

## E-CTFE-GK – the safe solution for organic solvents



*The GRP composite tanks are eleven metres high and five metres in diameter.*

**Plasticon The Netherlands is one of the leading manufacturers of GRP composite tanks. In 2006 the company manufactured four storage tanks in GRP composite construction (GRP = Glass Reinforced Plastic) to extremely high requirements for the company Teijin Twaron Emmen.**

### Project Summary

#### Project

Vertical circular tank  
Height: 11,000 mm  
Diameter: 5,000 mm

#### Requirements

- Operating pressure: atmospheric pressure
- Design pressure:  $-0.02/+0.02$  bar
- Operating temperature:  $+33$  °C
- Design temperature:  $-20$  °C/ $+40$  °C

#### Client

Teijin Twaron Emmen

#### Prime contractor

Plasticon The Netherlands

#### Technical support

Technical Service Center,  
SIMONA AG, Kirn

#### Products used

- SIMONA® E-CTFE-GK sheets  
Thickness = 2,3 mm
- Medium: 96 % sulphuric acid with organic solvent component
- Resin type: Epoxy vinyl ester resin DERAKANE 411-350

#### Project period

2006



Illustrations from left to right: Tank cover, manufacture of the cylindrical section, tank base

## SIMONA® E-CTFE-GK – the safe choice for chemically resistant composite tank constructions

### Initial situation

To manufacture Twaron fibre, which is a very heat-resistant fibre with many potential applications, particularly in the automotive sector and for lightweight constructions, different concentrations of sulphuric acid are required. The process also requires the inclusion of organic solvent components in the 96% sulphuric acid.

### Task

A GRP composite construction was selected for this purpose. A GRP composite construction comprises a chemically resistant inliner with an outer carrier laminate, which provides the mechanical strength of the construction. In this case, the carrier laminate was a combination of a resin (epoxy vinyl ester resin DERAKANE 411-350) with a glass fabric. After hardening, the carrier laminate constitutes a high-strength thermoset, which withstands the static requirements. The inliner (SIMONA® E-CTFE-GK) is responsible for the chemical resistance. SIMONA® E-CTFE-GK is a partially fluorinated thermoplastic with single-sided glass backing. The glass backing provides the connecting element between the thermoplastic and the carrier laminate in the composite construction.

### Solution

The organic solvent contained in the 96% sulphuric acid was the determining factor for selecting SIMONA® E-CTFE-GK as an inliner. For the purposes of manufacturing the tank cylinder, SIMONA® E-CTFE-GK sheets were supplied as panels on rollers in accordance with the tank size. The domed top of the tank was manufactured in segmented construction. For subsequent inspection of the weld seams using a high-voltage spark tester, the weld seams were finished with an electrically conductive carbon band and were over-laminated. The individual cylinder rings, the cover and the flat base were laminated and joined together. As soon as the rigidity of this construction was sufficient, the tank was inserted into a winding machine and wound according to the specifications.

### SIMONA® E-CTFE-GK

Partially fluorinated high-performance material made from ethylene-chlorotrifluoroethylene with glass fibre backing

#### Properties

- High-performance material
- High chemical resistance, including in the alkaline range
- Excellent weather-resistance
- Very good workability
- Temperature range from  $-40^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Suitable for the challenging applications in tank/vessel engineering

#### Product Range

- Extruded Sheets

#### Further Information:

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