



## Product Test Report

**PTR-4188**

Swagelok Hose Services Company  
29500 Solon Road  
Solon, Ohio 44139 U.S.A.

Ver 01  
May 2017  
Page 1 of 2

### TITLE

ISO 10380:2012 Cyclic Lifetime, Dynamic Bend Radius Testing of Swagelok® FX Series Metal Flexible Hose Assemblies

### PRODUCT TESTED

Six assemblies each of 1/4 in., 3/8 in., 1/2 in., 3/4 in., 1 in., 1 1/4 in., 1 1/2 in., and 2 in. Swagelok FX series high-pressure metal hose assemblies were tested according to ISO 10380:2012 test methods.

### PURPOSE

The hose assemblies were tested according to ISO 10380:2012, for cycle life, dynamic bend radius cycle performance. Testing was done under laboratory conditions.

### TEST CONDITIONS

Room temperature laboratory environment  
Test fluid: water  
Flex cycle rate: 30 cycles per minute  
Stroke: 5 in. (127 mm)

Hose Series	Assembly Live Length in. (mm)	Assembly Bend Radius in. (mm)	Proof Test Pressure – 1.5 x Maximum WP psig (bar)	Dynamic Bend Radius Test Pressure – 1.0 x Maximum WP psig (bar)
<b>FX4</b>	27.0 (686)	5.5 (140)	9000 (620)	6000 (413)
<b>FX6</b>	33.0 (838)	7.0 (178)	7500 (516)	5000 (344)
<b>FX8</b>	37.0 (940)	8.0 (203)	6750 (465)	4500 (310)
<b>FX12</b>	45.0 (1140)	10.0 (254)	5400 (372)	3600 (248)
<b>FX16</b>	49.0 (1240)	11.0 (279)	4500 (310)	3000 (206)
<b>FX20</b>	55.0 (1400)	12.5 (318)	3900 (268)	2600 (179)
<b>FX24</b>	57.0 (1450)	13.0 (330)	3300 (227)	2200 (151)
<b>FX32</b>	61.0 (1550)	14.0 (356)	2512 (173)	1675 (115)

**Table 1: Test Parameters**

### TEST METHOD

- Hoses were proof-pressure tested with water to 1.5 x working pressure (WP) for 5 minutes, to verify they were leak-tight.
- Hoses were installed into the flex test rig with a vertical loop (U shaped) configuration.
  - The distance between the two hose end connections was set to 2 x the bend radii listed in Table 1.
  - One end of the hose was held fixed while the other cycled up and down 5 in. (127 mm) from the original position.
- The hoses were pressurized with water to test 1.0 x maximum WP listed in Table 1, then cycled until leakage and/or braiding failure occurred, or at least 10 000 cycles.



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Page 2 of 2

### TEST RESULTS

#### Proof Pressure Test

Hose Type and Size	Test Pressure psig (bar)	Hoses Passing 5 Minute Proof Pressure Test
FX4	9000 (620)	6/6
FX6	7500 (517)	6/6
FX8	6750 (465)	6/6
FX12	5400 (372)	6/6
FX16	4500 (310)	6/6
FX20	3900 (268)	6/6
FX24	3300 (227)	6/6
FX32	2512 (173)	6/6

#### Dynamic Bend Radius Test

Hose Type and Size	Hose Live Length in. (mm)	Bend Radius in. (mm)	Test Pressure psig (bar)	Hoses Attaining at Least 10 000 Cycles
FX4	27.0 (686)	5.5 (140)	6000 (413)	6/6
FX6	33.0 (838)	7.0 (178)	5000 (344)	6/6
FX8	37.0 (940)	8.0 (203)	4500 (310)	6/6
FX12	45.0 (1140)	10.0 (254)	3600 (248)	6/6
FX16	49.0 (1240)	11.0 (279)	3000 (206)	6/6
FX20	55.0 (1400)	12.5 (318)	2600 (179)	6/6
FX24	57.0 (1450)	13.0 (330)	2200 (151)	6/6
FX32	61.0 (1550)	14.0 (356)	1675 (115)	6/6

The test results for FX4, FX6, FX8, FX12, FX16, FX20, FX24, and FX32 meet or exceed ISO 10380:2012 fatigue test standard cycle life.

This test was performed to consider a specific set of conditions and should not be considered valid outside those conditions. Swagelok Company makes no representation or warranties regarding these selected conditions or the results attained there from. Laboratory tests cannot duplicate the variety of actual operating conditions. Test results are not offered as statistically significant. See the product catalog for technical data.

#### SAFE PRODUCT SELECTION

When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

#### Referenced Documents

ISO 10380:2012, *Corrugated Metal Hoses and Hose Assemblies*, International Organization for Standardization, 1, ch. De la Voie-Creuse, Case postale 56, CH-1211 Geneva 20, Switzerland.