



PVDF circular tank withstands high service temperatures



Above: Finished tank. Below: Roof of the tank made of PVDF sheets 8 mm thick. Welding the PVDF semi-finished products.

In 2006, the Hungarian company **MULTILATERAL KFT.** awarded **TÜRK-MŰANYAG BT.** a contract to manufacture a polymer-based processing tank for mobile phone batteries – to be operated with 10% hydrochloric acid at a temperature of 80 °C.

The project at a glance

Project

Construction of a PVDF circular tank for processing mobile phone batteries

- Diameter: 1,600 mm
- Height: 1,500 mm

Requirements

- Service at high processing temperatures up to 80 °C
- High chemical resistance
- Resistance to highly abrasive and corrosive media

Client

MULTILATERAL KFT., Hungary

Contractor

TÜRK-MŰANYAG BT., Hungary

Technical support

- SIMONA AG Technical Service Centre
- UMUNDUM BT.
- HERZ Hungária KFT.
- Munsch Chemie-Pumpen GmbH

Products used

- SIMONA® PVDF sheets, thickness = 8 mm
- SIMONA® PE-HML 500 sheets, thickness = 8 mm
- SIMONA® PVDF welding rods
- SIMONA® PVDF pipes
- SIMONA® PVDF fittings

Project time

2006



From left to right: Welding the semi-finished products

SIMONA® PVDF – the intelligent choice for high demands in chemical tank construction

Initial situation

Planned construction of a PVDF circular tank for the purpose of processing mobile phone batteries. The technology, which is at the experimental stage, is to be implemented in the following steps:

1. Comminution of the batteries to pieces with a maximum size of 5 mm²
2. Decomposition of the ground material in 10% hydrochloric acid at 80 °C
3. Separation and recycling of the resulting metal salt solution

Task

TÜRKMŰANYAG BT. was awarded a contract to design and construct a process tank. TÜRK was selected in view of the company's considerable experience in making plastic tanks for the chemical and pharmaceutical industries. In terms of material selection the following criteria had to be considered:

- Excellent chemical resistance
- High resistance to corrosion and abrasion at 80 °C
- Long service life
- Excellent processing capability and weldability

Solution

Owing to the highly corrosive medium, the relatively high processing temperature and the abrasive properties of the ground material, PVDF was chosen in collaboration with the SIMONA AG Technical Service Centre and UMUNDUM BT. in order to be able to run the process at even higher temperatures if necessary. Structural analysis of the circular tank (diameter 1,600 mm, height 1,500 mm) with a conical roof was performed with the aid of a software application by the name of TankDesigner. Calculations indicated that the wall thickness of the tank would have to be at least 8 mm. To protect the walls against wear, high-molecular-weight polyethylene was used (SIMONA® PE-HML 500) in a thickness of 8 mm.

HERZ Hungária KFT. and Munsch Chemie-Pumpen GmbH assisted with the welding of the PVDF semi-finished products using the newly developed mini-extruder MM-Xtruder made by Munsch.

SIMONA® PVDF (KYNAR®) High-performance material polyvinylidene fluoride

Properties

- Highly crystalline thermoplastic
- High crystallinity
- High rigidity, even in the upper service temperature range
- Excellent chemical resistance
- Low flammability in accordance with FM 4910
- Outstanding ageing resistance

Product range

- Extruded and pressed sheets
- Solid rods
- Welding rods
- Pipes
- Fittings

Further information

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