

# Sanitation SYSTEMS

Please call Goodyear Rubber Products to order any products shown in this catalog  
1-727-822-4672 or 1-800-367-4673 toll free in the USA  
Email inquiries to: [Sales@GoodyearRubberProducts.com](mailto:Sales@GoodyearRubberProducts.com)

## SERIES 104

### COST EFFECTIVE PREMIUM SANITATION HOSE

The industry's premium sanitation hose. Designed and compounded to provide maximum resistance to odor permeation. Helical wire construction provides flexibility and collapse resistance for applications requiring a tight bend radius. Best choice for connection between head and holding tank, and holding tank to pump out.

**SIZE: 1", 1 1/4", 1 1/2", 1 7/8", 2", 2 1/4"**



## SERIES 144

### ODOR PROTECTOR SANITATION

A newly formulated premium PVC resin specifically developed to prevent odor permeation commonly found in marine waste systems. This newly designed resin protects against odor permeation. Highly flexible and compatible with all sanitation systems. Suction and vacuum applications. Operating temperature: 5° to 158°F (-12° to 70°C)  
Max Working Pressure: 50psi with worm gear clamps.

**SIZE: 1", 1 1/2"**



## SERIES 104OB

### ODOR BLOCK SANITATION

The best rubber sanitation hose available to prevent odor permeation in marine waste systems. New copolymer tube designed to exceed industry requirements and be highly flexible and easy to connect. Suction (full vacuum) and discharge applications. Operating temperature: -40° to 200°F (-40° to 93°C)  
Max Working Pressure: 75psi with worm gear clamps  
150 psi with industrial couplings & clamps or bands.

**SIZE: 1", 1 1/2"**



## SERIES 146

### SANITATION HOSE CUFFS (RIGHT HAND THREAD)

FDA materials, deep thread design for "hold fast" installation. Cuff taper allows for easy attachments to all major valves.

**SIZE: 1 1/2"**



## SERIES 140

### CORRUGATED PVC SANITATION HOSE

Flexible PVC hose designed primarily as a discharge hose. Applications include: potable water fill, drain lines, holding tank pump-out and bilge discharge. FDA approved compound. NOT DESIGNED FOR BELOW WATERLINE APPLICATIONS.

**SIZE: 5/8", 1", 1 1/2", 2"**



## SERIES 148

### H. D. SMOOTH PVC SANITATION HOSE

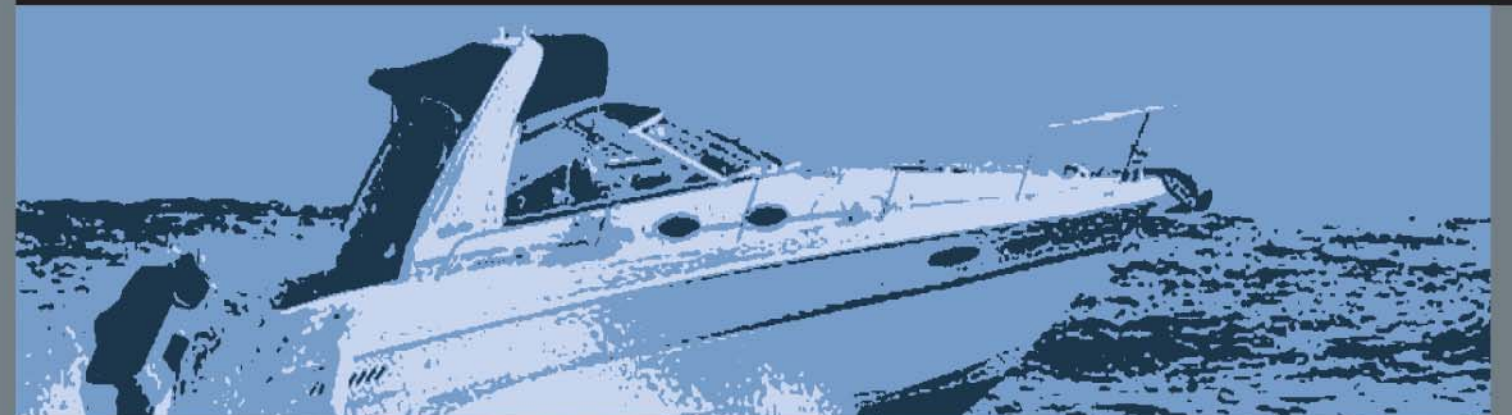
Heavy duty PVC hose designed for sanitation systems. Smooth interior and exterior provide excellent clamping surface. Helical rod design provides flexibility and collapse resistance. Produced with FDA approved materials.

