZARDS:
 - ⇒ No known hazardous reaction

16

- POTENTIAL GASES:
 - ⇒ No gases predicted.

MANGANESE(II) SULFATE MONOHYDRATE mixed with itself -

- INTRINSIC REACTIVE HAZARDS:
 - ⇒ No reaction expected.
- END OF HAZARDS FOR THIS ITEM ---

NITROGEN mixed with

ACETIC ACID, GLACIAL -

- PREDICTED HAZARDS:
 - ⇒ No known hazardous reaction
- POTENTIAL GASES:
 - ⇒ No gases predicted.

NITROGEN mixed with AIR, COMPRESSED -

- PREDICTED HAZARDS:
 - ⇒ No known hazardous reaction
- POTENTIAL GASES:
 - ⇒ No gases predicted.

MANGANESE(II) SULFATE MONOHYDRATE -

- PREDICTED HAZARDS:
 - ⇒ No known hazardous reaction
- POTENTIAL GASES:
 - ⇒ No gases predicted.

NITROGEN mixed with itself -

- INTRINSIC REACTIVE HAZARDS:
 - ⇒ No reaction expected.
- END OF HAZARDS FOR THIS ITEM ---

P-NITROTOLUENE mixed with

ACETIC ACID, GLACIAL -

- PREDICTED HAZARDS:
 - ⇒ Reaction products may be explosive or sensitive to shock or friction
- POTENTIAL GASES:
 - ⇒ No gases predicted.

AIR, COMPRESSED -

- PREDICTED HAZARDS:
 - ⇒ May be hazardous but unknown
- POTENTIAL GASES:
 - ⇒ No gases predicted.

17

MANGANESE(II) SULFATE MONOHYDRATE -

- **PREDICTED HAZARDS:**
 - ⇒ Exothermic reaction at ambient temperatures (releases heat)
 - ⇒ Reaction liberates gaseous products and may cause pressurization
 - ⇒ Reaction products may be explosive or sensitive to shock or friction
- **POTENTIAL GASES:**
 - ⇒ Nitrogen Oxides

NITROGEN -

- **PREDICTED HAZARDS:**
 - ⇒ No known hazardous reaction
- **POTENTIAL GASES:**
 - ⇒ No gases predicted.

P-NITROTOLUENE mixed with itself -

- **INTRINSIC REACTIVE HAZARDS:**
 - ⇒ No reaction expected.

--- END OF HAZARDS FOR THIS ITEM ---

SODIUM HYDROXIDE SOLUTION mixed with

ACETIC ACID, GLACIAL -

- **PREDICTED HAZARDS:**
 - ⇒ Reaction liberates gaseous products and may cause pressurization
 - ⇒ Reaction may be particularly intense, violent, or explosive
 - ⇒ Reaction products may be corrosive
 - ⇒ Reaction products may be flammable
 - ⇒ Reaction products may be toxic
- **POTENTIAL GASES:**
 - ⇒ Acid Fumes
 - ⇒ Base Fumes

AIR, COMPRESSED -

- **PREDICTED HAZARDS:**
 - ⇒ May be hazardous but unknown
- **POTENTIAL GASES:**
 - ⇒ No gases predicted.

MANGANESE(II) SULFATE MONOHYDRATE -

- **PREDICTED HAZARDS:**
 - ⇒ Exothermic reaction at ambient temperatures (releases heat)
 - ⇒ Reaction liberates gaseous products and may cause pressurization
 - ⇒ Reaction products may be corrosive
- **POTENTIAL GASES:**
 - ⇒ Acid Fumes
 - ⇒ Base Fumes

18

- ⇒ Hydrogen
- ⇒ Hydrogen Halide

NITROGEN -

- **PREDICTED HAZARDS:**
 - ⇒ No known hazardous reaction
- **POTENTIAL GASES:**
 - ⇒ No gases predicted.

P-NITROTOLUENE -

- **PREDICTED HAZARDS:**
 - ⇒ Reaction may be particularly intense, violent, or explosive
 - ⇒ Reaction products may be explosive or sensitive to shock or friction
- **POTENTIAL GASES:**
 - ⇒ Nitrogen Oxides

SODIUM HYDROXIDE SOLUTION mixed with itself -

- **INTRINSIC REACTIVE HAZARDS:**
 - ⇒ No reaction expected.

--- END OF HAZARDS FOR THIS ITEM ---

SULFURIC ACID, FUMING mixed with

ACETIC ACID, GLACIAL -

- **PREDICTED HAZARDS:**
 - ⇒ Exothermic reaction at ambient temperatures (releases heat)
 - ⇒ Reaction liberates gaseous products and may cause pressurization
 - ⇒ Reaction products may be flammable
 - ⇒ Reaction products may be toxic
- **POTENTIAL GASES:**
 - ⇒ Carbon Dioxide
 - ⇒ Carbon Monoxide
 - ⇒ Chlorine Dioxide
 - ⇒ Halogen Oxides
 - ⇒ Nitrogen Oxides
 - ⇒ Sulfur Oxides

AIR, COMPRESSED -

- **PREDICTED HAZARDS:**
 - ⇒ May be hazardous but unknown
- **POTENTIAL GASES:**
 - ⇒ No gases predicted.

MANGANESE(II) SULFATE MONOHYDRATE -

- **PREDICTED HAZARDS:**
 - ⇒ Exothermic reaction at ambient temperatures (releases heat)

19

- **POTENTIAL GASES:**
 => No gases predicted.

NITROGEN -

- **PREDICTED HAZARDS:**
 => No known hazardous reaction
- **POTENTIAL GASES:**
 => No gases predicted.

P-NITROTOLUENE -

- **PREDICTED HAZARDS:**
 => Reaction liberates gaseous products and may cause pressurization
 => Reaction may be particularly intense, violent, or explosive
 => Reaction products may be explosive or sensitive to shock or friction
 => Reaction products may be toxic
- **POTENTIAL GASES:**
 => Carbon Dioxide
 => Carbon Monoxide
 => Methylisothiocyanate
 => Nitrogen Oxides

SODIUM HYDROXIDE SOLUTION -

- **PREDICTED HAZARDS:**
 => Exothermic reaction at ambient temperatures (releases heat)
 => Reaction liberates gaseous products and may cause pressurization
 => Reaction may be particularly intense, violent, or explosive
 => Reaction products may be corrosive
 => Reaction products may be toxic
- **POTENTIAL GASES:**
 => Acid Fumes
 => Base Fumes
 => Nitrogen Oxides

SULFURIC ACID -

- **PREDICTED HAZARDS:**
 => May be hazardous but unknown
- **POTENTIAL GASES:**
 => No gases predicted.

SULFURIC ACID, FUMING mixed with itself -

- **INTRINSIC REACTIVE HAZARDS:**
 => No reaction expected.

--- END OF HAZARDS FOR THIS ITEM ---

SULFURIC ACID, SPENT mixed with

ACETIC ACID, GLACIAL -

- **PREDICTED HAZARDS:**
 => Exothermic reaction at ambient temperatures (releases heat)
 => Reaction liberates gaseous products and may cause pressurization
 => Reaction products may be flammable
 => Reaction products may be toxic
- **POTENTIAL GASES:**
 => Carbon Dioxide
 => Carbon Monoxide
 => Chlorine Dioxide
 => Halogen Oxides
 => Nitrogen Oxides
 => Sulfur Oxides

AIR, COMPRESSED -

- **PREDICTED HAZARDS:**
 => May be hazardous but unknown
- **POTENTIAL GASES:**
 => No gases predicted.

MANGANESE(II) SULFATE MONOHYDRATE -

- **PREDICTED HAZARDS:**
 => Exothermic reaction at ambient temperatures (releases heat)
- **POTENTIAL GASES:**
 => No gases predicted.

NITROGEN -

- **PREDICTED HAZARDS:**
 => No known hazardous reaction
- **POTENTIAL GASES:**
 => No gases predicted.

P-NITROTOLUENE -

- **PREDICTED HAZARDS:**
 => Reaction liberates gaseous products and may cause pressurization
 => Reaction may be particularly intense, violent, or explosive
 => Reaction products may be explosive or sensitive to shock or friction
 => Reaction products may be toxic
- **POTENTIAL GASES:**
 => Carbon Dioxide
 => Carbon Monoxide
 => Methylisothiocyanate
 => Nitrogen Oxides

SODIUM HYDROXIDE SOLUTION -

- **PREDICTED HAZARDS:**
 - ⇒ Exothermic reaction at ambient temperatures (releases heat)
 - ⇒ Reaction liberates gaseous products and may cause pressurization
 - ⇒ Reaction may be particularly intense, violent, or explosive
 - ⇒ Reaction products may be corrosive
 - ⇒ Reaction products may be toxic
- **POTENTIAL GASES:**
 - ⇒ Acid Fumes
 - ⇒ Basic Fumes
 - ⇒ Nitrogen Oxides

SULFURIC ACID -

- **PREDICTED HAZARDS:**
 - ⇒ May be hazardous but unknown
- **POTENTIAL GASES:**
 - ⇒ No gases predicted.

SULFURIC ACID, FUMING -

- **PREDICTED HAZARDS:**
 - ⇒ May be hazardous but unknown
- **POTENTIAL GASES:**
 - ⇒ No gases predicted.

SULFURIC ACID, SPENT mixed with itself -

- **INTRINSIC REACTIVE HAZARDS:**
 - ⇒ No reaction expected.
- END OF HAZARDS FOR THIS ITEM ---

WATER mixed with

ACETIC ACID, GLACIAL -

- **PREDICTED HAZARDS:**
 - ⇒ No known hazardous reaction
- **POTENTIAL GASES:**
 - ⇒ No gases predicted.

AIR, COMPRESSED -

- **PREDICTED HAZARDS:**
 - ⇒ No known hazardous reaction
- **POTENTIAL GASES:**
 - ⇒ No gases predicted.

22

MANGANESE(II) SULFATE MONOHYDRATE -

- **PREDICTED HAZARDS:**
 - ⇒ Exothermic reaction at ambient temperatures (releases heat)
 - ⇒ Reaction liberates gaseous products and may cause pressurization
 - ⇒ Reaction products may be corrosive
- **POTENTIAL GASES:**
 - ⇒ Acid Fumes
 - ⇒ Hydrogen
 - ⇒ Hydrogen Halide

NITROGEN -

- **PREDICTED HAZARDS:**
 - ⇒ No known hazardous reaction
- **POTENTIAL GASES:**
 - ⇒ No gases predicted.

P-NITROTOLUENE -

- **PREDICTED HAZARDS:**
 - ⇒ No known hazardous reaction
- **POTENTIAL GASES:**
 - ⇒ Nitrogen Oxides

SODIUM HYDROXIDE SOLUTION -

- **PREDICTED HAZARDS:**
 - ⇒ Exothermic reaction at ambient temperatures (releases heat)
 - ⇒ Reaction liberates gaseous products and may cause pressurization
 - ⇒ Reaction products may be corrosive
 - ⇒ Reaction products may be toxic
- **POTENTIAL GASES:**
 - ⇒ Ammonia
 - ⇒ Base Fumes
 - ⇒ Hydrogen
 - ⇒ Oxygen

SULFURIC ACID -

- **PREDICTED HAZARDS:**
 - ⇒ Exothermic reaction at ambient temperatures (releases heat)
 - ⇒ Reaction liberates gaseous products and may cause pressurization
 - ⇒ Reaction products may be corrosive
 - ⇒ Reaction products may be toxic
- **POTENTIAL GASES:**
 - ⇒ Acid Fumes
 - ⇒ Nitrogen Oxides

23

SULFURIC ACID, FUMING -**- PREDICTED HAZARDS:**

- Exothermic reaction at ambient temperatures (releases heat)
- Reaction liberates gaseous products and may cause pressurization
- Reaction products may be corrosive
- Reaction products may be toxic

- POTENTIAL GASES:

- Acid Fumes
- Nitrogen Oxides

SULFURIC ACID, SPENT -**- PREDICTED HAZARDS:**

- Exothermic reaction at ambient temperatures (releases heat)
- Reaction liberates gaseous products and may cause pressurization
- Reaction products may be corrosive
- Reaction products may be toxic

- POTENTIAL GASES:

- Acid Fumes
- Nitrogen Oxides

WATER mixed with itself -**- INTRINSIC REACTIVE HAZARDS:**

- No reaction expected

TRANSFORMATION - IF ANY, WHICH COULD OCCUR

SN.	NAME	DECOMPOSITION/ COMBUSTION PRODUCTS
1	Oleum (53% SO ₃)	Oxides of Sulfur, Irritating and toxic fumes and gases.
2	Para Nitro Toluene.	Hydrogen gas.
3	Sodium Dithionate.	Carbon Dioxide, Carbon Monoxide & Nitrogen Oxides.
4	Sodium Hydroxide.	May decompose on exposure to air and moisture.
5	Sulphuric Acid.	Sodium Oxide. Decomposition by reaction with certain metals releases flammable and explosive Hydrogen gas. Toxic fumes of Oxides of Sulfur when heated to decomposition. Will react with water or steam to produce toxic and corrosive fumes.

HAZARDS OF DECOMPOSITION/ TRANSFORMATION PRODUCTS

SN.	Name	CAS NO.	NFPA - Hazard Index		
			N ₁	N ₂	N ₃
1	Nitrogen Oxides.	10102-43-9 10102-44-0	3	0	0
2	Carbon Monoxide	630-08-0	2	4	0
3	Carbon Di Oxide.	127-18-4	2	0	0
4	Hydrogen.	1333-74-0	0	4	0

24

PURITY OF HAZARDOUS CHEMICALS

SN.	HAZARDOUS INGREDIENTS	PURITY (%)
1	Sulphuric Acid.	70
2	Sulphuric Acid.	98
3	Diesel.	Mixed Hydrocarbon
4	Caustic Lye.	49
5	Oleum.	65

EXPOSURE HAZARDS:**PERMISSIBLE LEVELS OF CHEMICALS IN WORK ENVIRONMENT**

Sr. No.	NAME	PERMISSIBLE LIMITS OF EXPOSURE IN WORK ENVIRONMENT	
		Time Weighted Average Concentration (TWA) (8 hrs.)	Short Term Exposure Limit (STEL) (15 min)
1	Acetic acid	100 ppm	150 ppm
2	Sodium Hydroxide - C.	2 mg/m ³	-
3	Sulfuric Acid.	1 mg/m ³	-

Source: Second Schedule of "The Factories Act, 1948".

C: Ceiling limit.

PRODUCT WISE - UNIT PROCESS & UNIT OPERATIONS

SN	UNIT PROCESS/ UNIT OPERATION	p-Nitro Toluene- o-Sulphonic Acid	4,4' - Dinitrostilbene- 2,2'-disulphonic acid (DNS)	4,4' - Diaminostilbene- 2,2'-disulphonic acid (DAS)
		(PNTOSA)		
1	Sulfonation.	√	-	-
2	Oxidation.	-	√	-
3	Reduction.	-	-	√
4	Mixing.	√	√	√
5	Crystallization.	√	√	√
6	Filtration.	√	√	√
7	Washing.	√	√	√
8	Absorption (Scrubbing).	√	√	√
9	Drying.	-	-	√
10	Packing.	-	-	√

25

PRODUCT WISE - MAJOR RAW MATERIALS

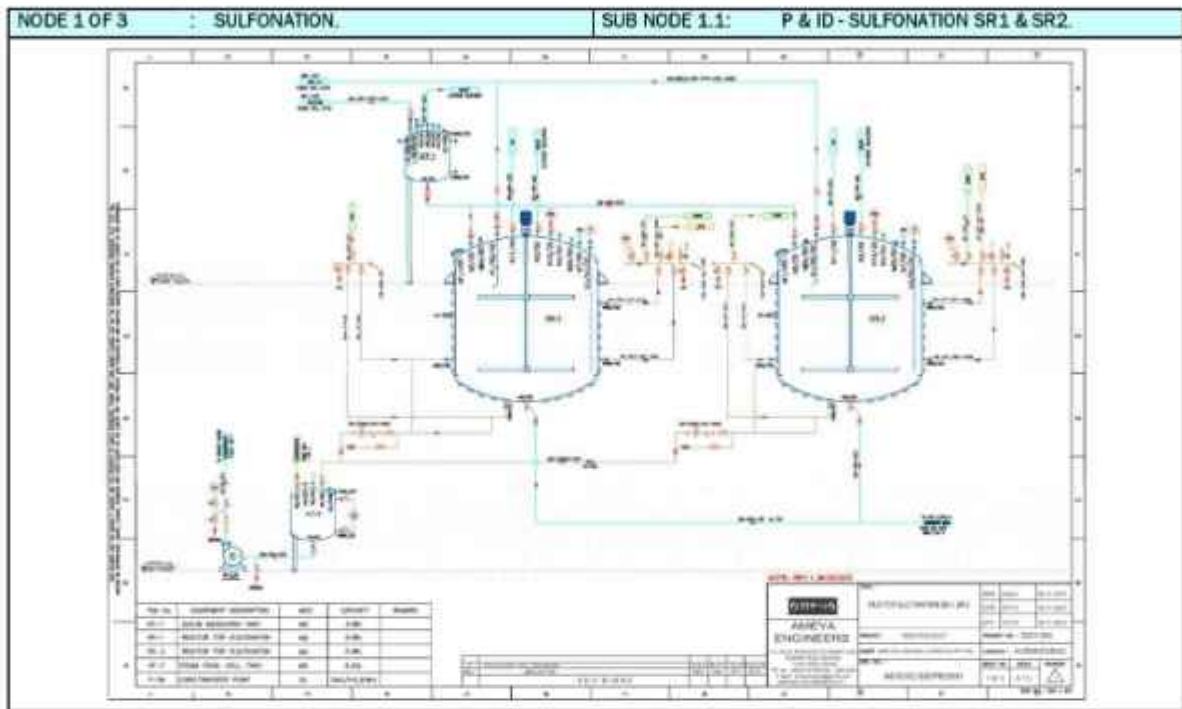
SN	RAW MATERIALS	p-Nitro Toluene- o-Sulphonic Acid	4,4'- Dinitrostilbene- 2,2'-disulphonic acid	4,4'- Diaminostilbene- 2,2'-disulphonic acid
		(PNTOSA)	(DNS)	(DAS)
1	Para Nitro Toluene.	√	-	-
2	Oleum (63% SO ₃).	√	-	-
3	PNTOSA.	-	√	-
4	Air.	-	√	-
5	Sodium Hydroxide.*	-	-	-
6	DNS.	-	√	-
7	Iron Powder.	-	-	√
8	Acetic Acid.	-	-	√
9	Sodium Carbonate.	-	-	√
10	Sulphuric Acid (70%).*	√	-	√
11	Sodium Dithionate.	-	-	-
12	Manganese Sulphate.	-	-	-

26

SN	NAME	CAS	LEL	UEL	F.P	B.P.	NFPA				TLV	STEL	IDLH	TOXICITY					
							HAZARD INDEX							ppm	ppm	ppm	Oral LD ₅₀ mg/kg.	Dermal LD ₅₀ m/kg	Inhalation LC ₅₀ mg/m ³
							H ₁	H ₂	H ₃	Other									
1	Acetic Acid.	64-19-7	5.4	16	39	118	3	2	0	-	10	15	50	3310	1060	-			
2	Diesel.	68476-34-6	0.5	7.5	32-62	>150	0	2	0	-	-	-	-	-	-	-			
3	Iron Powder.	7939-89-6	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-	-			
4	Manganese Sulphate.	10034-96-5	NA	NA	NA	NA	-	-	-	-	-	-	-	2150	-	-			
5	Oleum (63% SO ₃).	8014-95-7	NA	NA	NA	60	3	0	2	W	NA	-	-	-	-	347 ppm			
6	Para Nitro Toluene.	99-99-0	NA	NA	106	238.3	3	1	1	-	5	NA	200	1960	>750	>4167 mg/l			
7	Sodium Carbonate.	497-19-8	-	-	-	-	2	0	0	-	-	-	-	-	-	-			
8	Sodium Dithionate.	7775-14-6	NA	NA	100	De- composes	2	3	1	-	-	-	-	2500	-	-			
9	Sodium Hydroxide.	1310-73-2	-	-	-	1390	3	0	1	-	2 mg/m ³ ceiling	-	-	-	50 µg	-			
10	Sulphuric Acid.	7664-93-9	-	-	-	290	3	0	2	-	-	-	-	-	-	100-330			

27

SECTION 4: HAZOP WORKSHEETS



NODE 1 OF 3 : SULFONATION.		SUB NODE 1.1: P & ID - SULFONATION SR1 & SR2.							
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequences	Protection Measures	S	P	R	Action Suggested
None.	Flow.	No flow of PNT during transfer to SR1/ SR2 during batch charging.	No material in the storage tank.	Delayed operation.	PG, LG, Log book record.	3	3	9	SOP for blockage removal operation. Keep antidote like Methylene Blue in stock. Safety showers and eye wash fountain.
			Valve failure/blockage.	Spill hazard - during blockage removal operation.	Jacketed PNT transfer lines with heating arrangement.	4	4	16	
			Line blockage due to PNT (freezing point 52°C) solidification.	Exposure to PNT vapors, cyanide likely.	IL, PPI, training.	3	3	9	
None.	Flow.	More flow of Oleum from Oleum storage tank to DT1 Oleum measure tank.	Transfer pump failure (loss of power, impeller cone off or corroded etc.).	Delayed operation.	Supervision.	4	4	16	Consider some of the available options like: <ul style="list-style-type: none"> • Transfer pump emergency stop push button located near DT1 for operator. • Connecting the DT1 overflow line back to the Oleum storage tank.
			Human error.	Oleum overflow from DT1 vent. Spill hazard. Toxic gas release.	Installation valve in receipt line over DT1.	Training.			

