



PTFE lined, flexible hoses for the automotive industry

- Excellent chemical resistance
- Wide temperature range
- Highly flexible
- Kink resistant
- High flow
- Long life





THE WORLD'S LEADING MANUFACTURER OF PTFE LINED FLEXIBLE HOSE

For more than 50 years, we have been producing the most technically advanced range of PTFE lined flexible hose products in the world.

From our headquarters in the UK, we design, develop and manufacture our hoses from raw materials to finished products. This comprehensive approach gives us an unrivalled ability to meet specific needs.

As part of Watson-Marlow Fluid Technology Solutions, our quality products are backed by a global network of specialist engineers. We partner with our customers who have standardised on our hose products as the most reliable choice for their fluid transfer applications.



Through 50 years of processing improvement and refinement, we are proud to deliver the highest quality smoothbore hoses on the market.



ULTRA-LOW PERMEATION
OPTIONS AVAILABLE

Aflex Hose products are created through a combination of expert engineering and material knowledge.

Lined with Polytetrafluoroethylene (PTFE), our hoses offer excellent chemical resistance and can withstand temperatures up to 260 °C. Their structure provides a smooth bore allowing for a fast, laminar flow. Thermally forming a spiral convolution on the external surface of the PTFE liner dramatically improves flexibility and permeation rate (Hyperline FX), whilst adding a 316SS helical wire, wound directly into the route of the convolution adds kink resistance (Hyperline KR). PTFE is proven to outperform rubber, silicone and alternative plastic hoses and tubes in similar applications. Hoses are constructed without the use of adhesives, eliminating the risk of contamination and delamination of layers.

- Highly flexible and kink resistant
- Available with either natural or anti-static patented PTFE liner
- Industry leading 24 month warranty
- No adhesives in hose manufacture, eliminates the risk of contamination
- Up to 32mm bore and hose lengths of up to 200 metres

24
Month
MANUFACTURER'S
GUARANTEE

IATF 16949:2016
ISO 9001:2015
ISO 14001:2015
ISO 45001:2018
EN 9100:2018
SAE J1737

-0.9 Bar
USABLE AT
VACUUM FOR
All sizes

PTFE
will outperform
RUBBER
SILICONE
STAINLESS STEEL

Hyperline KR

Hyperline KR sets the standard for PTFE lined hose solutions for automotive applications.

- The ultimate flexible solution
- Internally smooth for fast laminar flow and system efficiency
- Externally convoluted for a high degree of flexibility
- Helically wound 316 stainless steel wire for added kink resistance and usable at vacuum up to -0.9 bar
- Resistant to temperatures from -150 °C to 260 °C



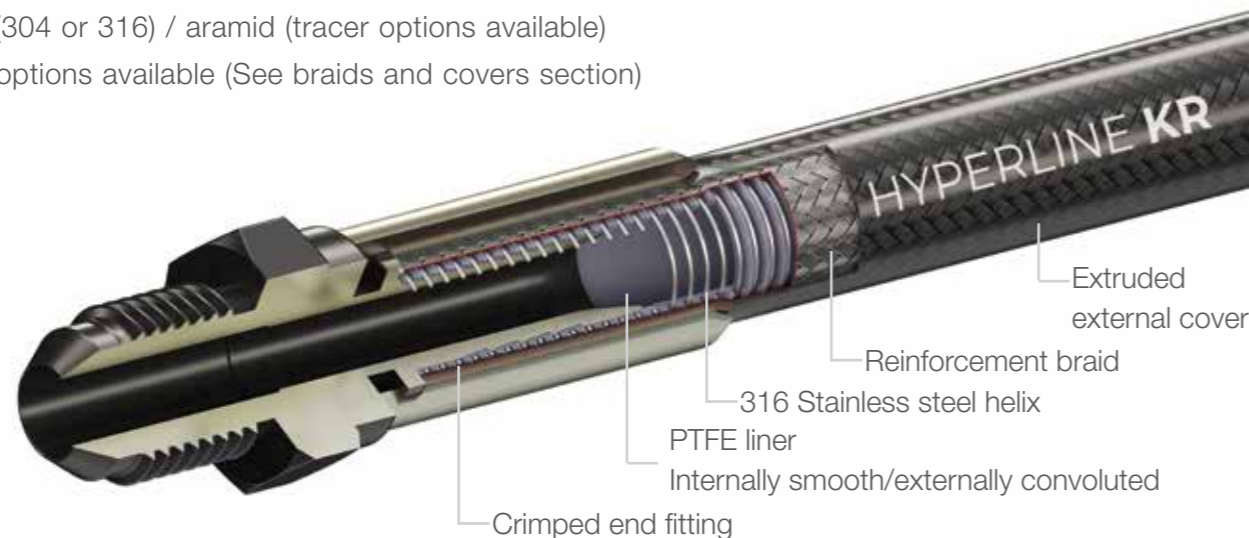
Hyperline KR construction

Design variations

Liner: AS or natural (ASTM D4895)

Braids: SS (304 or 316) / aramid (tracer options available)

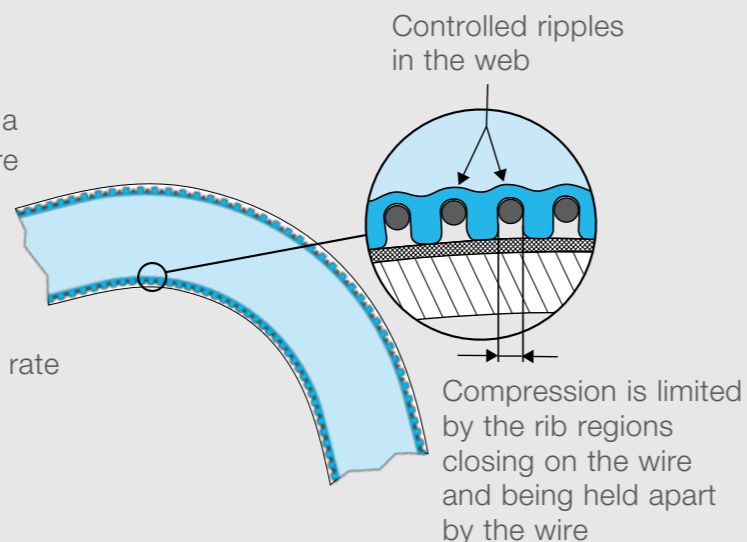
Covers: All options available (See braids and covers section)



Aflex Hose unique PTFE liner

The patented design of the PTFE liner used in Hyperline KR allows the liner to expand around the outside and compress around the inside of a bend. This helps to retain a smooth circular bore throughout the hose, without distortion.

- Natural or anti-static options
- No entrapment zones
- Minimal turbulence allows for increased flow rate
- Excellent internal cleanability
- Longer service life



