

Case Study Dhuba Desalination Plant

Application:	Desalination Plant
Location:	Saudi Arabia
Year:	2020
Instrumentation involved:	Pneumatic Butterfly Valves
Provided Solution:	Case Study Technical Analysis & Resolution

Project:

The Desalination Plant of Dhuba produces 125,000 m³/day. The project consists on the generation of 1 MGD desalination water and 5MW power generation. Facilities include diesel power generation plant and power distribution, Reverse Osmosis desalination plant and a transmission pipeline to Dhuba, seawater intake structure, water tower, control buildings, laboratories, office/administration building, mosque and housing facilities.



Figure 1.1 Dhuba SWRO Plant

Description:

The client asked for valveIT support concerning problems occurred on pneumatic butterfly valves. In details, damages referred to:

- a) Valve discs suffered from high level of corrosion due to the really hard environment of the Dhuba desalination Plant. Salt, Sand, Humidity, Wind & Sun strongly affected different kind of instrumentation applied on this plant.



Figure 1.2 High corrosion of a Dhuba SWRO Plant's Butterfly Valve

valveIT Intervention:

- a) After meeting with the client who asked for an urgent help with the occurred issue so as to avoid the plant deadlock, valveIT Technical Staff, basing on its previous experience on desalination project and evaluating on-field chemical and technical data coming from the client's local team, suggested the installation of pneumatic butterfly valves with a disc special coating called "HALAR®" instead of the previously used Rilsan coating. Thanks to its technical analysis and support and its prompt response in arranging the halar coated pneumatic butterfly valves, valveIT guaranteed the continuity of operations by increasing the desalination plant's life and reducing maintenance intervention.



Figure 13 Halar Coated Butterfly Valve Disc

Halar® ECTFE for Coatings

Halar fluoropolymer is widely regarded as one of the most chemically resistant polymers. With a minimum coating thickness of 600 microns, it can be used as coating for ductile iron or stainless steel discs. Widely used on desalination plants, Halar coated discs offer a good corrosion resistance against chlorides as well as other chemicals and make them suitable for many industrial chemical applications.

Halar® ECTFE, a copolymer of ethylene and chlorotrifluoroethylene, is a semi-crystalline melt processable partially fluorinated polymer. It is available in different grades that are specifically designed for electrostatic powder coating.

Halar® ECTFE is particularly suitable for use as a coating material in protection and anti-corrosion applications thanks to its unique combination of properties.

Performance:

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Key features:

- Very good chemical and thermal resistance
- Optimum permeation resistance
- Outstanding flame resistance
- Very good surface characteristics

- Surface smoothness
- Purity

Electrostatic Powder Coating:

The procedure involves substrate preparation, spray coating, baking and cooling. Several passes maybe required to obtain the desired Halar® ECTFE load and build up coating thickness.

Markets and Applications:

Typical applications served by Halar® ECTFE include those in contact with highly corrosive or ultrapure chemicals such as strong inorganic bases and strong mineral and oxidizing acids including:

- Vessels
- Reactors
- Semiconductor chemical storage tanks and ductwork
- Piping systems
- Centrifuges
- Agitators
- Exhaust hoods

- Filters
- Electroplating equipment

Pharma & Chemical Industry

Exhaust Duct Coatings: Halar® ECTFE coated stainless steel exhaust duct systems are designed to handle a wide range of corrosive exhaust streams found in a variety of industrial applications, including clean rooms.

- Chemical resistance
- Barrier properties
- Outperform plastic and FRP duct with improved safety and corrosion resistance
- Reduction or elimination of the buildup of salt deposits and debris that can reduce airflow approved by Factory Mutual for use in fume and smoke exhaust systems, without sprinklers.

Fluid Handling Systems: Delivery, storage, filtration and processing are some of the steps integral to a fluid handling system. Fluoropolymers, thanks to their superior capabilities to withstand extreme chemicals and temperatures, are widely in use in semiconductor operations.

Halar® ECTFE coatings are the best choice for key components such as: valves, pipe, tanks, vessels, and heat exchangers.

Case Studies

Halar® ECTFE stack liner. Halar® ECTFE-lined chimney remains maintenance-free

After 15 years, a fiberglass-reinforced FRP/Halar® chimney liner is still in good working order without any repairs. The chimney is part of a power station in the North Jutland region of Denmark. The liner is exposed to sulfuric acid at 110°C. Recent inspections showed no signs of chemical attack by the exhaust gas and no surface cracking was observed.

Chlorine scrubber. Fluoropolymer lining for a chlorine scrubber

An FRP/Halar® ECTFE dual laminate chlorine scrubber installed in a petrochemical plant delivered continuous service for 14 years. After the plant was shut down, the liner was inspected and found to be in excellent condition despite its exposure to chlorinated hydrocarbons combined with hydrochloric acid and molecular chlorine.

Fluoropolymer-lined process vessel. Long-term performance of a fluoropolymer-lined process vessel

A Halar® ECTFE-lined holding tank was undamaged after 23 years of service. It handled alkaline-based fluids and active chlorine in a vinyl chloride monomer plant.