

# Flexfab®

**DURAGUARD™  
TECHNOLOGY**

*SILICONE HOSES  
FOR HEAVY DUTY  
TRUCK APPLICATIONS*



**2007 PRODUCT SPECIFICATIONS**



## Helping You Meet The Challenges Of 2007 With Flexfab® DuraGuard™ Silicone Hoses.

The Environmental Protection Agency (EPA) has imposed stringent new limits on emissions from on-highway diesel engines for 2007. While these new regulations will have significant beneficial effects on air quality, they also will pose a multitude of design challenges for engine and truck manufacturers, and underhood component suppliers.

In 2007:

- \* Particulate matter (PM) emissions reduced to .01 grams per brake-horsepower-hour (g/bhp-hr).
- \* Nitrogen Oxide (NOx) lowered to .20g/bhp-hr and for non-methane hydrocarbons (NMHC), to .14g/bhp-hr.
- \* Crankcase emissions are now regulated as exhaust emissions.

A variety of combinations of methods will be used to meet these new regulations:

- \* Exhaust Gas Recirculation (EGR)
- \* Closed Crankcase Ventilation
- \* Diesel Particulate Filter (DPF)
- \* Ultra-Low Sulfur Fuel (ULSF)
- \* Low Sulfur Diesel Lubricants

The effect these elements will have under the hood:

- \* Increased Engine Temperatures
- \* External and Internal
- \* Increased Charge Air Pressures
- \* Corrosive EGR Gasses

The bottom line for 2007 is increased heat, increased pressures and corrosive conditions for underhood hoses on diesel engines. Working closely with the major OE Manufacturers, Flexfab has engineered the new DuraGuard line of hoses to meet – and exceed – the challenges of 2007.

## Fluorocarbon-Lined Silicone/Meta-Aramid Charge Air Bellows



### Application

Charge air bellows are used on diesel truck engines to deliver pressurized intake air through the charge air intercooler into the intake manifold. Meta-aramid reinforcement is required since the temperature of the turbocharger outlet is approximately 260°C+ (500°F+). Fluorocarbon lining is used inside the bellows since exhaust gasses and/or oil vapors are also recycled through the bellows.

### Design Features

- **Pilot flare** on the end of the bellows aids in bellows installation to the mating stem.
- Bellows is designed for connection to SAE AS J5131 pipe bead with **internal pockets** on the ID of the cuffs to mate and positively locate the bellows on the mating stem. Hoses can be used with a one or two bead configuration.
- Designed **clamp groove** for positive location of clamp.
- **Fluorocarbon liner** for exhaust gasses and/or oil vapor.
- Premium **silicone bonding layer** and **jacket layer** with low compression set to reduce clamp torque falloff.
- **Bellows tested** at 1 million hot air pulses, 500°F internal, 250°F external, 5 psig to 60 psia with no delamination of the fluorocarbon liner.
- **Low convolute design** reduces length growth to .30 inches max. at 60 psig and 500°F.
- **Blow-off** equal to or greater than 150 psig with clamp torque tolerance range of 60 to 120 inch-pounds using production "T" bolt clamps. 210 psi blow-off minimum with clamp torque of 120 inch-pounds.

### Pressure Capability with External Rings

Bellows ID	Max. Working Pressure	Min. Burst Pressure
76mm (3.0 inch)	4.8 bar (70 psi)	20.7 bar (300 psi)
89 mm (3.5 inch)	4.8 bar (70 psi)	20.7 bar (300 psi)
102 mm (4.0 inch)	4.8 bar (70 psi)	20.7 bar (300 psi)
115 mm (4.5 inch)	4.3 bar (62 psi)	18.3 bar (266 psi)

## Silicone/Meta-Aramid Charge Air Bellows

### Application

Turbocharger bellows are used on diesel truck engines to deliver pressurized intake air to the charge air intercooler and intake manifold. The temperature range is up to 232°C (450°F) on turbocharger connectors. These silicone bellows are for use on 2006 and prior diesel engines.

### Construction

High temperature silicone rubber liner, reinforced with four plies of silicone rubber coated, temperature-resistant meta-aramid fabric. The standard bellows has one or two external convolutions and two or three stainless steel external pressure retention rings. Other configurations are available.



### Pressure Capability with External Rings

Bellows ID	Max. Working Pressure	Min. Burst Pressure
76mm (3.0 inch)	4.1 bar (60 psi)	12.5 bar (180 psi)
89 mm (3.5 inch)	3.8 bar (55 psi)	11.4 bar (165 psi)
102 mm (4.0 inch)	3.4 bar (50 psi)	10.5 bar (150 psi)
115 mm (4.5 inch)	3.1 bar (45 psi)	9.3 bar (135 psi)

## Crimped Assemblies



Crimped assemblies can help manufacturers save time and money by converting the hose/pipe/clamp into one assembly. Pre-assembly is eliminated and the crimped assembly comes with the hoses properly oriented, ready for installation on the engine. In addition, the crimped design lowers leak occurrence and eliminates the need for two hose clamps.

