CaseStudy

SIMONA

Christen & Laudon Staffelstein

Bayer AG finds cutting-edge solution for large acid tanks

GFRP composite tanks are six metres long and 2.4 metres in diameter. The SIMONA® PVDF-GK sheets are clearly visible in the construction phase (below).

In 2003, Bayer AG commissioned Christen & Laudon to manufacture two storage tanks based on a GRP composite design (glass-fibre backed plastic) for the storage of hydrochloric acid. The size of the tanks and the special requirements of the application called for high-end materials.

Project Summary

Project
Construction of two horizontal tanks in GFRP composite construction in segment shells with a diameter of 2.4 m and a length of 6 m

Requirements
- Very high chemical resistance
- Medium: Hydrochloric acid: 17 to 30 %
- Operating pressure: –0.10/+0.50 bar
- Operating temperature: –25 to +60 °C

Client
Bayer AG

Contractor
Christen & Laudon GmbH, Bitburg-Staffelstein

Technical support
Applications Technology Department, SIMONA AG, Kirn

Products used

In-liner
- SIMONA® PVDF-GK sheets, thickness = 4 mm
- SIMONA® PVDF welding rods

Resin type (structural laminate)
- Epoxy vinyl ester resin DERAKANE-MOMENTUM 411-350

Project period
2003

Continued overleaf ▶

Fig. from left to right: Manufacture of the domed base in segmented design; cylinder made of welded SIMONA® PVDF-GK sheets; winding of the cylinder onto the winding mandrel with GFRP

SIMONA® PVDF-GK – the intelligent choice for chemically resistant composite tank constructions

Initial situation

Bayer AG is a global player with core competencies in the fields of health, nutrition and production of premium-quality substances. Most of the chemicals required for production have to be stored in large quantities – in tanks that meet the highest quality standards.

Task

Christen & Laudon were commissioned to develop two large-sized storage tanks for hydrochloric acid. The following criteria were of key importance:

- Outstanding chemical resistance
- High corrosion resistance
- High stability
- Cost-effective choice of materials

Solution

Due to the enormous size of the planned tanks, Christen & Laudon only considered a GRP composite construction. This comprises a chemically resistant thermoplastic as the in-liner – PVDF in this case, thanks to its good resistance to aggressive media – and structural laminate in GRP, a composite material made from resin and glass. However, as resin does not bond directly to the PVDF surface, the material selected was SIMONA® PVDF-GK, a high-quality PVDF with glass fibre backing.

In the subsequent production process the PVDF-GK sheets were cut into segments, formed in a hot-air oven and joined with PVDF welding rods. An electrically conductive carbon strip was applied to all weld seams to prove tightness. The cylinder was then reinforced with GRP in a winding machine and welded to the pre-fabricated bases and supports.

SIMONA® PVDF-GK

Partially fluorinated high-performance material comprising highly crystalline polyvinylidene fluoride with glass fibre fabric backing

Properties

- Outstanding chemical resistance
- Particularly weather-resistant
- Very good processability
- Operating temperature range from –30 °C to +140 °C

The product range

- Extruded sheets (also available with polyester fabric backing – PVDF-SK)

Further information:
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