NODE 1 OF 3 : SULFONATION.				SUB NODE 1.1: P & ID - SULFONATION SR1 & SR2.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Flow.	More flow of Oleum from DT1 Oleum measure tank to Sulfonator.	Valve failure. Human error in manual control of addition by valve.	Entire contents of measure tank may be added to reactor. Unsafe condition.	SG in feed line. Supervision.	4	4	16	Consider some of the available options like: <ul style="list-style-type: none"> Instrumentation for flow control. Flowmeter. Metering pump. Provision of orifice plate in feed line restricting flow to desired limit. Addition in small lots.
Less.	Flow.	Less flow of reaction mass from SR1 / SR2 to crystallizers.	Batch transfer is by compressed air Malfunctioning / failure of air supply. During transfer operation.	Delayed operation.	PE. Emergency power. Supervision.	3	3	9	-
Reverse.	Flow.	Reverse flow in compressed air line.	Compressed air connection to sulfonator. Air supply failure or pressurization in reactor simultaneously isolation valve passing.	Acidic vapors ingress in air line. Contaminated air in header may be detrimental to other operations.	Preventive maintenance.	4	3	12	Consider NRV in CA feed line over sulfonator.

30

NODE 1 OF 3 : SULFONATION.				SUB NODE 1.1: P & ID - SULFONATION SR1 & SR2.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
As Well As.	Flow.	Acidic vapors along with non condensable in vent.	Acid vapors (largely Sulfuric Acid and unreacted sulfonating agents arising from the use of an excess to drive the reaction.	Toxic gas release at vent.	-	4	4	16	SR1 and SR2 vent going outside building as per P & I Diagram. Vent header going to scrubber is adequate.
As Well As.	Flow.	Fugitive emission.	Piping leak. Pump gland leak. Gasket failure. Sampling. Vent release. Reactor gland leak.	Air pollution issues. VOC emissions at work place. Health hazard.	Regular maintenance of valves, pumps, flanges, joints and other equipment. Closed charging arrangement at reactor and operation with proper maintenance of pressure and temperature. Double mechanical seals in pumps.	4	3	12	LDMR (Leak Detection and Repair) system to monitoring, testing and maintenance. Monitoring of air born concentration of chemicals in work environment within the prescribed limits. Medical surveillance of workers and antidotes. Splash guards over flange joints carrying corrosive materials acid/alkali under pressure.
Other Than.	Flow.	Unintended / undesired flow of materials.	Wrong valve operation. Human error.	Accidental mix up. Unsafe condition depending upon materials involved.	Dedicated piping. Color code for piping	3	3	9	-

31

NODE 1 OF 3 : SULFONATION.				SUB NODE 1.1: P & ID - SULFONATION SR1 & SR2.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Temperature.	More temperature at reactor.	Faster addition of controlled reactant. Accumulation of reactant on loss of turbulence. Reaction exotherm. Accidental mix up. TI malfunctioning. Human error. Power failure and loss of cooling.	Temperature uncontrolled rise. Run away reaction.	Regular calibration of instrumentation.	4	3	12	Temperature control instrumentation high temperature interlock with feed with alarm.
Less.	Temperature.	Less ambient temperature of Oleum/ vapors trapped in transfer line.	Winter season the site under consideration is having history of low (<-4°C) temperature Sulfur Trioxide vapors trapped in transfer line.	Oleum freezing (65% Oleum melting point 50°C). Unsafe condition during melting operating likely. See Note 1.	SOP. Supervision.	5	4	20	

NOTE NO. 1: SULFUR TRI OXIDE ISOMERS MELTING

When the alpha form melts it takes the gamma form and vapor pressure rises dramatically with a hazard of explosion. Melting point is 62, 33 & 17 °C for alpha, beta & gamma forms respectively. Vapour pressure is 9.7, 45.9 & 57.7 kPa at 25 °C for alpha, beta & gamma forms respectively.

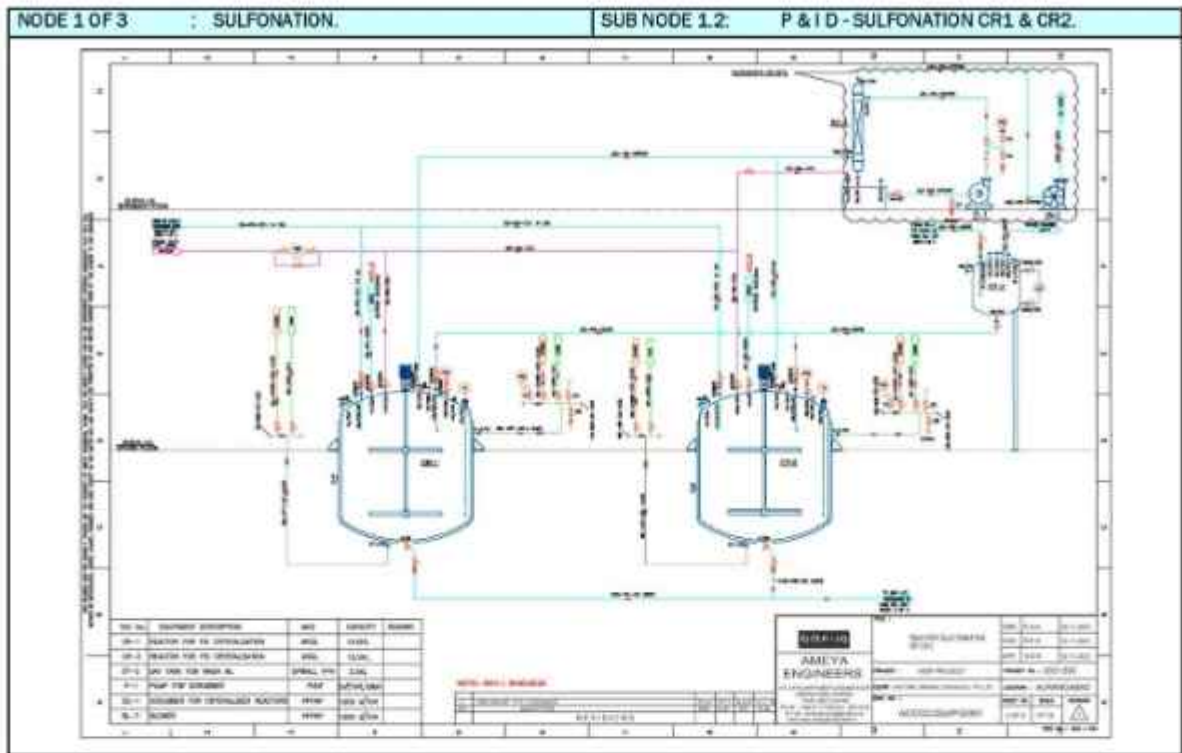
32

NODE 1 OF 3 : SULFONATION.				SUB NODE 1.1: P & ID - SULFONATION SR1 & SR2.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Pressure.	More pressure at reactor.	Faster addition of controlled reactant. Accumulation of reactant on loss of turbulence. Uncontrolled reaction. Exotherm. Accidental mix up. TI malfunctioning.	Fire/ explosion hazard. Health hazard.	Preventive maintenance. Regular calibration of instrumentation. Scrubber. Emergency instructions.	5	4	20	Provide rupture disc (RD) on the reactor in addition to the usual spring-loaded safety valve. The vent line leading from Rupture disc should be taken out of the plant (having minimum resistance at the time of blowing) to dump tank for total containment). Fast relief at 10% over-pressure by SRV. Instrumentation high pressure interlock with feed with alarm. Update P & ID showing only RD, consider corrosion aspect of materials handled and for SRV/ RD combination.
Less.	Pressure.	Less pressure.	Vacuum in the system. Fast pumping out and vent closed. Fast cooling, vent closed.	Not significant.	Equipments are designed for vacuum.	-	-	-	

33

NODE 1 OF 3 : SULFONATION.				SUB NODE 1.1: P & ID - SULFONATION SR1 & SR2.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
None.	Turbulence.	Loss of turbulence in reactor.	Agitator failure. Mechanical agitation failure, on account of broken shaft, broken blades, falling of blades or such other contingencies.	Loss of turbulence in reactor. Disturbed operation.	Supervision. Preventive maintenance.	4	4	16	Instrumentation Interlock with feed in case agitation failure. Consider signal for interlock from no load current and not on only power supply current.
As Well As.	Composition.	Impurities side reaction products. Isomers by-products formation.	Poor mixing in bottom dish. Poor tip speed of agitator for required shear force. Local temperature difference pockets. Addition of controlled reactant not by dip pipe. Reduced batch size.	Disturbed operation. Details not fully studied at this stage.	Supervision.	4	4	16	Review agitator design, baffles, location of TI. Addition dip pipe. Obtain MSDS of intermediates, side reaction products, isomers, decomposition products - etc. if any. In absence of adequate information the material should be considered as if hazardous material. Impurities may accumulate to detrimental level in recycle stream (as ML used in washings) unless adequate purge not considered.

NODE 1 OF 3 : SULFONATION.				SUB NODE 1.1: P & ID - SULFONATION SR1 & SR2.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Phase.	More number of phases.	Air lock in cooling water system at sulfonator.	Poor cooling. Disturbed operation.	-	3	3	6	Air lock removal valve. Update P & I Diagram.
More.	Level.	More level at D11.	Covered under more flow.	-	-	-	-	-	-
Less.	Level.	Less Level in D11.	Human error.	Disturbed operation.	LG.	3	3	9	LG over D11 and drain valve for LG. Update P & I Diagram.
Other.	Maintenance.	Cleaning of the piping/ tank/ equipments.	Inspection, repair, maintenance work. External corrosion.	Residual vapors in the equipment/ piping fire hazard. Health hazard.	SOP. Supervision.	3	3	9	Work permit.
Other.	Design.	P & I Diagrams.	Total 6 number of significant vents (RD, reactor, measure tank) located outside building in this P & I Diagram.	Toxic gas release in plant. Unsafe condition.		4	4	16	Need for connecting vent to header and to proper disposal system like scrubber. Update P & I Diagrams accordingly.



NODE 1 OF 3 : SULFONATION. **SUB NODE 1.2: P & I D - SULFONATION CR1 & CR2.**

DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.

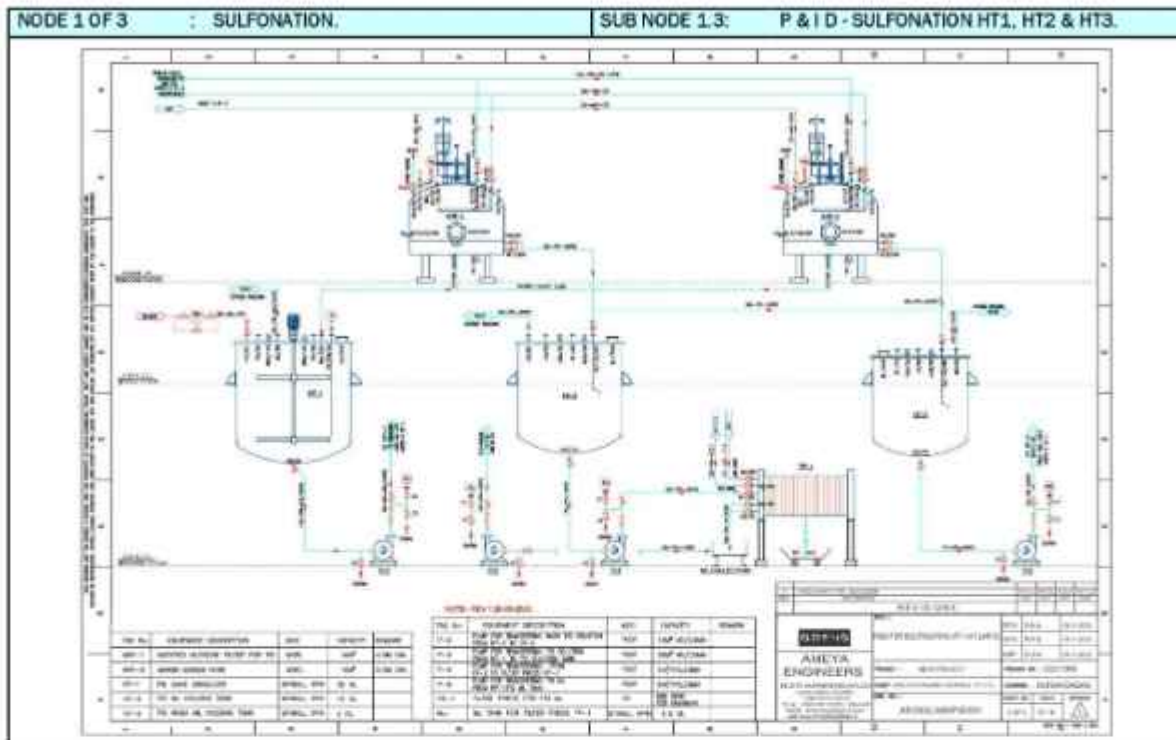
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
None.	Flow.	No flow.	-	-	-	-	-	-	-
More.	Flow.	More flow of vent gases at CR1/CR2.	Compressed air used for batch transfer from SR1/SR2 is released at the vent of CR1/CR2.	Large volume of vent gases loaded with toxic fumes and organic traces released.	Vent connected to scrubber SC1.	4	4	16	Provide adequate capacity of scrubber to handle the vent gases from CR1/CR2.
Less.	Flow.	Less flow.	-	-	-	-	-	-	-
As Well As.	Flow.	Emission at scrubber tank vent.	In absence of 'U' seal, gases are likely to take least resistanc path.	Emission at the vent of SC1 circulation tank vent.	-	4	4	16	Provide 'U' seal at scrubber. Update P & I Diagram.
As Well As.	Flow.	Toxic gas release at vent.	Scrubber malfunctioning (loss of circulating solution, 98% Sulfuric Acid power failure etc.).	Release of toxic gases at scrubber vent. Pollution. Environmental issues.	Supervision.	4	4	16	Leak detection at vent of scrubber.
Other.	Flow.	Static charge.	-	-	-	-	-	-	-
Other Than.	Flow.	In intended flow at CR1/CR2.	Leak at CR1/CR2 in chilled water side. Corrosion. Poor maintenance.	Ingress of chilled water in the crystallizers.	Supervision. Preventive maintenance. MOC of CR1/CR2 is SS.	3	3	9	Periodic testing of the crystallizers jacket/ coil/ shell by competent person.
More.	Temperature.	More temp.	-	-	-	-	-	-	-
Less.	Temperature.	Less temperature.	-	-	-	-	-	-	-

NODE 1 OF 3 : SULFONATION.				SUB NODE 1.2: P & I D - SULFONATION CR1 & CR2.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Pressure.	More pressure.	-	-	-	-	-	-	-
Less.	Pressure.	Less pressure.	-	-	-	-	-	-	-
As Well As.	Composition.	Accumulation of impurities in the wash ML at DT2 recycle stream.	Side reaction products (if any) likely to accumulate in the recycle cut. Rust, dirt etc.	Unsafe condition.	Process control check. Dedicated piping. Supervision. Strainer.	4	4	16	Monitor the impurity profile and purge level in recycle stream to avoid built up of impurity to detrimental level.
More.	Phase.	More number of phases.	At Crystallizer solids formed are likely to settle in bottom nozzle, blockage.	Spill hazard during blockage removal operation.	PPE. Flush type bottom valve provided.	4	3	12	-
None.	Flow.	No flow of air for batch transfer.	Air supply failure. Power failure.	Delayed operation.	Emergency power DG set. Preventive maintenance.	3	3	9	-
Less.	Flow.	Less flow of material transfer from CR1/ CR2 to ANF.	Air supply malfunctioning.	Delayed operation.	Emergency power DG set. Preventive maintenance.	3	3	9	Consider gravity flow as CR1/ CR2 are located at third floor and ANF 1 and ANF 2 are located at second floor.
More.	Temperature.	More temperature at CR1/ CR2.	Cooling water supply malfunctioning.	Disturbed operation.	Supervision. TI in CWS.	3	3	9	-
Less.	Temperature.	Less temperature.	Human error.	Not significant as freezing not likely.	-	-	-	-	-

38

NODE 1 OF 3 : SULFONATION.				SUB NODE 1.2: P & I D - SULFONATION CR1 & CR2.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Pressure.	More pressure.	Flooding at scrubber, back pressure or blockage in vent line.	Disturbed operation.	Supervision.	3	3	9	Consider trap in vent line to avoid ant solids going in vent system.
Less.	Pressure.	Less pressure.	Vacuum in the system. Fast pumping out and vent closed. Fast cooling, vent closed.	Not significant.	Equipments are designed for vacuum.	-	-	-	-
More.	Level.	More level at scrubber tank.	More feed in error. Human error.	Over flow of tank. Spill hazard at third floor. Unsafe condition.	Supervision. Log book record.	3	3	9	-
Less.	Level.	Less level.	Human error.	Circulation pump starving.	Supervision. Log book record.	3	3	9	Consider LG for scrubber tank.
Other.	Maintenance.	Repair / inspection over equipments.	Cleaning of the equipments. Residual toxic gas inside.	Health hazard.	Work permit.	3	3	9	Ensure positive isolation of piping connection before vessel entry.

39



40

NODE 1 OF 3 : SULFONATION. **SUB NODE 1.3: P & I D - SULFONATION HT1, HT2 & HT3.**

DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.

Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Less.	Flow.	Less flow during batch transfer.	HDPE line leak, as poor support/vibration/abuse.	Spill hazard.	-	3	3	9	Support to HDPE lines. Pre-fabricated coated piping option may be considered.
Less.	Flow.	No flow of material transfer from CR1/ CR2 to ANF.	No material in CR1/ CR2. Air supply malfunctioning.	Delayed operation.	LG over crystallizer. Emergency power DG set. Preventive maintenance.	3	3	9	Consider gravity flow as CR1/ CR2 are located at third floor and ANF-1 and ANF-2 are located at second floor.
More.	Flow.	More flow of vent gases at ANF 1 and ANF 2.	Compressed air used for batch transfer released at the vent of ANF 1 and ANF 2.	Large volume of vent gases loaded with toxic fumes and organic traces released.	Vent connected to scrubber.	4	4	16	Provide adequate capacity of scrubber to handled the vent gases from ANF 1 and ANF 2.
Reverse.	Flow.	Reverse flow at pump P4 discharge line.	Power failure, line material flowing back.	Disturbed operation.	NRV provided in pump discharge line.	3	3	9	-
As Well As.	Flow.	As well as flow of material in filtrate at ANF.	Bag torn of the filter.	Disturbed operation.	Supervision.	3	3	9	-
Other than.	Flow.	Acidic spill on floor.	Spill of acidic material on flooring of filter press.	Unsafe condition. Building foundation damage in long run.	Acid proof tile flooring. Safety shower and eye wash fountain.	4	4	16	-
More.	Temperature.	More temperature.	More ambient temperature.	Not significant.	-	-	-	-	-

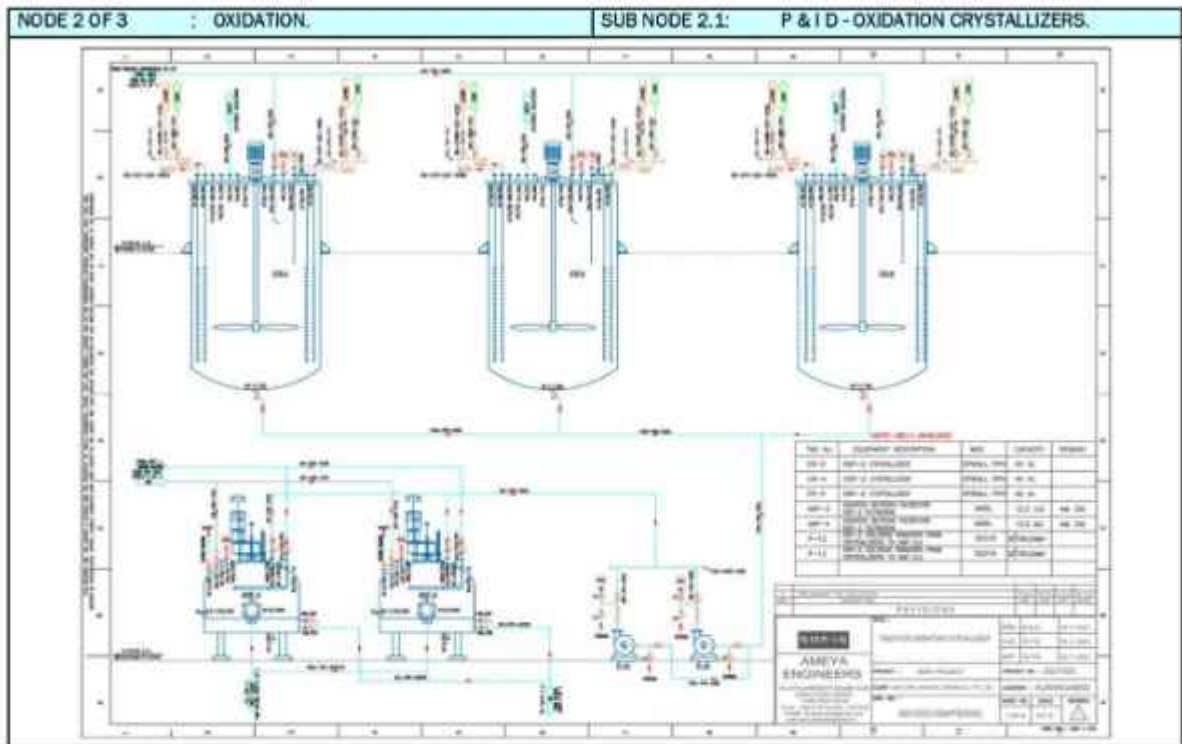
41

NODE 1 OF 3 : SULFONATION.				SUB NODE 1.3: P & I D - SULFONATION HT1, HT2 & HT3.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Less.	Temperature.	Less temperature.	Less ambient temperature.	Not significant.	-	-	-	-	-
More.	Pressure.	More pressure at pump P-5.	HDPE line joints leak if not properly maintained.	Spill hazard.	Support for HDPE lines. Preventive maintenance.	3	3	3	-
Less.	Pressure.	Less pressure.	Vacuum in the ANH-system. Fast pumping out and vent closed. Fast cooling, vent closed.	Not significant.	Equipments are designed for vacuum.	-	-	-	-
As Well As.	Composition.	Change in composition.	Loss of turbulence in reactor.	-	-	-	-	-	-

42

NODE 1 OF 3 : SULFONATION.				SUB NODE 1.3: P & I D - SULFONATION HT1, HT2 & HT3.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Phase.	More number of phases.	At HT1 solids are likely to settle in bottom nozzle blockage.	Spill hazard during blockage removal operation.	PPE. Flush type bottom valve provided.	4	3	12	-
More.	Level.	More level in ML collection tank.	ML from filter press collected.	Over flow. Spill hazard.	-	-	-	-	Update P & I Diagram the disposal/ transfer route for ML from filter press.
Less.	Level.	Less level in reactor.	Reduced trial batch size. Human error.	Thermowell may not dp. No agitation in bottom dish material. Unsafe condition.	Supervision.	4	4	16	Check heat removal capacity of the reactor adequate for the required reaction exotherm. The reactor volume is function of cube of radius where as heat transfer area is function of square of the radius.
Other.	Maintenance.	Repair / inspection over equipments.	Cleaning of the equipments. Residual toxic gas inside.	Health hazard.	Work permit.	3	3	9	Ensure positive isolation of piping connection before vessel entry.

