UWR Rainwater Offset Unit Standard

(UWR RoU Standard)

Concept & Design: Universal Water Registry

www.uwaterregistry.io

Project Concept Note & Monitoring Report

(PCNMR)

Project Name: "2.8 MLD IETP Reuse Wastewater Treatment by Victus Dyeings"

UWR RoU Scope: scope 5

Monitoring Period: 01-01-2014 to 31-12-2024
Crediting Period: 01-01-2014 to 31-12-2024
UNDP Human Development Indicator: _0.66[1] (India)
RoUs Generated During 1st Monitoring Period: 140,1316 RoUs

[1] HYPERLINK "https://www.undp.org/"https://www.undp.org/

A.1 Location of Project Activity

State	Tamil Nadu
District	Karaipudur Village, Polladam Road Tirupur.
Block Basin/Sub Basin/Watershed	Please refer to http://cgwb.gov.in/watershed/basinsindia.html Noyyal River
Lat. & Longitude	Lat 11°05'93''37 long 77°31'72''28
Area Extent	SF.No: 53/2, Chettiurai Thottam, Karaipudur Village, Tirupur – 641 605. India Tamil Nadu, India
No.of Villages/Towns	Karaipudur Village

Bird View:

Project Title:

"2.8 MLD IETP Reuse Wastewater Treatment by Victus Dyeings"

Purpose of the Project Activity:

Victus Dyeings, a prominent textile processing facility in Tirupur, has demonstrated its commitment to sustainable water management through the establishment and expansion of its Effluent Treatment Plant (ETP). Initially commissioned on 23rd September 1988 with a treatment capacity of 1.4 million litres per day (MLD), the ETP has been upgraded to handle 2.8 MLD to accommodate increased operational demand. The current operational throughput stands at 1.9 MLD.

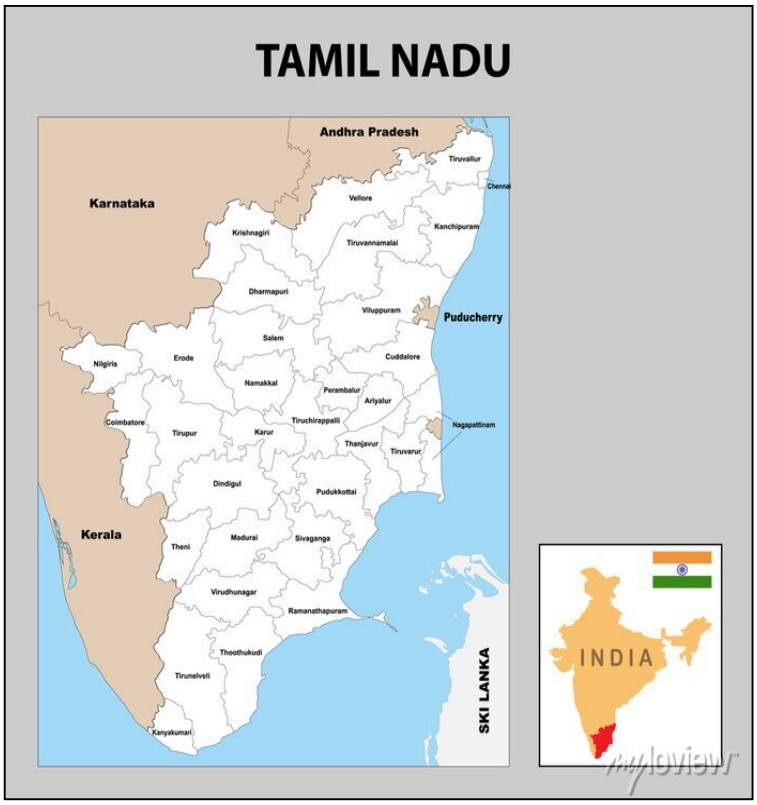
Rather than discharging treated effluent into the environment or relying on natural freshwater sources, the plant follows a closed-loop treatment system that enables complete internal reuse of water. The treated wastewater undergoes advanced purification through an in-house Reverse Osmosis (RO) system, ensuring high-quality water recovery for process use.

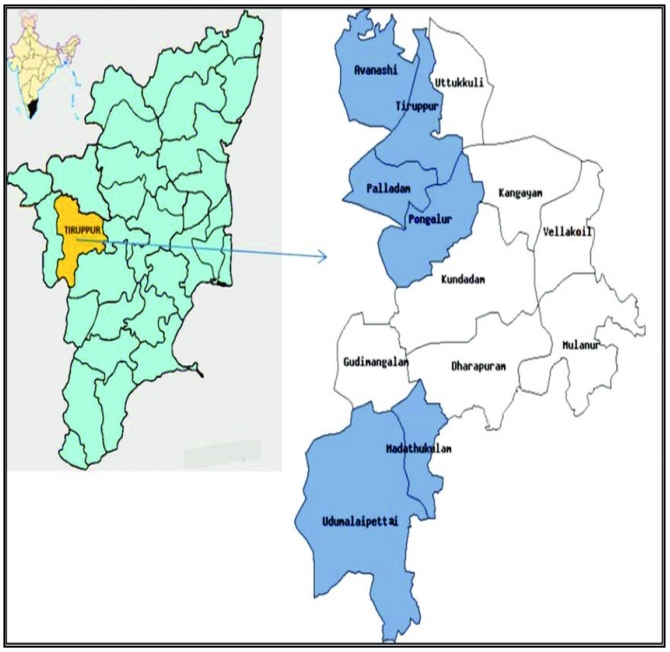
To manage the RO reject stream, Victus Dyeings employs a technologically sophisticated Multiple Effect Evaporator (MEE) system, combining both falling film and forced circulation techniques. This setup allows for efficient evaporation, condensation, and subsequent reuse of the remaining water, particularly in boiler feed and other industrial applications.

These interventions replace the need for freshwater in boiler feed and process applications, promoting zero liquid discharge (ZLD) and significantly reducing the facility's water footprint. By treating and reusing the entire volume of effluent internally, the project avoids environmental discharge, conserves freshwater.

RO PLANT

MULTIPLE EFFECT EVAPORATOR





Project Activity

A.2. Project owner information, key roles and responsibilities

Project Proponent (PP):	VICTUS DYEINGS
UCR Project Aggregator	Viviid Emissions Reductions Universal Private Limited
Contact Information:	lokesh.jain@viviidgreen.com

The Project Proponent (PP) confirms that They meet all requirements in the management plan for the successful implementation of the project, as outlined below:

Water Rights: They hold legal water user rights for the project area, ensuring we can use the necessary water resources for the project.

Land Ownership: They have a clear and undisputed legal land title for the entire project area, confirming our right to use the land.

Permits: They have secured all required permits for the project. For any permits still pending, we have submitted applications and are complying with all regulations to start on time.

Costs: They have documented all project costs in the Detailed Project Report (DPR)/Auditor Certificate. The project cost is approximately **₹16.65 Crores.** This covers Land, building, machineries, ETP and operational expenses.

Project Proponent Is committed to meet there all legal and regulatory requirements to ensure the project proceeds without issues. covering infrastructure, permits, equipment, and operational expenses.

A.2.1 Project RoU Scope

PROJECT NAME	**"2.8 MLD IETP Reuse Wastewater Treatment by Victus Dyeings"**
UWR Scope:	SCOPE 5: Conservation measures taken to recycle and/or reuse water, spentwash, wastewater etc across or within specific industrial processes and systems, including wastewater recycled/ reused in a different process, but within the same site or location of the project activity. Recycled wastewater used in off-site landscaping, gardening or tree plantations/forests activity are also eligible under this Scope.
Date PCNMR Prepared	28/06/2025

A.3. Land use and Drainage Pattern

Not Applicable.

This project treats and reuses wastewater. It doesn't involve land-use activities. It's an industrial process that meets technical standards and follows local pollution control board rules. The project does not damage land or drainage systems.

A.4. Climate

The project treats and reuses wastewater from dyeing It doesn't depend on the area's weather since the water isn't exposed to outside conditions Or harm the environment.

A.5. Rainfall

The project activity is not dependent on the rainfall pattern of the area as it treats and reuses the wastewater from the dying Industry.

A.6. Ground Water

The project activity does not rely on groundwater (fresh water); instead, it treats the effluent and recycles it back into the process.

A.7. Alternate methods

In many developed and some developing countries, effluent is typically managed through:

(1) integration with domestic sewerage systems for dilution and further treatment, or

(2) marine discharge of treated effluent with high Total Dissolved Solids (TDS).

However, these options are not feasible for textile industries in Tirupur. In the first case, domestic sewerage in the textile-concentrated areas of Tirupur remains untreated. Secondly, marine discharge is impractical due to the nearest coastline being over 250 km away. Although the Noyyal River flows through the region, the project proponent (PP), Victus Dyeings, has not been permitted to discharge treated effluent via either sewerage systems or marine outlets.

