

Case History

Composites Withstand Waste-to-Energy Exhaust Heat

Market Segments:	Industrial Power & Energy Scrubbers
Composite Application:	Two chimney liners
Manufacturing Process:	Hand Lay Up Filament Winding
Diameter:	55 inches 1400 millimeters
Liner X:	
Length:	236.2 feet, 72 meters
Operating temperature:	150°C, 302°F
One-hour exposures:	80°C, 356°F
Resin:	Vipel® F086
Liner Y:	
Length:	226 feet, 69 meters
Operating temperature:	130°C, 266°F
One-hour exposures:	160°C, 320°F
Resin:	Vipel® F085
Location:	Bergen, Norway

More than 40 years of experience and expertise helped Tunetanken A/S obtain the contract for high-performance, fiber-reinforced polymer (FRP) composite chimney liners for a modern waste-to-energy incineration plant. To get the best technology, quality and service for the liner resins, Tunetanken specified Vipel® epoxy novolac vinyl esters from AOC.

The incineration plant in Bergen, Norway, is operated by BiR Avfallsenergi, a company owned by various municipalities to convert waste that otherwise would have to be landfilled into useful energy. Incineration exhaust is sent through two composite stacks in a combined housing made of steel.



The stack liners were manufactured using Tunetanken's cutting-edge winding technology.



The composite liners were installed in a combined steel housing that was shipped to the plant site.

The liners were installed in the housing by Tunetanken customer, chimney manufacturer Steelcon A/S, Esbjerg N, Denmark, before the lined housing was sent to the plant for erection. One liner is 69 meters (226.4) tall, while the other is 72 meters (236.2 feet) tall. Both liners are 1400 millimeters (55.1 inches) in diameter.

The liners were installed in the housing by Tunetanken customer, chimney manufacturer Steelcon A/S, Esbjerg N, Denmark, before the lined housing was sent to the plant for erection. One liner is 69 meters (226.4) tall, while the other is 72 meters (236.2 feet) tall. Both liners are 1400 millimeters (55.1 inches) in diameter.

Incineration exhaust is so hot that one liner must withstand an operating temperature of 150°C (302°F) and exposure to 180°C (356°F) for up to one hour. To meet these requirements, the liner was made with Vipel F086 epoxy novolac vinyl ester. The design temperature for the other liner is 130°C (266°F), and the maximum one-hour exposure temperature is 160°C (320°F). These requirements are met with Vipel F085 epoxy novolac vinyl ester.

Manufacturing the liners

Tunetanken manufactured the liners by filament winding resin-impregnated, E-glass roving over a cylindrical mandrel. Each liner was made in three sections that were joined using composite lamination in the field. The longest individual section was 27 meters (88.6 feet).

Laminated joints and the top section of each liner were manufactured using hand lay-up. To improve the resistance of interior surfaces exposed to the hot and corrosive exhaust, 2.5-millimeter (0.1-inch) thick barrier layers were formed with resin-impregnated ECR veils.

About Tunetanken A/S

Located in Vejen, Denmark, Tunetanken A/S has more than 40 years experience in the design and manufacturing of superior corrosion-resistant composite parts and systems. Applications include silos and tanks for agricultural and industrial use as well as flue gas scrubbers, ducts and stack liners. For more information, phone +45 75588188, fax +45 75588537, e-mail hk@tunetanken.dk, or go to www.tunetanken.dk.

About AOC

AOC is a leading global supplier of resins, gel coats, colorants, additives and synergistic material systems for composites and cast polymers. For more information on AOC technology, quality and service, e-mail corrosionresins@aoc-resins.com, phone (866) 319-8827, or go to AOC-RESINS.com.