43



NODE 2 OF 3 : OXIDATION. **SUB NODE 2.1: P & I D - OXIDATION CRYSTALLIZERS.**

DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.

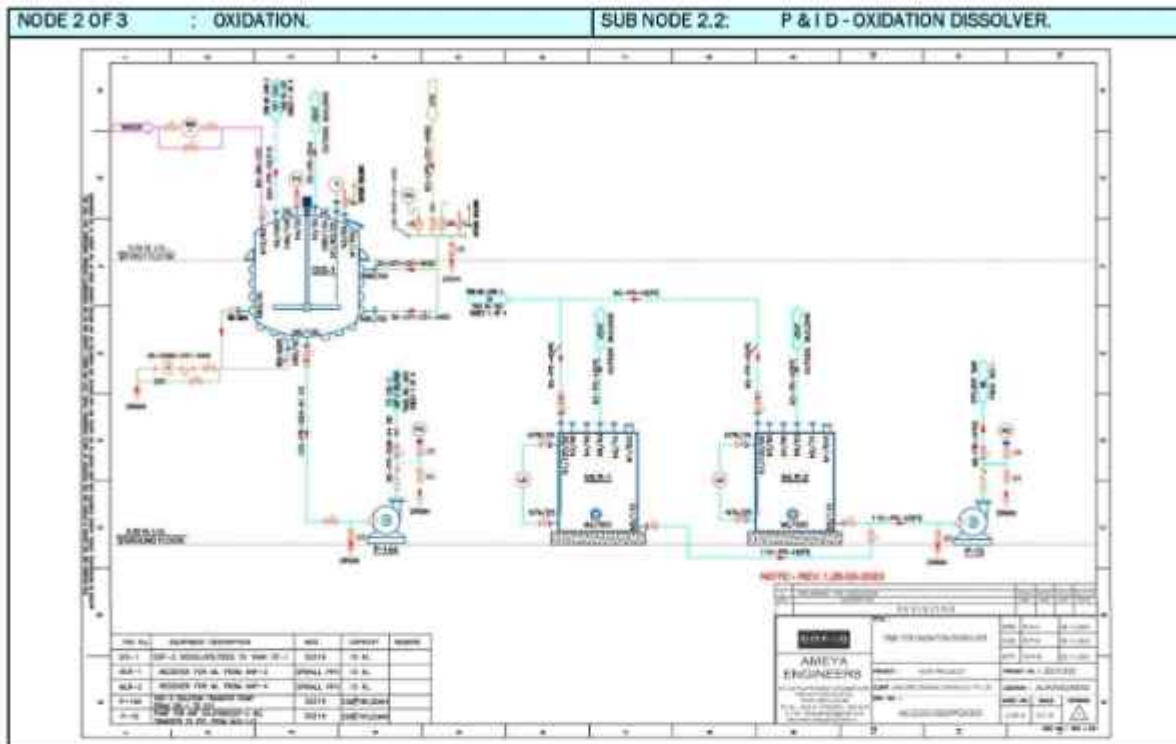
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
None.	Flow.	No flow of material from crystallizers to ANF.	No material in the CR3/CR4/CR5. Valve failure/blockage. Line blockage. Transfer pump P12/ P13 failure (loss of power, impeller came off or corroded etc.). Human error.	Delayed operation. Spill hazard during blockage removal operation. Pump damage.	LG/ SG over ANF. Training. Improved supervision. Preventive maintenance.	3	3	9	Log book record. SOP for blockage removal operation. Safety shower and eye wash fountain.
More.	Flow.	More rate of flow to ANF.	Human error wrong capacity pump during maintenance.	Disturbed operation.	History card of equipments. Supervision. Maintenance SOP's.	3	3	9	-
Less.	Flow.	Less flow.	Line blockage/ valve.	Spill hazard during blockage removal operation.	PPE. Supervision.	3	3	9	-
Reverse.	Flow.	Reverse flow at pump P-12/13 discharge line.	Power failure, line material flowing back.	Disturbed operation.	NRV provided in pump discharge line.	3	3	9	-

NODE 2 OF 3 : OXIDATION.				SUB NODE 2.1: P & I D - OXIDATION CRYSTALLIZERS.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
As Well As.	Flow.	As well as flow of material in filtrate at ANF.	Bag torn of the filter.	Disturbed operation.	Supervision.	3	3	9	-
Other than.	Flow.	Intended flow at CR3/ CR4/ CR5.	Leak in coil of crystallizers. Corrosion. Poor maintenance.	Ingress of chilled water in the crystallizers. Disturbed operation, depending upon any additives in chilled water.	Supervision. Preventive maintenance. MOX SS.	4	4	16	Periodic testing of the crystallizers coil by competent person.
More.	Temperature.	More temperature at CR3/ CR4/ CR5.	Cooling water supply malfunctioning.	Disturbed operation.	Supervision. TI in OWS.	3	3	9	-
Less.	Temperature.	Less temperature.	Human error.	Not significant as freezing not likely.	-	-	-	-	-
More.	Pressure.	More pressure.	Not anticipated.	-	-	-	-	-	-
Less.	Pressure.	Less pressure.	Vacuum in the crystallizer systems. Fast pumping out and vent closed. Fast cooling vent closed.	Not significant.	Equipments are designed for vacuum.	-	-	-	-
As Well As.	Composition.	More ML in wet cake.	ANF filtration by gravity.	Exposure to organic vapors during wet cake handling.	Supervision. Washing step.	3	3	9	Q.1: Is there vacuum connection at ML collection compartment of ANF?

46

NODE 2 OF 3 : OXIDATION.				SUB NODE 2.1: P & I D - OXIDATION CRYSTALLIZERS.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Phase.	More number of phases.	During crystallization solids formed are likely to settle in bottom nozzle, blockage.	Spill hazard during blockage removal operation.	PPE. Flush type bottom valve provided.	4	3	12	-
More.	Level.	More level at ANF-3/ ANF-4.	Human error more level in error.	Ingress of material in vent line of ANF. Disturbed operation.	Supervision. SG/ LG on ANF.	4	4	16	Q.2: ANF 3 & ANF 4 are 12.5 m ³ capacity where as crystallizers CR3/ CR4/ CR5 are 40 m ³ capacity each, mismatch capacity depending time cycle may become bottle neck in plant?
Less.	Level.	Less Level in crystallizers.	Human error.	Disturbed operation.	Supervision.	3	3	9	LG over CR3/4/5. Update P & I Diagram.
Other.	Maintenance.	Repair / inspection over equipments.	Cleaning of the equipments. Residual toxic gas inside.	Health hazard.	Work permit.	3	3	9	Ensure positive isolation of piping connection before vessel entry.

47



NODE 2 OF 3 : OXIDATION. **SUB NODE 2.2: P & I D - OXIDATION DISSOLVER.**

DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.

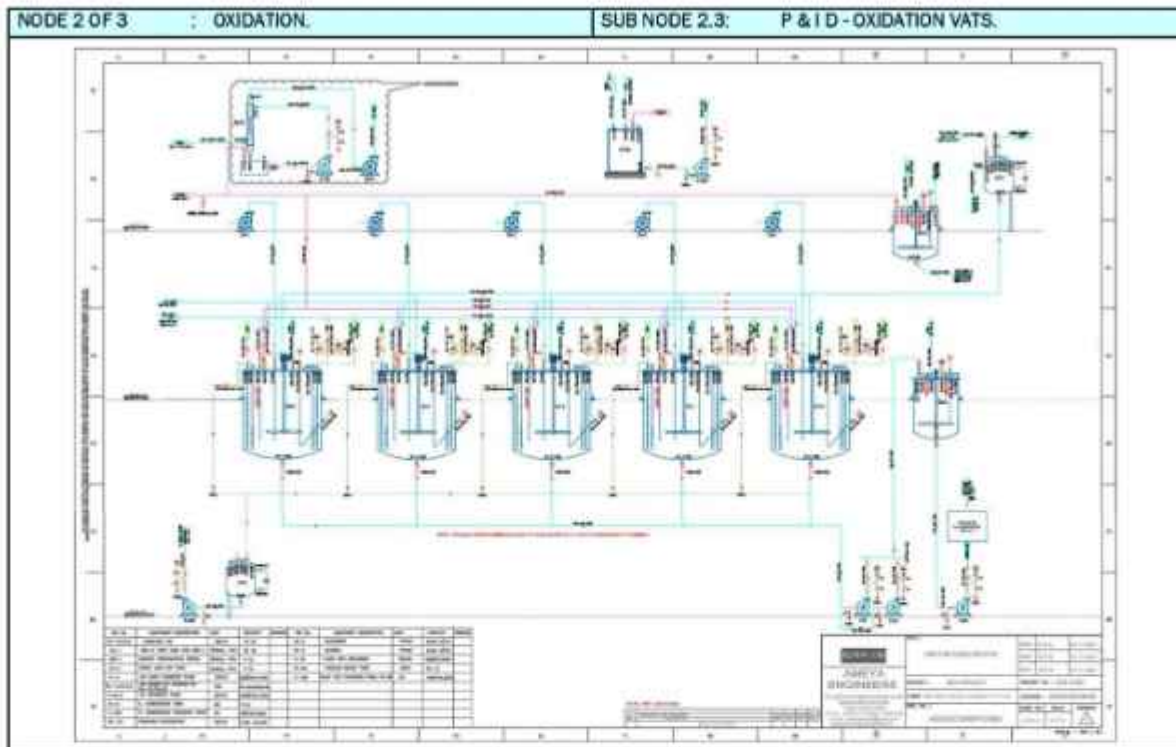
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
None.	Flow.	No flow of material from DS1 to DD1.	No material in the DS1.	Delayed operation.	LG/ SG over ANF.	3	3	9	Log book record.
			Valve failure/ blockage.	Spill hazard during blockage removal operation.	Training. Improved supervision.	4	4	16	SOP for blockage removal operation.
			Line blockage.	Pump damage.	Preventive maintenance.				Safety shower and eye wash fountain.
			Transfer pump P14A failure (loss of power, impeller came off or corroded etc.).		Electrical overload relay.	3	3	9	No standby pump for P14A.
			Human error.		Emergency power.				
More.	Flow.	More flow.	Not anticipated						
Less.	Flow.	Less flow.	Line blockage / valve.	Spill hazard during blockage removal operation.	PPE. Supervision.	3	3	9	
Reverse.	Flow.	Reverse flow at pump P14A discharge line.	Power failure, line material flowing back.	Disturbed operation.	NHV provided in pump discharge line.	3	3	9	
As Well As.	Flow.	As well as flow.	Undissolved material poor mixing.	Disturbed operation.	Supervision.	3	3	9	
Other Than.	Flow.	in intended flow.	Wrong valve operation.	Disturbed operation.	Piping color code. Training. Supervision.	3	3	9	

NODE 2 OF 3 : OXIDATION.				SUB NODE 2.2: P & I D - OXIDATION DISSOLVER.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Temperature.	More temperature.	More ambient temperature.	Not significant.	-	-	-	-	-
Less.	Temperature.	Less temperature.	Less ambient temperature.	Not significant.	-	-	-	-	-
More.	Pressure.	More pressure at reactor.	Vent blockage. Valve closed.	Pressurization.	Supervision.	3	3	9	Pressure relief system.
Less.	Pressure.	Less pressure.	Vacuum in the system. Fast pumping out and vent closed. Fast cooling, vent closed.	Not significant.	Equipments are designed for vacuum.	-	-	-	-
As Well As.	Composition.	Change in composition.	Lots of turbulence in reactor.	Poor mixing. Disturbed operation.	Supervision.	3	3	9	-
More.	Phase.	Increase in number of phases.	Wet cake added to DS1, solids are likely to settle in bottom nozzle, blockage.	Spill hazard during blockage removal operation.	PPE.	4	3	12	Consider flush type bottom valve for DS1. Review stirrer design of DS1 to ensure mixing in dish material.

50

NODE 2 OF 3 : OXIDATION.				SUB NODE 2.2: P & I D - OXIDATION DISSOLVER.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Level.	More level at DS1.	More water feed in error.	Ingress of material in vent of DS1. Disturbed operation.	Supervision. SG/LG on DS1. WM provided in feed line.	4	4	16	Log book record. Periodic calibration of water meter WM at DS1.
Less.	Level.	Less level in DS1.	Human error.	Disturbed operation.	IG. Supervision.	3	3	9	-
Other.	Maintenance.	Repair / inspection over equipments.	Cleaning of the equipments. Residual toxic gas inside.	Health hazard.	Work permit.	3	3	9	Ensure positive isolation of piping connection before vessel entry.

51



52

NODE 2 OF 3 : OXIDATION. **SUB NODE 2.3: P & I D - OXIDATION VATS.**

DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.

Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
None.	Flow.	No flow to evaporator.	No material in the DT3. Valve failure/ blockage. Line blockage. Transfer pump P11 failure (loss of power, impeller came off or corroded etc.). Human error.	Delayed operation. Spill hazard during blockage removal operation. Pump damage.	LG/ SG over ANF. Training. Improved supervision. Preventive maintenance.	3	3	9	Log book record. SOP for blockage removal operation. Safety shower and eye wash fountain.
More.	Flow.	More flow at vent of reduction reactor.	Unused compressed air released through vent.	Air released loaded with organic traces. Pollution issue.	Scrubber SC2 provided. Supervision.	4	4	16	Leak detection at scrubber SC2 vent.
As Well As.	Flow.	Emission at scrubber tank vent.	In absence of 'U' seal gases are likely to take least resistance path.	Emission at the vent of SC2 circulation tank vent.	-	4	4	16	Provide 'U' seal at scrubber. Update P & I Diagram.
Other Than.	Flow.	Unintended flow.	Ingress of exhaust fan/ acidic vent gases entering in blower suction located on third floor.	Disturbed operation.	-	4	4	16	-

53

NODE 2 OF 3 : OXIDATION.				SUB NODE 2.3: P & I D - OXIDATION VATS.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Other Than.	Flow.	Unintended flow.	Ingress of exhaust fan/ acidic vent gases entering in blower suction located on third floor.	Disturbed operation.	-	4	4	16	-
More.	Temperature.	More temperature.	Faster addition of controlled reactant. Reaction exotherm – moderate. Accidental mix up. TI malfunctioning. Steam line PRV malfunctioning.	Reaction exotherm.	Procedure for a safe mode of reaction, a dosage controlled process with precautions securing no accumulation of reactants. Two no. of TI provided. SRV on steam supply line.	4	3	12	Establish the maximum safe temperature for exothermic reactions like Oxidation by carrying out DSC test review the rupture disc (RD) setting accordingly. Estimate the heat removed capacity of the reactor at operating conditions. Establish the maximum heat removal requirement for the reaction system and hence the safety margin available.
Less.	Temperature.	Less temperature.	Less ambient temperature.	Not significant.	-	-	-	-	-

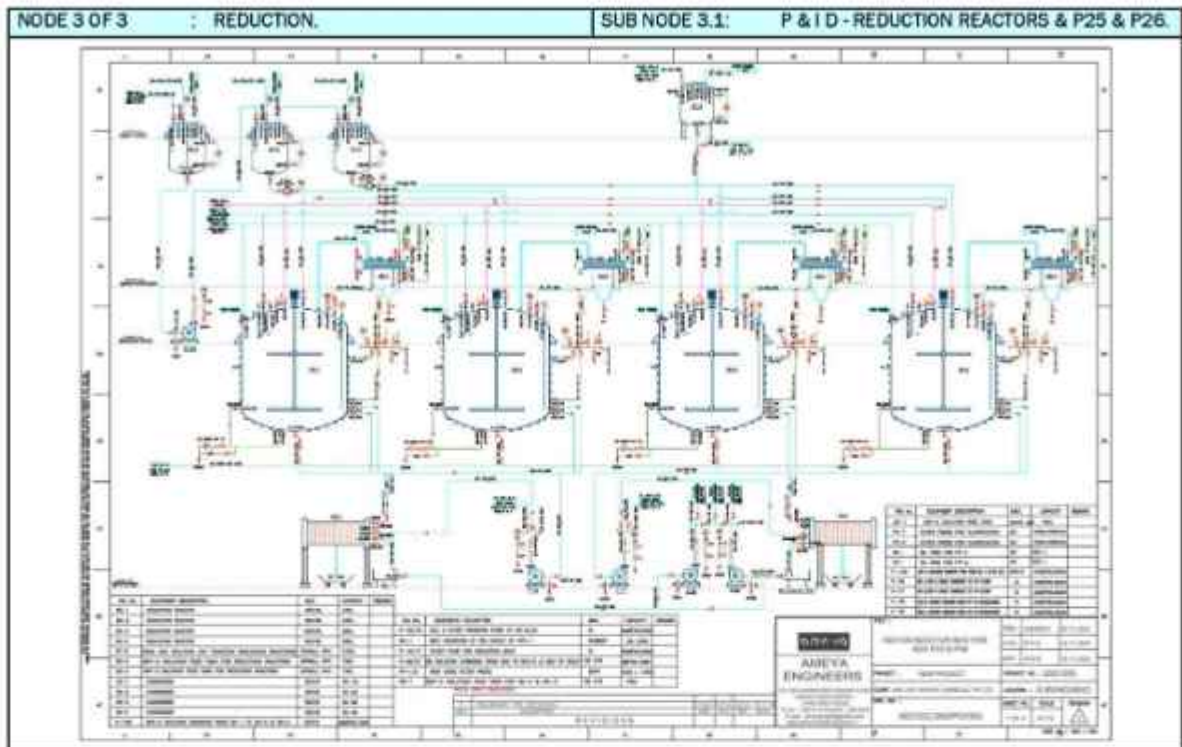
NODE 2 OF 3 : OXIDATION.				SUB NODE 2.3: P & I D - OXIDATION VATS.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Pressure.	More pressure.	Faster addition of controlled reactant. Reaction exotherm – moderate. Accidental mix up. TI malfunctioning. Vent valve closed in error for the only one reactor vent line.	Pressurization. Explosion hazard.	SOP.	4	4	16	Provide adequate pressure relief system. All pressure safety valves should be set at 10% higher than the maximum achievable working pressure. Prepare "On Site Emergency Plan" based on MCLS Study. Provide fire hydrant system.
Less.	Pressure.	Less pressure.	Vacuum in the reactor system. Fast pumping out and vent closed. Fast cooling, vent closed.	Not significant.	Equipments are designed for vacuum.	-	-	-	-
As Well As.	Composition.	Acidic gases in vent.	VOC's generated from unreacted feed, by-products and side reactions not fully known at present.	Pollution issues.	Scrubber provided.	3	3	9	Leak detection at the vent of scrubber.

