

CaseHistory

Desert environment is no challenge for Vipel®



The project included elbows and connectors for above- and below-ground pipe

Vipel® technology joins cooling water pipeline for the world's largest HDPE plant.

Market Segment:	Pipes/Ducts
Composite Application:	Field-laminated joints
Resin:	Vipel® F013 bisphenol-A epoxy vinyl ester
Manufacturing Process:	Hand Lay-up
Total Installed:	858
Diameters:	36 to 144 inches (900 to 3600 millimeters)
Design Parameters:	215 psi (15 bar) 97° to 115°F (36° to 46°C)
Installed:	2010
Location:	Ruwais, Abu Dhabi

The world's largest high density polyethylene (HDPE) plant in Abu Dhabi uses fiber-reinforced polymer (FRP) composite pipe to cool manufacturing process water with seawater. The critical joint system for the extensive pipe system relied on the corrosion-resistant and process-friendly properties of Vipel® F013 bisphenol-A epoxy vinyl ester from AOC.

Called "Borouge 2," the plant is owned by Abu Dhabi Polymers Co. of Ruwais, Abu Dhabi. Engineering, procurement and contracting was under the direction of the Middle East unit of Técnicas Reunidas, S.A., which has headquarters in Madrid, Spain.

The pipe system conveys 36° to 46°C (97° to 115°F) temperature seawater to cool process water that is in the 40° to 50°C (104° to 122°F) temperature range. The pipe and joints were designed to withstand 11.3 bar (160 psi) of service pressure and were successfully hydro-tested at 15 bar (215 psi).

The pipe was installed by Granite Construction Co. and manufactured by Future Pipe Industries Group (FPI),

Desert environment is no challenge for Vipel®, continued



The Vipel® resin was process-friendly in the demanding desert environment.

both of Abu Dhabi. Butt and wrap field joints that connected pipe section to pipe section were accomplished by Vayyu Composites Technologies (Pvt.), Ltd., Chennai, India, a subsidiary of Vayyu LLC, Malvern, Pennsylvania, USA.

Vayyu crews resin-impregnated fiberglass woven roving mats with 270, 360 and 580 grams per meter densities to field-laminate 858 joints. The job involved above- and below-ground pipe ranging in diameter from 900 to 3600 millimeters (36 to 144 inches). Vayyu used 327 technicians -- laminators, supervisors and engineers -- to complete the job within 12 months.

Vipel® F013 bisphenol-A epoxy vinyl ester resin was specified for its high resistance to corrosive attack from the hot, saline seawater. The laminating crew also appreciated the resin's excellent wetting, handling and curing characteristics in the hostile desert environment.

“In spite of extreme temperature ranges of 10°C (50°F) during winter nights and 46°C (115°F) during summer days, the resin performed consistently,” said G.S. Viswanath, Senior Partner & Chief Technical Officer. “The gel time was extremely predictable. We were also pleasantly surprised by the shelf life of the resin in the intense summer heat.”



More than 850 joints were formed in 12 months time.

About Vayyu Composite Technology

Vayyu Composite Technologies (Pvt.) Ltd., Chennai, India, provides composite pipe design, engineering, fabrication and installation expertise for projects around the world. Vayyu Composite Technologies is a subsidiary of Vayyu LLC, Malvern, PA, USA. For more information, phone (888) 236-6006, fax (888) 236-6006, e-mail info@vayyu.com or go to www.vayyu.com.

About AOC

AOC is a leading global supplier of resins, gel coats, colorants, additives and synergistic material systems for composites and cast polymers. AOC knows technology, lives quality and delivers service better than any other composites resin supplier. For more information, e-mail corrosionresins@aoc-resins.com, phone (901) 854-2800 or go to www.CorrosionResins.com.



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Borouge 2 Pipe Joint Summary

Pipe Diameter		Number of Joints
inches	mm	
36	900	43
48	1200	10
52	1300	9
56	1400	14
64	1600	55
68	1700	5
76	1900	18
84	2100	88
92	2300	14
96	2400	292
108	2700	156
136	3400	143
144	3600	11