Hyperline KR

Hose bore size		Actual bore size		**Hose construction	Outside diameter of tube or braid		Minimum bend radius		Maximum working pressure		Burst pressure		Weight per unit length		*Part number
in	dash size	in	mm		in	mm	in	mm	bar	psi	bar	psi	kg/m	lb/ft	
3/8	6	0.381 - 0.407	9.69 - 10.34	TO	0.475 - 0.511	12.06 - 12.98	1 3/8	35	10	145	30	435	0.06	0.04	86-100-06
		0.376 - 0.406	9.55 - 10.32	SS	0.502 - 0.542	12.75 - 13.77	3/4	19	140	2030	420	6091	0.14	0.09	86-100-06-01-01
		0.376 - 0.406	9.55 - 10.32	AM	0.515 - 0.555	13.08 - 14.10	3/4	19	140	2030	420	6091	0.10	0.15	86-100-06-01-55-01
1/2	8	0.518 - 0.544	13.17 - 13.83	TO	0.624 - 0.674	15.87 - 17.13	1 5/8	42	10	145	30	435	0.15	0.10	86-100-08
		0.502 - 0.529	12.77 - 13.43	SS	0.672 - 0.714	17.07 - 18.13	1 1/2	28	122	1769	367	5322	0.29	0.19	86-100-08-01-01
		0.506 - 0.533	12.87 - 13.53	AM	0.668 - 0.718	16.97 - 18.23	1 1/2	28	122	1769	367	5322	0.18	0.12	86-100-08-55-01
5/8	10	0.644 - 0.670	16.37 - 17.03	TO	0.766 - 0.816	19.47 - 20.73	1 3/4	45	10	145	30	435	0.17	0.11	86-100-10
		0.629 - 0.655	15.97 - 16.63	SS	0.826 - 0.867	20.97 - 22.03	1 1/4	32	113	1638	341	4945	0.35	0.23	86-100-10-01-01
		0.644 - 0.670	16.37 - 17.03	AM	0.826 - 0.875	20.97 - 22.23	1 1/4	32	113	1638	341	4945	0.26	0.17	86-100-10-55-01
3/4	12	0.774 - 0.804	19.67 - 20.43	TO	0.904 - 0.958	22.97 - 24.33	2 1/8	53	10	145	30	435	0.20	0.13	86-100-12
		0.751 - 0.785	19.07 - 19.93	SS	0.956 - 1.005	24.27 - 25.53	1 1/2	35	105	1522	315	4568	0.40	0.27	86-100-12-01-01
		0.774 - 0.804	19.67 - 20.43	AM	0.963 - 1.017	24.47 - 25.83	1 1/2	35	105	1522	315	4568	0.31	0.20	86-100-12-55-01
7/8	14	0.861 - 0.891	21.87 - 22.63	TO	1.006 - 1.060	25.57 - 26.93	2 1/2	63	10	145	30	435	0.34	0.23	86-100-14
		0.853 - 0.887	21.67 - 22.53	SS	1.066 - 1.115	27.07 - 28.33	1 5/8	40	96	1392	288	4177	0.60	0.40	86-100-14-01-01
		0.861 - 0.891	21.87 - 22.63	AM	1.066 - 1.119	27.07 - 28.43	1 5/8	40	96	1392	288	4177	0.41	0.27	86-100-14-55-011
1	16	1.026 - 1.046	26.07 - 26.57	TO	1.187 - 1.241	30.17 - 31.53	3	77	10	145	30	435	0.36	0.24	86-100-16
		1.003 - 1.036	25.47 - 26.33	SS	1.231 - 1.273	31.27 - 32.33	2	50	87	1261	262	3799	0.63	0.42	86-100-16-01-01
		1.015 - 1.041	25.77 - 26.43	AM	1.247 - 1.300	31.67 - 33.03	2	50	87	1261	262	3799	0.50	0.33	86-100-16-55-01
1 1/4	20	1.282 - 1.312	32.57 - 33.33	TO	1.471 - 1.525	37.37 - 38.73	3 7/8	98	10	145	30	435	0.45	0.30	86-100-20
		1.270 - 1.304	32.27 - 33.13	SS	1.530 - 1.580	38.87 - 40.13	2 7/8	70	78	1131	236	3422	0.85	0.57	86-100-20-01-01
		1.267 - 1.300	32.17 - 33.02	AM	1.519 - 1.568	38.57 - 39.83	2 7/8	70	78	1131	236	3422	0.74	0.50	86-100-20-01-55-01

* For anti-static grade, add 10 to the 3-digit part number e.g. 86-100- becomes 86-110.

**Hose construction - (TO) tube only, (SS) stainless steel, (AM) aramid.

The performance testing results stated in the above table have been carried out at ambient temperature, in a controlled laboratory environment, using water as the media. We recommend that the customer carries out stringent application performance testing on the hose, using the actual working conditions over a set period of time to validate the hose.

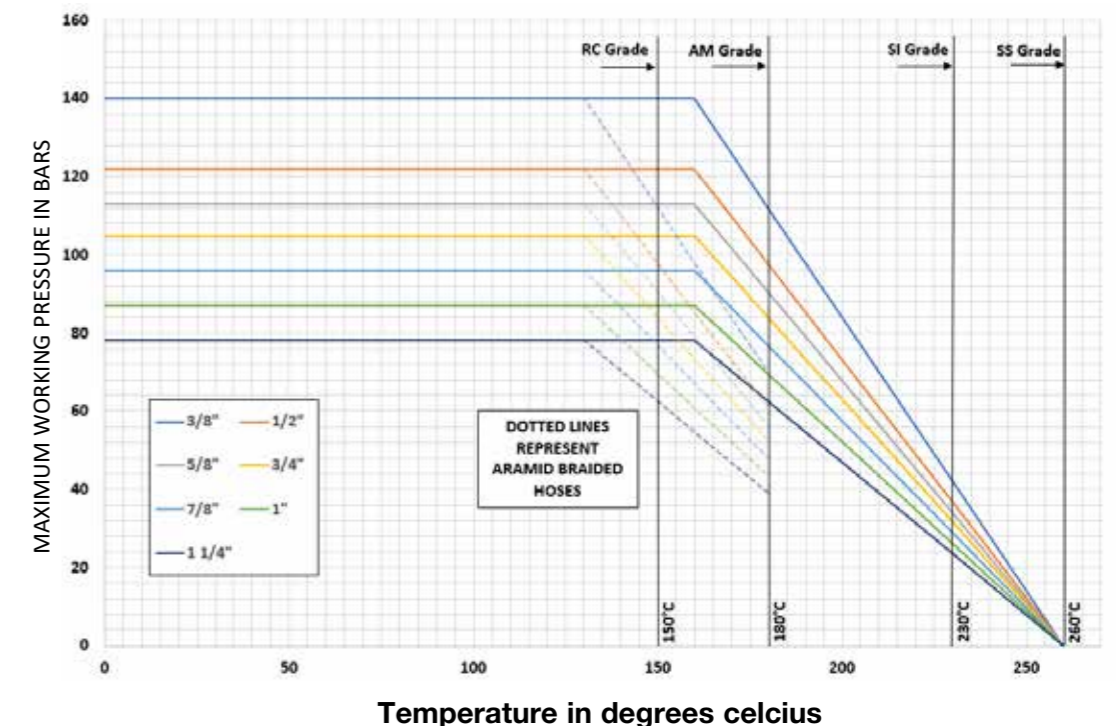
Temperature vs pressure

Due to its extremely strong construction, Hyperline KR has outstanding resistance to temperature and pressure, much higher than that of conventional convoluted PTFE lined hose.

Maximum working pressure (MWP) variation with temperature

Temperature and pressure limitations for the various sizes and specification variations of Hyperline KR is depicted on the graph.

Temperature and maximum working pressure graph for Hyperline KR



Hyperline FX

Hyperline FX hose consists of a smooth internal bore to eliminate turbulent flow and external convolutions to provide excellent flexibility.

- Excellent flow rates
- Non-stick internal surface
- Resistant to temperatures from -150 °C to 260 °C
- Usable at vacuum up to -0.9bar
- Thermally formed liner reduces diffusion rates



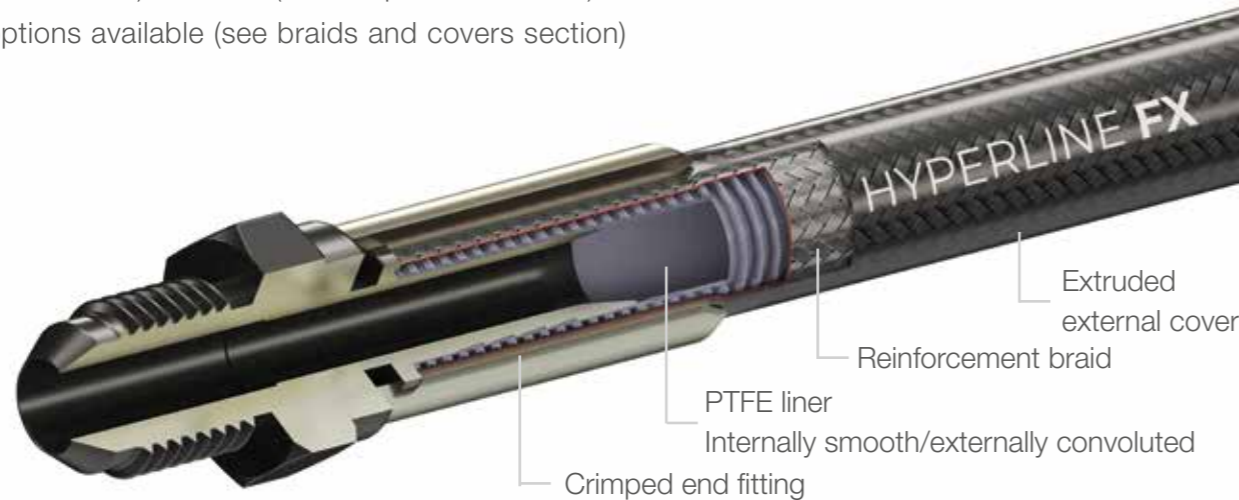
Hyperline FX construction

Design variations

Liner: AS or natural (ASTM D4895)

Braids: SS (304 or 316) / aramid (tracer options available) / PPS

Covers: All options available (see braids and covers section)



The Hyperline range - PTFE lined hose engineered for efficiency

Smooth bore for fluid system efficiency

All liners within the Hyperline range have a smooth internal bore. PTFE possesses low friction properties and creates the perfect conditions to maximise media flow rates and efficiency within a variety of systems.