**SIZE: 5/8", 3/4", 1", 1 1/8", 1 1/4", 1 1/2", 2"**



# NOVAFLEX

LAWRENCE MARINE



Marine Hose Catalogue

In USA:  
Novaflex Hose Inc.  
449 Trollingwood Road  
Haw River, North Carolina 27258

NOVAFLEX

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When you design performance watercraft, nothing takes priority over safety. Novaflex offers the broadest ranges of high performance marine hose products to meet your requirements.

- **Water systems hoses** that meet all your needs for flexibility, ease of installation and worry-free clamping.
- **Conduit and Ventilation Ducting** that is both flame and ozone resistant
- **Marine Water Exhaust and Intake Hoses** that are easy to install and meet or exceed SAEJ2006 standards.
- **Fuel Systems** that meet all requirements of SAEJ1527 and ISO7840 as well as those of USCG ABYC and NMMA are IMCI certified.
- **Silicone Rubber Exhaust Hoses and Connectors** for superior vibration and

## Water SYSTEMS

### Responsive to Customer's Needs

At Novaflex we are continuously expanding our line of key replacement and original equipment products to better meet your needs and reduce your dependence on multiple suppliers. Let Novaflex make your job easier; contact us to discuss your own individual requirements.

### SERIES 141/142

#### CORRUGATED PVC BILGE HOSE (CLEAR w/GRAY ROD)

Flexible PVC hose produced with FDA approved compound and designed primarily as a discharge hose. Applications include: potable water fill, drain lines, livewell aerators and bilge discharge. Available with black rod (142). NOT DESIGNED FOR BELOW WATERLINE APPLICATIONS.

**SIZE:** 3/4", 1", 1 1/8", 1 1/4", 1 1/2", 3"

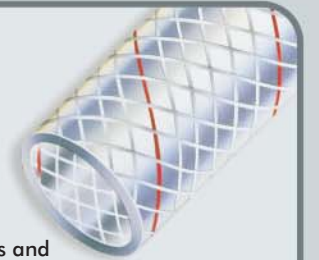


### SERIES 162

#### CLEAR REINFORCED PVC HOSE (RED TRACER)

Heavy duty red and white reinforced clear PVC hose designed for various water applications such as drain lines and air conditioner circulation. Produced with FDA approved materials, this hose is non-toxic, tasteless, and odorless, which makes it an excellent choice for hot or cold potable water applications.

**SIZE:** 3/8", 1/2", 5/8", 3/4", 1", 1 1/8", 1 1/4", 1 1/2"



### SERIES 120/121

#### BILGE PUMP HOSE

Designed for bilge discharge applications. The flexible corrugated polyethylene construction provides maximum flexibility and ease of installation with a molded cuff every twelve inches. Available in black (120) and white (121).

**SIZE:** 5/8", 3/4", 1 1/8", 1 1/4", 1 1/2"



### SERIES 149

#### H. D. PVC LIVEWELL HOSE

Heavy duty PVC hose designed for bilge, livewell circulation, sink and baitwell drains. Smooth interior and exterior provide excellent clamping surface. Helical rod design provides excellent flexibility and collapse resistance.

**SIZE:** 5/8", 3/4", 1", 1 1/8", 1 1/4", 1 1/2", 1 7/8", 2"



### SERIES 164

#### WHITE REINFORCED PVC HOSE (BLUE TRACER)

Heavy duty blue and white reinforced PVC hose with opaque white liner. Designed for various water applications such as drain lines, wash down and air conditioner circulation. Produced with FDA approved materials this hose is non-toxic, tasteless, and odorless, which makes it an excellent choice for hot or cold potable water applications.

**SIZE:** 1/2", 5/8", 3/4"



### SERIES 130/132/135

#### WATER / HEATER HOSE

General purpose water hose that can be used for ice box, sink and shower drain lines, air conditioning circulation, bilge and bait box applications. Available in 200psi version (132) black).