Flexfab designs and manufactures the pipes with an inverted bead. During the crimping operation, the flow of rubber is directed into the inverted bead. The inverted bead helps prevent leakage during operation of the system.

Flexfab currently can crimp assemblies from 2.00" to 4.00" in diameter. Additional diameters may be available upon request. Contact Flexfab engineering with any questions. Tube end form dimensions are available upon request from Flexfab's engineering department.

## Fluorocarbon-Lined Silicone EGR Sleeves

### Application

EGR Sleeves are used on diesel truck engines to connect metered, pressurized exhaust from the EGR cooler to the intake manifold. The temperature of the exhaust gasses is approximately 232°C (450°F) but can have peaks at 260°C (500°F). The purpose of the sleeve is to accommodate thermal expansion of the steel EGR crossover tube, compensate for small assembly misalignment and to dampen vibrational stresses on the metal mounting flanges.



### Construction

High-temperature fluorocarbon elastomer liner, reinforced with three, four or five plies of silicone rubber-coated, high-temperature resistant meta-aramid fabric.

### Pressure Capability

**(with 12.7mm max. spacing between ends of mounting stems.)**

Hose ID	Max. Working Pressure	Min. Burst Pressure
12.7 mm (.5 inch) to 38.1 mm (1.5 inch)	4.1 bar (60 psi)	12.5 bar (180 psi)
50.8 mm (2.0 inch)	3 bar (45 psi)	9.3 bar (135 psi)
63.5 mm (2.5 inch)	2.5 bar (36 psi)	7.4 bar (108 psi)
76.2 mm (3.0 inch)	2.1 bar (30 psi)	6.2 bar (90 psi)

## Fluorocarbon-Lined Silicone EGR Sensor Hose

### Application

EGR Sensor hoses are used on diesel truck engines to deliver pressurized cooled exhaust from the EGR crossover pipe to the EGR sensor. The temperature of the exhaust gasses is approximately 232°C (450°F) but can have peaks to 260°C (500°F). The purpose of the hose is to isolate the sensor from the exhaust heat by dead heading exhaust air allowing it to cool and preventing the thermal conductivity of steel tubing from heating the sensor. The hose also dampens vibrational stresses on the sensor.



### Construction

High temperature fluorocarbon elastomer liner, reinforced with three plies of silicone rubber-coated, high-temperature resistant meta-aramid fabric.

## Silicone 3- And 4-Ply Coolant Hose

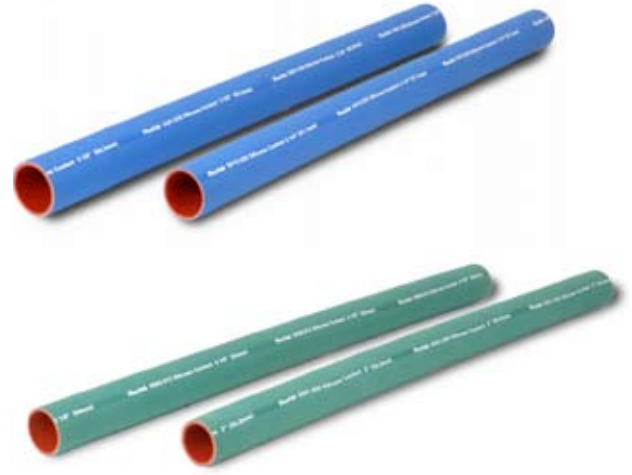
### Application

For heavy duty pressure connections in hostile engine environments. Resists hardening, cracking, cold leaks, aging, steam and many chemicals. Ideal for extreme temperature and various pressure ranges where high performance levels are required.

### Construction

3 ply silicone coolant hose reinforced with polyester fabric and coated with specially compounded silicone elastomer.

4-ply silicone coolant hose reinforced with polyester fabric and coated with specially compounded silicone elastomer.



### Operating Range

Temperature range -65°F (-54°C) to +350°F (+177°C). Meets or exceeds operating requirements of SAE J20 R1 Class A custom wall, TMC RP303B Class I Grade II and most OEM truck manufacturers specifications.

### 3-Ply Sizes and Specifications

INSIDE DIA		OUTSIDE DIA		PART NUMBER		BURST PRESSURE - PSI (BAR)				WEIGHT	
INCH	mm	INCH	mm	BLUE	GREEN	ACTUAL	SAE J20 R 1*	TMC	LB/ft	Kg/m	
2.00	51	2.32	61	5515-200	5500-200	250 (17.2)	200 (13.8)	100 (6.9)	0.64	0.95	
2.25	57	2.57	67	5515-225	5500-225	225 (15.5)	175 (12.1)	100 (6.9)	0.72	1.07	
2.50	64	2.82	73	5515-250	5500-250	200 (13.8)	150 (10.3)	100 (6.9)	0.80	1.19	
3.00	76	3.32	86	5515-300	5500-300	200 (13.8)	100 (6.9)	100 (6.9)	0.96	1.43	

