Silicone Coolant Hose

Construction

Leyland Hose and Silicone manufacture silicone hoses to the highest standard, designed to operate under the most extreme conditions found anywhere in todays modern engines. LHSS silicone hoses, are manufactured using high quality silicone from world leading suppliers. The woven and knitted polyester fabric reinforcement used, is of the highest quality and supplied by leading UK manufacturers.

Our standard range of hoses are constructed using 3, 4 or 5 plies of fabric depending on diameter, with a minimum wall thickness of 4.5mm. Other construction options are provided according to service conditions and specific customer requirements. Our materials and specification are carefully chosen, to provide a hose which offer easy fitting combined with maximum performance.

A range of sprung, stainless steel wire or nylon cord reinforced silicone hoses are also offered. These can be used in application where a great deal of flexibility is required, high working pressures up to 30 bar are experienced or, high vacuum or suction is applied. Our range of wire reinforced hoses can be supplied as a smooth, uniform hose or, with a spiral convoluted or castellated form, providing much greater flexibility. These hoses can be used in any vehicle systems, industrial applications, wind turbines and any high or low pressure systems.

Production and Technical Options

- Part marking including specific customer logo, part numbers and traceability options.
- High temperature reflective sleeving, providing protection in specific vulnerable areas for example close to turbo or exhaust systems.
- Anti-abrasion sleeving. This can provide protection where a hose is likely to come in to contact with moving or, vibrating components.
- Hose Clamps: Leyland Hose & Silicone recommend and can provide a range of clips, ideal for all hose clamping solutions.

Custom Designed and Bespoke Hoses

Leyland Hose & Silicone have 'in-house' tool manufacturing capability. In addition, we have the support of local and other tool manufacturers.

This allows us to offer a wide range of product options from simple elbow hoses to complex shapes, bellows and large intake hoses. We also offer a design service for non-standard applications, providing full technical and 3D drawings for approval and future reference.

Testing

Our dedicated factory is equipped with an extensive range of test equipment which allows LHSS to monitor, maintain and provide materials and product to both customer and our own unique and demanding specifications.

All product used in our hose building process is supplied with customer certification. We carry out our own in-house testing to verify batch to batch consistency.

In addition, LHSS are able to carry out product testing. Our factory has the facilities to carry out burst pressure testing, heat ageing, vibration and flex testing and pressure cycle testing. Wealso test the effect of coolants on silicone and other hose materials.

At Leyland Hose and Silicone, our priority is to ensure we can offer our customers a consistent and high quality silicone hose, out-performing many other hoses offered on the market today.

Standard Blue Silicone Hose

Our modern and highly flexible manufacturing process allows our production facility to cope with a wide range of products and a diverse customer base. Leyland Hose & Silicone produce specialist one off prototypes, low volume parts and high volume production for the bus, truck and automotive markets. Having our own dedicated factory means we can focus on specific requirements and tailor our production to the ever changing needs of our customers.

1) General

Working Temperature -50°C to +180°C.
Good physical and chemical compatibility with coolant and corrosion inhibitors.
For conveyance of oil and fuel, a fluorosilicone liner is required (FSH).
Standard colour is blue but other colours are available.
All hoses to meet or exceed SAE J20R1 class A.

2) Material Specification Silicone Compound

Tested to BS903 at pressed cured for 5 minutes at +115°C.
Hardness (IHRD) 65 + 5
Density (g/cm3) 1.26 + 0.03
Tensile strength (Mpa) 7 min
Elongation at break (%) 200 min
Tear strength (KN/m) 11 min
Compression set (%) 18 Max

3) Reinforcement Fabric

Yarn: Fine Mesh 100% Polyester
Thickness: 0.56mm
Weight: 90gsm +/ - 17gsm
Burst pressure: 16Bar (232 psi) Tensile strength: 75-80 Kgf

4) Construction

Thickness of hose: 4.5mm min. silicone compound.
Layers of reinforcements:
Minimum 3 ply for diameter < 50mm
Minimum 4 ply for diameter > 50mm
Minimum 5 ply for diameter > 102mm
* Or built to customer requirement

Outside finish:

Cellulose bound (smooth finish)

