

Solef®



**SOLVAY**

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# Solef® PVDF

High Purity Thermoplastics  
for Dialysis Water Distribution System

**SPECIALTY  
POLYMERS**

## Solef® PVDF for Dialysis Water Systems

The Hemodialysis industry is constantly looking for the highest possible safety standards for patients. The water utilized for hemodialysis is heavily regulated: chemical contaminants and microbiological purity are continuously monitored.

### Key Markets and Applications

Solef® PVDF is widely utilized in critical applications where extremely high purity is required, such as clean room applications in the Semiconductor and Microelectronic industry, Membranes for drinking water filtration, Plumbing, Food & Pharma industries.

#### Key features include:

- Chemical inertness to most acids, aliphatic and aromatic organic compounds, chlorinated solvents and alcohols
- Low friction coefficient
- Continuous use within a wide range of temperatures
- Unaffected by UV and good resistance to  $\gamma$  radiation
- Excellent intrinsic fire resistance

### High Purity

Solef® PVDF is specified for key components such as pipes, valves, fittings, vessels for transportation and storage of ultrapure water, hot and concentrated acids. It also offers the mechanical and chemical resistance needed for waste disposal systems.

- Low values of leachables and extractables
- Inherently plasticizer-free (processing does not require the use of processing aids or other additives)

### Regulatory

Available grades with USP Class VI letter.

### Surface Smoothness

By optimizing the manufacturing process it is possible to produce Solef® PVDF sheets and pipes with extremely low roughness.

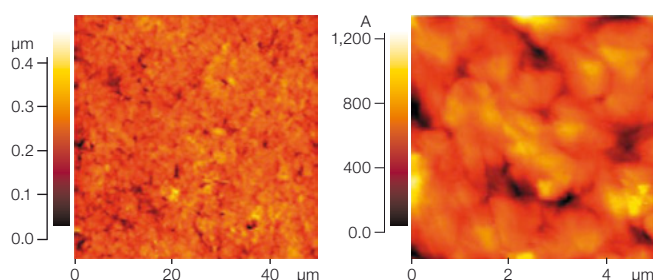
Examples of Ra values (average distance of peaks and valleys from the average surface level) measured on various Solef® PVDF items are reported in Table 1.

**Table 1:** Average roughness of internal walls of extruded Solef® 1010 pipes and sheets

Type of Object	Roughness $R_a$ [ $\mu\text{m}$ ]	
	M*	T*
Pipe $\varnothing = 63$ mm	0.08	0.06
Pipe $\varnothing = 110$ mm	0.09	0.10
<b>Extruded sheet</b> Thickness = 3 mm	0.04	0.04
<b>Extruded sheet</b> Thickness = 10 mm	0.08	0.19

\* M: machine direction; T: transversal direction

### Atomic Force Microscopy Topographic Images of Solef® PVDF Pipes



Even lower roughness values can be reached after careful optimization of extrusion conditions, as shown above in the Atomic Force Microscopy (AFM) pictures. By numerical elaboration of the AFM scans roughness values such as  $0.032 \mu\text{m}$  for the  $50 \mu\text{m} \times 50 \mu\text{m}$  scan and  $0.018 \mu\text{m}$  for the  $5 \mu\text{m} \times 5 \mu\text{m}$  scan were calculated (average on 8 measurements).

### Compatibility with Disinfection Procedures

- Withstands 6 months continuous exposure to water containing 3 ppm of ozone
- Chemical resistance to typical bleach concentrations utilized for cleaning dialysis circuits
- Heat resistance to hot water at  $90^\circ\text{C}$

### Processing

Solef® PVDF can be easily extruded for manufacturing solid pipes with dimensions in the range of ID 18 mm – OD 25 mm typical for dialysis water systems. Fittings, valves and other components of water circuits are typically injection molded.

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