Consequently, Victus Dyeings has adopted a self-reliant, advanced in-house effluent treatment system that ensures complete reuse and zero surface discharge. A full-fledged Effluent Treatment Plant (ETP) with an operational capacity of 1.9 MLD has been installed, supported by a Reverse Osmosis (RO) system for effective TDS removal. The RO reject, which retains high TDS, is further treated through a Multiple Effect Evaporator (MEE) consisting of five falling film and one forced circulation effect. Here, the water is evaporated and condensed for reuse.

The concentrated slurry from the MEE is processed in a crystallizer to recover salts, which are reused in the dyeing process. Despite the efficiency of the RO and MEE systems, the final TDS concentration remains higher than the Pollution Control Board (PCB) standard of 1500 mg/L.

To ensure regulatory compliance and uphold sustainability, the facility has implemented a Zero Liquid Discharge (ZLD) system that enables complete water recovery and significantly reduces TDS levels, avoiding any liquid discharge.

Thus, in the absence of conventional disposal routes, Victus Dyeings has implemented a closed-loop, resource-recovery-based solution, setting a benchmark in sustainable water management and industrial environmental protection.

The RoU program promotes wastewater treatment and reuse initiatives, thereby offering an alternative to the release of wastewater through surface Discharge which could have an adverse impact on soil Health.

A.8. Design Specifications

PROCESS DESCRIPTION:

The wastewater treatment process begins with effluent from various sections flowing through a bar screen to remove fibrous materials and solid particles, then collecting in a two-compartment tank, each holding 12 hours of discharge for equalization.

The homogenized effluent is neutralized with acid and sent to anaerobic digesters to reduce color and COD (chemical oxygen demand). Air is blown in to remove gases, and the effluent moves to a settling clarifier.

Next, it enters an aeration tank for biological treatment, reducing COD and BOD (biochemical oxygen demand) by 75-85% and color by 70-80%. The pH is adjusted to 7.0-8.0 with sulfuric acid, and settled sludge is sent to a holding tank for thickening and dewatering using a filter press.

Aeration uses an energy-efficient diffused system with 12-inch EPDM disc diffusers, producing fine air bubbles for better oxygen transfer, reducing power consumption.

After 24 hours in the aeration tank, the water and activated sludge flow to a secondary clarifier, where biomass settles.

Some biomass is recycled to maintain 3000 mg/l MLSS (mixed liquor suspended solids) for the activated sludge process, while excess sludge is sent to a sludge tank or used as biodegradable manure.

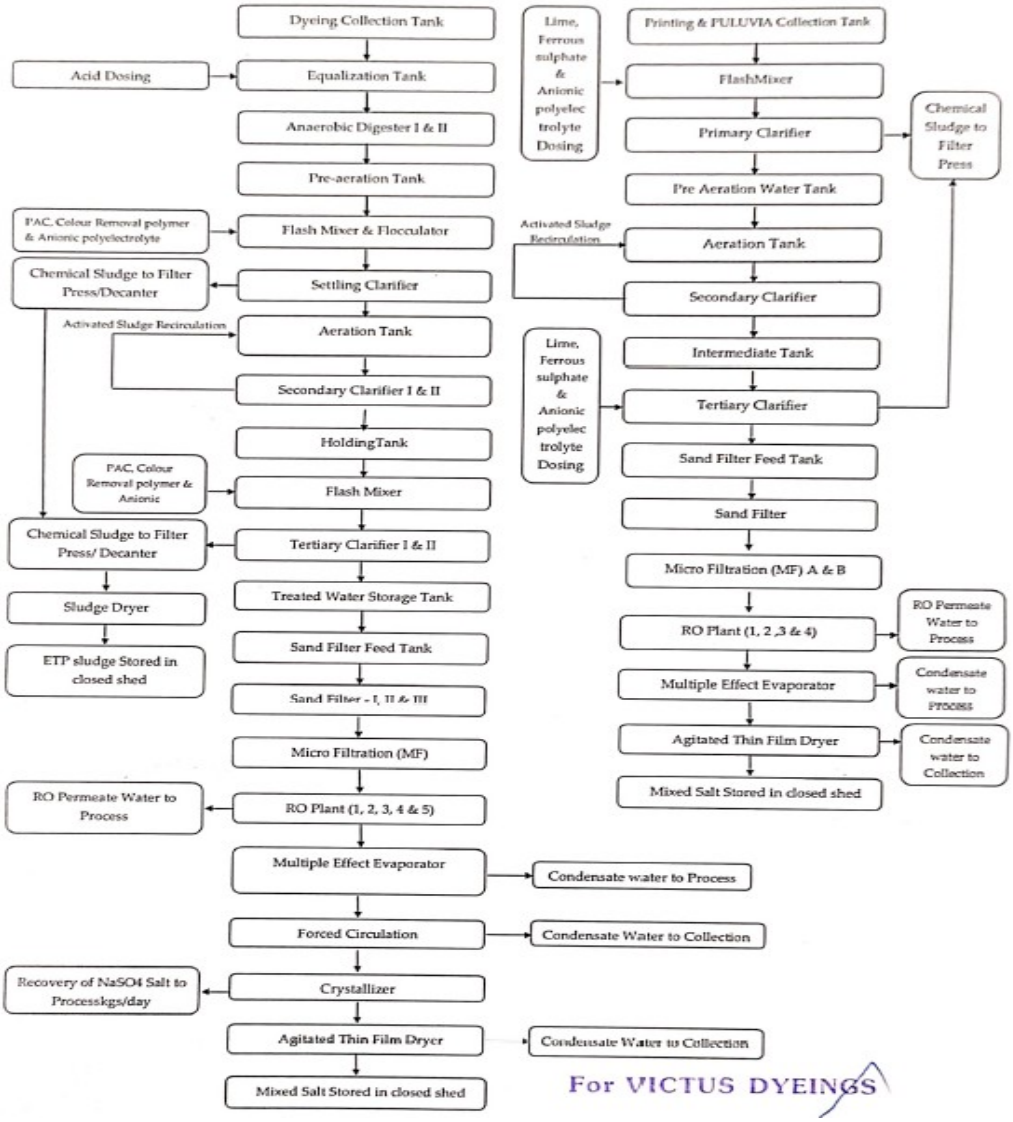
Clear water from the secondary clarifier is treated with coagulation and color-removal chemicals in a tertiary clarifier. The settled sludge goes to drying beds or a filter press, and the clear water is disinfected with sodium hypochlorite, filtered through a multi-grade filter, and processed in RO (reverse osmosis) plants for water recovery.

RO reject is sent to a multiple effect evaporator (MEE) to recover water and salt for reuse. The MEE reject is further concentrated in a five-effect falling and one-effect forced circulation evaporator, with condensate and salt recovered, and the final reject dried in an ATFD (Agitated Thin Film Dryer).

Process flow chart

VICTUS DYEINGS
TIRUPUR- 5

Existing &After Expansion - ZLDs Flowchart – 2700 KLD



For VICTUS DYEINGS

RAW EFFLUENT: DYEING - Chemical/Raw Material Consumption

Sl. No	Name of Chemical/Raw Material Used	Average % Used	Average Total (KG/Day)	Average Total (Ton/Month)
1	Wetting Oil	0.5	240	6
2	Dye Bath Conditioner	0.5	240	6
3	Caustic Soda	1.5	900	22.5
4	Peroxide GPL	2.5	1250	31.25
5	Stabilizer	0.3	150	3.75
6	De-mineralizer	0.3	150	3.75
7	Whitening Agent	0.5	240	6
8	Acetic Acid	1.5	600	15
9	Dyes	2	880	22
10	Salt (Sodium Sulphate)	-	13250 (Total)	285
	Dye Bath Volume: 157 KL			
	Salt Concentration AV: 60 G/L			
11	Soda Ash for 157 KL @ 12 G/L	-	2000	50
12	Soaping Agent	0.5	250	6.25
13	Softner	1	340	8.5

14	Grey Cloth	-	47660 KGS	1191.5

PRINTING - Chemical/Raw Material Consumption

Sl. No	Name of Chemical/Raw Material Used	Average Total (KG/Day)	Average Total (Ton/Month)
11	Hosiery Fabric	7.28	375
12	Pigments	468	12.7
13	Reactive Dyes	130	3.5
14	Binder	1040	28
15	MTO	1300	33.1
16	Auxiliary Chemicals	221	10.025
17	Urea	40	1.08
18	DAP	5	0.126
19	Lime	250	6.75
20	Ferrous Sulphate	500	13.5
21	Poly Electrolyte	10	0.3

MECHANICAL EQUIPMENT DETAILS:

S. No	Description	Qty	Unit

1	Raw effluent pumps, 110 M^3/h, 12 M head, Self priming non clog, 20 HP, Make: Johnson/eqt, (1 w + 1S)	2	Nos
2	Flash mixer	3	Nos
3	Primary clarifier (Reactivated 9 m dia)	1	No.
4	Aeration Tank		
5	Air Blowers, 1250 Cu.m/h, 7.0 mwc head, Kay make twin lobe type, 40 HP motor (2 w + 2 s)	4	Nos
6	Diffusers, 12” dia Disc type EPDM imported, SS/eqt make, 3 cu.m/h per diffuser	600	Nos
7	Sludge recycling pumps, 60 cu.m/h, 8 MWC, Self priming, non clog, 10 HP (2W+2S)	4	Nos
8	Secondary Clarifier mechanism, 12 m dia, central driven type, 1 HP	1	No.