NODE 2 OF 3 : OXIDATION.				SUB NODE 2.3: P & I D - OXIDATION VATS.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
None.	Turbulence.	Loss of turbulence in reactor.	Agitator failure, Mechanical agitation failure, on account of broken shaft, broken blades, falling of blades or such other contingencies.	Loss of turbulence in reactor, Disturbed operation.	Supervision, Preventive maintenance.	4	4	16	Instrumentation Interlock with feed in case agitation failure, Consider signal for interlock from no load current and not on only power supply current.
As Well As.	Composition.	Undesired products formation.	Side reactions, partial or complete oxidation of some Carbon.	Disturbed operation.	Careful control of oxidation process, Supervision.	3	3	9	-
Other.	Other.	Hazardous chemicals.	Handling of Caustic Soda.	Gasket/line leak, Spill hazard.	PPE, Safety shower and eye wash fountain, Alkali proof flooring.	-	-	-	Provide splash guards on flange joints of the Caustic dosing line, Avoid any flange joint in the Caustic pipe line crossing over walkway.

56

NODE 2 OF 3 : OXIDATION.				SUB NODE 2.3: P & I D - OXIDATION VATS.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Less.	Level.	Less level in OV reactors.	Human error.	Disturbed operation.	LG.	3	3	9	LG over OTI and drain valve for LG, Update P & I Diagram.
Less.	Level.	Less level in OVI.	Human error.	Disturbed operation.	Supervision.	3	3	9	LG over OVI, Update P & I Diagram.
Other.	Maintenance.	Repair / inspection over equipments.	Cleaning of the equipments, Residual toxic gas inside.	Health hazard.	Work permit.	3	3	9	Ensure positive isolation of piping connection before vessel entry.

57



NODE 3 OF 3 : REDUCTION. **SUB NODE 3.1: P & I D - REDUCTION REACTORS & P25 & P26.**
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.



Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
None.	Flow.	No flow of material from DD1 to DD2/ DD3.	No material in the DG1. Valve failure/ blockage. Line blockage. Transfer pump P14B failure (loss of power, impeller came off or corroded etc.). Human error.	Delayed operation. Spill hazard during blockage removal operation. Pump damage.	LG/ SG Training. Improved supervision. Preventive maintenance. Electrical overload relay. Emergency power.	3	3	9	Log book record. SOP for blockage removal operation. Safety shower and eye wash fountain. No standby pump for P14B.
None.	Flow.	No flow of material from DD2/ DD3 to reduction reactors.	No material in the DG5. Valve failure/ blockage. Line blockage. Transfer pump P25/ P26 failure (loss of power, impeller came off or corroded etc.). Human error.	Delayed operation. Spill hazard during blockage removal operation. Pump damage.	LG/ SG Training. Improved supervision. Preventive maintenance. Electrical overload relay. Emergency power.	3	3	9	Log book record. SOP for blockage removal operation. Safety shower and eye wash fountain. Pump for P25 & P26 are dedicated to DD2 & DD3 respectively, no flexibility system for pumps to be used as stand by, if needed.

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.1: P & I D - REDUCTION REACTORS & P25 & P26.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Less.	Flow.	Less flow during filtration.	Partial blockage of filter.	Spill hazard during blockage removal operation.	Supervision. PPE.	3	3	9	-
Less.	Flow.	Less flow during filtration.	Partial blockage of filter.	Spill hazard during blockage removal operation.	Supervision. PPE.	3	3	9	-
As Well As.	Flow.	Hydrogen released from iron - acid.	The acid is used for activation of the iron, Normally only 2 to 3% Hydrogen is derived from acid but 97 to 98% comes from water.	Not significant.	Hydrogen consumed in situ formation.	3	3	9	-
As Well As.	Flow.	Flammable gas released from iron - acid reduction reactor	The acid is used for activation of the iron, Normally only 2 to 3% Hydrogen is derived from acid but 97 to 98% comes from water.	Not significant.	Hydrogen formed is consumed in situ formation.	3	3	9	-
Revers.	Flow.	Reverse flow.	Vapors and fumes from reactor opening.	Emission at work place.	Ventilation.	3	3	9	-
Revers.	Flow.	Reverse flow.	Vapors and fumes from reactor opening.	Emission at work place.	Ventilation.	3	3	9	-

60

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.1: P & I D - REDUCTION REACTORS & P25 & P26.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Other.	Flow.	Release of liquid/ vapors.	Pump and leak. Gasket failure. Sampling. Vent release.	Spill release of Acetic Acid vapors. Formation of flammable mixture with air.	Fire/ explosion hazard if finds source of ignition. See Note 2. Portable fire extinguishers.	4	3	12	Monitor the work place air born concentration of chemicals within prescribed limit. Provide leak detection system.
Other.	Flow.	Release of liquid/ vapors.	Pump and leak. Gasket failure. Sampling. Vent release.	Spill release of Acetic Acid vapors. Formation of flammable mixture with air.	Fire/ explosion hazard if finds source of ignition. See Note 2. Portable fire extinguishers.	4	3	12	Monitor the work place air born concentration of chemicals within prescribed limit. Provide leak detection system.

NOTE NO. 2: IGNITION SOURCES

	<p>FIRE TRIANGLE: There are three conditions essential for a fire:</p> <ul style="list-style-type: none"> • Fuel, • Oxygen, & • Heat. <p>These three conditions are often represented as the Fire Triangle shown in the figure. If one of the conditions is missing, fire does not occur; if one of them is removed, fire is extinguished.</p>		<p>An explosion occurs if a fuel is present in mixture with air (i.e. sufficient Oxygen) within the explosion limits, together with a source of ignition.</p>
---	--	--	---

At the site air is present all the time, accidental spill of flammable material is credible scenario hence eliminating the source of ignition is the only control to avoid any fire/ explosion hazard.

61

IGNITION SOURCES (ATEX: Standard EN 1127-1).

Sr. No.	Ignition Source	Predominantly Of Electric Origin	Predominantly Of Nonelectric Origin
1	Electrical apparatus.	✓	
2	Hot surfaces flames and hot gases.		✓
3	Mechanically generated sparks.		✓
4	Stray electrical currents, cathodic corrosion protection.	✓	
5	Static electricity.	✓	
6	Lightning.	✓	
7	Electromagnetic fields in the frequency range from 9 KHz to 300 GHz.	✓	
8	Electromagnetic radiation in the frequency range from 300 GHz to 3×10^8 GHz, OR Wavelength range from 1000 mm to 0.1 mm (optical spectrum).		✓
9	Ionizing radiation.	✓	
10	Ultrasonic's.		✓
11	Adiabatic compression, shock waves, gas flows.		✓
12	Chemical reactions.		✓

NODE 3 OF 3 : REDUCTION.		SUB NODE 3.1: P & I D - REDUCTION REACTORS & P25 & P26.							
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Other.	Flow.	Static discharge.	Static sensitive material Acetic Acid transfer by pump. Free fall of Acetic Acid in the vessel. See Note 3.	Static discharge as source of ignition in case of any spill and vapors coming in flammable range with air. Fire/ explosion hazard.	Supervision. Dip pipe provided in feed lines. Equipments are earthed.	5	4	20	Provide effective measures for prevention of accumulation of static charge to a dangerous extent. See Note 3.

NOTE 3: STATIC CHARGE AS A SOURCE OF IGNITION		
	<p>Static charge to become source of ignition following conditions to be fulfilled simultaneously;</p> <ul style="list-style-type: none"> • A Flammable Atmosphere. • Charge Generation. (7 methods) • Charge Accumulation. (6 factors) • An Incendive Discharge (having energy greater than the MIE of the flammable atmosphere). (6 methods). 	<p>Therefore, control of static charge as source of ignition/ explosion is accomplished by at least any one of these FOUR factors.</p> <ul style="list-style-type: none"> • Elimination of a flammable atmosphere. • Control of charge generation. • Control of charge accumulation. • Minimization of incendive discharge.

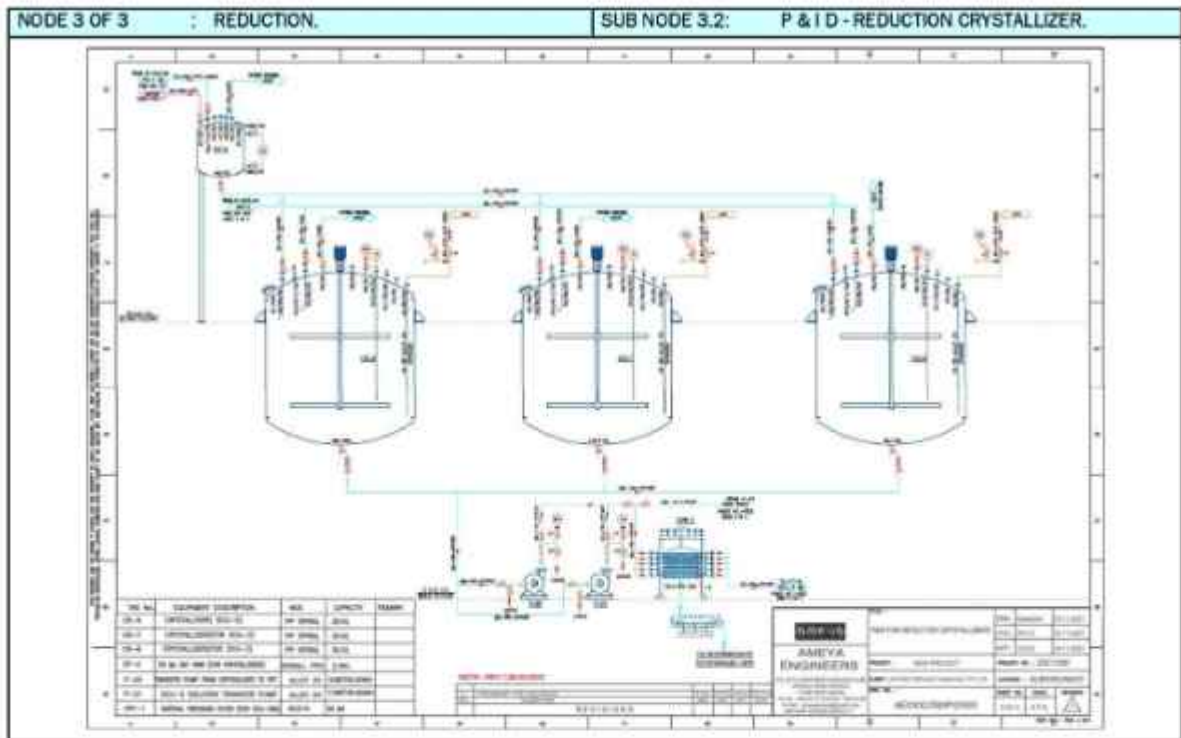
Electrostatic Charging Mechanism	Factors That Influence The Magnitude Of Charge Accumulation	Electrostatic Discharge Mechanisms
1. Contact and Separation.	1. Temperature of the surface.	1. Spark Discharge/ Capacitor Discharge.
2. Induction.	2. Permittivity.	2. Brush Discharge.
3. Double layer separation.	3. Number and density of contacts points.	3. Corona Discharge.
4. Charge sharing (mists & dusts).	4. Electrical conductivity.	4. Propagating Discharge.
5. Corona charging.	5. Speed of separation.	5. Bulking Brush Discharge.
6. Diffusion charging (collision between particles & ions in a gas).	6. Changes in the condition of the materials.	6. Lighting Discharge.
7. Particle capture.		

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.1: P & I D - REDUCTION REACTORS & P25 & P26.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Temperature.	More temperature at reactor.	Faster addition of controlled reactant. Accumulation of reactant on loss of turbulence. Reaction exotherm. Accidental mix up. TI malfunctioning. Human error. Power failure and loss of cooling.	Temperature uncontrolled rise. Run away reaction.	Regular calibration of instrumentation.	4	3	12	Temperature control instrumentation high temperature interlock with feed with alarm.
Less.	Temperature.	Less temperature of Acetic Acid.	Winter season Freezing of material e.g. Acetic Acid Glacial (melting point 16.7oC).	Not significant as dilute Acetic Acid used.	Supervision. Acetic Acid dilute used.	3	3	9	
Less.	Temperature.	Less temperature of Acetic Acid.	Winter season Freezing of material e.g. Acetic Acid Glacial (melting point 16.7oC).	Not significant as dilute Acetic Acid used.	Supervision. Acetic Acid dilute used.	3	3	9	

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.1: P & I D - REDUCTION REACTORS & P25 & P26.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Pressure.	More pressure at reactor.	Faster addition of controlled reactant. Accumulation of reactant on loss of turbulence. Reaction exotherm. Accidental mix up. TI malfunctioning. Cooling water malfunctioning. Only vent valve over condenser closed in error.	Fire/ explosion hazard. Health hazard.	Preventive maintenance. Regular calibration of instrumentation. Scrubber. Emergency instructions.	5	4	20	Adequate Pressure relief arrangement (SRV, RD, Dump Tank) flame arrestor at vent. Reduction reactors are vented through condensers, mal-operation or failure of the valve provided in vent line over the condenser may subject the system to unsafe condition. Consider proper venting for the system and ensure easy access to the vent valve. Avoid any sources of ignition in the area.
Less.	Pressure.	Less pressure.	More rate of pumping out and vent blockage.	Ingestion hazard.	Vent inspection. Equipments are designed for full vacuum.	4	3	12	Preventive maintenance.
As Well As.	Composition.	Emission at HE1 vent.	VOC release at HE1 vent at line number B0-PR-551.	Non - condensable released at vent of HE.	Released vapors are loaded with traces of organic vapor released to atmosphere.	5	4	20	Connect all the release vents and direct for safe disposal such as scrubber.

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.1: P & I D - REDUCTION REACTORS & P25 & P26.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
As Well As.	Composition.	Impurity profile of raw materials, by-products, side reaction, products & contaminations.	Not fully known.	Potential for unsafe condition.	SOP. Supervision. Final reaction mixture tested for complete reduction.	4	4	16	Avoid the buildup of excess nitro compound in the reaction mass.
As Well As.	Composition.	Hazardous solid waste generation.	Hazardous solid waste Iron sludge generated.	Spill of organic contaminated Iron sludge during storage and transport. Unsafe condition.	Iron Waste is recovered as by product.	4	4	16	Ensure effective washing to Iron sludge to make it free from residual product.
More.	Phase.	Increase in phases.	Agitation loss (loss of power, mechanical problem etc.). Layer separation.	Solids settling at bottom blocking. Bottom nozzle. Spill hazard during blockage removal operation.	Flush type bottom valve. SOP. Supervision.	3	3	9	

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.1: P & I D - REDUCTION REACTORS & P25 & P26.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Level.	More level at reactors.	Unintended flow at reduction reactors. Leak at cooling medium side. Corrosion. Poor maintenance.	Ingress of cooling water in the reactor.	Supervision. Preventive maintenance. MOC of reactors is SS 316L.	3	3	9	Periodic testing of the reactor by competent person.
Less.	Level.	Less level in reactor.	Reduced trial batch size. Human error.	Thermowell may not dip. No agitation in bottom dish material. Unsafe condition.	Supervision.	4	4	16	Ensure adequate mixing pattern in bottom dish material.
Other.	Maintenance.	Repair / inspection over equipments.	Cleaning of the equipments. Residual toxic gas inside.	Health hazard.	Work permit.	3	3	9	Ensure positive isolation of piping connection before vessel entry.
Other.	Other.	Hazardous chemicals.	Handling of Acetic acid.	Gasket/line leak. Spill hazard.	PPE. Safety shower and eye wash fountain. Portable fire extinguishers.	3	3	9	Provide splash guards on flange joints of the Caustic dosing line. Eliminate sources of ignition.

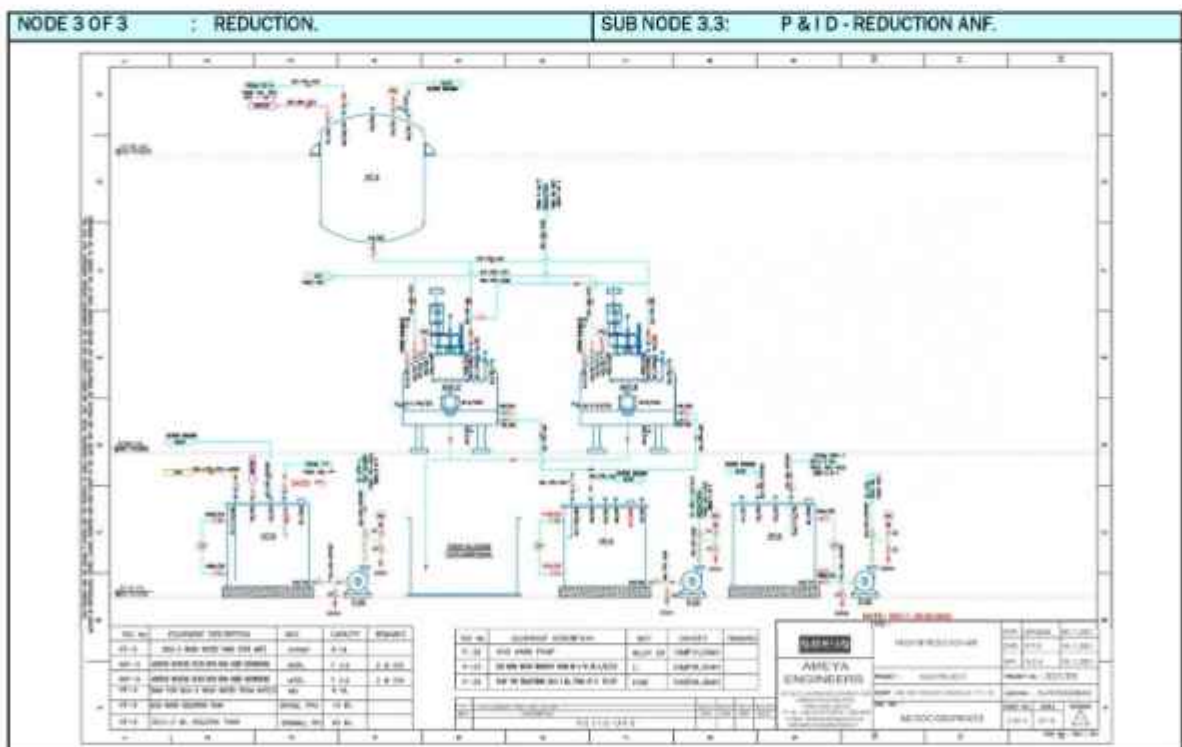


NODE 3 OF 3 : REDUCTION. **SUB NODE 3.2: P & I D - REDUCTION CRYSTALLIZER.**

DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.

Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
None.	Flow.	No flow of material from crystallizers to VFF1.	No material in the CR6/ CR7/ CR8. Valve failure/blockage. Line blockage. Transfer pump P20/ P21 failure (loss of power, impeller case off or corroded etc.). Human error.	Delayed operation. Spill hazard during blockage removal operation. Pump damage.	SG in transfer line. PG over pump. Training. Improved supervision. Preventive maintenance. Electrical overload relay. Emergency power.	3	3	9	Log book record. SOP for blockage removal operation. Safety shower and eye wash fountain. No standby pump for P11B.
Reverse.	Flow.	Reverse flow at pump P20/21d is charge line.	Power failure, line material flowing back.	Disturbed operation.	NRV provided in pump discharge line.	3	3	9	-
As Well As.	Flow.	As well as flow of material in filtrate.	Bag torn of the filter.	Disturbed operation.	Supervision.	3	3	9	-
More.	Temperature.	More temperature at CR6/ CR7/ CR8.	Cooling water supply malfunctioning.	Disturbed operation.	Supervision. If in CWS.	3	3	9	-
Less.	Temperature.	Less temperature.	More cooling. Human error.	Not significant as freezing not likely.	-	-	-	-	-

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.2: P & I D - REDUCTION CRYSTALLIZER.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Less.	Pressure.	Less pressure.	Vacuum in the reactor system. Fast pumping out and vent closed. Fast cooling, vent closed.	Not significant.	Equipments are designed for vacuum.	-	-	-	-
As Well As.	Composition.	Change in composition of ML.	Filter cloth damaged.	Material in ML. Disturbed operation.	Supervision.	3	3	9	-
More.	Phase.	Increase in number of phases.	During crystallization solids formed settling in bottom nozzle, blocking the bottom nozzle.	Spill hazard during blockage removal operation.	PPE. Flush type bottom valve.	4	3	12	-
Other.	Maintenance.	Repair / inspection over equipments.	Cleaning of the equipments. Residual toxic gas inside.	Health hazard.	Work permit.	3	3	9	Ensure positive isolation of piping connection before vessel entry.

