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Pure Performance

Benchmark Report

Surface Extraction Comparison of Furon HP PFA 400 and Two Other Industry Recognized Tubing Manufacturers

Three sets of HP PFA tubes from three industry recognized component manufacturers were produced with pellets from two major raw material suppliers for the semiconductor industry. The tubing was then tested in accordance with SEMI F57-0314 Specification for Polymer Materials and Components Used in Ultrapure Water and Liquid Chemical Distribution Systems by an independent test lab[1].

Test Conditions

Each tube was produced with Virgin HP PFA pellets from the semiconductor industry's two primary material providers. Most likely, the pellets used by each of the three component manufacturers some from different batches.

Each component manufacturer provided four tubes (two sets of each material).

Samples were prepared in accordance with SEMI F40-0699E Practice for Preparing Liquid Chemical Distribution Components for Chemical Testing. 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 (185°F) with a one-minute daily agitation. Values for each result were calculated by subtracting the blank and normalizing to the µg/m² of the surface of the leaching area.

Results

Test	Spec (µg/m2)	Saint-Gobain - Furon 400 HP PFA				Industry Recognized Component Mfr. #1				Industry Recognized Component Mfr. #2			
		Sample 1a	Sample 1b	Sample 2a	Sample 2b	Sample 1a	Sample 1b	Sample 2a	Sample 2b	Sample 1a	Sample 1b	Sample 2a	Sample 2b
TOC	≤ 60,000	110	86	81	92	310	310	82	100	600	680	210	220
Bromide	≤ 100	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	≤ 3,000	-	-	0.3	-	0.5	0.5	-	-	2.2	3.3	2.5	2.7
Fluoride	≤ 60,000	840	830	150	150	340	290	740	740	1600	1600	860	940
Nitrate	≤ 100	34	33	-	-	-	-	7.1	6.2	22	23	-	-
Nitrite	≤ 100	-	-	-	-	1.9	2.1	3	1.7	-	-	1.7	1.7
Phosphate	≤ 300	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	≤ 300	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum	≤ 10	-	-	0.13	-	0.03	-	0.05	0.06	-	0.03	0.05	0.03
Barium	≤ 15	-	-	-	0.01	-	-	0.07	-	0.04	-	-	-
Boron	≤ 30	1.6	1.6	0.17	0.19	1.6	1.9	3	5,2	6.5	5.2	1,6	1,7
Calcium	≤ 20	-	-	-	-	0.16	-	0.24	-	-	-	-	-
Chromium	≤ 1	0.2	0.18	-	-	-	-	0.01	0.02	0.15	0.12	0.02	0.01
Copper	≤ 15	-	-	0.14	-	-	-	0.1	0,03	-	-	-	-
Iron	≤5	-	-	-	-	-	-	-	-	-	-	-	-
Lead	≤ 1	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	≤ 2	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	≤ 5	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	≤5	-	-	-	-	-	-	-	-	-	-	0.01	-
Nickel	≤ 1	0.48	0.41	-	-	0.1	0.16	0.52	0.46	0.94	0.83	0.51	0.32
Potassium	≤ 15	0.03	-	-	-		0.03	-	0.03	-	0.03	0.05	0.03
Sodium	≤ 15	0.05	0.05	0.03	-	0.03	0.08	0.03	0.03	-	0,03	0.05	0.03
Strontium	≤0.5	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	≤10	-	-	-	-	0.03	-	-	-	-	-	-	-

Table Information
"-" Indicates the result is below the detection limit of the test.

Summary

The three component suppliers met the requirement from the industry. And evidenced by the table above the Furon 400 HP PFA sample presented the overall lowest level of contaminants of any of the components tested for this benchmark report.

References

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

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