

Project Profile

EGYPT'S FIRST INTEGRATED ZERO LIQUID DISCHARGE PLANT
ETHYDCO REFINERY, EGYPT



Aquatech was contracted by the Egyptian Ethylene and Derivatives Company (ETHYDCO) to provide a water treatment facility that includes the first integrated Zero Liquid Discharge (ZLD) plant in Egypt.

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THE FACILITY

Egyptian Ethylene and Derivatives Company (ETHYDCO) is an Egyptian joint venture company has been established with the purpose to produce Ethylene, Butadiene and their derivatives (Polyethylene, Poly-Butadiene). The company started to build a 460,000 T/Y ethylene plant and a 20,000 T/Y butadiene extraction plant as part of ETHYDCO's petrochemical complex in Alexandria.

ETHYDCO took the initiative to commission a Zero Liquid Discharge plant to optimize a consistent composite mix of treated effluent and water from Nile River canal.

PROJECT SCOPE

The integrated technology solution provided by Aquatech is a microfiltration system, a High Efficiency Reverse Osmosis (HERO™) system, followed by Fractional Electrodionization (FEDI™) and brine concentrator, and finally a crystallizer and sludge treatment system.

The ZLD plant was installed at ETHYDCO's petroleum derivatives manufacturing site in Alexandria. A subsidiary of Egyptian Holding Co. for Petrochemical (ECHEM), ETHYDCO produces ethylene and other petroleum derivatives at this site. The plant designed and installed by Aquatech treats wastewater from this facility and cooling tower blowdown to get cooling tower makeup water, boiler feed water and achieve Zero Liquid Discharge.

With this plant commissioned in 2015, ETHYDCO meets all the requisite norms of Zero Liquid Discharge established by the Egyptian government to protect their only life-giving aquifer, The River Nile. The success of this project is keenly viewed by the Egyptian government in this region.



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FEDI SYSTEM COMPONENT

Electrodeionization (EDI) is a continuous, chemical free process that removes ionized and ionizable impurities from the feed water using DC power. The Fractional Electrodeionization FEDI® process is an advancement of EDI. It was developed by QUA Technologies to take into account the limitations of conventional EDI, to include:

- Higher Hardness Tolerance In Feed Water
- Quicker Startup
- Reduced Cleaning

No. of Trains: 3 x 105 m³/h

FEDI Model: FEDI 2 30X

FEDI Product Capacity: 420 m³/h

Conductivity: 0.1 mS/cm, Silica as SiO₂ : < 20 ppb

This FEDI system is part of an integrated Zero liquid discharge project to treat cooling tower blow down water. The feed water going into to the FEDI system comes from a single pass HERO unit.



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DESIGN WATER ANALYSIS

Parameter	Feed Water Analysis	Treated Water Quality	DM Water Quality
Normal Flow Rate m ³ /hr	1122	813	210
Rated Flow Rate m ³ /hr	1219	813	210
TSS - ppm	20	0	-
TDS - ppm	609	271	0.2
Total Hardness - ppm as CaCO ₃	173	76	
Ca Hardness - ppm as CaCO ₃	106	46	Nil
Total Alkalinity - ppm as CaCO ₃	170	74	-
Sodium - ppm	87	42	-
Chloride - ppm	89	45	-
SiO ₂ - ppm	3	1	< 0.2
SO ₄ - ppm	92	41	-
pH	7- 8.5	8 - 9.5	6 - 8
Pressure, kg/cm ² g	4.5	ENPPI to add	2