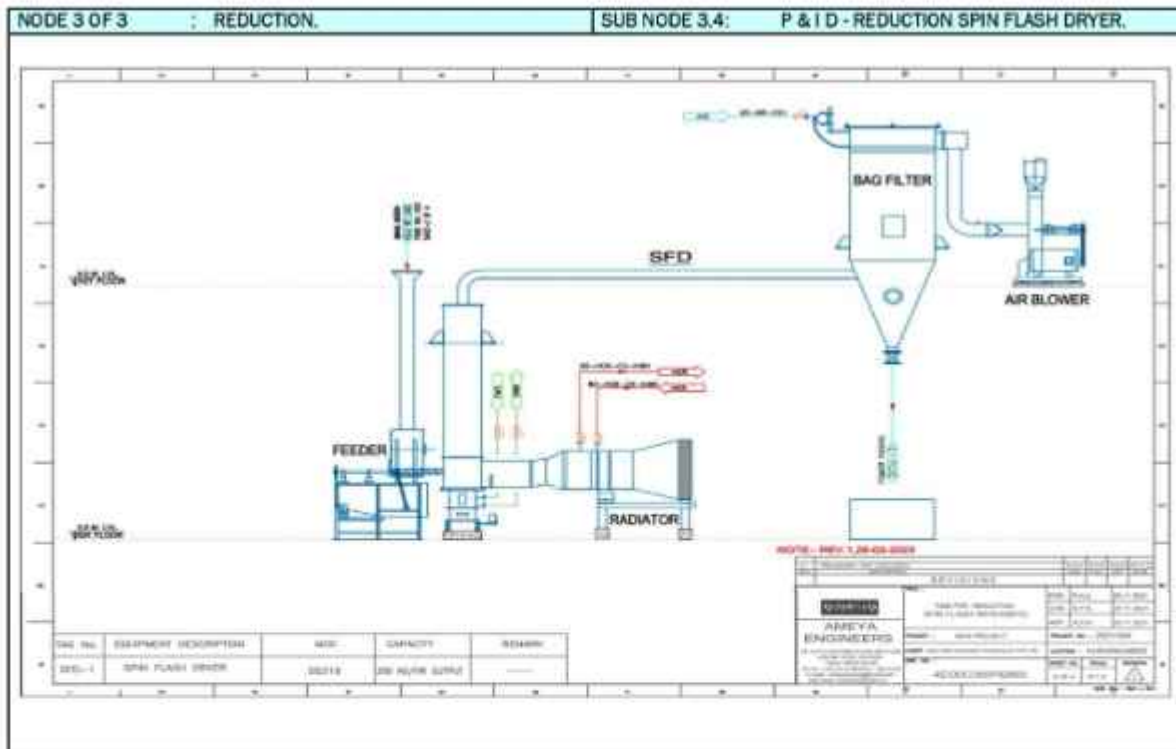


NODE 3 OF 3 : REDUCTION.				SUB NODE 3.3: P & I D - REDUCTION ANF.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
None.	Flow.	No flow of material from HT5 to ANF5/6.	No material in the HT5.	Delayed operation.	LG/ SG over ANF.	3	3	9	Log book record.
			Valve failure/blockage.	Spill hazard during blockage removal operation.	Training. Preventive maintenance.	4	4	16	SOP for blockage removal operation.
			Line blockage.		Improved supervision.	3	3	9	Safety shower and eye wash fountain.
			Human error.						
More.	Flow.	More flow at vent.	Compressed air used at ANF-released through vent.	ANF vent contains organic loaded air. Pollution issue.		4	4	16	Connect vent of ANF5/ ANF6 to scrubber.
Reverse.	Flow.	Reverse flow at pump P23 discharge line.	Power failure, line material flowing back.	Disturbed operation.	NRV provided in pump discharge line.	3	3	9	-
As Well As.	Flow.	As well as flow of material in filtrate at ANF.	Bag torn of the filter.	Disturbed operation.	Supervision.	3	3	9	-
More.	Temperature.	More temperature.	More ambient temperature.	Not significant.	-	-	-	-	-
Less.	Temperature.	Less temperature.	Less ambient temperature.	Not significant.	-	-	-	-	-

72

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.3: P & I D - REDUCTION ANF.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Less.	Pressure.	Less pressure.	Vacuum in the system. Fast pumping out and vent closed. Fast cooling, vent closed.	Not significant.	Equipments are designed for vacuum.	-	-	-	-
More.	Phase.	More number of phases.	Solids accumulating at HT6.	Disturbed operation.	Supervision.	3	3	9	-
More.	Level.	More level at HT4/ HT5.	More feed in error.	Overflow at HT4/HT5. Spill hazard.	Supervision.	4	4	16	Contain any accidental spill for safe disposal and route floor washings through LTP. Avoid any organic contaminated water entering storm drain.
Less.	Level.	Less level at HT6.	P - 24 suction starving.	Disturbed operation.	LIT at HT6.	3	3	9	Drain valve for LG.
Other.	Maintenance.	Repair / inspection over equipments.	Clearing of the equipments. Residual toxic gas inside.	Health hazard.	Work permit.	3	3	9	Ensure positive isolation of piping connection before vessel entry.

73



74

NODE 3 OF 3 : REDUCTION. **SUB NODE 3.4: P & I D - REDUCTION SPIN FLASH DRYER.**

DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.

Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Less.	Flow.	Less flow of hot oil supply.	Hot oil system malfunctioning.	Disturbed operation.	Supervision.	3	3	9	
As Well As.	How.	As well as flow of dust in vent.	Bag torn of the bag filter.	Disturbed operation.	Supervision.	3	3	9	
Other.	Flow.	Static charge.	Powder transfer operations.	Unsafe condition.	Equipments are earthed.	4	4	16	
As Well As.	Composition.	Residual Acetic Acid traces in feed to SFD.	Incomplete washing step at ANF. Acetic Acid traces entering feed of SFD.	Smoldering at bag house. Unsafe condition. Fire/ explosion hazard. In presence of fine powder hybrid mixture formation is likely increasing the explosion hazard.	Equipments are earthed.	5	4	20	Provide effective measures for prevention of accumulation of static charge to a dangerous extent. Electrical as per electrical area classification. See Note 4. Ensure no Acetic Acid traces left in the feed to SFD. Vacuum to ANF may be considered and introduce process control check at this step.

75

NOTE 4: ELECTRICAL EQUIPMENTS			
ELECTRICAL AREA CLASSIFICATION		INGRESS PROTECTION (IP)	
All electrical devices are inherent ignition sources. Special design features are required to prevent the ignition of flammable vapors and dusts.		Solids and powders are used at site specify IP Types and Protection Details;	
Selection Criteria of electrical equipments in hazardous areas; <ul style="list-style-type: none"> Gas Grouping (based on ignition energy). Temperature Classification. Classified Zones. 		FIRST NUMERAL (Degree of Protection of persons against contact with or moving parts inside the enclosure & Protection Of Equipment against Solid Ingress)	SECOND NUMERAL (Ingress of Liquid)
Out of the three aspects in electrical area classification; first two i.e. group of materials handled and 'T' rating being property of the material we do not have any control over it the key being Zoning there by reduction in probability of the existence of a Flammable Atmosphere in the vicinity of the charged liquid.	0	No protection.	0 No protection.
	1	Objects greater than 50 mm.	1 Vertically dripping.
	2	Objects greater than 12 mm.	2 Angular dripping.
	3	Objects greater than 2.5 mm.	3 Sprayed water.
	4	Objects greater than 1.0 mm.	4 Splashed water.
	5	Dust - protected.	5 Water jets.
	6	Dust tight.	6 Heavy seas.
			7 Effects of immersion.
		8 Indefinite immersion.	
The fire and explosion hazard is directly proportional to the number and type of electrically powered devices in a process area The overall classification is only as good as the piece of equipment in an area with the lowest classification.			

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.4: P & I D - REDUCTION SPIN FLASH DRYER.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
As Well As.	Composition.	Powder in the vent exhaust gases.	Filter cloth damaged at bag house. Filter bag is not properly placed or turned up.	In case of hybrid mixture formation dust explosion likely. See Note 5.	Instrumentation on panel.	3	3	9	Dust detector in the vent.

76

NOTE NO. 5: HYBRID MIXTURES		
Dust suspensions in air containing a proportion of flammable gas or Vapour are frequently termed "hybrid mixtures".	<ul style="list-style-type: none"> Handling non-flammable dusts or granules can also present an electrostatic hazard if a flammable gas or Vapour is present. Dust mixtures and gas mixtures in non-flammable concentrations can form explosible hybrid mixtures when combined. A flammable dust mixed with a flammable gas and air will explode more violently than in air alone even if the gas concentration is below the LFL. A dispersion of flammable dust that is too coarse to be explosible may be rendered explosible by admixture of a small quantity of flammable gas or Vapour. 	Low energy electrostatic discharges that would not be capable of igniting a flammable dust dispersion may ignite a hybrid mixture of that dust even when the concentration of the gas or Vapour component is below its LFL.
The occurrence of hybrid mixtures in industrial plant is an increased danger even when the concentration of flammable gases or Vapours in itself is below the LFL.		

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.4: P & I D - REDUCTION SPIN FLASH DRYER.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
More.	Temperature.	More temperature at system	CWS failure.	Unsafe condition	Supervision. Alarm.	3	3	9	-
Less.	Temperature.	Less temperature.	Not significant.	-	-	-	-	-	-
More.	Pressure.	More pressure.	Dusting.	Pressurization. Dust explosion.	-	5	4	20	Dust safety tests.
Less.	Pressure.	Less pressure.	Vacuum in the system. Fast removing powder out and vent closed.	Not significant.	Equipments are designed for vacuum.	-	-	-	-
More.	Level.	More level for charging.	Manual addition at 6 m level.	Unsafe condition may be possible.	Supervision.	3	3	9	Keep proper access at charging platform.

77

NODE 3 OF 3 : REDUCTION.				SUB NODE 3.4: P & I D - REDUCTION SPIN FLASH DRYER.					
DESIGN INTENT : PROCESS OPERATIONS AS DETAILED IN THE SECTION 2.									
Guide Word	Parameter	Deviation	Cause	Consequence	Protection Measures	S	P	R	Action Suggested
Other.	Hazardous chemicals.	Handling of powders.	Handling of powder at packing and SFD section.	Dust explosion hazard. See Note 6.	-	5	4	20	Safety Class of powder handled not known. Powder safety tests are advisable so that safety precautions as required for that safety class of powder are applicable can be suggested. Explosion vent located at safe place.
Other.	Bought outs.	P & I Diagrams of bought outs.	SFD is bought out equipment.	P & I D not available.	-	4	4	16	Any bought equipment like SFD, identification of Hazop Study report and operating manual is to be insisted from the supplier. Q.3: Is SFD equipment Hazop Study report from supply available?
Other.	Maintenance.	Repair / inspection over equipments.	Cleaning of the equipments. Residual toxic gas inside.	Health hazard.	Work permit.	3	3	9	Ensure positive isolation of piping connection before vessel entry.

78

NOTE NO. 6: DUST EXPLOSION		
	<p>Dust explosions can occur when the following conditions are satisfied simultaneously:</p> <ul style="list-style-type: none"> The dust must be flammable. The particle size distribution must be capable of propagating flame. The dust concentration must fall within the Flammable Range. The air must contain sufficient oxygen to support combustion. <p>The dust suspension must be in contact with an ignition source of sufficient energy.</p>	<p>DUST EXPLOSIBILITY</p> <p>Some factors which influence dust explosibility are:</p> <ol style="list-style-type: none"> (1) Chemical composition; (2) Particle size; (3) Moisture content; (4) Oxygen concentration; (5) Inert gas; (6) Admixed inert dust concentration.
<p>Therefore, control of dust explosion is accomplished by at least any one of these five factors.</p>		<p>Moisture content has a strong effect on dust explosibility, although the effect is generally weak for moisture contents below 10%. At the other end of the range, dust with a moisture content greater than 30% is unlikely to be responsible for initiation of an explosion.</p>

79

SECTION 5: LIST OF ACTION SUGGESTED

SN.	ACTION SUGGESTED	REF NODE
1	Oleum measure tank DT1 overflow while receipt of Oleum from storage tank leads to unsafe condition in plant. Consider some of the available options like; <ul style="list-style-type: none"> ▪ Transfer pump emergency stop push button located near DT1 for operator. ▪ Connecting the DT1 overflow line back to the Oleum storage tank 	1.1
2	Instrumentation interlock with feed in case agitation failure (consider signal for interlock from no load current and not on only power supply current).	1.1
3	Review agitator design of sulfonator, baffles, location of TI, addition dip pipe.	1.1
4	Obtain MSDS of intermediates, side reaction products, isomers, decomposition products etc. if any. In absence of adequate information the material should be considered as if hazardous material.	1.1
5	Impurities may accumulate to detrimental level in recycle stream (as ML used in washings) unless adequate purge not considered.	1.1
6	Provide Air lock removal valve in cooling water loop. Update P & I Diagram.	1.1
7	LG over DT1 and drain valve for LG. Update P & I Diagram.	1.1
8	Work permit.	1.1
9	Need for connecting vent to header and to proper disposal system like scrubber. Update P & I Diagrams accordingly.	1.1
10	Sulfonator flow control in addition to manual valve control Consider some of the available options like; <ul style="list-style-type: none"> ▪ Instrumentation for flow control. ▪ Rotameter. ▪ Metering pump. ▪ Provision of orifice plate in feed line restricting flow to desired limit. ▪ Addition in small lots. 	1.1
11	Sulfonator instrumentation feed cut off interlock in case high temperature, agitation failure, high pressure with alarm.	1.1
12	Consider NRV in CA feed line over sulfonator.	1.1
13	SR1 and SR2 vent going outside building as per P & I Diagram. Vent header going to scrubber is advisable.	1.1

80

SN.	ACTION SUGGESTED	REF NODE
14	LDAR (Leak Detection and Repair) system to monitoring, testing, and maintenance.	1.1
15	Provide rupture disc (RD) on the reactor in addition to the usual spring loaded safety valve. The vent line leading from Rupture disc should be taken out of the plant (having minimum resistance at the time of blowing) to dump tank for total containment). First relief at 10% overpressure by SRV, update P& ID showing only RD, consider corrosion aspect of materials handled and for SRV/ RD combination.	1.1
16	Safety shower and eye wash fountain.	1.1
17	Splash guards over flange joints carrying corrosive materials acid/alkali under pressure.	1.1
18	In view of Nitro-Amino compounds handling medical surveillance of workers and keep antidote like Methylene Blue in stock.	1.1
19	Monitoring of air born concentration of chemicals in work environment within the prescribed limits.	1.1
20	SOP for blockage removal operation.	1.1
21	Provide adequate capacity of scrubber to handled the vent gases from CR1/CR2.	1.2
22	Consider gravity flow as SR1/ CR2 are located at third floor and ANF 1 and ANF 2 are located at second floor.	1.2
23	Provide 'U' seal at scrubber. Update P & I Diagram.	1.2
24	Leak detection at vent of scrubber.	1.2
25	Periodic testing of the crystallizers jacket/ coil/ shell by competent person.	1.2
26	Monitor the impurity profile and purge level in recycle stream to avoid built up of impurity to detrimental level.	1.2
27	Provide adequate support to HDPE lines or pre-fabricated coated piping option may be considered.	1.3
28	Update P & I Diagram the disposal/ transfer route for ML from filter press.	1.3
29	Check heat removal capacity of the reactor adequate for the required reaction exotherm especially for reduced batch/ for dish material. (as The reactor volume is function of cube of radius where as heat transfer area is function of square of the radius).	1.3
30	Safety shower and eye wash fountain.	2.1
31	Periodic testing of the crystallizers coil by competent person.	2.1
32	Q.1: Is there vacuum connection at ML collection compartment of ANF?	2.1

81

SN	ACTION SUGGESTED	REF NODE
33	Q.2: ANF 3 and ANF 4 are 12.5 m ³ capacity where as crystallizers CR3/ CR4/ CR5 are 40 m ³ capacity each, mismatch capacity depending time cycle may become bottle neck in plant?	2.1
34	No standby pump for P14A.	2.2
35	Consider flush type bottom valve for DIS1.	2.2
36	Review stirrer design of DIS1 to ensure mixing in dish material.	2.2
37	Periodic calibration of water meter WM at DIS1	2.2
38	Provide 'U' seal at scrubber SC2. Update P & I Diagram.	2.3
39	Establish the maximum safe temperature for exothermic reactions like Oxidation by carrying out DSC test review the rupture disc (RD) setting accordingly.	2.3
40	Estimate the heat removed capacity of the reactor at operating conditions. Establish the maximum heat removal requirement for the reaction system and hence the safety margin available	2.3
41	Provide adequate pressure relief system for oxidation reactors.	2.3
42	All pressure safety valves should be set at 10% higher than the maximum achievable working pressure.	2.3
43	Prepare "On Site Emergency Plan" based on MCLS Study.	2.3
44	Provide fire hydrant system with water runoff system.	2.3
45	Leak detection at the vent of scrubber.	2.3
46	Instrumentation interlock with feed in case agitation failure. Consider signal for interlock from no load current and not on only power supply current.	2.3
47	Provide splash guards on flange joints of the Caustic dosing line.	2.3
48	Avoid any flange joint in the Caustic pipe line crossing over walkway.	2.3
49	Reduction reactors are vented through condenser, mal-operation or failure of the valve provided in vent line over the condenser may subject the system to unsafe condition. Consider proper venting for the system and ensure ease access to the vent valve.	3.1
50	Temperature control instrumentation high temperature interlock with feed with alarm for reduction reactor	3.1
51	Adequate Pressure relief arrangement (SRV, RD, Dump Tank) flame arrestor at vent reduction reactor.	3.1
52	Avoid any sources of ignition in the area of reduction area.	3.1
53	Connect all the release vents and direct for safe disposal such as scrubber in reduction area.	3.1

SN	ACTION SUGGESTED	REF NODE
54	Avoid the buildup of excess nitro compound in the reaction mass at reduction reactor.	3.1
55	Ensure effective washing to Iron sludge to make it free from residual product.	3.1
56	Periodic testing of the reactors by competent person.	3.1
57	Ensure adequate mixing pattern in bottom dish material.	3.1
58	SOP for blockage removal operation VPF1.	3.2
59	Safety shower and eye wash fountain VPF1 area.	3.2
60	No standby pump for P14B	3.2
71	Safety shower and eye wash fountain at HT5 area	3.3
72	Connect vent of ANF5/ ANF6 to scrubber.	3.3
73	SOP for blockage removal operation HT5.	3.3
74	Contain any accidental spill for safe disposal and route floor washings through ETP.	3.3
75	Avoid any organic contaminated water entering storm drain.	3.3
76	Provide effective measures for prevention of accumulation of static charge to a dangerous extent	3.4
77	Electrical as per electrical area classification of SFD area.	3.4
78	Ensure no Acetic Acid traces left in the feed to SFD.	3.4
79	Vacuum to ANF may be considered and introduce process control check at this step.	3.4
80	Provide Dust detector in the vent of SFD.	3.4
81	Carry our powder safety tests and take precautions required for the safety class of powder are applicable	3.4
82	Explosion vent of SFD to be located at safe place.	3.4
83	Any bought equipment like SFD, identification of Hazop Study report and operating manual is to be insisted from the supplier.	3.4
84	As the equipments at each building block/ plant are fixed there can be comprehensive Master P & I Diagram for each plant or building block which remains as starting point for the HAZOP Study. Any modifications/ alterations/ additional precautions as outcome of the HAZOP Study meeting need to be viewed with respect to such master P & I Diagram, recorded and P & I Diagrams update where ever necessary.	3.4

Note on Odour Management Oric Chemicals Aurangabad

Following chemicals are stored and handled in the plant:

1. Para Nitro Toluene (p NT) in tanks
2. Acetic acid in tanks

Products and Intermediate products

3. Para nitro toluene o sulfonic acid (PNTOSA) CAS no 121-03-94.
4. 4, 4 Diaminostiebene-2 -2 -Di sulfonic acid DAS CAS no 81-11-8
5. 4, 4 Dinitrostiebene-2 -2 -Di sulfonic acid DNS CAS No 128-42-7

As per the MSDS of these products the properties with respect to odour and compatibility are as follows:

1. The information as per the MSDS available it is clear that all are solids and Acetic acid is high boiling liquid and none of the chemicals handled have any odour problem at the room temperature at which these are handled.
2. All these are kept in tanks securely and separately and handled and transferred in the closed system and handled by the operators wearing masks and PPES to prevent any exposure.
3. All are non-compatible with strong oxidizers only. And there is no presence of strong oxidizers in the plant.

IMORTANT PROPERTIES OF THE CHEMICLAS WITH RESPECT TO ODOUR AND NON-COMPAITBILITY

Para Nitro Toluene (p NT) in tanks

1. a) Physical state & Color Form: Solid
2. c) Odour: Aromatic
3. Odour threshold limit: Not available
4. e) Freezing/ Melting point 52 oC
5. f) Boiling Point/range 238 0C
6. **Incompatible Materials:** Various plastics and rubbers

4, 4'-Di amino stilbene-2, 2'disulfonic acid

State: Solid

Odour: characteristic

Odour Thresh hold limit: Not determined

MP= 133.5 Degree C

Incompatible materials: Oxidisers

Acetic Acid

Physical State Liquid

Appearance Colorless

Odor vinegar-like

ORIC
ORIC ORGANIC CHEMICALS PVT. LTD.

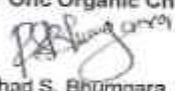
Head Office : 205, 2nd Floor, 22-D, Motilal Wadia Building, S. A. Brelvi Road, Fort, Mumbai - 400 001
Tel. No. +91 22 22670305 / +91 22 22680647 Email : info@oricorganics.com

UNDERTAKING

We, M/s Oric Organics Chemicals Pvt. Ltd. state that our proposal is being considered for Environmental Clearance for our project situated at Plot no. 9, Sector 1, AURIC City, Chh. Sambhajinagar (MH).

We undertake that, we will provide bio-toilets during construction phase.

Thanking you,
For Oric Organic Chemicals Pvt. Ltd.


Rishad S. Bhungara
Director



ORIC

ORIC ORGANIC CHEMICALS PVT. LTD.

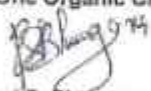
Head Office : 205, 2nd Floor, 22-D, Motilal Wadia Building, S. A. Brelvi Road, Fort, Mumbai - 400 001
Tel. No. +91-22-22870305 / +91-22-22880647 Email : info@oricorganics.com

UNDERTAKING

We, M/s Oric Organics Chemicals Pvt. Ltd. state that our proposal is being considered for Environmental Clearance for our project situated at Plot no. 9, Sector 1, AURIC City, Chh. Sambhajinagar (MH).

