

**Leachable testing of Orion Whiteline
High Purity Polypropylene Piping into High Purity Water**

Conducted by Mead CompuChem Company

Orion's Whiteline Polypropylene Piping is manufactured from a high purity, unpigmented polypropylene homopolymer resin. It is used for transportation of high purity liquids such as distilled water and up to 18 Meg Ohm deionized water.

To establish the level of purity of Whiteline piping, testing was performed by Mead CompuChem Company to determine pollutant concentrations. This testing included chromatograms, mass spectra, calibration and quality control data for the organics.

It should be noted that the only significant contaminants include methylene chloride and toluene. The testing facility has confirmed through independent control sample testing, that the presence of methylene chloride was a result of laboratory contamination and that the presence of toluene is likely the result of contamination from the paint markings on the outside of the piping.

Results:

With exception of the two laboratory contaminants listed above, the levels of leachables tested were below the limits of detection for the instruments used. These test results show that our Whiteline is of very high purity and is the material of choice for almost any High Purity liquid application.

Detailed test results are shown on the attached pages.

Leachables

ORION WHITELINE UNPIGMENTED POLYPROPYLENE LEACHABLES TESTING REPORT

SAMPLE IDENTIFIER: ASTM-2146-SC4-40-1/2
COMPUCHEM SAMPLE NUMBER: 7269

NUMBER	VOLATILE ORGANICS	CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1V.	ACROLEIN	BDL	100
2V.	ACRYLONITRILE	BDL	100
3V.	BENZENE	BDL	10
4V.	BIS (CHLOROMETHYL) ETHER	BDL	10
5V.	BROMOFORM	BDL	10
6V.	CARBON TETRACHLORIDE	BDL	10
7V.	CHLOROBENZENE	BDL	10
8V.	CHLORODIBROMOMETHANE	BDL	10
9V.	CHLOROETHANE	BDL	10
10V.	2-CHLOROETHYLVINYL ETHER	BDL	13
11V.	CHLOROFORM	BDL	10
12V.	DICHLOROBROMOMETHANE	BDL	10
13V.	DICHLORODIFLUOROMETHANE	BDL	10
14V.	1, 1-DICHLOROETHANE	BDL	10
15V.	1 2-DICHLOROETHANE	BDL	10
16V.	1, 1-D1CHLOROETHYLENE	BDL	10
17V.	1, 2-DICHLOROPROPANE	BDL	10
18V.	1, 3-DICHLOROPROPYLENE	BDL	10
19V.	ETHYLBENZENE	BDL	10
20V.	METHYL BROMIDE	BDL	10
21V.	METHYL CHLORIDE	BDL	10
22V.	METHYLENE CHLORIDE	11*	10
23V.	1,1,2,2-TETRACHLOROETHANE	BDL	10
24V.	TETRACHLOROETHYLENE	BDL	10
25V.	TOLUENE	82*	10
26V.	1, 2-TRANS-D1CHLOROETHYLENE	BDL	10
27V.	1, 1, 1-TRICHLOROETHANE	BDL	10
28V.	1, 1, 2-TRICHLOROETHANE	BDL	10
29V.	TRICHLOROETHYLENE	BDL	10
30V.	TRICHLOROFLUOROMETHANE	BDL	10
31V.	VINYL CHLORIDE	BDL	10

ACID EXTRACTABLE ORGANICS

1A.	2-CHLOROPHENOL	BDL	25
2A.	2, 4-DICHLOROPHENOL	BDL	25
3A.	2, 4 DIMETHYLPHENOL	BDL	25
4A.	4, 6-DINITRO-O-CRESOL	BDL	250
5A.	2, 4-DINITROPHENOL	BDL	250
6A.	2-NITROPHENOL	BDL	25
7A.	4-NITROPHENOL	BDL	25
8A.	P-CHLORO-M-CRESOL	BDL	25
9A.	PENTACHLOROPHENOL	BDL	25
10A.	PHENOL	BDL	25
11A.	2, 4, 6-TRICHLOROPHENOL	BDL	25