Unique liner design to maximise routing efficiency

With increased flexibility, much tighter minimum bend radius (MBR) and kink resistance, Hyperline KR and FX have allowed automotive design engineers to reduce their application footprint by routing pipework through the most efficient path without compromising on performance.

The length of flexible section (live length) can be shortened to achieve the same degree of flexibility, further reducing the overall cost of the assembly.



Hyperline FX

Hose bore size	dash size	Actual bore size		**Hose construction	Outside diameter of tube or braid		Minimum bend radius		Maximum working pressure		Burst pressure		Weight per unit length		*Part number
		in	mm		in	mm	in	mm	bar	psi	bar	psi	kg/m	lb/ft	
¼	4	0.252 - 0.278	6.39 - 7.06	TO	0.326 - 0.368	8.28 - 9.35	1 ½	38	6	87	18	261	0.041	0.027	92-100-04
		0.250 - 0.280	6.34 - 7.12	SS	0.355 - 0.395	9.02 - 10.04	¾	19	110	1595	330	4786	0.092	0.062	92-100-04-01-02
		0.250 - 0.280	6.35 - 7.12	AM	0.360 - 0.400	9.14 - 10.16	1 ½	38	77	1116	231	3350	0.056	0.038	92-100-04-01-55-01
⅜	5	0.308 - 0.333	7.84 - 8.46	TO	0.382 - 0.424	9.72 - 10.77	1 ½	38	6	87	18	261	0.056	0.037	92-100-05
		0.302 - 0.328	7.66 - 8.33	SS	0.424 - 0.458	10.77 - 11.63	¾	19	105	1522	315	4569	0.126	0.084	92-100-05-01-02
		0.290 - 0.320	7.36 - 8.13	AM	0.440 - 0.480	11.17 - 12.19	1 ½	38	74	1073	222	3220	0.075	0.050	92-100-05-01-55-01
½	6	0.381 - 0.407	9.69 - 10.34	TO	0.475 - 0.511	12.06 - 12.98	2	50	6	87	18	261	0.070	0.047	92-100-06
		0.376 - 0.406	9.54 - 10.32	SS	0.502 - 0.542	12.75 - 13.64	1	25	100	1450	300	4351	0.160	0.151	92-100-06-01-02
		0.376 - 0.406	9.55 - 10.32	AM	0.515 - 0.555	13.08 - 14.10	2	50	70	1015	210	3046	0.100	0.094	92-100-06-01-55-01
¾	8	0.525 - 0.550	13.33 - 13.97	TO	0.620 - 0.668	15.77 - 16.97	3	76	6	87	18	261	0.110	0.074	92-100-08
		0.515 - 0.545	13.07 - 13.85	SS	0.655 - 0.695	16.64 - 17.66	1 ½	38	75	1087	225	3263	0.225	0.151	92-100-08-01-02
		0.515 - 0.545	13.08 - 13.85	AM	0.655 - 0.695	16.64 - 17.66	3	76	52	754	156	2263	0.140	0.094	92-100-08-01-55-01
1	10	0.639 - 0.665	16.25 - 16.89	TO	0.770 - 0.811	19.55 - 20.60	4	100	6	87	18	261	0.161	0.108	92-100-10
		0.635 - 0.665	16.12 - 16.89	SS	0.810 - 0.850	20.57 - 21.59	2	50	62	899	186	2698	0.336	0.226	92-100-10-01-02
		0.635 - 0.665	16.13 - 16.89	AM	0.815 - 0.855	20.70 - 21.72	4	100	44	638	132	1915	0.204	0.137	92-100-10-01-55-01
1 ¼	12	0.765 - 0.795	19.42 - 20.20	TO	0.895 - 0.941	22.73 - 23.90	5	126	6	87	18	261	0.179	0.120	92-100-12
		0.760 - 0.790	19.30 - 20.07	SS	0.950 - 0.990	24.13 - 25.15	2 ½	63	52	754	156	2263	0.383	0.257	92-100-12-01-02
		0.760 - 0.790	19.30 - 20.07	AM	0.946 - 0.986	24.03 - 25.05	5	126	36	522	108	1566	0.236	0.158	92-100-12-01-55-01
1 ½	16	1.015 - 1.045	25.77 - 26.55	TO	1.165 - 1.215	29.58 - 30.86	6	150	6	87	18	261	0.268	0.180	92-100-16
		1.005 - 1.035	25.52 - 26.29	SS	1.227 - 1.269	31.15 - 32.23	3	75	50	725	150	2176	0.540	0.362	92-100-16-01-02
		1.005 - 1.035	25.52 - 26.29	AM	1.233 - 1.273	31.32 - 32.34	6	150	35	507	105	1523	0.354	0.237	92-100-16-01-55-01

*For anti-static grade, add 10 to the 3-digit part number e.g. 92-100- becomes 92-110.

**Hose construction - (TO) tube only, (SS) stainless steel, (AM) aramid.

The performance testing results stated in the above table have been carried out at ambient temperature, in a controlled laboratory environment, using water as the media. We recommend that the customer carries out stringent application performance testing on the hose, using the actual working conditions over a set period of time to validate the hose.

Temperatures and pressures

Hyperline FX, SS grades - The MWP listed above should be reduced by 1% for each 1 °C above 160 °C (1% for each 1.8 °F above 320 °F) up to a maximum of 260 °C (500 °F).

Hyperline FX, AM Grades - The MWP listed above should be reduced by 1% for each 1 °C above 130 °C (1% for each 1.8 °F above 266 °F) up to a maximum of 180 °C (356 °F).

MWP listed are calculated on the basis of a 3:1 safety factor relative to the burst pressure, so burst pressure = 3 x MWP. If MWP is required based on a 4:1 safety factor (e.g. EN 16643 requirement), multiply the listed value by 0.75.

Vacuum resistance

Hyperline FX, SS grades are usable at vacuum up to -0.9bar up to 150 °C (300 °F).

Excellent flow rates

Compared with conventional convoluted hose designs, Hyperline FX has excellent flow rates due to the smooth bore, which prevents the turbulent fluid flow which occurs in convoluted hose products.

Reduced diffusion rates

Hyperline FX is much more resistant to diffusion of liquids or gases than other PTFE hose products, due to its highly compressed, non-porous PTFE matrix. Hyperline FX has been successfully tested to SAE J1737 for resistance to automotive fuel diffusion.

Non-stick internal surface

Hyperline FX hose has a smooth bore, non-stick liner which is effectively self-cleaning, and which resists material build-up inside the hose which may cause bore constriction.

Hyperline SB

Hyperline SB consists of a PTFE liner that has smooth internal and external surfaces.