9	Tertiary clarifier feed pumps, 95 cu.m/h, 15 m head, 7.5 HP	2	Nos
10	Tertiary clarifier (Reactivated) mechanism, 8 m dia x 3.5 m with 1 HP drive, (1 W+1S)	2	Nos
11	pH correction with pH sensor, indicator and Dosing pump edose /eqt make	2	Sets
12	Pipeline, fittings, valves etc.	1	Set
13	Filter feed pumps, 90 cu.m/h, 35 m head, Horizontal, centrifugal, CI, 20 HP, Make: Johnson/eqt	2	Nos
14	Decanter – 6 m^3/hr – HAUS Make	1	Nos
15	Mno2 filter, 70 cu.m/h 2.2 m dia x 2.0 m HOS, MS FRP lined	1	Nos
16	Acid & Sodium Hypochlorite dosing, 5 lph Milton roy/eqt with tank	2	Nos

17	Electrical panel board	1	No.

MICRO FILTRATION MECHANICAL EQUIPMENT DETAILS:

S. No	Description	Qty	Unit
1	Feed pump, 140 M^3/h, 25M head, Centrifuge pump 20 HP, Make: Johnson/eqt (1 w + 1S)	2	Nos
2	Backwash pump, 140 M^3/h, 25M head, Centrifuge pump 20 HP, Make: Johnson/eqt (1 w + 1S)	2	Nos
3	UNA620A – Membrane/ Asahikashi – Japan Make	60	Nos
4	Cleaning, 120 M^3/h, 20M head, Centrifuge pump, 15 HP, Make: Johnson/eqt (1 w + 1S)	2	Nos
5	Air Compressor – 7.5 HP Elgi Make	1	Nos
6	Air Tank – 2000 Lts	1	Nos
7	CIP tank 3000 Ltrs – Sintex	1	Nos
8	Backwash Tank 5000 Ltrs – Sintex	1	Nos

PARAMETER OF EFFLUENT:

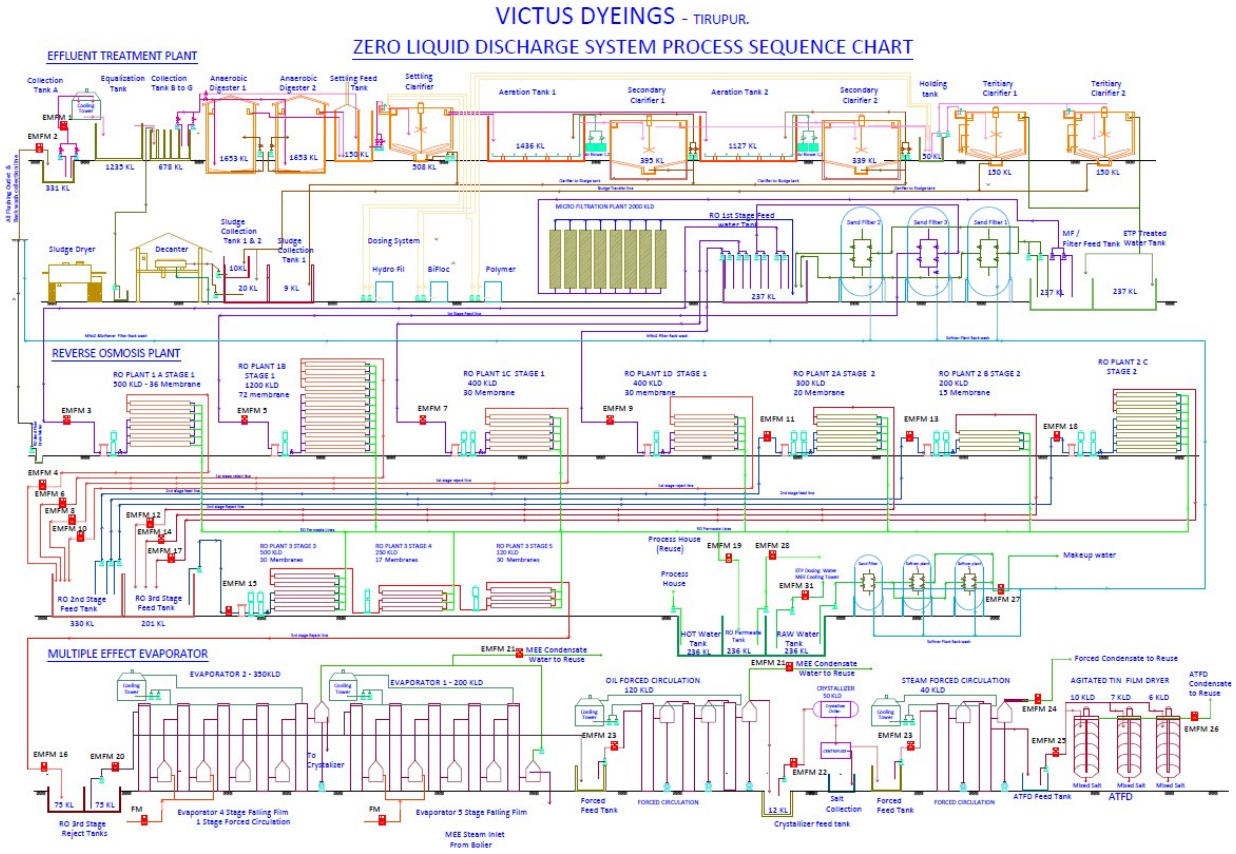
Sr. No	Parameter	Value	Unit
1	Colour	Lightly colored	--
2	PH	9 - 11	--
3	Total dissolved solids	6000 - 7000	Mg/l
4	COD	1000 to 1500	Mg/l
5	BOD5 at 20 Deg C	300 to 500	Mg/l
6	Total suspended solids	100-200	Mg/l
7	Total Hardness as CaCO3	100-150	Mg/l
8	Silica as SiO2	10 – 15	Mg/l
9	Chlorides as Cl	1000	Mg/l
10	Sulphates as SO4	4000	Mg/l
11	Total Iron as Fe	1-2	Mg/l

ETP CIVIL TANKS/STRUCTURES:

Tanks for ETP				
S.No	Name of the Treatment Unit	No. of Units	Tank Dimension L x B x H (in M)	Built- up Volume in Liters

1		Collection Tank - A	1	9.3 x 12.3 x 2.9 m	331731
2		Collection Tank - B	1	15 x 4.1 x 4.0 m	246000
3		Collection Tank - C	1	4.5 x 5.5 x 2.9 m	71775
4		Collection Tank - D	1	4.9 x 4.8 x 3.9 m	91278
5		Collection Tank - E	1	4.9 x 6.4 x 3.9 m	122304
6		Collection Tank - F	1	4.9 x 3.7 x 3.0 m	54390

DETAILED FLOW CHART DESIGN OF ZLD:



Effluent Treatment Plant (ETP) Description with Photos:

- **Collection & Equalization Tank**: Gathers and balances incoming effluent.
- **Anaerobic & Aerobic Tanks**: Biologically treats wastewater using anaerobic digestion (Anoxic Tank 1 & 2) and Aeration Tank 1 & 2).

- **Secondary Clarifier & Tertiary Treatment**: Settles solids and polishes water quality.

AERATION TANK

- **Aeration** is done using energy efficient diffused aeration system, which results in compact layouts and reduces the power consumption. Air from the blower is diffused through the Diffuser grid. It consists of porous membranes of 12” dia disc type diffusers made of EPDM material. The diffusers are of non-buoyant type, which during shutdown condition contracts to prevent any backflow.

- The diffuser is designed to ensure uniform permeability and to produce a flow of fine air bubbles and provides high contact area and more contact time due to slow rise of the bubbles which makes the system very efficient in terms of oxygen transfer efficiency thus low installed HP for the blower drive and hence low operational cost.

- After a residence of 24 hours in the aeration tank the measure of water and activated sludge flows to a secondary clarifier where the biomass is allowed to settle.

  The settled biomass in the secondary clarifier is re-circulated back to the aeration tank to maintain the mixed liquor suspended solids (MLSS) up to the level of 3000 mg/l suitable for the activated sludge process. The excess waste sludge is sent to sludge tank or used as manure as the sludge is biodegradable.

  The aeration tank will be in RCC construction. Air will be provided through fine bubble diffused aeration system. Air blowers, twin lobe type will be provided for air supply.

The Proposed Diffused Aeration System gives the following advantages compared to the conventional surface aerators:

-Reduction in power consumption resulting in lower operating costs.

-Lesser space requirements.

-No submerged moving parts within the aeration tank, hence less maintenance.

-Retrievable type of membranes that allow removal and maintenance of individual membranes without interrupting the entire system.