5) Diameter Ranges

¼" (6mm) to 3" (76mm): 3m or 4m lengths
3-1/8" (80mm) and above: 1m lengths

Burst Pressure Chart

LHSS Burst Pressure for POSH (OAT Grade) and standard blue hoses.
Temperature rating: (-50°C) up to (+180°C)

Inner Diameter	Standard Blue Coolant Burst Presure (Bar)	Oat Resistant Hose Burst Presure (Bar)
6mm	34.0	
9.5mm	30.0 (41)	33.8 (45)
12.7mm	27.2	29.0
14mm	26.2	28.8
15mm	25.8 (29)	28.5 (33)
16mm	25.0	28.2
19mm	22.0	27.4
22mm	20.5	26.0
25.4mm	19.0 (25)	25.2 (30)
28mm	18.8	24.8
30mm	18.5	24.3
32mm	18.2	24.0
35mm	17.2	22.5
38mm	16.6	21.6
40mm	16.1	38.0
42mm	15.5	20.5
45mm	14.2	19.6
48mm	13.8	19.1
50.8mm	16.0 (18)	18.8 (21)
54mm	14.8	17.5
55mm	14.6	17.3
57mm	13.8	16.5
60mm	13.0	15.5
63mm	12.6 (16)	14.8 (19)
65mm	12.2	14.3
70mm	10.2	13.8
76mm	9.5 (14)	12.2 (17)
80mm	8.1	10.9
83mm	7.0	9.2
85mm	6.9	9.0
89mm	8.5	11.8
95mm	7.4	9.2
102mm	6.0	8.0
115mm	5.6	7.7
127mm	5.0	7.5
140mm	5.0	7.3
152mm	4.6	7.1
	Temp resistant to: 180°C	Temp resistant to: 200°C

Chemical Resistance & Coolant Guide

The following chart compares the resistance of elastomers to certain compounds (at temperatures assumed to be less than 65°C). S = Suitable for use with minimal or no attack. L = Often suitable, but with some limitations. U = Very limited, or completely unsuitable.

CHEMICAL	SILICONE (VMO)	NEOPRENE (CR)	ETHYLENE PROPYLENE (EPDM)	FLUOROSILICONE (FVMQ)	FLUOROCARBON (FKM)	NITRILE (NBR)
Acetic Acid 5%	S	S	S	S	S	L
Air	S	S	S	S	S	S
Ammonia (Liquid)	S	S	S	S	U	L
Animal Fats	L	L	L	S	S	S
ASTM Oil #1	S	S	U	S	S	S
ASTM Oil #4	U	U	U	L	S	L
Beer	S	S	S	S	S	S
Bezine	U	L	U	S	S	S
Bleach Solutions	L	U	S	L	S	L
Boric Acid	S	S	S	S	S	S
Calcium Chloride	S	S	S	S	S	S
Calcium Hypochlorite	L	L	S	L	S	L
Carbon Dioxide Dry	L	L	L	L	L	S
Carbon Dioxide Wet	L	L	L	L	L	S
Carbon Tetrachloride	U	U	U	S	S	L
Chlorine Dry	U	U	U	S	S	U
Chlorine Wet	U	U	L	L	S	U
Chloroform	U	U	U	L	S	U

CHEMICAL	SILICONE (VMO)	NEOPRENE (CR)	ETHYLENE PROPYLENE (EPDM)	FLUOROSILICONE (FVMQ)	FLUOROCARBON (FKM)	NITRILE (NBR)
Copper Salts	S	S	S	S	S	S
Diesel Oil	U	U	U	S	S	S
Ethanol	S	S	S	S	U	S
Ferric Sulfate	L	S	S	S	S	S
Freon 114	U	S	S	L	L	S
Fuel Oil	U	L	U	S	S	S
Gasoline	U	U	U	S	S	S
Glucose	S	S	S	S	S	S
JP4 (Mil-J-5624-F)	U	U	U	S	S	S
Kerosene	U	L	U	S	S	S
Lactic Acid cold	S	S	S	S	S	S
Linseed Oil	S	U	U	S	S	S
Lye Solutions	L	L	S	L	L	L
Magnesium Chloride	S	S	S	S	S	S
Methanol	S	S	S	S	U	S
Mineral Oils	L	L	U	S	S	S
Natural Gas	S	S	U	U	S	S