We undertake that, we will install an online monitoring system for ambient air monitoring which will be connected to CPCB & MPCB, servers.

Thanking you,
For Oric Organic Chemicals Pvt. Ltd.


Rishad S. Bhungara
Director



ANNEXTURE IX

VOC Mitigation Measures

Process Operation and potential source of VOC	Recommended devices / Equipment/utility
Charging of solvent in the Reactor	a) The provision of overhead tank or addition tank. None of the solvents shall be charged directly in the Reactor.
Reactor -Equipment	<p>a) The various accessories and joints shall be provided with tongue and grieve flanges and flange joints shall be provided with appropriate guard or clamps to avoid escape of any vapors or liquid.</p> <p>b) The Reactor drive system shall be provided with mechanical seal to restrict any possible escape of such solvent to surrounding atmosphere.</p>
Condenser	<p>a) Condenser shall be of appropriate capacity and utility. Recommended is chilled water, cooling water within let supply temperature 20°C</p> <p>b) Recommended to install a sub cooler as secondary condenser of appropriate capacity and provision of chilled water/brine as utility.</p> <p>c) Condenser vents shall be connected to a dump tank having jacket and provision of cooled water circulation as utility.</p> <p>d) The Dump tank shall be provided with a vent with minimum height of 12 feet with flame arrestor.</p>
Reaction mass Filtration	<p>a) Filters shall be of suitable capacity and closed and not open to air or surrounding atmosphere. Open Nutsche Filter shall not be used which are open to surrounding air.</p> <p>b) Nitrogen gas with oxygen content less than 0.0009 shall be purged.</p> <p>c) The filtrate having product shall be collected in the close vessel with appropriate vent height and provision offlame arrestor.</p> <p>d) The close vessels as storage tank shall have jacket with cooled water circulation.</p>
Centrifuge	<p>a) Centrifuge equipment shall be for suspension and top or bottom discharge</p> <p>b) The operation shall be in close loop and not manually charged with product slurry for separation for solid and liquid.</p> <p>c) The vent of the centrifuge shall be connected with close tank with below additional vent with flame arrestor.</p> <p>d) The filtrate shall be collected in a close tank or receiver with appropriate jacket utility.[Cooled water or chilled water]</p>

	<p>e) The transfer of filtrate to the distillation vessels or for recovery shall be through appropriate pump with mechanical seal and in close loop.</p>
Charging Tanks	<p>a) Charging tanks shall be of suitable size and shall be connected to main or bulk storage tank.</p> <p>b) Supply line shall be of lower size than the Return or overflow line to avoid any overflow by any means.</p> <p>c) The pumps shall be provided with mechanical seal and cut off device [level control switch] so that it will stop once an appropriate level is reached.</p> <p>d) An alarm system shall be provided</p>
Dosing Pumps	<p>Dosing pumps shall be installed to avoid manual operation in the case where an addition of a reactant is required to be controlled with time.</p>
Drying Operation	<p>a) In case of atmosphere drying operation, the dryers shall be provided with utility cut of device so that overheating shall be controlled.</p> <p>b) In case of vacuum drying operation non Return valves and utility pneumatic control device shall be suitable installed.</p> <p>c) The dryer exhaust or vent shall be connected to water Scrubber so that the solvent vapors shall be appropriately scrubbed and will not be released to air or surrounding atmosphere.</p>
Distillation column or recovery system	<p>a) All the flange joints shall be appropriately covered with flange guards.</p> <p>b) Condensers shall be of appropriate capacity and utility.</p> <p>c) Condenser vent shall be of appropriate height and shall be connected to a tank with secondary vent and appropriate jacket cooling system.</p> <p>d) Distilled solvent shall be transferred in a close loop.</p> <p>e) Solvent distillation Residue shall be discharged with Nitrogen blanketing and in close containers.</p> <p>f) Solvent containers or drums shall be sealed appropriately.</p>
Training for avoiding wrong operation for escape of VOC and causing health hazard.	<p>The working staff and rest all the employees in the manufacturing and factory premises shall be trained for the various operations in line with standard operating Procedure</p> <ol style="list-style-type: none"> 1. On job training. 2. Class Room training. 3. Standard operating procedure shall be in place for checkup of the equipment and devices in operation and shall be strictly implemented

BONDE TECHNICAL SERVICES

Date: - 17th June 2023

To,

M/S. ORIC ORGANIC CHEMICALS PVT. LTD.

ROOM NO. 205, 2ND FLOOR,
22-D, MOTLIBAI WADIA BUILDING,
S.A. BRELVI ROAD, MUMBAI - 400 001.

KIND ATTENTION : DR. SHAVAK K. BIJUMGARA,
Chairman & Managing Director.

SUBJECT : EMERGENCY PLAN.

Respected Sir,

Thanking you for the trust shown in assigning the preparation of **Emergency Plans** for your proposed plant at **AURIC City**, located at Plot No. 9, Sector 1, Village: Shendra, Aurangabad - 431 154 to us.

Please consider this letter as acceptance of the work by us as per attached work order issued by you.

Thanking you,

Yours Faithfully,

FOR BONDE TECHNICAL SERVICES



(S. L. BONDE)
Proprietor

Enclosed:

Work Order No.: ORIC/23-23/18 dated 17.06.2023 for Emergency Plan.

ORIC
ORIC ORGANIC CHEMICALS PVT. LTD.

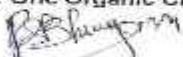
Head Office : 205, 2nd Floor, 22-D, Motilal Wasia Building, S. A. Brelvi Road, Fort, Mumbai - 400 001.
Tel. No. +91-22-22870305 / +91-22-22880647 E-mail : info@oricorganics.com

UNDERTAKING

We, M/s Oric Organics Chemicals Pvt. Ltd. state that our proposal is being considered for Environmental Clearance for our project situated at Plot no. 9, Sector 1, AURIC City, Chh. Sambhajinagar (MH).

We undertake that, rain water harvesting facility will be completed before commissioning of manufacturing activity.

Thanking you,
For Oric Organic Chemicals Pvt. Ltd.


Rishad S. Bhungara
Director



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name :	Waste Water
		Sample Location:	STP Inlet
		Sample Drawn by:	SAEN
		Sample Quantity:	2 Ltr
		Sample Condition:	Properly packed & labelled
Analysis Information		Report Information	
Analysis carried out at:	SAEN Lab	Sample Inward No :	SAEN/24-25/149(A) - 1
Date of Sample Receipt :	18.06.2024	Date of Sample collection :	17.06.2024
Analysis Start Date:	18.06.2024	Report No. :	SAEN/TR/24-25/10-94
Analysis End Date:	25.06.2024	Date of Report :	25.06.2024

Sr.No	Parameters	Result	Unit	Standard Limits	Test Method
1	Total Suspended Solids	170.7	mg/l	Not Applicable	APHA 24th Edn. 2540 D
2	Biochemical Oxygen Demand for 3 days @ 27°C	90.5	mg/l	Not Applicable	IS: 3025 (Part 44) 2023

Remarks (If Any): Not Applicable**Note:**

1. Test Report is based on above parameters.
2. SAEN will discard the sample after 15 Days of the date of Test Report.
3. Test Results pertain only to the sample tested.
4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
6. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anantrao Nandawadekar
Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Waste Water Sample Location: STP Outlet Sample Drawn by: SAEN Sample Quantity: 2 Ltr Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 18.06.2024 Analysis Start Date: 18.06.2024 Analysis End Date: 25.06.2024	Sample Inward No : SAEN/24-25/149(A) - II Date of Sample collection : 17.06.2024 Report No. : SAEN/TR/24-25/10-95 Date of Report : 25.06.2024		

Sr.No	Parameters	Result	Unit	Standard Limits	Test Method
1	Total Suspended Solids	43.3	mg/l	< 50	APHA 24th Edn. 2540 D
2	Biochemical Oxygen Demand for 3 days @ 27°C	24.9	mg/l	< 30	IS: 3025 (Part 44) 2023

Remarks (If Any): Results are well within limits prescribed by MPCB Consent.

Note:

1. Test Report is based on above parameters.
2. SAEN will discard the sample after 15 Days of the date of Test Report.
3. Test Results pertain only to the sample tested.
4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
6. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantrao Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Waste Water	Sample Location: ETP Inlet
		Sample Drawn by: SAEN	Sample Quantity: 2 Ltr
		Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab		Sample Inward No : SAEN/24-25/149(A) - III	
Date of Sample Receipt : 18.06.2024		Date of Sample collection : 17.06.2024	
Analysis Start Date: 18.06.2024		Report No. : SAEN/TR/24-25/10-96	
Analysis End Date: 25.06.2024		Date of Report : 25.06.2024	


Sr.No	Parameters	Result	Unit	Standard Limits	Test Method
1	pH at 25 °C	6.6	--	Not Applicable	APHA 24th Edn. 4500 H+B
2	Total Suspended Solids	90.3	mg/l	Not Applicable	APHA 24th Edn. 2540 D
3	Total Dissolved Solids	7883.0	mg/l	Not Applicable	APHA 24th Edn. 2540 C
4	Biochemical Oxygen Demand - 3 Days at 27°C	275.20	mg/l	Not Applicable	IS 3025 "44" 2023
5	Chemical Oxygen Demand	795.0	mg/l	Not Applicable	IS : 3025 "58" 2023
6	Oil & Grease	13.34	mg/l	Not Applicable	IS : 3025 "39" 2021
7	Chloride (as Cl ⁻)	477.5	mg/l	Not Applicable	APHA 24th Edn. 4500 ClB
8	Sulphate (as SO ₄ ²⁻)	5873.6	mg/l	Not Applicable	APHA 24th Edn. 4500- SO ₄ ²⁻ E
9	Phosphate (as PO ₄)	49.20	mg/l	Not Applicable	APHA 24th Edn. 4500 - P D
10	Ammonical Nitrogen	19.30	mg/l	Not Applicable	IS 3025 Part (34) 2022
11	N Total	8.52	mg/l	Not Applicable	APHA 24th Edn. 4500- NH ₃ C
12	Fecal Coliform	80.0	/100 ml.	Not Applicable	IS 1622 (Clause 3.3.3) -2019

Remarks (If Any): Not Applicable.

Note:

1. Test Report is based on above parameters.
2. SAEN will discard the sample after 15 Days of the date of Test Report.
3. Test Results pertain only to the sample tested.
4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
6. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anantrao Nandawadekar
 Technical Manager

END OF REPORT



S A Encon Private Limited Accredited with ISO 9001, ISO 14001 & ISO 45001

SHIRWAL: Dt. Sacara - 412801, Maharashtra, Ph. No.: + 91-9112 343 343 + 91-9850 173 286
 eMail : info@saenco.in, saenonpl@gmail.com, website: www.saenco.in


Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Waste Water Sample Location: STP Inlet Sample Drawn by: SAEN Sample Quantity: 2 Ltr Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 17.07.2024 Analysis Start Date: 17.07.2024 Analysis End Date: 23.07.2024	Sample Inward No. : SAEN/24-25/195(A) - 1 Date of Sample collection : 16.07.2024 Report No. : SAEN/TR/24-25/14-77 Date of Report : 24.07.2024		

Sr.No	Parameters	Result	Unit	Standard Limits	Test Method
1	Total Suspended Solids	159.6	mg/l	Not Applicable	APHA 24th Edn. 2540 D
2	Biochemical Oxygen Demand for 3 days @ 27°C	88.4	mg/l	Not Applicable	IS: 3025 (Part-14) 2023

Remarks (If Any): Not Applicable
Note:

1. Test Report is based on above parameters.
2. SAEN will discard the sample after 15 Days of the date of Test Report.
3. Test Results pertain only to the sample tested.
4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
6. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anant Rao Nandawadekar
 Technical Manager

END OF REPORT

SARN/P-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaj Nagar, Dist-Shendra - 431007.		Sample Name : Waste Water Sample Location: STP Outlet Sample Drawn by: SAEN Sample Quantity: 2 Ltr Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 17.07.2024 Analysis Start Date: 17.07.2024 Analysis End Date: 23.07.2024	Sample Inward No : SAEN/24-25/195(A) - II Date of Sample collection : 16.07.2024 Report No. : SAEN/TR/24-25/14-78 Date of Report : 24.07.2024		

Sr.No	Parameters	Result	Unit	Standard Limits	Test Method
1	Total Suspended Solids	40.7	mg/l	< 50	APHA 24th Edn. 2540 D
2	Biochemical Oxygen Demand for 3 days @ 27°C	25.4	mg/l	< 30	IS: 3025 (Part 44) 2023

Remarks (If Any): Results are well within limits prescribed by MPCB Consent.

Note:

1. Test Report is based on above parameters.
2. SAEN will discard the sample after 15 Days of the date of Test Report.
3. Test Results pertain only to the sample tested.
4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
5. The Instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
6. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anantao Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhajii Nagar, Dist-Shendra - 431007.		Sample Name : Waste Water Sample Location: ETP Inlet Sample Drawn by: SAEN Sample Quantity: 2 Ltr Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 17.07.2024 Analysis Start Date: 17.07.2024 Analysis End Date: 23.07.2024	Sample Inward No : SAEN/24-25/195(A) - III Date of Sample collection : 16.07.2024 Report No. : SAEN/TR/24-25/14-79 Date of Report : 24.07.2024		


Sr.No	Parameters	Result	Unit	Standard Limits	Test Method
1	pH at 25 °C	6.7	--	Not Applicable	APHA 24th Edn. 4500 H+B
2	Total Suspended Solids	84.9	mg/l	Not Applicable	APHA 24th Edn. 2540 D
3	Total Dissolved Solids	7912.5	mg/l	Not Applicable	APHA 24th Edn. 2540 C
4	Biochemical Oxygen Demand - 3 Days at 27°C	260.90	mg/l	Not Applicable	IS 3025 "44" 2023
5	Chemical Oxygen Demand	705.8	mg/l	Not Applicable	IS : 3025 "58" 2023
6	Oil & Grease	12.50	mg/l	Not Applicable	IS : 3025 "39" 2021
7	Chloride (as Cl ⁻)	460.2	mg/l	Not Applicable	APHA 24th Edn. 4500 Cl B
8	Sulphate (as SO ₄ ²⁻)	5958.7	mg/l	Not Applicable	APHA 24th Edn. 4500- SO ₄ ²⁻ B
9	Phosphate (as PO ₄)	52.60	mg/l	Not Applicable	APHA 24th Edn. 4500 - P D
10	Ammonical Nitrogen	18.50	mg/l	Not Applicable	IS 3025 Part (34) 2022
11	N Total	9.05	mg/l	Not Applicable	APHA 24th Edn. 4500- NH ₃ C
12	Fecal Coliform	85.0	/100 ml.	Not Applicable	IS 1622 (Clause 3.3.3) -2019

Remarks (If Any): Not Applicable.

Note:

1. Test Report is based on above parameters.
2. SAEN will discard the sample after 15 Days of the date of Test Report.
3. Test Results pertain only to the sample tested.
4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
6. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anant Rao Nandawadekar
 Technical Manager

END OF REPORT



TEST REPORT

Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Drinking Water Sample Location: Office Cooler Sample Drawn by: Customer Sample Quantity: 2 Ltr Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - I Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-41 Date of Report : 27.08.2024		

Sr.No	Parameters	Result	Unit	Standard Limits	Test Method
<i>Chemical Discipline</i>					
1	Turbidity	0.10	NTU	< 1.0	APHA 24th Edn. 2130 B
2	Conductivity at 25°C	131.40	µmhos/cm	-	APHA 24th Edn. 2510 B
3	pH at 25 °C	6.56	-	6.5 - 8.5	APHA 24th Edn. 4500 H ⁺ B
4	Total Dissolved Solids	84.20	mg/l	< 500	APHA 24th Edn. 2540 C
5	Total Alkalinity (as CaCO ₃)	31.20	mg/l	< 200	APHA 24th Edn. 2320 B
6	Total Hardness (as CaCO ₃)	28.00	mg/l	< 200	APHA 24th Edn. 2340 C
7	Calcium (as Ca)	7.21	mg/l	< 75	APHA 24th Edn. 3500-Ca B
8	Magnesium (as Mg)	2.43	mg/l	< 30	APHA 24th Edn. 3500-Mg B
9	Chlorides (as Cl)	20.37	mg/l	< 250	APHA 24th Edn. 4500 Cl-B
10	Sulphate (as SO ₄)	4.52	mg/l	< 200	APHA 24th Edn. 4500- SO ₄ ²⁻ E
11	Iron as Fe	0.02	mg/l	< 0.3	APHA 24th Edn. 3500 Fe B
<i>Biological Discipline</i>					
12	Total Coliform	Absent	/100ml	Absent	IS: 15185-2021
13	E. Coli	Absent	CFU/ml	Absent	IS: 15185-2021

Remarks (If Any): Based on above parameters water sample is Potable.

Note: Limits as per IS 10500:2012

1. Test Report is based on above parameters.

2. SAEN will discard the sample after 15 Days of the date of Test Report.

3. Test Results pertain only to the sample tested.

4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.

5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.

6. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantrao Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



S A Encon Private Limited - Accredited with ISO 9001, ISO 14001 & ISO 45001

SHIRWAL, Dt. Satara, 412901, Maharashtra Ph. No. + 91-9112 343 343, + 91-9850 173 286
 eMail : info@saenco.in, saenconp@gmail.com, website: www.saenco.in

Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Waste Water Sample Location: STP Inlet Sample Drawn by: SAEN Sample Quantity: 2 Ltr Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - II Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-42 Date of Report : 27.08.2024		

Sr.No	Parameters	Result	Unit	Standard Limits	Test Method
1	Total Suspended Solids	168.3	mg/l	Not Applicable	APHA 24th Edn. 2540 D
2	Biochemical Oxygen Demand for 3 days @ 27°C	92.6	mg/l	Not Applicable	IS: 3025 (Part 44) 2023

Remarks (If Any): Not Applicable

Note:

1. Test Report is based on above parameters.
2. SAEN will discard the sample after 15 Days of the date of Test Report.
3. Test Results pertain only to the sample tested.
4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
6. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited



Mr. Anant Rao Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangshah Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Waste Water Sample Location: STP Outlet Sample Drawn by: SAEN Sample Quantity: 2 Ltr Sample Condition: Properly packed & labelled.	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - III Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-43 Date of Report : 27.08.2024		

Sr.No	Parameters	Result	Unit	Standard Limits	Test Method
1	Total Suspended Solids	46.8	mg/l	< 50	APHA 24th Edn. 2540 D
2	Biochemical Oxygen Demand for 3 days @ 27°C	23.7	mg/l	< 30	IS: 3025 (Part 4) 2023

Remarks (If Any): Results are well within limits prescribed by MPCB Consent.

Note:

1. Test Report is based on above parameters.
2. SAEN will discard the sample after 15 Days of the date of Test Report.
3. Test Results pertain only to the sample tested.
4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain 80% Traceability.
6. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anant Rao Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023




Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Waste Water Sample Location: BTP Inlet Sample Drawn by: SAEN Sample Quantity: 2 Ltr Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024		Sample Inward No : SAEN/24-25/260 - IV Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-44 Date of Report : 27.08.2024	

Sr.No	Parameters	Result	Unit	Standard Limits	Test Method
1	pH at 25 °C	6.8	--	Not Applicable	APHA 24th Edn. 4500 H+B
2	Total Suspended Solids	96.5	mg/l	Not Applicable	APHA 24th Edn. 2540 D
3	Total Dissolved Solids	8095.4	mg/l	Not Applicable	APHA 24th Edn. 2540 C
4	Biochemical Oxygen Demand - 3 Days at 27°C	254.60	mg/l	Not Applicable	IS 3025 "44" 2023
5	Chemical Oxygen Demand	760.0	mg/l	Not Applicable	IS : 3025 "58" 2023
6	Oil & Grease	12.30	mg/l	Not Applicable	IS : 3025 "39" 2021
7	Chloride (as Cl ⁻)	456.3	mg/l	Not Applicable	APHA 24th Edn. 4500 Cl B
8	Sulphate (as SO ₄ ²⁻)	6005.0	mg/l	Not Applicable	APHA 24th Edn. 4500- SO ₄ ²⁻ E
9	Phosphate (as PO ₄)	58.60	mg/l	Not Applicable	APHA 24th Edn. 4500 - P D
10	Ammonical Nitrogen	17.55	mg/l	Not Applicable	IS 3025 Part (34) 2022
11	N Total	7.96	mg/l	Not Applicable	APHA 24th Edn. 4500- NH ₃ C
12	Focal Coliform	88.0	/100 ml.	Not Applicable	IS 1622 (Clause 3.3.3) -2019

Remarks (If Any): Not Applicable.
Note:

1. Test Report is based on above parameters.
2. SAEN will discard the sample after 15 Days of the date of Test Report.
3. Test Results pertain only to the sample tested.
4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
6. Laboratory Recognized by NABL with Certificate ID : TC-12366, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantro Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Ambient Air Sample Location: Near Main Gate Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - V Date of Sample collection : 16.08.2024 - 17.08.2024 Report No. : SAEN/TR/24-25/17-45 Date of Report : 27.08.2024		

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
<i>Environmental Conditions</i>					
1	Ambient Temperature	Min. = 21.1	°C	Not Available	Thermohygrometer
		Max. = 44.9			
2	Relative Humidity	Min. = 21.0	% RH	Not Available	Thermohygrometer
		Max. = 99.0			
<i>Pollutant Concentration</i>					
3	Sulphur Dioxide (SO ₂)	19.7	µg/m ³	≤ 80	CPCB Guidelines - NAAQS Monitoring & Analysis Guidelines Volume-1 NAAQMS/36/2012
4	Oxides of Nitrogen (NO ₂)	22.3	µg/m ³	≤ 80	
5	Particulate Matter PM ₁₀	46.7	µg/m ³	≤ 100	
6	Particulate Matter PM _{2.5}	20.8	µg/m ³	≤ 60	
7	Ozone (O ₃) (1hr)	BDL	µg/m ³	≤ 180	
8	Lead (Pb)	BDL	µg/m ³	≤ 1.0	
9	Carbon Monoxide (CO) (1hr)	BDL	mg/m ³	≤ 4.0	
10	Ammonia (NH ₃)	BDL	µg/m ³	≤ 400	
11	Benzene (C ₆ H ₆)	BDL	µg/m ³	≤ 5.0	
12	Benzo(a)Pyrene (BaP)	BDL	ng/m ³	≤ 1.0	
13	Arsenic (As)	BDL	ng/m ³	≤ 6.0	
14	Nickel (Ni)	BDL	ng/m ³	≤ 20	

Remarks (If Any) : Results are within standard limits prescribed by NAAQS.