Reverse Osmosis (RO) Plant:

- Multi-stage RO system (e.g., RO Plant A, B, C) with stages like 1st Stage, 2nd Stage, and 3rd Stage.
- Filters water to produce permeate (clean water) and reject (concentrated waste), using membranes (e.g., EMFA 1-13).

Multiple Effect Evaporator (MEE):

- Concentrates reject water through evaporation in multiple effects (e.g., Evaporator 1-4, 200-250 KL/D).
- Includes forced circulation and falling film stages, with condensate reused.

RO PLANT

MULTIPLE EFFECT EVAPORATOR

MULTIPLE EFFECT EVAPORATORS (MEE)

Feed is received in an MEE feed tank and passed through pre-heaters, heat exchanger and vapour separators of various effects. The evaporation takes place under vacuum, which is maintained by a vacuum system. Steam is supplied as a heating medium to the first effect jacket. Vapour & concentrated liquor enters the vapour separator in a tangential entry.

The vapor gets separated and goes to the effect as heating medium while the concentrated liquor is pumped to the effect calandria Evaporator is a Device which is used to transfer a heat through shell and tube and it use of both heat exchangers and flash separation units with circulation of the solvent in order to remove liquid mixtures. The solution to be evaporated is circulated by circulation pump through the heat exchanger tubes with high velocity from bottom to the top. The vaporization takes place in the vapor head, where the vapor and liquor are separated by gravity and / or by centrifugal force.

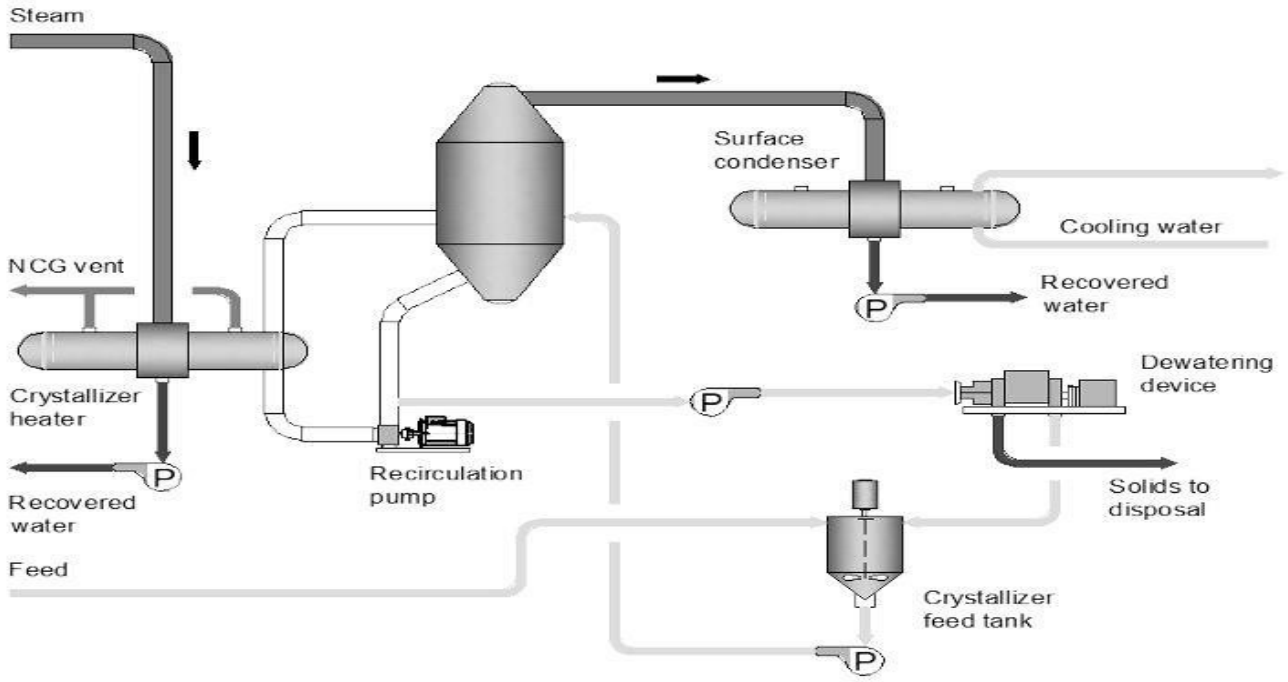
The preheated high TDS effluent is passed to heat exchanger Bottom of the Evaporator. Steam is used as a heating media. The superheated liquid from Calandria enters the flash vessel and the product is flashed to boiling pressure and then in-part evaporated.

The designed velocity is maintained inside the Evaporator tubes with the help of recirculation pump. The concentrated liquid shall be sent to Agitated Thin Film Dryer for salt recovery by Concentrate Pump, and also designed velocity maintained inside the tubes with help of recirculation pump. Vapour is condensed in surface condenser.

Multiple effect evaporators (MEE)

ADIABATIC VACUUM CRYSTALLIZER (CHILLER)

Description of the Process Crystallization of Glauber Salt from a mixture of water, sodium chloride and sodium sulphate are being presented. Feed to the crystallizer is heated to achieve a desired temperature difference between the feed and the solution in the crystallizer. Vacuum is introduced into the crystallizer resulting in an adiabatic cooling of the solvent.



Adiabatic vacuum crystallizer chiller

This results in evaporation of the solvent leading to decrease in the solvent temperature. This considerable decrease in temperature leads to cooling and hence super saturation occurs at low temperature of around 6.5 degrees C to 8.5 degrees C. Desired concentration of sodium sulphate is required for this supersaturation to take place with controlled nucleation rates and growth rates.

Sr. No.	Specification	Unit	Data
1	Feed to crystallizer	kg/hr	2500
2	Initial TDS	w/w%	35
3	Dissolved sulphate in feed	w/w%	24 / 25
4	Feed to Pusher Centrifuge @ 32%	kg/hr	1000
5	Feed temperature	°C	32

6	Concentrate Outlet Temperature	°C	10
7	Glauber Salt Recovery Rate	kg/hr	70 / 0
8	Cooling Water Quantity	m^3/hr	80
9	Cooling water in & out temperature	°C	32 / 38
10	Steam Supply Rate	kg/hr	850
11	Motive Steam Pressure	kgf/cm^2	8
12	Plant Power with Cooling Tower	HP	35
13	Type of Installation	mtr	15
14	Operating Hours	hr	20

Sr. No.	Particulars	Unit	Tech. Details
1	Water Evaporation Capacity	Kg/hr	550
2	Product Feed Rate	Kg/hr	700
3	Mixed Salt Recovery Rate	Kg/hr	150 maxes
4	Weight Percentage of Product Feed	Wt %	35%
5	Weight Percentage of Concentrate Outlet	Wt %	95%
6	Concentrate Outlet Temp.	°C (Around)	65
7	Cooling Water Inlet Temp.	°C	32
8	Cooling Water Outlet Temp.	°C	38
9	Cooling Water Quantity	m^3/hr	65

10	Steam Consumption	Kg/hr	700
11	Steam Pressure	Kgf/cm²	7
12	Process Power Required	HP	21
13	Cooling Tower Pump Power	HP	7.5
14	Vacuum Pump Power	HP	5

CRYSTALLIZER CENTRIFUFE: SODIUM SALT RECOVERY

The solid-liquid mixture to be separated is delivered continuously through the inlet pipe into the rotating distributor and is evenly distributed throughout the entire sieve area in the first stage. The majority of the liquid is already centrifuged off here and a solid cake is formed. The first stage also incorporates an oscillating movement in addition to the rotation.

This is performed hydraulically by means of a pusher piston with a reversing mechanism. In this way, the solid cake is pushed in ring sections according to the pusher length from the first to the second stage and finally leaves the machine through the collecting channel and the solids casing.

The solid is cleaned in the pusher centrifuge via the continuous addition of washing liquid on to the solid cake. The wash pipes or other washing devices can be arranged easily and cost-effectively in the freely accessible basket interior. The spun-off mother liquor and washing liquid are collected in the housing and drained off separately.

AGITATOR THIN FILM DRYER:

CGE Reject water is Mother Liquid water recycled to CGE for concentrate NaCl process for minimizing ATFD feed water quantity. Taken from ATFD feed tank passed through single stage vessel top side. The evaporation takes place direct steam into the outer vessel and effluent is fed to inner vessel.

Steam is supplied as a heating medium to of the vessel. The scrapper blades are running continuously with drive technology and pasted effluent to scrapped and fine salt will be collected in the bottom of the vessel.

HAZARDOUS WASTE GENERATION & DETAILS: -

• **Title**: Hazardous Waste Management for M/s. VICTUS DYEINGS
• **Authorization Number**: 24HFC60444956
• **Date of Issue**: 30/07/2024
• **Valid Until**: 31/03/2029
• **Location**: S.F.No. 52/1B2B, 52/2, 53/1B2B, 53/2, 54/1A1, 54/1B1 & 54/1C1, KARAIPUDUR Village, PALLADAM Taluk, Tiruppur District

To establish a standardized procedure for the generation, collection, transportation, storage, and disposal of hazardous and other wastes at M/s. VICTUS DYEINGS, in compliance with the authorization granted by the Tamil Nadu Pollution Control Board (TNPCB).