### 4-Ply Sizes and Specifications

INSIDE DIA		OUTSIDE DIA		PART NUMBER		BURST PRESSURE - PSI (BAR)				WEIGHT	
INCH	mm	INCH	mm	BLUE	GREEN	ACTUAL	SAE J20 R 1*	TMC	LB/ft	Kg/m	
2.00	51	2.39	61	5581-200	5501-200	400 (27.6)	200 (13.8)	100 (6.9)	0.78	1.16	
2.25	57	2.64	67	5581-225	5501-225	350 (24.1)	175 (12.1)	100 (6.9)	0.88	1.31	
2.50	64	2.89	73	5581-250	5501-250	300 (20.7)	150 (10.3)	100 (6.9)	0.98	1.45	
3.00	76	3.39	86	5581-300	5501-300	250 (17.2)	100 (6.9)	100 (6.9)	1.17	1.74	

## Silicone Formed Coolant And Heater Hose

### Application

Custom designed and manufactured hose products for coolant transfer. Engineered to your specifications using a variety of reinforcements. Available in 2-, 3-, and 4-ply construction. Continuous operating temperature -65°F (-54°C) to +350°F (+177°C). Available in sizes from 5/8" to 2 1/2" ID.



2-ply extruded formed coolant/heater hose



3- and 4-ply wrapped shaped coolant/EGR cooler hose

## Silicone Heater Hose

### Application

For heavy duty pressure connections in hostile engine environments. Resists hardening, cracking, cold leaks, aging, steam and many chemicals. Ideal for extreme temperature and various pressure ranges where high performance levels are required.

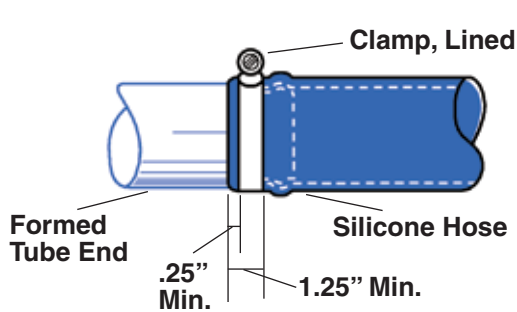


### Characteristics

Continuous operating temperature -65°F (-54°C) to +350°F (+177°C). Nylon fiber reinforced. Resistant to coolant additives. Flexfab silicone heater hose is shipped on wooden reels or handy dispenser cartons containing 25' or 50' of hose. For high temperature applications, meta-aramid reinforcement is available

### Sizes and Specifications - FLX5526 Series - Blue

INSIDE DIAMETER				OUTSIDE DIAMETER				BURST PRESSURE						WEIGHT	
								5526		SAE J20 R3		TMC			
INCH	mm	MAX.	MIN.	INCH	mm	MAX.	WALL THICKNESS	PSI	BARS	PSI	BARS	PSI	BARS	LB/ft	Kg/m
1/4	6	.270	.230	.580	15	.690	.140/.170	320	22.1	250	17.2	125	8.6	.111	.165
3/8	10	.400	.360	.705	18	.720	.140/.170	310	21.4	250	17.2	125	8.6	.145	.217
1/2	13	.520	.480	.830	25	.840	.140/.170	310	21.4	250	17.2	125	8.6	.181	.269
5/8	16	.645	.605	.955	26	.970	.140/.170	300	20.7	250	17.2	125	8.6	.216	.341
3/4	19	.770	.730	1.080	27	1.090	.140/.170	300	20.7	200	13.8	125	8.6	.250	.372
1	25	1.020	.970	1.330	35	1.400	.140/.170	250	17.2	175	12.1	125	8.6	.345	.517
1 1/4	32	1.270	1.220	1.580	40	1.650	.140/.170	200	13.8	175	12.1	125	8.6	.385	.572



## Coolant Hose Clamping Instructions

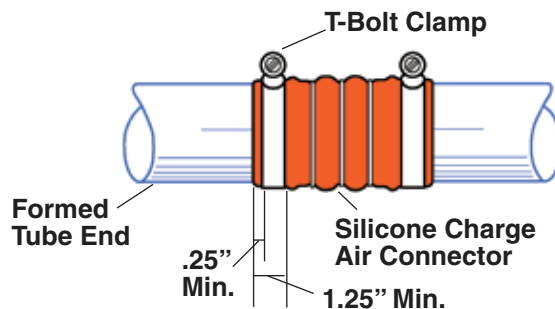
Worm gear or constant torque type stainless steel clamps with inner liner are recommended for silicone heater and coolant hose. Initial clamp torque should be 40 inch-lbs. If retorquing is required, it should be limited to 20 inch-lbs. Do not use serrated, slotted or wire type clamps.

*Recommended bead specifications SAE AS5131.*

## Charge Air Connector Clamping Instructions

Use only T-bolt style clamps. Constant torque T-bolt style clamps may help to retain clamp load. Torque to 70-75 in-lbs (2006 and prior) or up to 120 in-lbs (2007).

*Recommended bead specifications SAE AS5131.*



**All specifications are subject to change without notice.**

***In addition to the products in this brochure, Flexfab also has extensive experience in the design and manufacture of silicone polymer products for automotive, aerospace, and specialty industrial applications.***



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