- Smooth internal and external surfaces
- High pressure solutions
- High quality extrusion
- Exceptionally tight tolerances
- Ultra high pressure and low permeation liner options available upon request



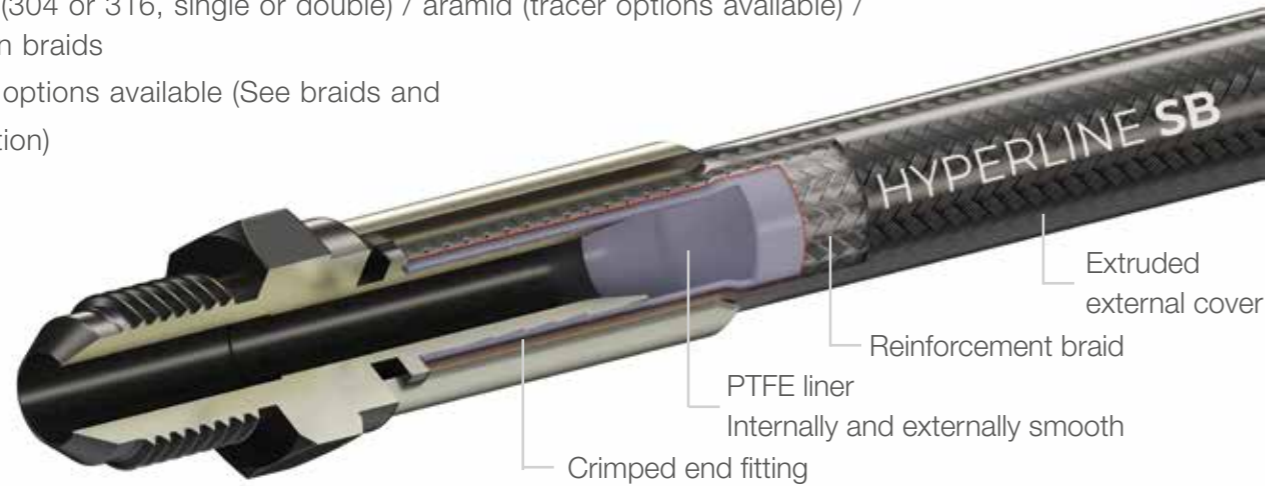
Hyperline SB construction

Design variations

Liner: AS or natural (ASTM D4895)

Braids: SS (304 or 316, single or double) / aramid (tracer options available) / combination braids

Covers: All options available (See braids and covers section)



High pressure Smoothbore hose grades

There are many different applications for PTFE lined Smoothbore hose which are subjected to high pressures in service, and each application has its own individual set of requirements.

Aflex Hose is able to provide different specifications for high pressure hoses that are custom designed for particular applications or testing procedures where pressures exceed 100 Bar (1500 psi) for gases, or the listed maximum pressures for fluids.

Aramid fibre braid - A black Aramid fibre named "Technora", which is a high technology fibre, with tensile, abrasion and temperature properties significantly better than the older Aramid products like Kevlar.

Stainless steel braid - Braided from AISI grade 304 stainless steel wire, bright hard drawn to a minimum 1700 N/mm² tensile strength. The braiding process is closely controlled to ensure even tensions and the correct braid angle, to give minimum expansion/contraction under pressure.

The custom design will include the size, wall thickness and quality of the PTFE tube and the precise design of the braid, all optimised for the particular application. Please consult Aflex Hose for further advice.

Hyperline SB

Hose bore size		Actual bore size		PTFE tube wall thickness		Outside diameter of the stainless steel braid		Minimum bend radius		Working pressure (MWP)		Weight per unit length		*Part number
in	Dash size	in	mm	in	mm	in	mm	in	mm	Bar	Psi	kg/m	lb/ft	
1/16 BB	2 (TW 3 Ends)	0.068 - 0.091	1.75 - 2.31	0.028	0.71	0.151 - 0.168	3.85 - 4.27	3/4	20	350	5076	0.043	0.029	70-615-02-01s-02
1/16 BB	2	0.068 - 0.091	1.75 - 2.31	0.04	1.02	0.191 - 0.208	4.87 - 5.29	1/2	13	450	6500	0.045	0.030	70-300-02-01-02
7/64	2.5	0.096 - 0.114	2.44 - 2.90	0.04	1.02	0.209 - 0.229	5.31 - 5.82	3/4	17	375	5438	0.059	0.040	70-310-025-01-02
1/8"	3 (MW 3 Ends)	0.113 - 0.131	2.87 - 3.33	0.027	0.68	0.203 - 0.226	5.17 - 5.73	3/4	20	280	4061	0.050	0.033	70-331-03-01-02
1/8"	3 (HW 3 Ends)	0.130 - 0.146	3.30 - 3.71	0.0375	0.95	0.241 - 0.260	6.14 - 6.61	3/4	20	290	4206	0.060	0.040	70-300-03-01s-02
1/8"	3 (HW 4 Ends)	0.130 - 0.146	3.30 - 3.71	0.0375	0.95	0.241 - 0.263	6.14 - 6.68	3/4	20	350	5076	0.070	0.050	70-300-03-01-02
1/8"	3 (TW 3 Ends)	0.130 - 0.146	3.30 - 3.71	0.026	0.66	0.217 - 0.238	5.53 - 6.05	3/4	20	290	4206	0.050	0.033	70-600-03-01s-02
3/16 BB	4	0.195 - 0.213	4.95 - 5.41	0.030	0.76	0.300 - 0.324	7.62 - 8.23	1 1/4	45	290	4206	0.078	0.052	70-400-03-01-02
1/4 BB	5	0.260 - 0.280	6.60 - 7.11	0.030	0.76	0.362 - 0.386	9.19 - 9.81	2 3/8	60	240	3480	0.110	0.074	70-400-04-01-02
5/16 BB	6	0.310 - 0.345	7.87 - 8.77	0.030	0.76	0.410 - 0.445	10.41 - 11.31	2 3/4	70	220	3190	0.136	0.091	70-400-05-01-02
3/8 BB	7	0.380 - 0.401	9.67 - 10.19	0.030	0.76	0.492 - 0.522	12.49 - 13.26	3	80	190	2755	0.166	0.111	70-400-06-01-02
-8 MW	8	0.400 - 0.440	10.16 - 11.18	0.030	0.76	0.507 - 0.552	12.90 - 14.02	3	80	190	2755	0.180	0.121	70-300-08-01-02
1/2 BB	10	0.515 - 0.545	13.07 - 13.84	0.030	0.76	0.635 - 0.669	16.12 - 17.00	5	130	150	2175	0.210	0.141	70-400-08-01-02
5/8 BB	12	0.640 - 0.670	16.25 - 17.01	0.033	0.85	0.772 - 0.806	19.60 - 20.48	6 1/2	163	130	1885	0.280	0.188	70-400-10-01-02
3/4 BB	14	0.765 - 0.785	19.42 - 19.94	0.040	1.02	0.905 - 0.932	22.98 - 23.68	7	180	110	1595	0.327	0.219	70-400-12-01-02
7/32	16	0.845 - 0.911	21.46 - 23.13	0.040	1.02	1.001 - 1.063	25.65 - 27.00	9	230	56	812	0.388	0.261	70-300-16-01-02
1 1/8	20	1.089 - 1.155	27.67 - 29.34	0.038	0.97	1.251 - 1.305	31.77 - 33.15	16	410	42	609	0.522	0.351	70-400-20-01-02

* For anti-static grade, add 10 to the 3-digit part number e.g. 70-100- becomes 70-110.

The Hyperline SB range meets or exceeds the SAE 100 R14 standard. The performance testing results stated in the above table have been carried out at ambient temperature, in a controlled laboratory environment, using water as the media. We recommend that the customer carries out stringent application performance testing on the hose, using the actual working conditions over a set period of time to validate the hose.

Temperature and pressures

- Temperature affects the maximum working pressure (MWP) as listed above, so for temperatures above 130 °C reduce the MWP by 0.75% for each 1 °C / 33 °F above 130 °C / 266 °F. Example: at 180 °C / 356 °F, reduce the MWP by (180 - 130) x 0.75 = 37.5%.

- Pressure ratings above 100 Bar (1500 psi) only apply for the transfer of non-penetrating fluids. If gases or penetrating fluids are used in the application, or used during pressure testing at pressures above 100 Bar, HPG grade hose is required.

MWP listed are calculated on the basis of a 3:1 safety factor relative to the burst pressure, so burst pressure = 3 x MWP. If MWP is required based on a 4:1 safety factor (e.g EN 16643 requirement), multiply the listed value by 0.75.

HPG specification

For applications where gases are used in the hose at high pressures, or testing procedures above 100 bar (1500 psi) it is necessary to specify a HPG grade PTFE liner tube. HPG grade is also required when high pressures are applied to penetrating fluids.

HPG grade tubing is achieved by subjecting the PTFE tube to certain special processes, commonly known as "post sintering", which increases the resistance of the material to penetration and porosity development by gases in service.

This specification requires that when compressed air or nitrogen is applied to a sample length at a pressure of 275 Bar (4000 psi) for one minute, then the pressure rapidly broken then re-applied for a total of 10 cycles, the sample must not show signs of excessive diffusion when finally gas tested under water.

Pure gases do not generate static charges, HPG liners are rarely required to be anti-static, but on such rare occasions, a special "inner layer" AS grade is used.