The following table outlines the hazardous waste categories, quantities, and authorized activities as per the TNPCB authorization:

Sl. No.	Schedule / Process	Hazardous Waste (Category No.)	Quantity	Authorized Activities	Authorized Vendor
1	Schedule I / 35. Purification and treatment of exhaust air/gases, water, and wastewater	35.3 - Chemical sludge from wastewater treatment	1200 T/Annum	Generation, Collection, Transportation, Storage, Disposal	M/s.Deepika Traders, Sivagangai (Preprocessor)
2	Schedule I / 35. Purification and	35.3 - Chemical sludge from wastewater treatment	1920 T/Annum	Generation, Collection, Transportation, Storage,	M/s.Arunachalaa Enterprises, Ramanathapuram (Recycler)

	treatment of exhaust air/gases, water, and wastewater			Disposal	
3	Schedule I / 33. Handling of hazardous chemicals and wastes	33.1 - Empty barrels/containers/liners contaminated with hazardous chemicals/wastes	3 T/Annum	Generation, Collection, Transportation, Storage, Disposal	M/s.Vinayaga Lubricants, Karur (Recycler)
4	Schedule I / 5. Industrial operations using mineral or synthetic oil	5.1 - Used or spent oil	3.6 KL/Annum	Generation, Collection, Transportation, Storage, Disposal	M/s.Vinayaga Lubricants, Karur (Recycler)

A.9. Implementation Benefits to Water Security

The implementation of a comprehensive Effluent Treatment Plant (ETP) by the project proponent (PP) delivers significant benefits to water security, especially in light of the rising demand within the textile industry. With the installation of a full-fledged ETP and Reverse Osmosis (RO) system, the discharge of untreated effluent into land and water bodies has been significantly curtailed. This proactive measure not only reduces pollution but also safeguards local ecosystems.

The Multiple Effect Evaporator (MEE) enables efficient resource utilization by treating RO reject, which is subsequently reused in boiler feed and other industrial applications.

Furthermore, the commitment to advanced treatment technologies ensures compliance with environmental regulations. By eliminating harmful effluent discharge, the project activity contributes to improved community health and long-term cost efficiency through reduced freshwater procurement and potential revenue from recovered salts.

Overall, this initiative has positioned favorably against future regulatory challenges and align operations with sustainability goals, reinforcing.

A9.1 Objectives vs Outcomes

The goals (OBJECTIVE) and benefits (OUTCOME) of this project are simplified as follows:

- Project activity shows how Indian companies can lead in cutting down industrial water use and pollution.
- The Project Proponent uses new technology to turn wastewater into safe water for industrial use, doing better than other methods.
- The project displays top-notch technology that can replace freshwater for non-drinking industrial needs, reducing untreated wastewater and boosting recycling and safe reuse in India.
- It promotes teamwork between industries and supports policies to tackle India's water shortage.

A9.2 Interventions by Project Owner / Proponent / Seller

The project demonstrates a strong commitment to sustainable water resource management by reusing of treated effluent instead of relying on increasingly stressed groundwater reserves. The project proponent has proactively implemented advanced treatment and recycling systems, significantly reducing the dependency on potable water and thereby conserving millions of liters for other essential uses in the region.

With growing populations and improved living standards, the demand for water continues to rise, putting immense strain on groundwater resources. This overexploitation has led to serious consequences, including falling water tables, frequent water shortages, saltwater intrusion in coastal zones, and increased energy requirements for water extraction.

It alleviates pressure on groundwater sources and helps prevent the long-term environmental impacts associated with over-pumping, such as aquifer depletion, saline intrusion, and higher energy usage.

A.10. Feasibility Evaluation

The installed IETP and ZLD System by the PP are robust and smoothly adapt to variations in wastewater effluent. Before establishing the project, PP has done the feasibility test as per **DPR** (Detailed Project Report)

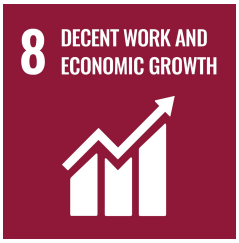
A.11. Ecological Aspects & Sustainable Development Goals (SDGs):

The MEE system treats RO reject water, ensuring that no liquid waste is released into the environment. By preventing the formation of stagnant water pools, the project reduces the risk of vector breeding and the transmission of associated diseases. Additionally, the crystallizer minimizes solid waste generation, preventing sludge accumulation that could lead to waterlogging. These measures collectively help protect public health and support the objectives of SDG 6 (Clean Water and Sanitation) by promoting safe and sustainable environmental practices. Textile effluents, which are typically high in total dissolved solids (TDS), heavy metals, and organic pollutants, pose a serious threat to groundwater when discharged untreated. In regions like Tirupur, where groundwater is vital for both drinking and irrigation, such contamination can significantly degrade water quality, harm agricultural productivity, and endanger the health of local communities.

The dyeing unit's comprehensive effluent management system prevents groundwater contamination by ensuring no effluent is discharged. The ETP treats 1.9 MLD of wastewater, with the RO system removing dissolved solids and pollutants to produce reusable water.

Sustainable Development Goals Targeted	Most relevant SDG Target/Impact	Indicator (SDG Indicator)
	13.2: Integrate climate change measures into national policies, strategies and planning	By preventing effluent discharge, you reduce environmental degradation that could exacerbate climate-related issues like water scarcity. Water and salt reuse lowers the energy and resource intensity of your operations, indirectly

		reducing emissions.
	3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	The PP showcases how recycling and reusing wastewater can prevent depletion of natural water reserves and prevent water scarcity during droughts. The hazardous impact of industrial wastewater is now avoided due to this project. The PP ensures water availability in water-scarce zones that help promote healthy lives and well-being in the region.
	6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	PP Shows there how ETP processes 1.9 MLD of effluent is preventing untreated effluent discharge into land or water bodies. The RO system enables water reuse in boiler feed or process applications, reducing freshwater demand. The MEE system treats RO reject water, evaporates it, and condenses it for reuse, further minimizing wastewater discharge.

	8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	Number of jobs created and also the Number of people trained as part of this project activity.

A.12. Recharge Aspects:

NA

Water Budget Component	Typical Estimated Uncertainty (%)	Description
Surface Inflow	1%	In accordance with the RoU Standard version 7, and considering that the flow meters are calibrated, PP has accounted for a 1% uncertainty factor in both inflow and outflow volumes to maintain a conservative approach. Consequently, an uncertainty factor of 0.98 is applied to all ROUs.
Precipitation	0	NOT APPLICABLE
Surface Outflow	1%	In accordance with the RoU Standard version 7, and considering that the

		flow meters are calibrated, PP has accounted for a 1% uncertainty factor in both inflow and outflow volumes to maintain a conservative approach. Consequently, an uncertainty factor of 0.98 is applied to all ROUs.
Evapotranspiration	NA	NOT APPLICABLE
Deep Percolation	NA	NOT APPLICABLE

A.13. Quantification Tools

Baseline scenario:

The baseline scenario is the situation were, in the absence of project activity, the PP would have **one or all** of the following options:

- (a) installed multiple bore wells within the project boundary which would have depleted the local groundwater resources (aquifers); **and/or**
- (b) diverted existing safe drinking water resources from the surrounding residential area; **and/or**
- (c) discharged the ETP effluent without further recycling and reusing.

Hence the following baseline scenario is applicable for this project activity:

"The net quantity of treated ETP effluent / wastewater that would be discharged directly into the local drain/sewer without further being recycled and/or reused daily post treatment per year"

The net quantity of treated water used is measured via flow meters installed at the site. The primary set of data records are kept at plant level, managed by PP's ETP team.
The working days or operational days have been 330 days, the 1st monitoring period is from **01-01-2014** -**31-12-2024.** However, the number of days is not an influential parameter on RoUs

calculation as RoUs are calculated based on the total quantity of treated water being recycled & reused.