Instrument Used : SAEN/INSTRU/69A, Calibration Cert. No.LE5-CCL/FF/RF/SC/26, Valid till - 29.05.2024.

Instrument Used : Thermohygrometer - SAEN/Instru/52F, Calibration Cert. No. 2324/1118/01-02, Valid till - 17.11.2024.

Limits as referred to National Ambient Air Quality Standards (NAAQS), 2009 - TWA method - 24 Hours.

Note:

- BDL - Below Detection Limit
- Test Report is based on above parameters.
- Test Results pertain only to the sample tested.
- The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
- The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
- Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantrao Nandawadekar
Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



S A Encon Private Limited: Accredited with ISO 9001, ISO 14001 & ISO 45001

SHIRWAL, Dt. Satara, 412801, Maharashtra. Ph. No. + 91-9112 343 343. + 91-9860 173 298
 eMail : info@saenco.in, saenconp@gmail.com, website: www.saenco.in

Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Ambient Air Sample Location: Near ETP Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/200-VI Date of Sample collection : 16.08.2024 - 17.08.2024 Report No. : SAEN/TR/24-25/17-46 Date of Report : 27.08.2024		

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
<i>Environmental Conditions</i>					
1	Ambient Temperature	Min. = 20.0 Max. = 33.1	°C	Not Available	Thermohygrometer
2	Relative Humidity	Min. = 21.0 Max. = 99.0	% RH		
<i>Pollutant Concentration</i>					
3	Sulphur Dioxide (SO ₂)	19.2	µg/m ³	≤ 80	CPCB Guidelines - NAAQS Monitoring & Analysis Guidelines Volume-1 NAAQMS/36/2012
4	Oxides of Nitrogen (NO _x)	21.1	µg/m ³	≤ 80	
5	Particulate Matter PM ₁₀	43.0	µg/m ³	≤ 100	
6	Particulate Matter PM _{2.5}	19.4	µg/m ³	≤ 60	
7	Ozone (O ₃) (1hr)	BDL	µg/m ³	≤ 180	
8	Lead (Pb)	BDL	µg/m ³	≤ 1.0	
9	Carbon Monoxide (CO) (1hr)	BDL	mg/m ³	≤ 4.0	
10	Ammonia (NH ₃)	BDL	µg/m ³	≤ 400	
11	Benzene (C ₆ H ₆)	BDL	µg/m ³	≤ 5.0	
12	Benzo(a)Pyrene (BaP)	BDL	ng/m ³	≤ 1.0	
13	Arsenic (As)	BDL	ng/m ³	≤ 6.0	
14	Nickel (Ni)	BDL	ng/m ³	≤ 20	

Remarks (If Any): Results are within standard limits prescribed by NAAQS.

Instrument Used : SAEN/INSTRU/69B, Calibration Cert. No. LES-CCL/00/01/SC/28, Valid till - 29.05.2024.

Instrument Used : Thermohygrometer - SAEN/Instru/52F, Calibration Cert. No. 3324/1110/01-02, Valid till - 17.11.2024.

Limits as referred to National Ambient Air Quality Standards (NAAQS), 2009 - TWA method - 24 Hours.

Note:

- BDL - Below Detection Limit
- Test Report is based on above parameters.
- Test Results pertain only to the sample tested.
- The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
- The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
- Laboratory Recognized by NABL with Certificate ID : TC-12460, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anant Nandawadekar
 Technical Manager

END OF REPORT

SAEN/P-06 Amul 00 dt. 08.06.2023



S A Encon Private Limited, Accredited with ISO 9001, ISO 14001 & ISO 45001

SHIRWAL, Dist. Solapur, 412801, Maharashtra. Ph. No. : + 91 9112 343 343. : 91-9800-173 885
 Email : info@saenco.in, saenconp@gmail.com, website: www.saenco.in

Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaj Nagar, Dist Shendra - 431007.		Sample Name : Ambient Air Sample Location: Near Boiler Area Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024		Sample Inward No : SAEN/24-25/260 - VII Date of Sample collection : 16.08.2024 - 17.08.2024 Report No. : SAEN/TR/24-25/17-17 Date of Report : 27.08.2024	

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
<i>Environmental Conditions</i>					
1	Ambient Temperature	Min. = 22.1 Max. = 44.3	°C	Not Available	Thermohygrometer
2	Relative Humidity	Min. = 21.5 Max. = 98.0			
<i>Pollutant Concentration</i>					
3	Sulphur Dioxide (SO ₂)	19.5	µg/m ³	≤ 80	CPCB Guidelines - NAAQS Monitoring & Analysis Guidelines Volume-1 NAAQMS/36/2012
4	Oxides of Nitrogen (NO _x)	21.8	µg/m ³	≤ 80	
5	Particulate Matter PM ₁₀	46.5	µg/m ³	≤ 100	
6	Particulate Matter PM _{2.5}	20.2	µg/m ³	≤ 60	
7	Ozone (O ₃) (1hr)	BDL	µg/m ³	≤ 180	
8	Lead (Pb)	BDL	µg/m ³	≤ 1.0	
9	Carbon Monoxide (CO) (1hr)	BDL	mg/m ³	≤ 4.0	
10	Ammonia (NH ₃)	BDL	µg/m ³	≤ 400	
11	Benzene (C ₆ H ₆)	BDL	µg/m ³	≤ 5.0	
12	Benzo(a)Pyrene (BaP)	BDL	ng/m ³	≤ 1.0	
13	Arsenic (As)	BDL	ng/m ³	≤ 6.0	
14	Nickel (Ni)	BDL	ng/m ³	≤ 20	

Remarks (If Any) : Results are within standard limits prescribed by NAAQS.

Instrument Used : SAEN/INSTRU/69C, Calibration Cert. No. LES-CCL/FF/RF/SC/30, Valid till - 29.05.2024.

Instrument Used : Thermohygrometer - SAEN/Instru/52F, Calibration Cert. No. 2324/1118/01-02, Valid till - 17.11.2024.
Limits as referred to National Ambient Air Quality Standards (NAAQS), 2009 - TWA method - 24 Hours.

Note:

- BDL - Below Detection Limit
- Test Report is based on above parameters.
- Test Results pertain only to the sample tested.
- The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
- The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
- Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For SA Encon Private Limited

Mr. Anant Rao Nandawadekar
Technical Manager

SAEN/F-06 Amd 00 dt. 08.06.2023

END OF REPORT



SA Encon Private Limited Accredited with ISO 9001, ISO 14001 & ISO 45001

SHIRWAL, DC, Betara, 418801, Maharashtra, Ph. No. : 91-2112-343 343, - 91-9850 173 886
eMail : info@saenco.in, saencoapl@gmail.com, website : www.saenco.in

Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaj Nagar, Dist-Shendra - 431007.		Sample Name : Ambient Air Sample Location: Between Oxidation & Sulphonation Building Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - VIII Date of Sample collection : 16.08.2024 - 17.08.2024 Report No. : SAEN/YR/24-25/17-4B Date of Report : 27.08.2024		

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
<i>Environmental Conditions</i>					
1	Ambient Temperature	Min. = 30.6	°C	Not Available	Thermohygrometer
		Max. = 35.0			
2	Relative Humidity	Min. = 24.2	% RH	Not Available	Thermohygrometer
		Max. = 45.0			
<i>Pollutant Concentration</i>					
3	Sulphur Dioxide (SO ₂)	19.5	µg/m ³	≤ 80	CPCB Guidelines - NAAQS Monitoring & Analysis Guidelines Volume 1 NAAQMS/36/2012
4	Oxides of Nitrogen (NO _x)	21.0	µg/m ³	≤ 80	
5	Particulate Matter PM ₁₀	46.5	µg/m ³	≤ 100	
6	Particulate Matter PM _{2.5}	20.2	µg/m ³	≤ 60	
7	Ozone (O ₃) (1hr)	BDL	µg/m ³	≤ 180	
8	Lead (Pb)	BDL	µg/m ³	≤ 1.0	
9	Carbon Monoxide (CO) (1hr)	BDL	mg/m ³	≤ 4.0	
10	Ammonia (NH ₃)	BDL	µg/m ³	≤ 400	
11	Benzene (C ₆ H ₆)	BDL	µg/m ³	≤ 5.0	
12	Benzo(a)Pyrene (BaP)	BDL	ng/m ³	≤ 1.0	
13	Arsenic (As)	BDL	ng/m ³	≤ 6.0	
14	Nickel (Ni)	BDL	ng/m ³	≤ 20	

Remarks (If Any): Results are within standard limits prescribed by NAAQS.


Instrument Used : SAEN/INSTRU/43, Calibration Cert. No. CC105124000001982F, Valid till - 28.04.2025.

Instrument Used : Thermohygrometer - SAEN/Instru/52F, Calibration Cert. No. 2324/111B/01-02, Valid till - 17.11.2024. Limits as referred to National Ambient Air Quality Standards (NAAQS), 2009 - TWA method - 24 Hours.

Note:

- BDL - Below Detection Limit
- Test Report is based on above parameters.
- Test Results pertain only to the sample tested.
- The content of Test Reports shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
- The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
- Laboratory Recognized by NABL with Certificate ID : TC 12368, Valid till dt. 09.10.2025

For S A Encon Private Limited


Mr. Anant Rao Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



S A Encon Private Limited Accredited with ISO 9001 ISO 14001 & ISO 45001

SHIRWAL, Dist. Baram, 412001, Maharashtra. Ph. No. : + 91-9112 343 343 ; 01-0650 173 200
 eMail : info@saenco.in, saencorp@gmail.com, website : www.saenco.in

Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaj Nagar, Dist-Shendra - 431007.		Sample Name : Workzone Air Sample Location: Oxidation Building Ground Floor Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024		Sample Inward No : SAEN/24-25/260 - IX Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-49 Date of Report : 27.08.2024	

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
<i>Environmental Conditions</i>					
1	Shop Temperature	Min. = 26.8 Max. = 45.0	°C	Not Available	Thermohygrometer
2	Relative Humidity	Min. = 31.3 Max. = 83.0			
<i>Pollutant Concentration</i>					
3	Sulphur Dioxide (SO ₂)	15.8	µg/m ³	≤ 80	CPCB Guidelines - NAAQS Monitoring & Analysis Guidelines Volume-1 NAAQMS/36/2012
4	Oxides of Nitrogen (NO _x)	18.2	µg/m ³	≤ 80	
5	Particulate Matter PM ₁₀	39.4	µg/m ³	≤ 100	
6	Particulate Matter PM _{2.5}	16.7	µg/m ³	≤ 60	
7	Ozone (O ₃) (1hr)	BDL	µg/m ³	≤ 180	
8	Lead (Pb)	BDL	µg/m ³	≤ 1.0	
9	Carbon Monoxide (CO) (1hr)	BDL	mg/m ³	≤ 4.0	
10	Ammonia (NH ₃)	BDL	µg/m ³	≤ 400	
11	Benzene (C ₆ H ₆)	BDL	µg/m ³	≤ 5.0	
12	Benzo(a)Pyrene (BaP)	BDL	ng/m ³	≤ 1.0	
13	Arsenic (As)	BDL	ng/m ³	≤ 6.0	
14	Nickel (Ni)	BDL	ng/m ³	≤ 20	

Remarks (If Any): Results are within standard limits prescribed by NAAQS.

Instrument Used : SAEN/INSTRU/45, Calibration Cert. No. CC10512400001986F, Valid till - 28.04.2025.

Instrument Used : Thermohygrometer - SAEN/Instru/52P, Calibration Cert. No. 2324/1118/01-02, Valid till - 17.11.2024.

Note: NAAQS stands for National Ambient Air Quality Standards, 2009.

- BDL - Below Detection Limit
- Test Report is based on above parameters.
- Test Results pertain only to the sample tested.
- The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
- The instruments & equipments used for sampling and analysis are calibrated from NABL Acer. Calibration Laboratory, to maintain NIST Traceability.
- Laboratory Recognized by NABL with Certificate ID : TC-12360, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantao Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Workzone Air Sample Location: Oxidation Building First Floor Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - X Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-50 Date of Report : 27.08.2024		

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
<i>Environmental Conditions</i>					
1	Shop Temperature	Min. = 22.0 Max. = 44.1	°C	Not Available	Thermohygrometer
2	Relative Humidity	Min. = 35.2 Max. = 88.6			
<i>Pollutant Concentration</i>					
3	Sulphur Dioxide (SO ₂)	15.8	µg/m ³	≤ 80	CPCB Guidelines - NAAQS Monitoring & Analysis Guidelines Volume-1 NAAQMS/36/2012
4	Oxides of Nitrogen (NO _x)	10.2	µg/m ³	≤ 80	
5	Particulate Matter PM ₁₀	39.4	µg/m ³	≤ 100	
6	Particulate Matter PM _{2.5}	16.7	µg/m ³	≤ 60	
7	Ozone (O ₃) (1hr)	BDL	µg/m ³	≤ 180	
8	Lead (Pb)	BDL	µg/m ³	≤ 1.0	
9	Carbon Monoxide (CO) (1hr)	BDL	mg/m ³	≤ 4.0	
10	Ammonia (NH ₃)	BDL	µg/m ³	≤ 400	
11	Benacene (C ₆ H ₆)	BDL	µg/m ³	≤ 5.0	
12	Benzo(a)Pyrene (BaP)	BDL	ng/m ³	≤ 1.0	
13	Arsenic (As)	BDL	ng/m ³	≤ 6.0	
14	Nickel (NI)	BDL	ng/m ³	≤ 20	

Remarks (If Any): Results are within standard limits prescribed by NAAQS.

Instrument Used : SAEN/INSTRU/45, Calibration Cert. No. CC105124000001986P, Valid till - 28.04.2025.

Instrument Used : Thermohygrometer - SAEN/Instru/52P, Calibration Cert. No. 2324/1118/01-02, Valid till - 17.11.2024.

Note: NAAQS stands for National Ambient Air Quality Standards, 2009.

1. BDL - Below Detection Limit

2. Test Report is based on above parameters.

3. Test Results pertain only to the sample tested.

4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.

5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.

6. Laboratory Recognized by NABL with Certificate ID : TC-12366, Valid till dt: 09.10.2025.

For S A Encon Private Limited

Mr. Anant Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name :	Workzone Air
		Sample Location:	Sulphonation Building Ground Floor
		Sample Drawn by:	SAEN
		Sample Quantity:	1 nos
		Sample Condition:	Properly packed & labelled
Analysis Information		Report Information	
Analysis carried out at:	SAEN Lab	Sample Inward No :	SAEN/24-25/260 - XI
Date of Sample Receipt :	19.08.2024	Date of Sample collection :	17.08.2024
Analysis Start Date:	19.08.2024	Report No. :	SAEN/TR/24-25/17-51
Analysis End Date:	27.08.2024	Date of Report :	27.08.2024

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
<i>Environmental Conditions</i>					
1	Shop Temperature	Min. = 27.0	°C	Not Available	Thermohygrometer
		Max. = 45.0			
2	Relative Humidity	Min. = 33.0	% RH	Not Available	Thermohygrometer
		Max. = 89.3			
<i>Pollutant Concentration</i>					
3	Sulphur Dioxide (SO ₂)	15.8	µg/m ³	≤ 80	CPCB Guidelines - NAAQS Monitoring & Analysis Guidelines Volume-1 NAAQMS/36/2012
4	Oxides of Nitrogen (NO ₂)	18.2	µg/m ³	≤ 80	
5	Particulate Matter PM ₁₀	39.4	µg/m ³	≤ 100	
6	Particulate Matter PM _{2.5}	16.7	µg/m ³	≤ 60	
7	Ozone (O ₃) (1hr)	BDL	µg/m ³	≤ 180	
8	Lead (Pb)	BDL	µg/m ³	≤ 1.0	
9	Carbon Monoxide (CO) (1hr)	BDL	mg/m ³	≤ 4.0	
10	Ammonia (NH ₃)	BDL	µg/m ³	≤ 400	
11	Benzene (C ₆ H ₆)	BDL	µg/m ³	≤ 5.0	
12	Benzo(a)Pyrene (BaP)	BDL	ng/m ³	≤ 1.0	
13	Arsenic (As)	BDL	ng/m ³	≤ 6.0	
14	Nickel (Ni)	BDL	ng/m ³	≤ 20	

Remarks (If Any): Results are within standard limits prescribed by NAAQS.

Instrument Used : SAEN/INSTRU/45, Calibration Cert. No. CC105124000001986P, Valid till - 28.04.2025.

Instrument Used : Thermohygrometer - SAEN/Instru/52P, Calibration Cert. No. 2324/1118/01-02, Valid till - 17.11.2024.

Note: NAAQS stands for National Ambient Air Quality Standards, 2009.

1. BDL - Below Detection Limit.

2. Test Report is based on above parameters.

3. Test Results pertain only to the sample tested.

4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.

5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.

6. Laboratory Recognised by NABL, with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantnand Nandawadekar
Technical Manager

SAEN/F-06 Amd 00 dt. 08.06.2023

END OF REPORT



S A Encon Private Limited, Accredited with ISO 9001, ISO 14001 & ISO 45001

SHIRWAL, Dt. Basara, 412801, Maharashtra, Ph. No. : + 91-9112-343-943, - 91-9850 173 286
eMail : info@saenco.in, saenconpl@gmail.com, website: www.saenco.in

Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aursanghad Industrial City, Sambhaj Nagar, Dist-Shendra - 431007.		Sample Name : Workzone Air Sample Location: Sulphonation Building First Floor Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - XII Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-52 Date of Report : 27.08.2024		

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
<i>Environmental Conditions</i>					
1	Shop Temperature	Min. = 27.1 Max. = 44.0	°C	Not Available	Thermohygrometer
2	Relative Humidity	Min. = 32.0 Max. = 87.0			
<i>Pollutant Concentration</i>					
3	Sulphur Dioxide (SO ₂)	15.0	µg/m ³	≤ 80	CPCR Guidelines - NAAQS Monitoring & Analysis Guidelines Volume-1 NAAQMS/36/2012
4	Oxides of Nitrogen (NO _x)	18.2	µg/m ³	≤ 80	
5	Particulate Matter PM ₁₀	39.4	µg/m ³	≤ 100	
6	Particulate Matter PM _{2.5}	16.7	µg/m ³	≤ 60	
7	Ozone (O ₃) (1hr)	BDL	µg/m ³	≤ 180	
8	Lead (Pb)	BDL	µg/m ³	≤ 1.0	
9	Carbon Monoxide (CO) (1hr)	BDL	mg/m ³	≤ 4.0	
10	Ammonia (NH ₃)	BDL	µg/m ³	≤ 400	
11	Benzene (C ₆ H ₆)	BDL	µg/m ³	≤ 5.0	
12	Benzo(a)Pyrene (BaP)	BDL	ng/m ³	≤ 1.0	
13	Arsenic (As)	BDL	ng/m ³	≤ 6.0	
14	Nickel (Ni)	BDL	ng/m ³	≤ 20	

Remarks (If Any): Results are within standard limits prescribed by NAAQS.

Instrument Used : SAEN/INSTRU/45, Calibration Cert. No. CC105124000001986F, Valid till - 28.04.2025.

Instrument Used : Thermohygrometer - SAEN/Instru/52P, Calibration Cert. No. 2324/1118/01-02, Valid till - 17.11.2024.

Note: NAAQS stands for National Ambient Air Quality Standards, 2009.

1. BDL - Below Detection Limit

2. Test Report is based on above parameters.

3. Test Results pertain only to the sample tested.

4. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.

5. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.

6. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantao Nandawadekar
 Technical Manager

SAEN/T-06 Amd 00 dt. 08.06.2023.