All sizes and types of Smoothbore hose PTFE tube liners can be supplied to HPG quality. However, we would always recommend that HPG hoses are supplied with a HW (Heavy Wall) for maximum performance.

Hyperline VI

Hyperline VI consists of a PTFE liner that has convoluted internal and external surfaces.

- Hyperline VI consists of a PTFE liner that is fully convoluted internally and externally
- Vacuum resistance SS grades are vacuum resistant to -0.9 bar up to 130°C (266°F).
- Hyperline VI TO and AM grades are vacuum resistant to -0.9 bar up to 80°C (176°F)
- Extremely Flexible



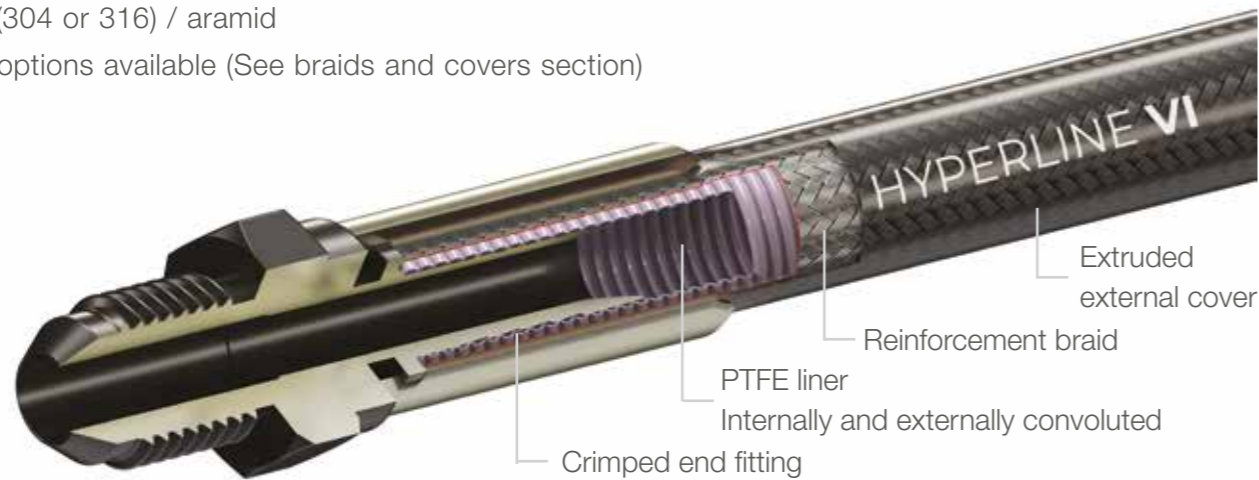
Hyperline VI construction

Design variations

Liner: AS or natural (ASTM D4895)

Braids: SS (304 or 316) / aramid

Covers: All options available (See braids and covers section)



Hyperline VI properties

Vacuum Resistance

Hyperline VI SS Grades are vacuum resistant to -0.9 bar up to 130°C (266°F).

Hyperline VI TO and AM Grades are vacuum resistant to -0.9 bar up to 80°C (176°F).

Flow Rates

The internal convolutions restrict flow rates due to turbulent flow, and may also cause a whistling noise when gases are passed through. For any applications where this may be a problem, the alternative Aflex Hose products Hyperline FX or Hyperline KR would provide a solution

Hyperline VI

Hose size		Actual bore size		**Hose construction	Outside diameter of tube or braid		Minimum bend radius		Maximum working pressure		Burst pressure		Weight per unit length		*Part number
in	Dash size	in	mm		in	mm	in	mm	Bar	Psi	Bar	Psi	kg/m	lb/ft	
3/8	6	0.0248	6.3	TO	0.435 - 0.465	11.05 - 11.81	1	25	4	58	12	174	0.057	0.038	71-100-06
				SS	0.455 - 0.485	11.55 - 12.32	3/4	19	60	870	180	2,610	0.144	0.096	71-100-06-01-02
				AM	0.475 - 0.505	12.07 - 12.83	1	25	45	652	135	1,956	0.071	0.047	71-100-06-01-55-01
1/2	8	0.374	9.5	TO	0.563 - 0.597	14.30 - 15.16	1 1/2	38	4	58	12	174	0.076	0.051	71-100-08
				SS	0.580 - 0.620	14.73 - 15.75	1	25	47	680	141	2,040	0.195	0.130	71-100-08-01-02
				AM	0.602 - 0.637	15.29 - 16.18	1 3/16	30	34	493	102	1,479	0.112	0.075	71-100-08-01-55-01
3/4	10	0.500	12.7	TO	0.750 - 0.790	19.05 - 20.07	1 3/4	50	4	58	12	174	0.126	0.084	71-100-10
				SS	0.815 - 0.855	20.70 - 21.72	2	38	40	580	120	1,740	0.296	0.194	71-100-10-01-02
				AM	0.798 - 0.841	20.27 - 21.36	1 1/2	35	30	435	90	1,305	0.158	0.106	71-100-10-01-55-01
1	12	0.630	16	TO	0.828 - 0.872	21.03 - 22.15	1 3/8	75	3	43	9	129	0.166	0.111	71-100-12
				SS	0.874 - 0.914	22.20 - 23.22	2	50	32	460	96	1,380	0.376	0.251	71-100-12-01-02
				AM	0.872 - 0.918	22.14 - 23.32	2 3/8	60	24	348	72	1,044	0.198	0.133	71-100-12-01-55-01
1 1/4	16	0.866	22	TO	1.135 - 1.185	28.83 - 30.10	3 1/2	89	3	43	9	129	0.235	0.157	71-100-16
				SS	1.179 - 1.229	29.94 - 31.22	2 1/2	63	26	380	78	1,140	0.533	0.310	71-100-16-01-02
				AM	1.190 - 1.249	30.23 - 31.73	3 1/2	89	20	290	60	870	0.298	0.200	71-100-16-01-55-01
1 3/4	20	1.102	28	TO	1.395 - 1.455	35.43 - 36.96	4	100	2	29	6	87	0.342	0.229	71-100-20
				SS	1.445 - 1.495	36.70 - 37.97	3	75	25	360	75	1,080	0.729	0.489	71-100-20-01-02
				AM	1.403 - 1.471	35.64 - 37.36	4	100	17	246	51	738	0.446	0.299	71-100-20-01-55-01

* For anti-static grade, add 10 to the 3-digit part number e.g. 71-100- becomes 71-110-

**Hose construction - (TO) tube only, (SS) stainless steel, (AM) aramid

Temperature and pressures

Hyperline VI TO Grades - The MWP listed above applies up to a maximum temperature of 100 °C (212 °F).

Hyperline VI SS Grades - The MWP listed above should be reduced by 1% for each 1°C above 130 °C up to a maximum of 230 °C (1% for each 1.8 °F above 266 °F up to a maximum of 450 °F).

Hyperline VI AM Grades - The MWP listed should be reduced by 5% for each 1°C above 80°C up to a maximum of 100 °C (5% for each 1.8 °F above 176 °F to 212 °F)

Assembly instructions

1. Cut the hose to the required length, preferably using a hose cut off machine with a hardened steel blade, allowing for the length of the end fitting.
2. Assemble the correct ferrules on to the hose ends.
3. Open the hose bore, by screwing in then pulling out the correct Hyperline VI Opening Tool (Manual or Motorised). For hydraulic fittings, use the basic tool. For PTFE tail fittings, add the correct collar to the tool.
4. Insert the end fitting, then push the ferrule fully over the hose up to the end fitting.
5. Crimp the ferrule to the correct diameter as given in Aflex Document AS-42 for Hydraulic Inserts, or AS-VI-01 for PTFE Tail Inserts. These are available on an I-Bay system - apply to Aflex Hose for access codes. Check using a Vernier or Micrometer.
6. Pressure test the assembly with air or water to 1.5 x listed Maximum Working Pressure before use in application.

Hyperline AU

Hyperline AU consists of a PTFE liner that has convoluted internal and external surfaces.

