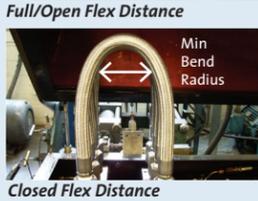


For more than four decades, Saint-Gobain Performance Plastics and its family of companies have supplied the world with innovative, high-performance polymer products for the most demanding applications. Our tradition of excellence goes back more than 300 years through our parent company, Compagnie de Saint-Gobain, one of the world's top 100 industrial corporations, with operations in more than 40 countries. This successful corporation has been built with the single purpose of serving the customer and a commitment to quality and leadership in each of the industries served.



Saint-Gobain Performance Plastics
460 Milltown Road
Bridgewater, NJ 08807
1-800-435-3992
www.flexiblecomponents.com

FlexPro™ Service Life Flex Cycle Impulse Test



The test evaluates properties affecting a hose assembly. Hose assemblies are typically affected by pressure, temperature, flexing and pressure pulsing of the application. The pulsing part of the application can significantly impact the performance of the assembly because the pressure pulse, although brief, is often significantly higher than the steady state pressure of the system.

The test applies pulsating pressure internally to the hose assembly while flexing the assembly from an open to a closed position. Impulse test parameters are based on SAE J343. Pressure impulse is cycled from 0 PSI to test pressure approximately 30 times/minute. Flexing is a 180° bend, which reduces the bend to the minimum bend radius. Flexing occurs between 5 and 15 cycles/minute. Fluid temperature is maintained at a constant level.

No failure was observed before testing was terminated.

High Temperature 250°F, 400 PSI		Room Temperature 91°F, 400 PSI	
Impulse Cycles	Flex Cycles	Impulse Cycles	Flex Cycles
750,000	125,000	500,000	250,000

Permeation Test

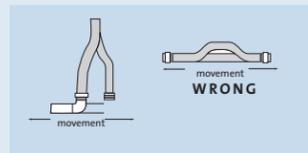
Permeation is a natural property of fluoropolymers. The gas permeation test is designed to quantify the volume of gas that may pass through the wall of the hose for specified pressure, temperature and time. A small molecule, such as nitrogen, is used during the test, which consists of a pressurized hose being held under water for extended periods of time (typically 24-72 hours); the permeated gas is collected. The volume of gas collected can be divided by the time and length of the hose to normalize the data and yield volume/foot/hour data results.

FlexPro™ was tested according to this procedure and showed a result of 3.322 ml/ft/hour (10.899 ml/m/hour).

Helpful Installation Tips



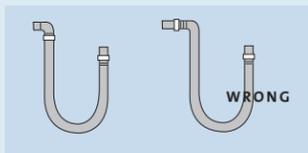
Restrict movement to a single plane



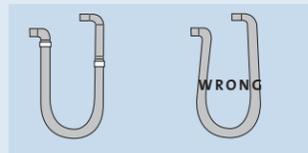
Eliminate axial movement
No stretching or compression



Minimize twisting (torque)



Avoid severe bends
Use 45° or 90° elbows



Never use hose below minimum bend radius

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NOTE: Saint-Gobain Performance Plastics Corporation does not assume any responsibility or liability for any advice furnished by it, or for the performance or results of any installation or use of the product(s) or of any final product into which the product(s) may be incorporated by the purchaser and/or user. The purchaser and/or user should perform its own tests to determine the suitability and fitness of the product(s) for the particular purpose desired in any given situation.



FlexPro™

A True Smooth Bore Flexible Chemfluor® PTFE Fluoropolymer Hose

FlexPro™ delivers maximum flexibility and best-in-class performance in the most demanding process environments. FlexPro™ is the only hose on the market that delivers the flexibility you desire and the smooth inner bore you demand — flexible enough to accommodate the tightest installations with an extremely, smooth Chemfluor® PTFE inner tube surface.