YEAR	Inlet Water Flow (KLD)	RO Permeate	Brine	RoUs (RO+Brine)*0.98
2014	144401	101081	28880	127362
2015	144240	100968	100968	127220
2016	144830	101381	28966	127740
2017	144658	101261	28932	127589
2018	144513	101159	28903	127461
2019	144338	101037	28868	127306
2020	144472	101131	28894	127424
2021	144436	101105	28887	127392
2022	144253	100977	28851	127232
2023	144491	101143	28898	127441
2024	144161	100912	28832	127150
TOTAL	**1588794**	**1112156**	**389879**	**1,401,316**

Quantification: -

Year	Total ROUs (1000 liters)/yr UCR Cap(1 million RoUs/yr
2014	127362
2015	127220
2016	127740
2017	127589
2018	127461
2019	127306
2020	127424
2021	127392
2022	127232
2023	127441

2024	127150
Total RoUs	**1,401,316**

A.14. UWR Rainwater Offset Do No Net Harm Principles

According to the UCR RoU Standard principles, the project activity accomplishes the following:

• Increases the sustainable water yield in areas where over development has depleted the aquifer
According to the data released by the Central Groundwater Board in 2021, the total amount of groundwater that can be utilised in India in a year is 398 billion cubic meters (BCM), of which, approximately 245 BCM is currently being utilised, which is about 62 per cent of the total. But the level of exploitation of groundwater is very high in States like Punjab, Rajasthan, Haryana, Delhi and Tamil Nadu. This project activity was commissioned in 1988, and the PP has reduced the proportion of untreated wastewater that future generations would need to recycle and has showcased recycling and safe reuse within the industry from unutilized water resources. Revenue from the sale of UWR RoUs will enable scaling up such project activities.
• Collect unutilized water or rainwater and preserve it for future use
In India, at the district level, in 24 states/UTs, as many as 267 districts had stages of groundwater extraction more than 63 per cent, ranging from 64 per cent to 385 per cent (source: https://www.business-standard.com/article/current-affairs/from-58-to-63-india-pumpedmore-groundwater-between-2004-and-2017-121122101377_1.html). This project activity serves as an example to recycle and reuse wastewater and encourages companies, especially large and transnational companies in the biotechnology and biopharmaceuticals sector, to adopt similar sustainable practices in regard to captive water requirements and groundwater management.
• Conserve and store excess water for future use
The project activity decreases the dependence on groundwater, thereby preventing excessive depletion. Between 2014 to 2024, the project activity has reused 1401316 kilolitres of ETP effluent successfully post treatment with gainful end use of the same.

A.15. Scaling Projects-Lessons Learned-Restarting Projects

As one of Tirupur's leading dyeing units, the project proponent (PP) remains at the forefront of sustainable textile processing. In response to growing industry demands, the expansion of the Effluent Treatment Plant (ETP) became imperative. In alignment with environmental priorities and pollution control norms, the project has adopted proactive measures to achieve zero discharge of untreated effluent to land or water, reinforcing its commitment to eco-conscious operations.

The plant currently treats approximately 1.9 million litres of effluent daily and is designed for a capacity of 2.8 MLD, accommodating future dyeing and printing requirements. To enable water reuse, a three-stage Reverse Osmosis (RO) system with 2200 KLD capacity was installed by M/s Systech Aqua Solution, Tirupur, and M/s Chemin Enviro Systems Pvt. Ltd., Perundurai—both recognized for their expertise in advanced water treatment technologies.

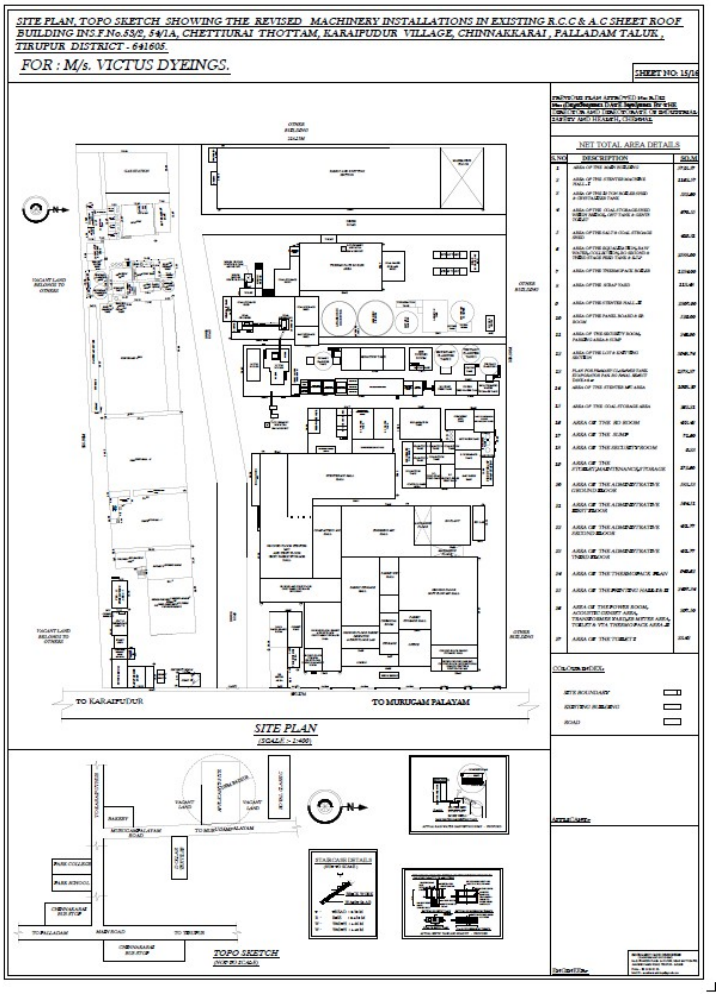
Innovative Reject Management and Resource Recovery

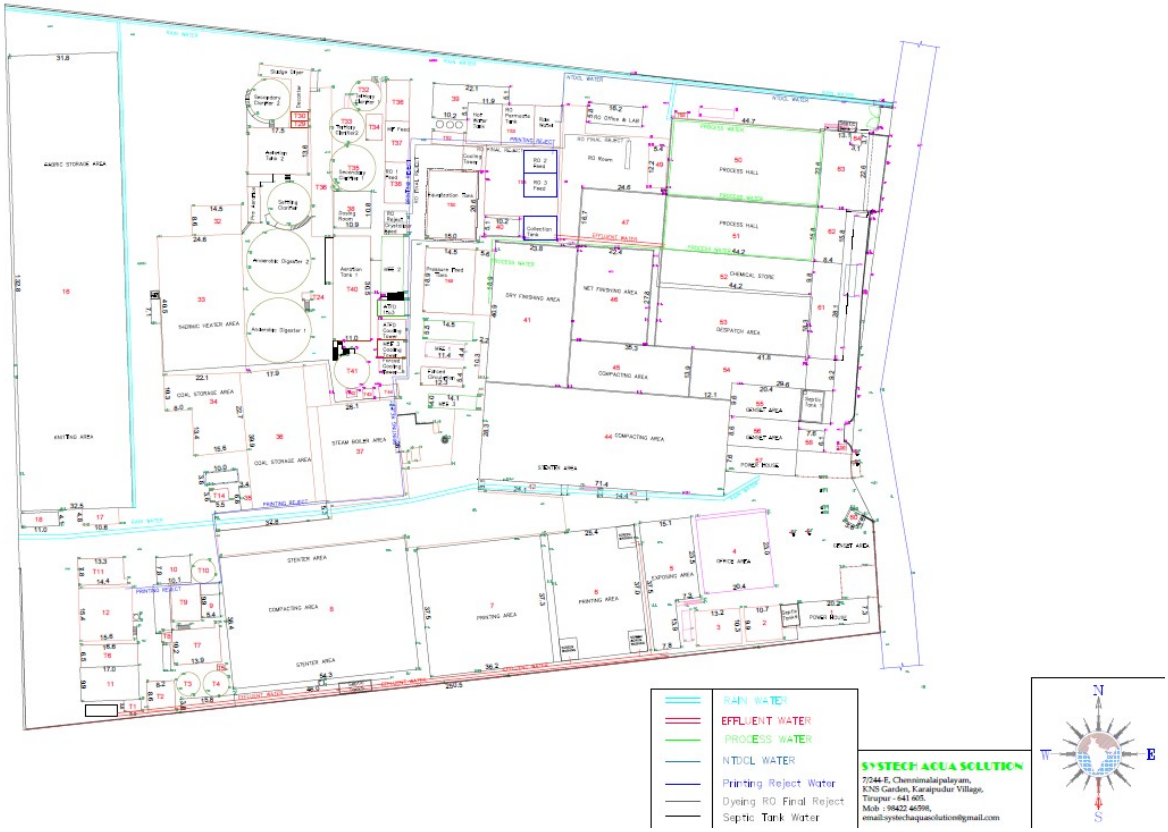
To handle RO reject, the unit utilizes a thermal-based recovery system comprising a Multiple Effect Evaporator (MEE) with five falling film and one forced circulation effect. Steam is used to heat the reject, and the resulting vapor is condensed for reuse in boiler feed and other operational needs. The residual slurry from the MEE is processed in a crystallizer to extract moisture, enabling salt recovery, which is reused in dyeing.

This closed-loop system ensures optimal resource use and minimizes environmental impact. The project sets a practical example of effective wastewater management and reuse, offering a replicable model for other textile units. It reduces pressure on groundwater resources and prevents effluent discharge into rivers—making a strong case for sustainable industrial water practices across the sector.

