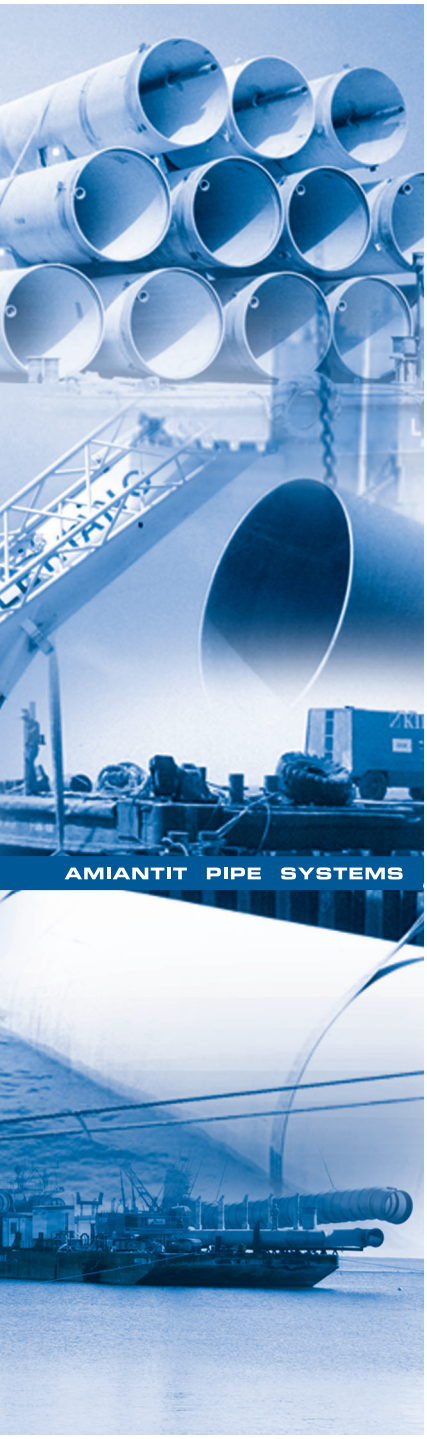
Fujairah

Water and Power Project - UAE.



Overview

The UAE is one of the fastest developing countries in the GCC and the world. In recent years, the Government of the UAE has invested millions of US Dollars to develop their entire states (Emirates).

Fujairah City is the capital of the Fujairah Emirates. This Emirate known for its Dibba Al Fujairah which comprises the most important agricultural and livestock projects. To foster the countries growth, the government has initiated massive investments to secure the basic demands of food, water and live stock. The contractor Doosan Heavy Industries & Construction Company Ltd. was awarded the water and power contract in Fujairah and chose Flowtite® GRP piping systems for the project.

A hot climate and wide open plain make the Middle East an ideal location to desalinize. Evaporators the size of football pitches can soak up the sun's rays to extract the water, which can then be transported to dry cities. Doosan, the South Korean-based EPC contractor of desalination plants, has seized the opportunity and built several plants in the Middle East. The Fujairah Desalination and Power Plant serves as an oasis in the desert.

Geography has shaped Fujairah like a natural fortress surrounded by stone mountains on all four sides. This remote area is where the contractor delivered the five evaporators, and where construction began on 1 July 2002.

Project

The Fujairah Water and Power Plant is an US $1.2billion complex designed to meet the fast-growing demand for water in the Al-Ain region and the power requirements of the Northern Emirate. Funded by the Abu Dhabi Government, construction work is preceding at a rapid pace on the 656 MW power generator, the 100 million gallons a day water desalination plant, and the water transmission pipeline. The power plant being constructed by Doosan will use 120 MW of the output for powering the water desalination plant and 36 MW for the transmission system.

It is considered as Doosan's largest ever hybrid MSF/RO desalination plant and serves as a new oasis that produces 450000 tons of fresh water every day for the neighboring cities. The UAE Governmental authority recognized Flowtite® GRP pipe system as a superior engineered product, due to its:

- Inherent corrosive resistance
- Long life cycle and
- Easy installation

An additional factor for using AFIL's Flowtite® GRP pipe system was the multinational recognition of its products with successful references.