CHEMICAL	SILICONE (VMO)	NEOPRENE (CR)	ETHYLENE PROPYLENE (EPDM)	FLUOROSILICONE (FVMQ)	FLUOROCARBON (FKM)	NITRILE (NBR)
Olive Oil	S	L	L	S	S	S
Ozone	S	L	S	S	S	U
Perchlorelhylene	U	U	U	L	S	U
Potassium Salts	S	S	S	S	S	S
Propane	U	L	U	L	S	S
Sewage	S	L	S	S	S	S
Silicone Grease/Oils	U	S	S	S	S	S
Sodium Hypochlorite	L	U	L	L	S	L
Sulfur Chloride	U	U	U	S	S	U
Sulfuric Acid, dilute	U	U	L	U	S	U
Tannic Acid	L	L	S	S	S	S
Toluene	U	U	U	S	S	U
Trichlerethylene	U	U	U	S	S	U
Turpentine	U	U	U	S	S	S
Vinegar	S	L	S	U	S	L
Wood Alcohol	S	S	S	S	U	S
Xylene	U	U	U	S	S	U

Elastomer and Fabric Ratings

The following chart explains strengths and weaknesses of common raw materials, rating by numbers; 1-Excellent, 2-Good, 3-Fair, 4-Poor.

ELASTOMERS	TEMP RANGE °C	PHYSICAL						ENVIRONMENTAL RESISTANCE							SUBJECTIVE			HEAT	
		TENSILE	ELECT. RESITY	IMPERMEABILITY	RESILIENCE	ABRASION	TEAR	WEATHERING	OZONE	RADIATION	WATER	ACIDS	ALKALIES	GASOLINE	TASTE	ODOR	NON-STAINING	AGING AT 212 °F	AGING RM TEMP
ELASTOMER (ASTM Desig)	**LOW / HIGH**																		
Silicone (VMO)	-70°C +315°C	2	1	4	2	4	2	1	1	2	1	3	2	4	1	1	1	1	1
Fluorosilicone (FVMO)	-50°C +230°C	2	1	4	2	3	2	1	1	2	1	2	2	1	1	1	1	1	1
Neoprene (CR)	-40°C +120°C	1	3	3	1	1	1	2	2	2	3	3	3	4	3	2	3	2	2
Hypalon (CSM)	-30°C +135°C	2	2	2	2	2	2	1	1	1	2	3	3	3	3	2	2	1	1
Nitriles (NBR)	-40°C +120°C	1	2	2	1	1	2	3	4	3	1	4	2	2	3	2	2	2	2
Vinyl (PVC)	-20°C +75°C	2	1	3	2	2	3	1	1	2	1	2	2	3	2	2	2	4	1

FABRICS	Maximum Continuous Operating Temperture °C	Acids	Alkalies	Flex and Abrasion
Fibergias	370°C	1	3	3
Polyester	175°C	2	2	1
Nylon	160°C	3	1	1
Nomex	220°C	3	2	1
Kevlar	200°C	4	1	2
Cotton	105°C	4	1	2
Teflon	200°C	1	3	3

Chemical Resistance

The following is a run-down of the basic characteristics of LHSS's general purpose, elastomers:

Silicone, VMQ, is generally resistant to oxidising chemicals, ozone, concentrated hydroiodo; but attacked by many solvents and concentrated acids.

Fluorosilicone, FVMQ, is similar to silicone, but also resistant to gasoline, aromatic solvents and chlorinated solvents. It is attacked by ketones and selected chemicals such as hydrazine.

Fluorocarbon, FKM, is resistant to all aliphatic, aromatic, and halogenated hydrocarbons, acids, vegetable and animal oils; but is attacked by ketones, low molecular weight esters and nltro containing compounds.

Neoprene, CR, is generally resistant to mild chemicals and aliphatic hydrocarbons, ozone, selected oils and solvents; but is attacked by strong oxidizing acids, esters, ketones, and chlorinated aromatic hydrocarbons.

Nitrile, NBR, is generally resistant to hydrocarbons, fats, oils, greases, hydraulic fluids, and a variety of other chemicals, — but is attacked by ketones, esters, aldehydes, aromatic hydrocarbons and nitrocarbons.

Ethylene Propylene, EPDM, Is generally resistant to animal and vegetable oils, strong oxidizing chemicals, and ozone, — but is attacked by mineral oils, solvents and aromatic hydrocarbons.