FlexPro™ — A True Smooth Inner Bore Flexible PTFE Fluoropolymer Hose

Features & Benefits

- Precisely engineered for true smooth bore ID with convoluted hose flexibility
- Extremely smooth ID surface for unimpeded flow with no particle entrapment
- Reduced force to bend for easy handling
- Reduced minimum bend radius for versatile flexible connections

- Choice of platinum-cured silicone or EPDM cover, with color options to prevent cross contamination.
- SaniSeal™ tracking system for accurate traceability
- High pressure rating for resilient performance
- Sterilizable for high purity
- Steamable for low TOCs and extractables

- Autoclavable to meet the highest sanitary standards
- Full vacuum rating for critical applications
- Chemfluor® PTFE fluoropolymer liner imparts no taste or odor
- Highly chemical resistant to handle the most aggressive materials
- Patent pending

Typical Applications

- Skid transfer
- Pumping station/portable pumps
- Vessel or tank transfer
- Transfer lines
- Rail car loading or unloading
- WFI use point drops
- Clean steam drops
- Isolation from tanks on load cells
- Bioreactors process

- Bioreactors utility
- Process UF and chromo skids
- CIP skids
- Portable skids
- Finish fill process
- Finish fill SIP
- Rotary filling machines
- Fermentation transfer vessels
- Steam applications
- Food and beverage sanitary transfers

- **TEMPERATURE**
-100° F to +450° F

- **CONSTRUCTION**
Inner Tube: Chemfluor® PTFE fluoropolymer smooth bore
Reinforcement: High tensile 304 stainless steel mechanical braid or 316 stainless steel braid

- **INDUSTRY APPROVALS**
FDA
USP Class VI

FlexPro™ Series Hose Specifications

Nominal ID for Crimp Style (304 stainless steel mechanical braid)

P/N	Nominal Inside Diameter		Outside Diameter		Max Working Pressure		Min Burst Pressure		Min Bend Radius		Max Length (ft)		Vacuum Hg @ 70°F	
	in.	mm.	in.	mm.	PSI	Mpa	PSI	Mpa	in.	mm.	ft.	m.	in.	mm.
12FLP*	3/4	19.1	1-1/8	34.9	1000	6.9	4000	27.6	2	50.8	12	3.7	29.9	760
16FLP	1	25.4	1-3/8	34.9	1000	6.9	4000	27.6	2-1/4	57.2	12	3.7	29.9	760
24FLP	1-1/2	38.1	1-7/8	47.6	700	4.8	2800	19.3	4-1/2	114.3	12	3.7	29.9	760
32FLP*	2	50.8	2-3/8	60.3	500	3.5	2000	13.8	7	177.8	12	3.7	29.9	760

Tube Size for Flare-Thru (316 stainless steel braid)

14FLP	7/8	22.2	1-1/4	31.8	400	2.76	1600	11.03	2-1/4	57.2	12	3.7	29.9	760
22FLP*	1-3/8	34.9	1-3/4	44.5	300	2.07	1200	8.27	4-1/2	114.3	12	3.7	29.9	760
30FLP*	1-7/8	47.6	2-1/4	57.2	240	1.66	960	6.62	7	177.8	12	3.7	29.9	760

*Coming soon.

Note: When using Flare-Thru technology, pressure rating is for hose only.

Cover Options



Color options for platinum-cured silicone cover:
• Standard — Clear
• Special — Green, Blue, Red, Purple



Color options for EPDM rubber cover:
• Standard — Grey
• Special — Green, Blue, Red, Purple

Fitting Options



PermaSeal®:
• Over 40 styles of PermaSeal® crimped fittings



Flare-Thru:
• Sanitary clamp style
• 1/8" available now
• Other sizes coming soon
• Consult factory for other fitting styles

SANIseal™ Tracking System

Saint-Gobain's SANIseal™ Tracking System is the most effective and economical way to identify and trace hoses. Our patented technology can customize tracking information and provide the most accurate tracking data, such as hose ID, lot number, etc., to meet the industry's needs for traceability. Patent No. 6,660,396.