In addition to the described project, Flowtite® pipes systems can also be used in the following main applications:

- Water transmission and distribution
- Sanitary sewerage collection systems and outfalls
- Storm water
- Hydropower
- Seawater intake and outfalls
- Circulating cooling water in power plants.
- Industrial application

Product Range

Fujairah, UAE water and power project used a variety range of AFIL's Flowtite® GRP products to transport seawater from the Arabian Gulf to the plant. For the subaqueous installation, diameters ranged from DN 200-3700mm with a pressure class of PN 3 bar and a stiffness class of SN2500 N/m^2 were installed. The underground and aboveground installation included pipes with diameters ranging from DN 150-1800mm and with a pressure class of PN5.5 bar. All pipes were supplied in stiffness class of SN9000 N/m^2.

In general AFIL's Flowtite® GRP pipe systems can be supplied in the following diameter range. Tailor made diameters can be supplied on request.

80	100	150	200	250	300	350	400	500
600	700	800	900	1000	1100	1200	1300	1400
1500	1600	1700	1800	1900	2000	2100	2200	2300
2400	2500	2600	2700	2900	3000	3100	3200	3300
3400	3500	3600	3700	3800	3900	4000		

AFIL standard diameter range in mm

In addition to the pipes, a wide range of Flowtite® GRP fittings and accessories are offered. This includes:

- Elbows
- Tees, Wyes and Nozzles
- Reducers
- Flanges
- Bulkheads
- Saddles
- Tapping

Installation

Flowtite® GRP piping system allow various installation methods which are mainly.

- Subaqueous
- Aboveground (AG)
- Underground (UG)

For this project all three different installation methods were used.

Subaqueous

This installation is similar to belowground installation except that the trench is made at the seabed (below water). Protection of the backfill material is generally done using rib-rap or concrete mattress. Thrust blocks can be eliminated at changes in directions. Multiple lines can be installed in one trench.

Installation:
For the subaqueous installation, the multiple pipe joining method was used. In this process two or three section of pipes are preassembled on land then lowered to water and joined under water with the main line below sea bed level. The pipes were joined with flexible coupling joints for standard pipes.

Backfill Material:
Sand, Gravel and/or Native Soil.

Aboveground-AG

Rigid AG piping is often used inside plants and it may require detailed stress analysis to ensure proper performance. The support can be concrete, steel or GRP.

Installation:
The pipes were installed on aboveground level. The pipeline is fully exposed and supported on cradles.

Joint Types:
Rigid butt strap (B/S) or Butt-and-Wrap joints, and flanged joints are the common joint types for AG Piping systems. Flexible coupling joints can also be used in AG piping using different supporting systems.

Underground-UG

Underground installation is a commonly practiced for all Flowtite® pipes. Installing pipes underground permits the area to be used for roads, highways and other constructions. Further more to protecting the pipes and investment against impact, vandalism and other external accidents.

Installation:
Underground level installation, a normal trench was dug and the pipes were installed.

Joints Types:
Flowtite® GRP pressure couplings were used for this application.

Project Data Sheet

General	Project	Water and Power Project - Fujairah - UAE		
	Client	UAE - Gonverment		
	Contractor	Doosan Heavy Industries & Construction Co. Ltd		
	Location	UAE - Fujairah		
Product Specification and information	Installation Type		Subaqueous	Above / Underground
	Application		Sea Water	Cooling Water
	Diameter(DN), mm		200 - 3700	150 - 1800
	Pressure(PN), bar		3	5.5 Full Vacuum Barg.
	Stiffness(SN), N/m^2		2500	9000
	Design Temp ^oC		50	50
	Resin		Vinylester for line and isophthtalic for structure	Vinylester for A/G and isophthtalic for U/G

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