

Statement of Performance

Surface Extraction from Versilon™ HP PFA 400

Versilon HP PFA 400 tubes have been tested in accordance with SEMI F57-0314 specification for Polymer Materials and Components Used in Ultrapure Water and Liquid Chemical Distribution Systems at an independent test lab¹.

Test Conditions

Saint-Gobain produced two tubes (3/8" OD x 1/4" ID) using virgin HP PFA pellets that were sourced from the two main raw material providers that supply the Semiconductor industry. Both were manufactured in a clean room, on the same equipment and with the same settings.

Samples were prepared in accordance with F40-0699. Each tube was rinsed ten times using UPW with a two-minute soak between. Following the cleaning process, each tube was filled with UPW and sealed by bending the ends and securing them with plastic cable ties. A leach blank was also prepared in this manner for the testing.

The prepared samples were then leached for 7 days at 85°C with a one-minute, daily agitation. Values for each result were calculated by subtracting the blank and normalizing to the $\mu\text{g}/\text{m}^2$ of the surface of the leaching area.

Summary

Versilon HP PFA 400 was tested for TOC and Surface Contamination (ionic & metallic) per the F57-0314 requirement. Tubing made from resins from two different PFA suppliers were tested to the standard. Tubing made from material A tested within the limits of the standard with the exception of nickel. Tubing made from material B tested within the limits of the standard except for Nitrite.

References

¹ Balazs NanoAnalysis Air Liquide US L.P. 46409 Landing Parkway

Results

Test	Spec ($\mu\text{g}/\text{m}^2$)	Value for sample A ($\mu\text{g}/\text{m}^2$)	Value for sample B ($\mu\text{g}/\text{m}^2$)
Total Organic Carbon			
TOC	$\leq 60,000$	530	270
Surface Extractable Ionic Contamination			
Bromide	≤ 100	-	-
Chloride	$\leq 3,000$	-	-
Fluoride	$\leq 60,000$	1700	910
Nitrate	≤ 100	4	-
Nitrite	≤ 100	27	6.3
Phosphate	≤ 300	-	-
Sulfate	≤ 300	-	-
Surface Extractable Metallic Contamination			
Aluminum	≤ 10	-	-
Arsenic	--	-	-
Barium	≤ 15	0.12	-
Boron	≤ 30	2.5	3.6
Cadmium	--	-	-
Calcium	≤ 20	-	-
Chromium	≤ 1	-	0.06
Copper	≤ 15	-	-
Iron	≤ 5	-	-
Lead	≤ 1	-	-
Lithium	≤ 2	-	-
Magnesium	≤ 5	-	-
Manganese	≤ 5	-	-
Nickel	≤ 1	0.2	0.3
Potassium	≤ 15	-	-
Sodium	≤ 15	-	-
Strontium	≤ 0.5	-	-
Titanium	--	-	-
Vanadium	--	-	-
Zinc	≤ 10	-	-

Table Information

"-" indicates the result is below the detection limit of the test.
"--" indicates no reference value from the standard.
Bold values are above specification requirements.