END OF REPORT



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaj Nagar, Dist-Shendra - 431007.		Sample Name : Ambient Noise Sample Location: As Below. Sample Drawn by: SAEN Sample Quantity: 8 Locations	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - XIII Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-53 Date of Report : 27.08.2024		

Sr. No	Monitoring Location	Result		Unit	Standard Limits		Test Method
		Day	Night		Day	Night	
1	Near Main Gate	61.3	56.3	dB (A)	≤ 75	≤ 70	IS: 9989-2020
2	Near DG Set	72.3	72.5	dB (A)	≤ 75	≤ 70	
3	Near Office Area	65.4	60.2	dB (A)	≤ 75	≤ 70	
4	Near ETP	69.1	61.9	dB (A)	≤ 75	≤ 70	
5	Near Boiler	68.2	60.7	dB (A)	≤ 75	≤ 70	
6	Near Oxidation Building	70.1	61.9	dB (A)	≤ 75	≤ 70	
7	Near Sulphonation Building	71.1	66.6	dB (A)	≤ 75	≤ 70	
8	Near Transformer Area	73.4	67.3	dB (A)	≤ 75	≤ 70	

Remarks (If Any): Results are well within limit prescribed by MPCB Consent.

Instrument Used : Sound Level Meter - SAEN/Instru/30 A, Calibration Cert. No. 2324/1118/01-22, Valid till 17.11.2024.

Day time shall mean from 06.00 am to 10.00 pm & Night time shall mean from 10.00 pm to 06.00 am. Leq denotes the time weighted average of the level of sound in decibels on scale A which is referable to human hearing. 'A' in dB (A) Leq, denotes the Frequency weighting in the measurement of noise and corresponds to frequency response characteristic of the human hearing.

Note:

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The Instruments & equipments used for sampling and analysis are calibrated from NABL Accred. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL with Certificate ID : TC-12968, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantnar Nandawadekar
 Technical Manager

SAEN/P-06 Amd 00 dt. 08.06.2023

END OF REPORT



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name :	Ambient Noise
		Sample Location:	As Below.
		Sample Drawn by:	SAEN
		Sample Quantity:	8 Locations
Analysis Information		Report Information	
Analysis carried out at:	SAEN Lab	Sample Inward No :	SAEN/24-25/260 - XIII
Date of Sample Receipt :	19.08.2024	Date of Sample collection :	17.08.2024
Analysis Start Date:	19.08.2024	Report No. :	SAEN/TR/24-25/17-53
Analysis End Date:	27.08.2024	Date of Report :	27.08.2024

Sr. No	Monitoring Location	Result		Unit	Standard Limits		Test Method
		Day	Night		Day	Night	
1	Near Main Gate	61.3	56.1	dB (A)	≤ 75	≤ 70	IS: 9989-2020
2	Near DG Set	74.3	72.5	dB (A)	≤ 75	≤ 70	
3	Near Office Area	65.4	60.2	dB (A)	≤ 75	≤ 70	
4	Near ETP	69.1	61.9	dB (A)	≤ 75	≤ 70	
5	Near Boiler	68.2	60.7	dB (A)	≤ 75	≤ 70	
6	Near Oxidation Building	70.1	61.9	dB (A)	≤ 75	≤ 70	
7	Near Sulphonation Building	71.1	66.6	dB (A)	≤ 75	≤ 70	
8	Near Transformer Area	73.4	67.3	dB (A)	≤ 75	≤ 70	

Remarks (If Any): Results are well within limit prescribed by MPCB Consent.

Instrument Used : Sound Level Meter - SAEN/Instru/30 A, Calibration Cert. No. 2324/1118/01-22, Valid till 17.11.2024.

Day time shall mean from 06.00 am to 10.00 pm & Night time shall mean from 10.00 pm to 06.00 am. Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing. 'A' in dB (A) Leq, denotes the Frequency weighting in the measurement of noise and corresponds to frequency response characteristic of the human hearing.

Note:

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited



Mr. Anantrao Nandawadekar
Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name :	Workzone Noise
		Sample Location:	As Below.
		Sample Drawn by:	SAEN
		Sample Quantity:	9 Locations
Analysis Information		Report Information	
Analysis carried out at:	SAEN Lab	Sample Inward No :	SAEN/24-25/260 - XIV
Date of Sample Receipt :	19.08.2024	Date of Sample collection :	17.08.2024
Analysis Start Date:	19.08.2024	Report No. :	SAEN/TR/24-25/17-54
Analysis End Date:	27.08.2024	Date of Report :	27.08.2024

Sr. No	Monitoring Location	Result		Unit	Standard Limits		Test Method
		Day	Night		Day	Night	
1	Oxidation Building - Ground Floor	70.1	60.8	dB(A)	≤ 90	≤ 90	IS 4758 : 2017
2	Oxidation Building - First Floor	71.2	63.4	dB(A)	≤ 90	≤ 90	
3	Oxidation Building - Second Floor	70.3	62.7	dB(A)	≤ 90	≤ 90	
4	Oxidation Building - Third Floor	72.4	64.0	dB(A)	≤ 90	≤ 90	
5	Sulphonation Building - Ground Floor	71.4	63.1	dB(A)	≤ 90	≤ 90	
6	Sulphonation Building - First Floor	70.4	62.3	dB(A)	≤ 90	≤ 90	
7	Sulphonation Building - Second Floor	69.8	60.4	dB(A)	≤ 90	≤ 90	
8	Sulphonation Building - Third Floor	72.9	65.2	dB(A)	≤ 90	≤ 90	
9	Office	65.1	60.1	dB(A)	≤ 90	≤ 90	

Remarks (If Any): Results are within limits prescribed by Factory Act, 1948.

Instrument Used : Sound Level Meter - SAEN/Instru/30 A, Calibration Cert. No. 2324/1118/01-22, Valid till 17.11.2024.

Day time shall mean from 06.00 am to 10.00 pm & Night time shall mean from 10.00 pm to 06.00 am. Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing. 'A' in dB (A) Leq, denotes the Frequency weighting in the measurement of noise and corresponds to frequency response characteristic of the human hearing.

Note:

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL, with Certificate ID : TC-12360, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantso Nandawadekar
Technical Manager

SAEN/F-06 Amd 00 dt. 08.06.2023

END OF REPORT



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name :	Illumination Level
		Sample Location:	As Below.
		Sample Drawn by:	SAEN
		Sample Quantity:	10 Locations
Analysis Information		Report Information	
Analysis carried out at:	SAEN Lab	Sample Inward No :	SAEN/24-25/260 - XV
Date of Sample Receipt :	19.08.2024	Date of Sample collection :	17.08.2024
Analysis Start Date:	19.08.2024	Report No. :	SAEN/TR/24-25/17-55
Analysis End Date:	27.08.2024	Date of Report :	27.08.2024

Sr. No	Monitoring Location	Result		Unit	Standard Limits		Test Method
		Day	Night		Day	Night	
1	Office	528	501	Lux	>150	>150	IS: 3646 (Part 1) 2018
2	Utility Room	236	188	Lux	>150	>150	
3	Oxidation Building - Ground Floor	301	209	Lux	>150	>150	
4	Oxidation Building - First Floor	321	288	Lux	>150	>150	
5	Oxidation Building - Second Floor	311	270	Lux	>150	>150	
6	Oxidation Building - Third Floor	302	266	Lux	>150	>150	
7	Sulphonation Building - Ground Floor	313	288	Lux	>150	>150	
8	Sulphonation Building - First Floor	322	220	Lux	>150	>150	
9	Sulphonation Building - Second Floor	300	240	Lux	>150	>150	
10	Sulphonation Building - Third Floor	320	248	Lux	>150	>150	

Remarks (If Any): Results are within limits prescribed by Factory Act, 1948.

Instrument Used : Lux Level Meter - SAEN/Instru/30 A, Calibration Cert. No. CC263823000027039F, Valid till - 04.12.2024.

Note: Day time shall mean from 06.00 am to 10.00 pm & Night time shall mean from 10.00 pm to 06.00 am.

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantao Nandawadekar
Technical Manager

SAEN/P-06 Amd 00 dt. 08.06.2023

END OF REPORT



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : DG Insertion Loss Sample Location: DG Set 750 kVA Sample Drawn by: SAEN Sample Quantity: 1 nos.	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - XVI Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-56 Date of Report : 27.08.2024		

Sr. No	Monitoring Location	Result								Unit	Difference	Standard Value	Test Method
		Without Acoustic				With Acoustic							
		N	W	S	E	N	W	S	E				
1	DG Set - 750 kVA	100.1	98.3	99.0	98.6	73.2	74.1	73.7	73.5	dB (A)			IS: 4758-2017
	Average	99.0				73.6				dB (A)	25.4	> 25	

Remarks (If Any): Results are well within limit prescribed by MPCB Consent.

Instrument Used : Sound Level Meter - SAEN/Instru/30 A, Calibration Cert. No. 2324/1118/01-22, Valid till 17.11.2024.

Note:

The Acoustic enclosure or acoustic treatment of the room shall be designed for minimum 25dB(A) insertion loss or for meeting the ambient noise standards.

1. Test Report is based on above parameters.

2. Test Results pertain only to the sample tested.

3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.

4. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.

5. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited



Mr. Anant Rao Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Ventilation Sample Location: Oxidation Building Ground Floor Sample Drawn by: SAEN Sample Quantity: 1 Location	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024		Sample Inward No : SAEN/24-25/260 - XVII Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-57 Date of Report : 27.08.2024	

Sr. No	Test Location	Unit	Observations	Standard Value
1	Ambient Temperature	^o C	30.8	
2	Shop Temperature	^o C	35.7	
3	Shop Relative Humidity	%	31.3	
4	Shop Volume	m ³	1834.9	
5	Incoming Open Area	m ²	200.6	
6	Incoming Velocity	m/s	0.9	
7	No. of Air changes	Per Hr.	14.8	

Remark: Ventilation is within limits prescribed by Factory Act, 1948.

Instrument Used : Anemometer - SAEN/Instru/50 A, Calibration Cert. No. 2324/1118/01-24, Valid till - 17.11.2024.


Instrument Used : Thermohygrometer - SAEN/Instru/52F, Calibration Cert. No. 2324/1118/01-02, Valid till - 17.11.2024.

As Per Factories Act 1948, The amount of fresh air supplied by mechanical means of ventilation in an hour shall be equivalent to at least six times the cubic capacity of the workroom.

Note:

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anant Rao Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name :	Ventilation
		Sample Location:	Sulphonation Building Ground Floor
		Sample Drawn by:	SAEN
		Sample Quantity:	1 Location
Analysis Information		Report Information	
Analysis carried out at:	SAEN Lab	Sample Inward No :	SAEN/24-25/260 - XVIII
Date of Sample Receipt :	19.08.2024	Date of Sample collection :	17.08.2024
Analysis Start Date:	19.08.2024	Report No. :	SAEN/TR/24-25/17-58
Analysis End Date:	27.08.2024	Date of Report :	27.08.2024

Sr. No	Test Location	Unit	Observations	Standard Value
1	Ambient Temperature	°C	31.1	
2	Shop Temperature	°C	38.5	
3	Shop Relative Humidity	%	33.8	
4	Shop Volume	m ³	1834.9	
5	Incoming Open Area	m ²	200.6	
6	Incoming Velocity	m/s	0.8	
7	No. of Air changes	Per Hr.	13.1	Minimum 6

Remark: Ventilation is within limits prescribed by Factory Act, 1948.

Instrument Used : Anemometer - SAEN/Instru/50 A, Calibration Cert. No. 2324/1118/01-24, Valid till - 17.11.2024.

Instrument Used : Thermohygrometer - SAEN/Instru/52F, Calibration Cert. No. 2324/1118/01-02, Valid till - 17.11.2024.

As Per Factories Act 1948, The amount of fresh air supplied by mechanical means of ventilation in an hour shall be equivalent to at least six times the cubic capacity of the workroom.

Note:

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL, Accr. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anant Rao Nandawadekar
Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Ventilation Sample Location: Office Sample Drawn by: SAEN Sample Quantity: 1 Location	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - XIX Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-59 Date of Report : 27.08.2024		

Sr. No	Test Location	Unit	Observations	Standard Value
1	Ambient Temperature	^o C	30.9	
2	Shop Temperature	^o C	29.1	
3	Shop Relative Humidity	%	48.6	
4	Shop Volume	m ³	747.5	
5	Incoming Open Area	m ²	19.8	
6	Incoming Velocity	m/s	2.1	
7	No. of Air changes	Per Hr.	0.3	Minimum 6

Remark: Ventilation is within limits prescribed by Factory Act, 1948.

Instrument Used : Anemometer - SAEN/Instru/50 A, Calibration Cert. No. 2324/1118/01-24, Valid till - 17.11.2024.


Instrument Used : Thermohygrometer - SAEN/Instru/52F, Calibration Cert. No. 2324/1118/01-02, Valid till - 17.11.2024.

As Per Factories Act 1948, The amount of fresh air supplied by mechanical means of ventilation in an hour shall be equivalent to at least six times the cubic capacity of the workroom.

Note:

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anantraj Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No, 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Stack Emission Sample Location: Boiler - 10 Ton Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysts Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysts End Date: 27.08.2024		Sample Inward No : SAEN/24-25/260 - XX Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-60 Date of Report : 27.08.2024	

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
1	Duration Of Sampling	30	Min		
2	Capacity	10	Ton		
3	Sampling Point	Exhaust	----		
4	Material Of Stack	MS	----		
5	Shape Of Stack	Round	----		
6	Dimensions	1.03	Meter		
7	Stack Height above Ground Level	30.0	Meter		
8	Type of Fuel	Coal	----		
9	Fuel Consumption	1.6	Mt/Hr		
10	Flue Gas Temperature	189.3	°C		
11	Flue Gas Velocity	2.18	m/s		
12	Flue Gas Volume	20631.5	Nm ³ /hr		
13	Total Particulate Matter	38.1	mg/Nm ³	< 50	IS:11255 (Part 1) 2019
14	Sulphur Dioxide	12.3	Kg/day	< 304	IS:11255 (Part 2) 2019


Remarks (If Any): Results are well within limit prescribed by MPCB Consent.

Instrument Used : Stack Sampling Kit - SAEN/Instru/71, Calibration Cert. No.CC105124000001695F/ 1698F/ 1699F/ 1700F/ 1701F, Valid till- 05.03.2025.

Note:

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anantnand Nandawadekar
 Technical Manager

SAEN/F-06 Amd 00 dt. 08.06.2023

END OF REPORT



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaj Nagar, Dist-Shendra - 431007.		Sample Name : Stack Emission Sample Location: Thermic Fluid Heater Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024	Sample Inward No : SAEN/24-25/260 - XXI Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-61 Date of Report : 27.08.2024		

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
1	Duration Of Sampling	30	Min		
2	Capacity	---	---		
3	Sampling Point	Exhaust	---		
4	Material Of Stack	MS	---		
5	Shape Of Stack	Round	---		
6	Dimensions	0.61	Meter		
7	Stack Height above Ground Level	20.0	Meter		
8	Type of Fuel	Coal	---		
9	Fuel Consumption	0.227	Mt/Hr		
10	Flue Gas Temperature	171.3	^o C		
11	Flue Gas Velocity	3.70	m/s		
12	Flue Gas Volume	3974.8	Nm ³ /hr		
13	Total Particulate Matter	27.5	mg/Nm ³	< 50	IS:11255 (Part 1) 2019
14	Sulphur Dioxide	4.08	Kg/day	< 54.48	IS:11255 (Part 2) 2019

Remarks (If Any): Results are well within limit prescribed by MPCB Consent.

Instrument Used : Stack Sampling Kit - SAEN/Instru/71, Calibration Cert. No.CC105124000001695F/ 1698F/ 1699F/ 1700F/ 1701F, Valid till- 05.03.2025.

Note:

1. Test Report is based on above parameters.
2. Test Results pertains only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL Accred. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL, with Certificate ID: TC-12360, Valid till dt. 09.10.2025.

For S A Encon Private Limited

Mr. Anantnao Nandawadekar
 Technical Manager

SAEN/P-06 Amd 00 dt. 06.06.2023

END OF REPORT



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Stack Emission Sample Location: Sulphonation Scrubber Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024		Sample Inward No : SAEN/24-25/260 - XXII Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-62 Date of Report : 27.08.2024	

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
1	Duration Of Sampling	30	Min		
2	Capacity	----	----		
3	Sampling Point	Exhaust	----		
4	Material Of Stack	MS	----		
5	Shape Of Stack	Round	----		
6	Dimensions	0.152	Meter		
7	Stack Height above roof	3.6	Meter		
8	Type of Fuel	----	----		
9	Fuel Consumption	----	----		
10	Flue Gas Temperature	52.3	°C		
11	Flue Gas Velocity	10.5	m/s		
12	Flue Gas Volume	685.6	Nm ³ /hr		
13	Total Particulate Matter	13.4	mg/Nm ³	< 50	IS:11255 (Part 1) 2019
14	Acid Mist	8.67	mg/Nm ³	< 35	IS:11255 (Part 2) 2019

Remarks (If Any): Results are well within limit prescribed by MPCB Consent.

Instrument Used : Stack Sampling Kit - SAEN/Instru/71, Calibration Cert. No.CC10512400001695F/ 1698F/ 1699F/ 1700F/ 1701F, Valid till- 05.03.2025.

Note:

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anant Rao Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



S A Encon Private Limited: Accredited with ISO 9001, ISO 14001 & ISO 45001

SHIRWAL, Dt. Sacara, 412801, Maharashtra. Ph. No. : + 91-9112 343 343; + 91-9850 173 288
 eMail : info@saenco.in, saenco@saenco.in, saenco@saenco.com, website: www.saenco.in

Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaj Nagar, Dist-Shendra - 431007.		Sample Name :	Stack Emission
		Sample Location:	Oxidation Scrubber
		Sample Drawn by:	SAEN
		Sample Quantity:	1 nos
		Sample Condition:	Properly packed & labelled
Analysis Information		Report Information	
Analysis carried out at:	SAEN Lab	Sample Inward No :	SAEN/24-25/260 - XXIII
Date of Sample Receipt :	19.08.2024	Date of Sample collection :	17.08.2024
Analysis Start Date:	19.08.2024	Report No. :	SAEN/TR/24-25/17-63
Analysis End Date:	27.08.2024	Date of Report :	27.08.2024

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
1	Duration Of Sampling	30	Min		
2	Capacity	----	----		
3	Sampling Point	Exhaust	----		
4	Material Of Stack	MS	----		
5	Shape Of Stack	Round	----		
6	Dimensions	0.152	Meter		
7	Stack Height above roof	3.6	Meter		
8	Type of Fuel	----	----		
9	Fuel Consumption	----	----		
10	Flue Gas Temperature	51.0	°C		
11	Flue Gas Velocity	9.8	m/s		
12	Flue Gas Volume	639.8	Nm ³ /hr		
13	Total Particulate Matter	17.2	mg/Nm ³	< 50	IS:11255 (Part 1) 2019
14	Sulphur Dioxide	6.25	mg/Nm ³	< 35	IS:11255 (Part 2) 2019


Remarks (If Any): Results are well within limit prescribed by MPCB Consent.

Instrument Used : Stack Sampling Kit - SAEN/Instru/71, Calibration Cert. No.CC105124000001695F/ 1698F/ 1699F/ 1700F/ 1701F, Valid till- 05.03.2025.

Note:

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL Accr. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL, with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anant Rao Nandawadekar
Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



Customer Information		Sample Details	
M/s. Oric Organic Chemicals Pvt. Ltd. Plot No. 9, Sector 1, Aurangabad Industrial City, Sambhaji Nagar, Dist-Shendra - 431007.		Sample Name : Stack Emission Sample Location: DG Set - 750 kVA Sample Drawn by: SAEN Sample Quantity: 1 nos Sample Condition: Properly packed & labelled	
Analysis Information		Report Information	
Analysis carried out at: SAEN Lab Date of Sample Receipt : 19.08.2024 Analysis Start Date: 19.08.2024 Analysis End Date: 27.08.2024		Sample Inward No : SAEN/24-25/260 - XXIV Date of Sample collection : 17.08.2024 Report No. : SAEN/TR/24-25/17-64 Date of Report : 27.08.2024	

Sr.No	Parameters	Results	Unit	Standard Limits	Test Method
1	Duration Of Sampling	30	Min		
2	Capacity	750	kVA		
3	Sampling Point	Exhaust	----		
4	Material Of Stack	MS	----		
5	Shape Of Stack	Round	----		
6	Dimensions	0.3	Meter		
7	Stack Height above Ground Level	18.0	Meter		
8	Type of Fuel	HSD	----		
9	Fuel Consumption	120	L/Hr		
10	Flue Gas Temperature	133.7	°C		
11	Flue Gas Velocity	6.92	m/s		
12	Flue Gas Volume	1760.3	Nm ³ /hr		
13	Total Particulate Matter	40.6	mg/Nm ³	< 50	IS:11255 (Part 1) 2019
14	Sulphur Dioxide	3.51	Kg/day	< 15.36	IS:11255 (Part 2) 2019

Remarks (If Any): Results are well within limit prescribed by MPCB Consent.

Instrument Used : Stack Sampling Kit - SAEN/Instru/71, Calibration Cert. No.CC105124000001695F/ 1698F/ 1699F/ 1700F/ 1701F, Valid till- 05.03.2025.

Note:

1. Test Report is based on above parameters.
2. Test Results pertain only to the sample tested.
3. The content of Test Report shall not be reproduced / used for advertising or legal use, in part or full, without written permission.
4. The instruments & equipments used for sampling and analysis are calibrated from NABL.Accr. Calibration Laboratory, to maintain NIST Traceability.
5. Laboratory Recognized by NABL with Certificate ID : TC-12368, Valid till dt. 09.10.2025.

For S A Encon Private Limited


Mr. Anantro Nandawadekar
 Technical Manager

END OF REPORT

SAEN/F-06 Amd 00 dt. 08.06.2023