- Hyperline AU consists of a PTFE liner that is fully convoluted internally and externally
- Exceptional flexibility
- Light weight
- Developed for the motorsport industry



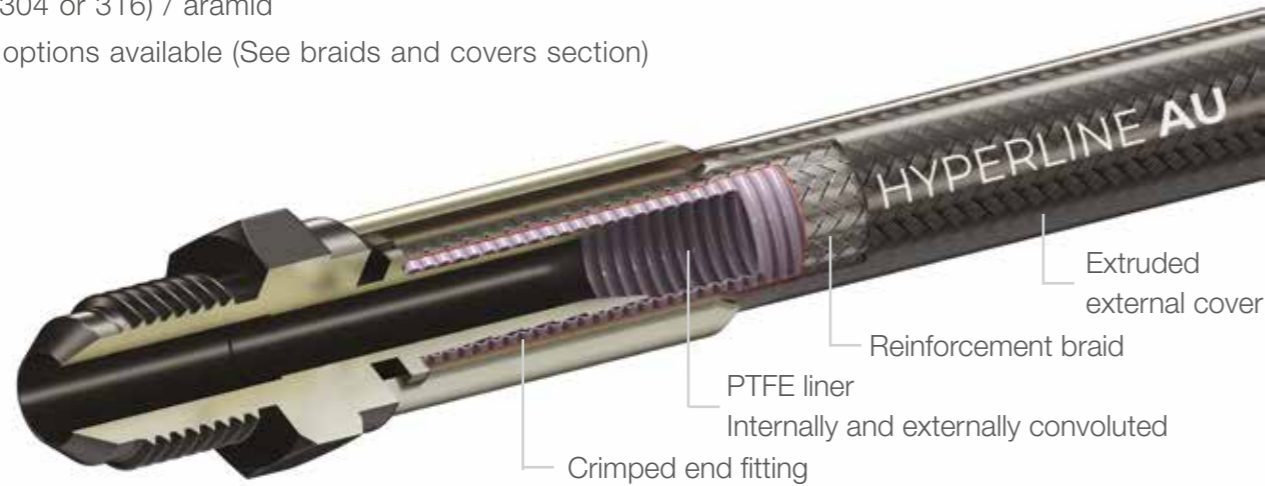
Hyperline AU construction

Design variations

Liner: AS or natural (ASTM D4895)

Braids:SS (304 or 316) / aramid

Covers: All options available (See braids and covers section)



Hyperline AU Properties

Hyperline AU can be used at a centreline bend radius 1 ½ times the hose bore diameter. The resistance to flex fatigue failure is equally excellent offering new design options in a variety of hose applications where very tight bend or rapid flexing are required

Hyperline AU has been developed to be flexible, robust with high pressure rating. This has been achieved without compromising on the weight per meter. Hyperline AU is one of the lightest convoluted hoses available.

Hyperline AU

Hose size		Actual bore size		**Hose construction	Outside diameter of tube or braid		Minimum bend radius		Maximum working pressure		Burst pressure		Weight per unit length		*Part number
in	Dash size	in	mm		in	mm	in	mm	Bar	Psi	Bar	Psi	kg/m	lb/ft	
¼	4	0.28	7.1	TO	0.390 - 0.410	9.91 - 10.41	¾	19	4.5	65	18	260	0.044	0.03	72-100-04
				SS	0.427 - 0.453	10.85 - 11.51	¾	19	70	1025	280	4,100	0.089	0.06	72-100-04-01-02
				AM	0.430 - 0.456	10.92 - 11.58	¾	19	70	1025	280	4,100	0.075	0.05	72-100-04-01-55-01
⅜	6	0.374	9.5	TO	0.507 - 0.530	12.88 - 13.46	1	25	2.5	36	10	144	0.076	0.05	72-100-06
				SS	0.537 - 0.563	13.64 - 14.30	1	25	65	940	260	3,760	0.134	0.09	72-100-06-01-02
				AM	0.546 - 0.576	13.87 - 14.63	1	25	65	940	260	3,760	0.089	0.06	72-100-06-01-55-01
½	8	0.524	13.3	TO	0.695 - 0.720	17.65 - 18.29	1	25	2.5	36	10	144	0.118	0.8	72-100-08
				SS	0.735 - 0.765	18.67 - 19.43	1	25	58	850	232	3,400	0.193	0.13	72-100-08-01-02
				AM	0.742 - 0.772	18.85 - 19.61	1	25	58	850	232	3,400	0.154	0.09	72-100-08-01-55-01
⅝	10	0.630	16	TO	0.828 - 0.872	19.94 - 20.57	1 ¼	32	2	30	8	120	0.148	0.1	72-100-10
				SS	0.874 - 0.914	20.90 - 21.77	1 ¼	32	50	735	200	2,940	0.253	0.17	72-100-10-01-02
				AM	0.872 - 0.918	21.06 - 21.92	1 ¼	32	50	735	200	2,940	0.164	0.11	72-100-10-01-55-01
¾	12	0.768	19.5	TO	1.135 - 1.185	23.88 - 24.65	1 ½	40	2	30	8	120	0.174	0.12	72-100-126
				SS	1.179 - 1.229	24.97 - 25.83	1 ½	40	35	510	140	2,040	0.327	0.22	72-100-12-01-02
				AM	1.190 - 1.249	25.17 - 26.01	1 ½	40	35	510	140	2,040	0.193	0.13	72-100-12-01-55-01
1	16	1	25.4	TO	1.395 - 1.455	28.58 - 32.13	1 ½	40	1.5	22	6	88	0.29	0.11	72-100-16
				SS	1.445 - 1.495	32.28 - 33.60	1 ½	40	33	485	132	1,940	0.446	0.3	72-100-16-01-02
				AM	1.403 - 1.471	32.05 - 33.60	1 ½	40	33	485	132	1,940	0.237	0.16	72-100-16-01-55-01
1 ¼	20	1.250	32	TO	1.135 - 1.185	35.43 - 36.96	4	75	1	15	4	60	0.342	0.229	72-100-20
				SS	1.179 - 1.229	36.70 - 37.97	3	75	25	367	100	1,468	0.729	0.489	72-100-20-01-02
				AM	1.190 - 1.249	36.64 - 37.36	3	75	25	367	100	1,468	0.461	0.031	72-100-20-01-55-01

* For anti-static grade, add 10 to the 3-digit part number e.g. 72-100- becomes 72-110-

**Hose construction - (TO) tube only, (SS) stainless steel, (AM) aramid

Temperature and pressures

Hyperline AU TO Grades - The MWP listed above applies up to a maximum temperature of 100 °C (212 °F).

Hyperline AU SS Grades - The MWP listed above should be reduced by 1% for each 1°C above 130 °C up to a maximum of 230 °C (1% for each 1.8 °F above 266 °F up to a maximum of 450 °F).

Hyperline AU AM Grades - The MWP listed should be reduced by 5% for each 1°C above 80°C up to a maximum of 100 °C (5% for each 1.8 °F above 176 °F to 212 °F)

Hose braiding and covers

Tube only		-150 °C to +260 °C	<ul style="list-style-type: none"> Suitable for low pressure applications Cost effective solution Ideal for weight critical application Outer covers can be extruded directly over tube for added protection
		-73 °C to +260 °C	<ul style="list-style-type: none"> Various grades available including 304 and 316 High tensile wires Suitable for high pressure and high temperature applications Available in double braid for ultra-high pressure applications
Braids		-40 °C to +180 °C	<ul style="list-style-type: none"> Lightweight High strength to weight ratio Exceptional abrasion resistance Different colours available for tracer options
		-40 °C to +204 °C	<ul style="list-style-type: none"> Ultra-lightweight High strength to weight ratio Suitable for high temperature applications Excellent chemical compatibility properties
		Dependent on braid type	<ul style="list-style-type: none"> All braids can be used in combination with one another to broaden design parameters. Further details upon request
		-10 °C to +60 °C	<ul style="list-style-type: none"> Cost effective outer cover for exposed brake lines Highly flexible Available in 28 different colours Can 'colour match' upon request
Extruded outer covers		-30 °C to +93 °C	<ul style="list-style-type: none"> Non-porous material, therefore zero chloride release Available as a strippable (PU-S) and direct crimp (PU-DC) cover Wide range of colours available including fluorescents High mechanical strength and excellent abrasion resistance qualities Good compatibility with most oils and automotive fluids
		-40 °C to +120 °C	<ul style="list-style-type: none"> Very hard-wearing material for high levels of protection Excellent mechanical strength Resistant to almost all automotive fluids Direct crimp cover - no need to strip cover before crimping Wide temperature range Available in a wide range of colours
		-40 °C to +150 °C	<ul style="list-style-type: none"> Very hard-wearing material for high levels of protection Excellent mechanical strength Resistant to almost all automotive fluids Direct crimp cover - no need to strip cover before crimping Excellent temperature range
		-40 °C to +125 °C	<ul style="list-style-type: none"> Wide temperature range Excellent abrasion resistance Suitable for use in various internal/external chassis applications Excellent chemical compatibility with most automotive fluids
		-40 °C to +149 °C	<ul style="list-style-type: none"> Excellent temperature range Chemically compatible with most automotive fluids Exceptional abrasion qualities Highly flexible
		-73 °C to +230 °C	<ul style="list-style-type: none"> Exceptional temperature range Perfect cover for a range of under-bonnet and on-engine applications Ideal for motorsport applications where everything leans towards the extreme

Auto cut lengths

1 - Consultative design



We consider ourselves to be more than just a manufacturing company, placing an emphasis on all members of our team having an excellent level of engineering awareness. We have a wealth of application knowledge to complement our product expertise. Working with our automotive customers at the design phase of projects can help to reduce application footprints by routing pipework through the most efficient path without compromising on performance.