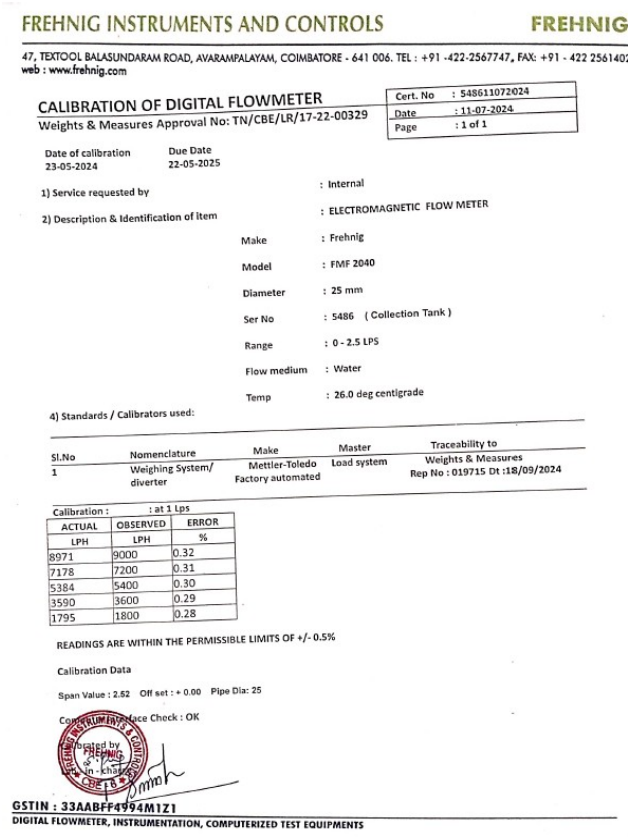
Appendix

Plant layout




RAIN WATER
EFFLUENT WATER
PROCESS WATER
NTDCL WATER
Printing Reject Water
Dyeing RO Final Reject
Septic Tank Water
SYSTECH AQUA SOLUTION
7/244-E, Chennimalaipalayam,
KNS Garden, Karaipudur Village,
Tirupur - 641 605.
Mob : 96422 46598,
email:systechaquasolution@gmail.com
N
W
E
S

Calibration Details



FREHNIG INSTRUMENTS AND CONTROLS **FREHNIG**

47, TEXTOOL BALASUNDARAM ROAD, AVARAMPALAYAM, COIMBATORE - 641 006. TEL : +91 -422-2567747, FAX: +91 - 422 256140
web : www.frehnig.com

CALIBRATION OF DIGITAL FLOWMETER

Weights & Measures Approval No: TN/CBE/LR/17-22-00329

Cert. No	: 548611072024
Date	: 11-07-2024
Page	: 1 of 1

Date of calibration 23-05-2024 — Due Date 22-05-2025

1) Service requested by : Internal

2) Description & Identification of item : ELECTROMAGNETIC FLOW METER

Make : Frehnig
Model : FMF 2040
Diameter : 25 mm
Ser No : 5486 (Collection Tank)
Range : 0 - 2.5 LPS
Flow medium : Water
Temp : 26.0 deg centigrade

4) Standards / Calibrators used:

Sl.No	Nomenclature	Make	Master	Traceability to
1	Weighing System/ diverter	Mettler-Toledo Factory automated	Load system	Weights & Measures Rep No : 019715 Dt :18/09/2024

Calibration : : at 1 Lps

ACTUAL	OBSERVED	ERROR
LPH	LPH	%
8971	9000	0.32
7178	7200	0.31
5384	5400	0.30
3590	3600	0.29
1795	1800	0.28

READINGS ARE WITHIN THE PERMISSIBLE LIMITS OF +/- 0.5%

Calibration Data

Span Value : 2.62 Off set : + 0.00 Pipe Dia: 25

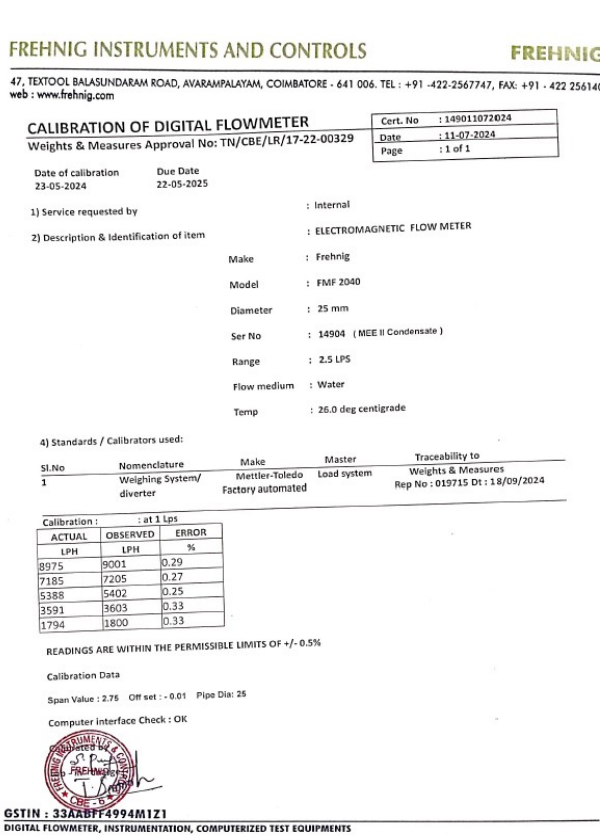
Computer interface Check : OK

Calibrated by FREHNIG

GSTIN : 33AABFF4994M1Z1

DIGITAL FLOWMETER, INSTRUMENTATION, COMPUTERIZED TEST EQUIPMENTS

Inlet EMFM



FREHNIG INSTRUMENTS AND CONTROLS **FREHNIG**

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web : www.frehnig.com

CALIBRATION OF DIGITAL FLOWMETER

Weights & Measures Approval No: TN/CBE/LR/17-22-00329

Cert. No	: 149011072024
Date	: 11-07-2024
Page	: 1 of 1

Date of calibration 23-05-2024 — Due Date 22-05-2025

1) Service requested by : Internal

2) Description & Identification of item : ELECTROMAGNETIC FLOW METER

Make : Frehnig
Model : FMF 2040
Diameter : 25 mm
Ser No : 14904 (MEE II Condensate)
Range : 2.5 LPS
Flow medium : Water
Temp : 26.0 deg centigrade

4) Standards / Calibrators used:

Sl.No	Nomenclature	Make	Master	Traceability to
1	Weighing System/ diverter	Mettler-Toledo Factory automated	Load system	Weights & Measures Rep No : 019715 Dt : 18/09/2024

Calibration : : at 1 Lps

ACTUAL	OBSERVED	ERROR
LPH	LPH	%
8975	9001	0.29
7185	7205	0.27
5388	5402	0.25
3591	3603	0.33
1794	1800	0.33

READINGS ARE WITHIN THE PERMISSIBLE LIMITS OF +/- 0.5%

Calibration Data

Span Value : 2.75 Off set : - 0.01 Pipe Dia: 25

Computer interface Check : OK

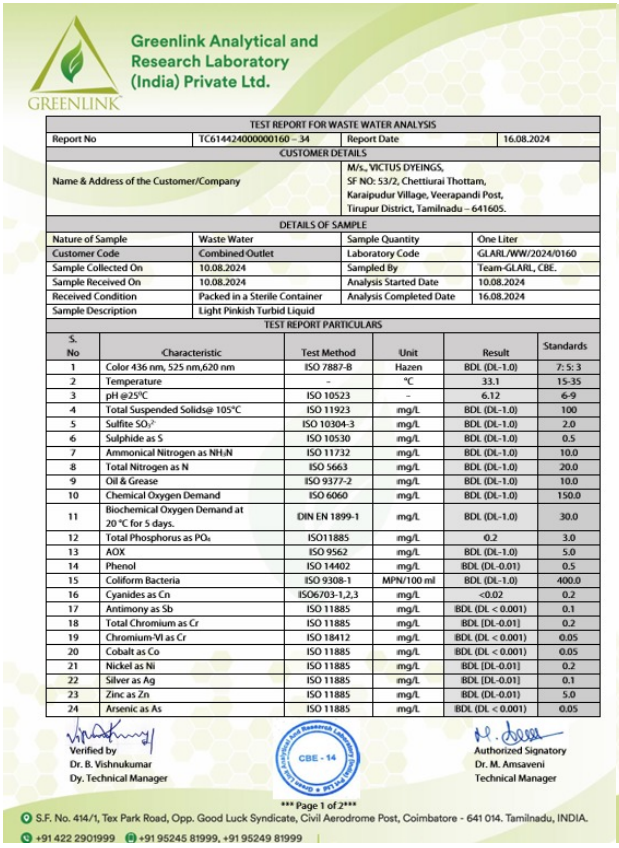
Calibrated by FREHNIG

GSTIN : 33AABFF4994M1Z1

DIGITAL FLOWMETER, INSTRUMENTATION, COMPUTERIZED TEST EQUIPMENTS

Outlet EMFM

Lab test Report (Inlet & Outlet)



Greenlink Analytical and Research Laboratory (India) Private Ltd.