*BDL = BELOW DETECTION LIMIT

Leachables

<u>NUMBER</u>	<u>BASE-NEUTRAL EXTRACTABLE ORGANICS</u>	<u>CONCENTRATION (UG/L)</u>	<u>DETECTION LIMIT (UG/L)</u>
1B.	ACENAPHTHENE	BDL	100
2B.	ACENAPHTHYLENE	BDL	100
3B.	ANTHRACENE	BDL	10
4B.	BENZIDINE	BDL	10
5B.	BENZO (A) ANTHRACENE	BDL	10
6B.	BENZO (A) PYRENE	BDL	10
7B.	3,4-BENZOFLUORANTHENE	BDL	10
8B.	BENZO (GHI) PERYLENE	BDL	25
9B.	BENZO (K) FLUORANTHENE	BDL	10
10B.	BIS (2-CHLOROETHOXY) METHANE	BDL	13
11B.	BIS (2-CHLOROETHYL) ETHER	BDL	10
12B.	BIS (2-CHLOROISOPROPYL) ETHER	BDL	10
13B.	BIS (2-ETHYLHEXYL) PHTHALATE	BDL	10
14B.	4-BROMOPHENYL PHENYL ETHER	BDL	10
15B.	BUTYL BENZYL PHTHALATE	BDL	10
16B.	2-CHLORONAPHTHALENE	BDL	10
17B.	4-CHLOROPHENYL PHENYL ETHER	BDL	10
18B.	CHRYSENE	BDL	10
19B.	DIBENZO (A,H) ANTHRACENE	BDL	25
20B.	1,2-DICHLOROBENZENE	BDL	10
21B.	1,3-DICHLOROBENZENE	BDL	10
22B.	1,4-DICHLOROBENZENE	BDL	10
23B.	3,3-DICHLOROBENZIDINE	BDL	10
24B.	DIETHYL PHTHALATE	BDL	10
25B.	DIMETHYL PHTHALATE	BDL	10
26B.	DI-N-BUTYL PHTHALATE	BDL	10
27B.	2,4-DINITROTOLUENE	BDL	10
28B.	2,6-DINITROTOLUENE	BDL	10
29B.	DI-N-OCTYL PHTHALATE	BDL	10
30B.	1,2-DIPHENYLHYDRAZINE	BDL	10
31B.	FLUORANTHENE	BDL	10
32B.	FLUORENE	BDL	10
33B.	HEXACHLORDBENZENE	BDL	10
34B.	HEXACHLOROBUTADIENE	BDL	10
35B.	HEXACHLOROCYCLOPENTADIENE	BDL	10
36B.	HEXACHLOROETHANE	BDL	10
37B.	INDENO (1,2,3-CD) PYRENE	BDL	25
38B.	ISOPHORONE	BDL	10
39B.	NAPHTHALENE	BDL	10
40B.	NITROBENZENE	BDL	10
41B.	N-NITROSODIMETHYLAMINE	BDL	10
42B.	N-NITROSODI-N-PROPYLAMINE	BDL	10
43B.	N-NITROSODIPHENYLAMINE	BDL	10
44B.	PHENANTHRENE	BDL	10
45B.	PYRENE	BDL	10
46B.	1,2,4-TRICHLOROBENZENE	BDL	10
LIMIT		*BDL = BELOW	DETECTION

Leachables

<u>NUMBER</u>	<u>PESTICIDES/PCB-S</u>	<u>CONCENTRATION (UG/L)</u>	<u>DETECTION LIMIT (UG/L)</u>
1P.	ALDRIN	BDL	10
2P.	ALPHA-BHC	BDL	10
3P.	BETA-BHC	BDL	10
4P.	GAMMA-BHC	BDL	10
5P.	DELTA-BNC	BDL	10
6P.	CHLORDANE	BDL	10
7P.	4,4-DDT	BDL	10
8P.	4,4-DDE	BDL	10
9P.	4,4-DDD	BDL	10
IOP.	DIELDRIN	BDL	13
11P.	ALPHA-ENDOSULFAN	BDL	10
12P.	BETA-ENDOSULFAN	BDL	10
13P.	ENDOSULFAN SULFATE	BDL	10
14P.	ENDRIN	BDL	10
15P.	ENDRIN ALDEHYDE	BDL	10
16P.	HEPTACHLOR	BDL	10
17P.	HEPTACHLOR EPOXIDE	BDL	10
18P.	PCB-1242	BDL	10
19P.	PCB-1254	BDL	10
20P.	PCB-1221	BDL	10
21P.	PCB-1232	BDL	10
22P.	PCB-1248	BDL	10
23P.	PCB-1260	BDL	10
24P.	PCB-1016	BDL	10
25P.	TOXAPHENE	BDL	10

*BDL= BELOW DETECTION

LIMIT

* Note: According to the testing laboratory, the presence of methylene chloride is likely the result of laboratory contamination and toluene is likely the result of contamination from the paint markings on the outside of the pipe.