- Customer requirement
- Aflex design consultation
- Aflex solution proposal

2 - Cut



Aflex Hose has developed both annealed and E-weld automatic hose cutting machines which are able to cut stainless steel braided hose lengths within a tight length tolerance, without squashing or creating braid flare out. This system is applicable to (uncovered) stainless steel braided grades of the Hyperline range, in sizes up to -20 (SAE100R14) bore, with minimum cut lengths as short as 48mm.

- Customer specific hose lengths
- Annealed / E-Weld cut process
- High quality, tight tolerance cut

3 - Clean



Automated washing equipment is available for the cut lengths, which has the capability of achieving the required tolerance levels, whilst our validation equipment allows Aflex to verify the particle size, particle count and particle weight. Tolerance levels are typically 85 particles between 150 and 400 microns – with our facilities we typically find 0-5 particles of this size upon inspection.

- Effective cleaning process
- Removal of all processing fluids and particulates
- Batch specific cleanliness validation

4 - Inspect



In addition, Aflex has developed a fully automated inspection system which verifies the internal bores, braid outer diameter, flare diameter and hose length, ensuring only products that are 100% fit for purpose are sent to the customer. This inspection system is only applicable to regularly supplied large quantities of cut lengths and is limited to cut length which are less than 150mm (5.9 inches) in length.

- Customer specific tolerances
- Automatic defect segregation
- 100% dimensional compliance delivered

Applications



Fuel systems

A customer who manufactures high specification fuel pumps for supercars and for the motorsport industry was having issues using conventional annular corrugated nylon tube to convey various grades of fuel. The corrugations were needed for flexibility as the hose is routed in extremely compact packages, however, this creates problems when trying to expel all air from the system. The presence of air bubbles can cause the fuel to boil which leads to inefficiencies within the system. Nylon isn't perfectly compatible with most fuels so in time, it will start to degrade, turning brown and brittle, and will need to be replaced within three to five years.

Hyperline FX and KR used without reinforcing braids (tube only) are proven to be the perfect alternative; the smooth bore allows for all air to be expelled from the system, the external convolution provides the required flexibility (the added kink resistance of Hyperline KR is beneficial for extremely small packages) and the non-ageing nature of PTFE means the hose never has to be replaced, giving total piece of mind to the end user. As the convolutions are thermally formed, the liner becomes less permeable which makes it suitable to transfer fluids with high Hydrocarbon content.

For higher pressure systems, the addition of a PPS braid is recommended to increase the MWP of the hose as it is chemically compatible to all known fuels and doesn't dramatically increase the weight.



Safety systems

A well-known car manufacturer has integrated a 'frontal collision inerting system' within their models. In the event of a collision, the engine is immediately filled with inert gas to prevent against engine fires and any subsequent explosion.

The inert gas is stored in a high-pressure gas canister and is connected to the engine using Aflex Smoothbore PTFE lined hose. Our hose was selected because of its high quality, dimensional consistency and exceptional volumetric expansion properties. The hose includes a TPE (Sarlink) external cover to give it additional protection.



Turbo fluid transfer (Oil and Coolant)

A well-known automotive manufacturer was experiencing severe kinking issues during the installation of Smoothbore 5/16" turbocharger oil feed lines. Pipework had been designed around the limitations of the hose, but to install, the flexible section had to be bent past the specified minimum bend radius (MBR) resulting in 80% assemblies being rejected.

Aflex specified stainless steel braided 5/16" Hyperline FX with its impressive MBR of 19mm, in comparison with the current hose the customer was using that only had an MBR of 70mm. Hyperline FX's unique liner design provided the customer with the smooth bore they required, as well as the added flexibility to prevent kinking during installation.

By switching to Hyperline FX, the customer eliminated all kinking issues, improved productivity and reduced total cost of ownership.



Flexible braking systems

Aflex has global recognition as the manufacturer of the best quality PTFE lined brake hose available on the market – the hose of choice for some of the most prestigious car, motorbike and ATV manufacturers along with some of the biggest aftermarket brake line providers.

Having spent 45 years perfecting the extrusion and braiding processes, we can say with confidence that our hose is the most dimensionally consistent product on the market.

By altering braid angles to suit our PTFE liner, we've managed to create the optimal solution which offers high flexibility, high pressure rating and low volumetric expansion.

A range of cover materials can be extruded over the hose making it extremely easy on the eye as well as to help protect it against the elements. We are experts in the extruding of compound plastic covers, such as Nylon PA11 or Arnitel, which allows for the ferrule/crimp shell to be crimped directly over the cover without skiving, therefore, dramatically reducing production times.



Suspension systems

Similar to braking systems, Aflex Hose is renowned for manufacturing the best quality PTFE lined solution for suspension systems. Dimension consistency allows our customers to efficiently assemble a product they can be proud to supply to their customers.

In recent years we've seen an increasing demand for flexibility and kink resistance of the hose so it can be routed in the most efficient path. Therefore, Hyperline KR has been selected for various platforms. Using this liner with SS braid provides a high-pressure hose that can fit into the smallest spaces, and inclusion of an extruded rubber cover gives it the protection needed for the most versatile off-road vehicles.



Electric vehicle applications

As a way of futureproofing the Automotive Division at Aflex Hose, we have placed a huge amount of focus on the development of products for the transfer of fluids in electric vehicles.

We have already seen a need for a PTFE lined hose to convey more aggressive oil-based battery coolants, commonly used in EV motorsports as they cool batteries much more efficiently. As technologies improve and filter down from motorsport into passenger vehicle platforms, it's becoming more apparent that PTFE lined hose is the most feasible, long-term solution.

Please speak to a member of our automotive team for more information.