GREENLINK

TEST REPORT FOR WASTE WATER ANALYSIS			
Report No	TC614424000000160 – 34	Report Date	16.08.2024
CUSTOMER DETAILS			
Name & Address of the Customer/Company	M/s., VICTUS DYEINGS, SF NO: 53/2, Chettiurai Thottam, Karaipudur Village, Veerapandi Post, Tirupur District, Tamilnadu – 641605.		
DETAILS OF SAMPLE			
Nature of Sample	Waste Water	Sample Quantity	One Liter
Customer Code	Combined Outlet	Laboratory Code	GLARL/WW/2024/0160
Sample Collected On	10.08.2024	Sampled By	Team-GLARL, CBE.
Sample Received On	10.08.2024	Analysis Started Date	10.08.2024
Received Condition	Packed in a Sterile Container	Analysis Completed Date	16.08.2024
Sample Description	Light Pinkish Turbid Liquid		

TEST REPORT PARTICULARS

S. No	Characteristic	Test Method	Unit	Result	Standards
1	Color 436 nm, 525 nm,620 nm	ISO 7887-B	Hazen	BDL (DL-1.0)	7: 5: 3
2	Temperature	-	°C	33.1	15-35
3	pH @25°C	ISO 10523	-	6.12	6-9
4	Total Suspended Solids@ 105°C	ISO 11923	mg/L	BDL (DL-1.0)	100
5	Sulfite SO_3^{2-}	ISO 10304-3	mg/L	BDL (DL-1.0)	2.0
6	Sulphide as S	ISO 10530	mg/L	BDL (DL-1.0)	0.5
7	Ammonical Nitrogen as NH_3N	ISO 11732	mg/L	BDL (DL-1.0)	10.0
8	Total Nitrogen as N	ISO 5663	mg/L	BDL (DL-1.0)	20.0
9	Oil & Grease	ISO 9377-2	mg/L	BDL (DL-1.0)	10.0
10	Chemical Oxygen Demand	ISO 6060	mg/L	BDL (DL-1.0)	150.0
11	Biochemical Oxygen Demand at 20 °C for 5 days.	DIN EN 1899-1	mg/L	BDL (DL-1.0)	30.0
12	Total Phosphorus as PO_4	ISO11885	mg/L	0.2	3.0
13	AOX	ISO 9562	mg/L	BDL (DL-1.0)	5.0
14	Phenol	ISO 14402	mg/L	BDL (DL-0.01)	0.5
15	Coliform Bacteria	ISO 9308-1	MPN/100 ml	BDL (DL-1.0)	400.0
16	Cyanides as Cn	ISO6703-1,2,3	mg/L	<0.02	0.2
17	Antimony as Sb	ISO 11885	mg/L	BDL (DL < 0.001)	0.1
18	Total Chromium as Cr	ISO 11885	mg/L	BDL (DL-0.01)	0.2
19	Chromium-VI as Cr	ISO 18412	mg/L	BDL (DL < 0.001)	0.05
20	Cobalt as Co	ISO 11885	mg/L	BDL (DL < 0.001)	0.05
21	Nickel as Ni	ISO 11885	mg/L	BDL [DL-0.01]	0.2
22	Silver as Ag	ISO 11885	mg/L	BDL [DL-0.01]	0.1
23	Zinc as Zn	ISO 11885	mg/L	BDL (DL-0.01)	5.0
24	Arsenic as As	ISO 11885	mg/L	BDL (DL < 0.001)	0.05

Verified by
Dr. B. Vishnukumar
Dy. Technical Manager

CBE - 14

Authorized Signatory
Dr. M. Amsaveni
Technical Manager

*** Page 1 of 2***

S.F. No. 414/1, Tex Park Road, Opp. Good Luck Syndicate, Civil Aerodrome Post, Coimbatore - 641 014. Tamilnadu, INDIA.

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Greenlink Analytical and Research Laboratory (India) Private Ltd.

GREENLINK

TEST REPORT FOR WASTE WATER ANALYSIS			
Report No	TC614424000000160 – 33	Report Date	16.08.2024
CUSTOMER DETAILS			
Name & Address of the Customer/Company	M/s., VICTUS DYEINGS, SF NO: 53/2, Chettiurai Thottam, Karaipudur Village, Veerapandi Post, Tirupur District, Tamilnadu – 641605.		
DETAILS OF SAMPLE			
Nature of Sample	Waste Water	Sample Quantity	One Liter
Customer Code	ETP - Inlet	Laboratory Code	GLARL/WA/2024/0160
Sample Collected On	10.08.2024	Sampled By	Team-GLARL, CBE.
Sample Received On	10.08.2024	Analysis Started Date	10.08.2024
Received Condition	Packed in a Sterile Container	Analysis Completed Date	16.08.2024
Sample Description	Grayish turbid liquid		

TEST REPORT PARTICULARS

S. No	Characteristic	Test Method	Unit	Result
1	Color 436 nm, 525 nm,620 nm	ISO 7887-B	Hazen	2220.0
2	Temperature	-	°C	33.4
3	pH @25°C	ISO 10523	-	11.39
4	Total Suspended Solids@ 105°C	ISO 11923	mg/L	158.0
5	Sulfite SO_3^{2-}	ISO 10304-3	mg/L	32.0
6	Sulphide as S	ISO 10530	mg/L	23.0
7	Ammonical Nitrogen as NH_3N	ISO 11732	mg/L	28.0
8	Total Nitrogen as N	ISO 5663	mg/L	36.8
9	Oil & Grease	ISO 9377-2	mg/L	24.0
10	Chemical Oxygen Demand	ISO 6060	mg/L	2100.0
11	Biochemical Oxygen Demand at 20 °C for 5 days.	DIN EN 1899-1	mg/L	590.0
12	Total Phosphorus as PO_4	ISO11885	mg/L	162.0
13	AOX	ISO 9562	mg/L	12.0
14	Phenol	ISO 14402	mg/L	18.0
15	Coliform Bacteria	ISO 9308-1	MPN/100 ml	22×10^2
16	Cyanides as Cn	ISO6703-1,2,3	mg/L	<0.02
17	Antimony as Sb	ISO 11885	mg/L	0.1
18	Total Chromium as Cr	ISO 11885	mg/L	18.0
19	Chromium-VI as Cr	ISO 18412	mg/L	09.0
20	Cobalt as Co	ISO 11885	mg/L	0.8
21	Nickel as Ni	ISO 11885	mg/L	0.6
22	Silver as Ag	ISO 11885	mg/L	0.31
23	Zinc as Zn	ISO 11885	mg/L	14.8
24	Arsenic as As	ISO 11885	mg/L	0.5

BDL-Below Detectable Limit — DL- Detectable Limit

Verified by
Dr. B. Vishnukumar
Dy. Technical Manager

CBE - 14

Authorized Signatory
Dr. M. Amsaveni
Technical Manager

*** Page 1 of 2***

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enquiry@greenlinklabs.com, info@greenlink.in

www.greenlink.in

Category of the Industry :

RED

CONSENT ORDER NO. 2407158939640 DATED: 31/05/2024.

PROCEEDINGS NO.T5/TNPCB/F.0014TPS/RL/TPS/W/2024 DATED: 31/05/2024

SUB: Tamil Nadu Pollution Control Board –CONSENT TO OPERATE FOR EXPANSION-I -M/s. VICTUS DYEINGS , S.F.No. 52/1B2B, 52/2, 53/1B2B, 53/2, 54/1A1, 54/1B1 & 54/1C1, KARAIPUDUR village Palladam Taluk and Tiruppur District - Consent for the operation of the plant and discharge of sewage and/or trade effluent under Section 25 of the Water (Prevention and Control of Pollution) Act, 1974 as amended in 1988 (Central Act 6 of 1974) – Issued- Reg. (Industry User ID- R15TPS236239)

REF: 1. Board Proc.No.T5/TNPCB/F.0014TPS/RL/TPS/W&A/2024 dated: 12.02.2024

2. DEE/TPR(S), IR.No : F.0014TPS/RL/AEE/TPS/2024 dated 15.05.2024

3. CCC Resolution vide Item No.324-9, dated:- 24.05.2024

CONSENT TO OPERATE FOR EXPANSION is hereby granted under Section 25 of the Water (Prevention and Control of Pollution) Act, 1974 as amended in 1988 (Central Act, 6 of 1974) (hereinafter referred to as "The Act") and the rules and orders made there under to

The Partner
M/s . VICTUS DYEINGS
S.F No. 52/1B2B, 52/2, 53/1B2B, 53/2, 54/1A1, 54/1B1 & 54/1C1
KARAIPUDUR Village
Palladam Taluk
Tiruppur District.

Authorising the occupier to make discharge of sewage and /or trade effluent.

This is subject to the provisions of the Act, the rules and the orders made there under and the terms and conditions incorporated under the Special and General conditions stipulated in the Consent Order issued earlier and subject to the special conditions annexed.

This CONSENT is valid for the period ending **March 31, 2029**

S RAGUPATHI Digitally signed by S RAGUPATHI
Date: 2024.05.31 19:00:25 +05'30'

For Member Secretary,
Tamil Nadu Pollution Control Board,
Chennai

Consent- dated (31-05-2024)