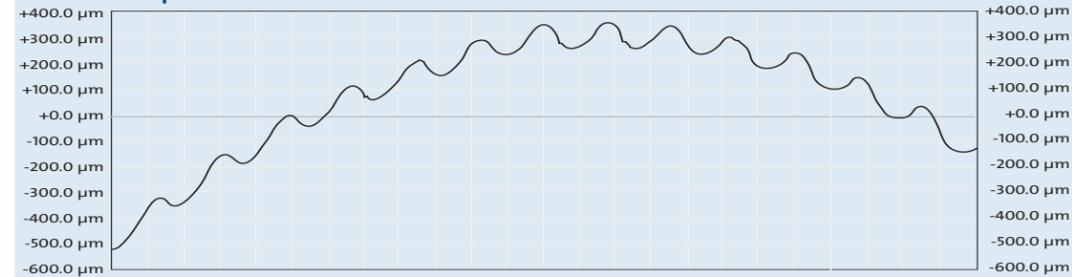


Critical Specifications Comparison

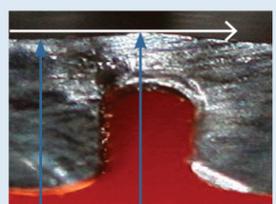
Inside Diameter	Max Working Pressure	Min Burst Pressure	Min Bend Radius	Temperature		Max Length		Vacuum Hg @ 70°F					
				in.	mm.	ft.	m.	in.	mm.				
FlexPro™													
3/4	19.1	1000	6.9	4000	27.6	2	50.8	-100 to +450	-73 to +232	12	8.7	29.9	760
1	25.4	1000	6.9	4000	27.6	2-1/4	57.2	-100 to +450	-73 to +232	12	3.7	29.9	760
1-1/2	38.1	700	4.8	2800	19.3	4-1/2	114.3	-100 to +450	-73 to +232	12	3.7	29.9	760
2	50.8	500	3.5	2000	13.8	7	177.8	-100 to +450	-73 to +232	12	3.7	29.9	760
Competitor A													
3/4	19.1	870	6.0	3480	24.0	2	50.8	-40 to +500	-40 to +260	66	20	29.9	760
1	25.4	750	5.2	3000	20.7	2-3/4	69.9	-40 to +500	-40 to +260	66	20	29.9	760
1-1/2	38.1	600	4.1	2400	16.6	5-1/2	139.7	-40 to +500	-40 to +260	56	17	29.9	760
2	50.8	450	3.1	1800	12.4	8	203.2	-40 to +500	-40 to +260	33	10.1	29.9	760

Inside Diameter Surface Roughness Comparison/Profilometer Graphs

Competitor A ID Surface Profilometer Graph



ID Surface Exploded View Between 2 Pitches

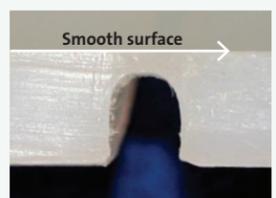


Peak — highest point
Valley — lowest point

FlexPro™ ID Surface Profilometer Graph (as 1/10 of Competitor A Graph)



ID Surface Exploded View Between 2 Pitches



Smooth surface

Inside Diameter Surface Roughness Comparison/Numerical Data

Sample	Scan Location	Scan L (mm)	Ra (µm)	Rp (µm)	Rv (µm)	Rt (µm)	Rz Din (µm)
FlexPro	Longitudinal ID	49.5	0.1731	1.3804	1.9585	3.267	1.0699
Competitor A	Longitudinal ID	48.8	1.6038	6.7278	10.711	17.438	5.7084

Tube ID Measurement Test Method:

Surface roughness analysis is performed using a Taylor Hobson FormTally-surf Contact profilometer. A 10 µm diamond stylus was used to measure scans longitudinally along the inside diameter at three parallel locations approximately 50mm in length. Each measurement was analyzed under two conditions. The raw data plot was reviewed to determine form and trough depth differences; the raw data was then analyzed for roughness using a Gaussian filter and an 0.8mm cutoff length to obtain Ra, Rv, Rp, and Rt values.

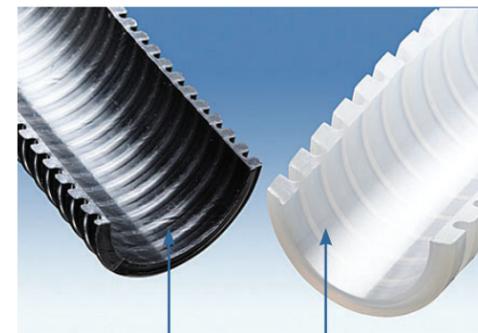
Terminology definitions (per ASME B46.1-1995):

Roughness Average (Ra) — the arithmetic average of the absolute values of the profile height deviations recorded within the evaluation length and measured from the mean line.

Maximum profile peak height (Rp) — the distance between the highest point of the profile and the mean line within the evaluation length.

Maximum profile valley height (Rv) — the distance between the lowest point of the profile and the mean line within the evaluation length.

Maximum height of the profile (Rt) — the vertical distance between the highest and lowest points of the profile within the evaluation length.



Competitor A

FlexPro™