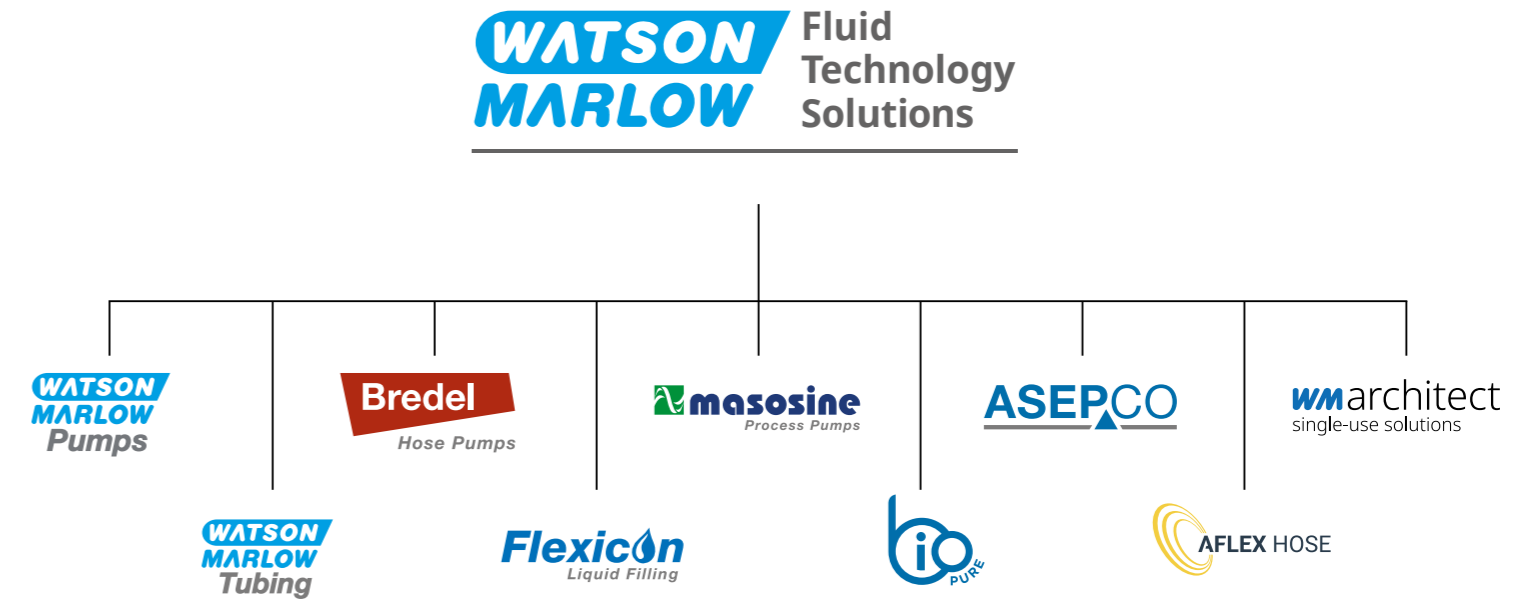
Chemical compatibility

Material Chemical compatibility <small>Make sure your Aflex automotive solution is perfect for the application and environment its used in</small>	Material														
	PPS	304SS	Aramid	Polyurethane (Revarthane AGI140)	Nylon PA6	Nylon PA6.12	Nylon PA11	Nylon PA12	Ardinel (Nylon alternative)	Sarlink	Hytrek	Silicone	PTFE	PVC	316SS
Antifreeze	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A
Brake Fluid Dot3/4/5	A	A	A	-	A	A	A	A	-	A	-	C	A	-	A
Diesel Fuel	A	A	A	C	A	-	A	A	A	-	A	-	A	A	A
Ethanol (100%)	A	A	A	-	A	A	B	A	B	A	A	B	A	A	A
Ethylene Glycol	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A
Gasoline (40% aromatic)	A	A	-	B	-	-	B	-	-	-	B	-	A	A	A
Gasoline Octane 65	A	A	A	B	A	-	A	-	-	-	-	-	A	C	A
Gasoline Octane 100	A	A	-	-	A	-	A	A	A	-	A	-	A	C	A
Jet Fuel (JP3, JP4, JP5)	A	A	A	-	A	-	C	-	-	-	A	B	A	A	A
Kerosene	A	A	A	A	A	A	A	A	B	-	A	-	A	A	A
Nitromethane	A	A	-	-	A	A	A	A	-	-	A	-	A	-	A
Petroleum	A	A	A	B	A	A	A	A	-	-	A	B	A	A	A
Power steering fluid	A	A	-	A	A	-	A	B	-	-	A	-	A	A	A
Shock fluid	A	A	-	A	A	-	A	B	-	-	A	-	A	A	A
Sulfuric acid <10%	A	-	A	-	-	-	B	-	A	A	A	-	A	A	A
Sulfuric acid 10%-75%	A	-	B	B	-	-	-	-	A	A	A	-	A	B	A
Sulfuric acid 75%-100%	A	-	-	-	-	-	-	-	-	A	-	-	A	A	A
Transmission fluid (ATF Type A)	A	A	-	A	-	-	B	-	-	-	B	B	A	-	A
Transmission fluid (OIL, MANUAL)	A	A	-	-	-	-	B	-	-	-	-	-	A	-	-
Windscreen washer fluid	A	A	A	A	B	B	B	B	-	A	A	A	A	A	A

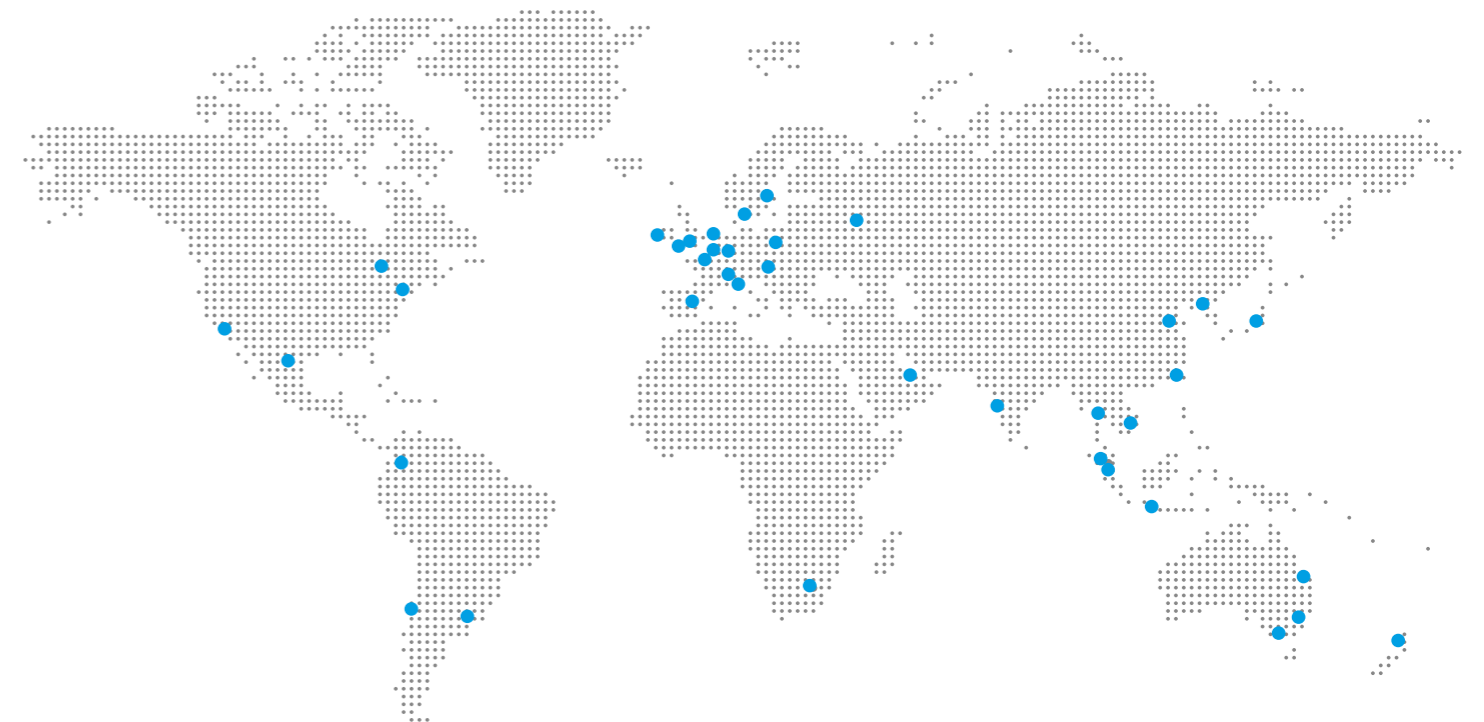
Compatibility table correct at time of publication. For most up to date compatibility information, see reference below:
 Chemical Compatibility Database [online] available at <https://www.wmfts.com/en/support/chemical-compatibility-guide/>

Letter	Ratings
A	Excellent
B	Good, minor effect, slight corrosion or discolouration
C	Fair, moderate effect, softening, loss of strength or swelling may occur
D	Severe effect
N/A	Not tested/no results known

Group structure



Watson-Marlow Fluid Technology Solutions global locations



a workforce of over
1,500 people

a presence in over
42 countries

an annual turnover of
394 million

AUTOMOTIVE SOLUTIONS



Watson-Marlow Fluid Technology Solutions

Watson-Marlow Fluid Technology Solutions supports its customers locally through an extensive global network of direct sales operations and distributors

wmfts.com/global



Disclaimer: The information contained in this document is believed to be correct but Aflex Hose Limited accepts no liability for any errors it contains and reserves the right to alter specifications without notice. It is the users responsibility to ensure product suitability for use within their application. Bioflex, Corroflon, Corroline, Pharmaline, FaBLINE, Hyperline FX are registered trademarks of Aflex Hose Limited