### SERIES 150/150 HD

#### CLEAR PVC TUBING

Vinyl tubing produced with FDA approved material. Applications include sink drains, ice boxes and refrigerators. Available in heavy duty 3/16" version. NOT RECOMMENDED FOR HOT WATER OR BELOW WATER LINE.



As a manufacturer, Novaflex continuously seeks ways to improve product quality and processes. Success is based on an ability to create value with innovative products and services that exceed expectations and requirements.

## Conduit/Ventilation SYSTEMS

### SERIES 128

#### SPLIT CONDUIT HOSE

Flame Retardant Cable/Wire Harness Cover. Split for easy access to route wires. V2 Rated UL 94A Available in black or white.

**SIZES:** 1/4", 3/8", 1/2", 5/8", 3/4", 1", 1 1/4", 1 1/2", 2"



### SERIES 186

#### OUTBOARD MOTOR BRACKET HOSE

Cable conduit designed to conceal hose or cable of outboard motor. Available in black or grey.

**SIZES:** 1 1/2", 2"



### SERIES 400/402

#### VENTILATION DUCTING

Flame resistant PVC ducting designed for venting bilge gases. Ozone and sunlight resistant. Available in white (402).

**SIZES:** 3" 4"



## Exhaust SYSTEMS

### SERIES 200/260

#### SOFTWALL EXHAUST HOSE

Designed for a wide range of water transfer and discharge applications as well as the tough demands of wet exhaust. The softwall (non-wire) construction is designed for straight routings. An excellent choice for bilge, toilet, scupper and water discharge applications that are straight. Meets SAEJ2006 R1 for marine exhaust hose. Available in heavy duty version (260).

**SIZE:** 3/4" to 18"



### SERIES 250/210

#### HARDWALL EXHAUST HOSE

Designed for a wide range of demanding engine applications from water intake and engine coolant to marine wet exhaust. It's wire helix construction provides excellent flexibility and bend radius. Also an excellent choice for bilge discharge, toilet and holding tank connections, water discharge and scupper lines. Meets SAEJ2006 R2 for marine exhaust hose. Available in heavy duty version (210).

**SIZE:** 1/2" to 8"



### SERIES 252

#### CORRUGATED EXHAUST HOSE

Designed to meet the tough demands of wet exhaust. The hose is constructed to resist panting, vibration and wall collapse. Helical wire construction (hardwall) allows the hose to accept bending without collapsing. The minimum designed bend radius of the hose is calculated by...



## Fuel SYSTEMS

### SERIES 315

#### OUTBOARD FUEL LINE

Very flexible fuel line designed only for outboard engine applications. Designed to handle alcohol blended fuels as well as oil and gasoline mixtures. Meets SAEJ1527 B2

**SIZE:** 3/8"



### SERIES 360-00

#### FUEL FEED AND VENT HOSE (BARRIER)

Designed to meet fuel hose specifications of SAE J1527 and ISO 7840. The barrier construction provides the lowest permeation rating available for any marine fuel hose. Formulated to handle gasoline, diesel and alcohol blended fuels. This hose meets all the requirements of the USCG, NMMA, ABYC and is certified by IMCI for use in the European community. The 360-00 series is an A-1 hose that can be used in a feed or vent application. The flame resistant cover is designed for enclosed engine compartment applications

**SIZE:** 1/4", 5/16", 3/8", 1/2", 5/8"



### SERIES 360-03

#### FUEL FEED AND VENT HOSE (ALL RUBBER)

Designed to meet fuel hose specifications of SAE J1527 and ISO 7840. The all rubber construction offers greater flexibility and compression for ease of coupling installation. Formulated to handle gasoline, diesel and alcohol blended fuels. This hose meets all requirements of the USCG, NMMA,



### SERIES 373

#### CORRUGATED FUEL FILL HOSE

Designed to meet fuel hose specifications of SAE J1527 and ISO 7840. The helical wire construction provides flexibility and collapse resistance for applications requiring a tight bend radius. This hose meets all the requirements of the USCG, NMMA, ABYC and is certified by IMCI for use in the European community. This A-2 hose is designed for fill applications where the fuel is not normally continuously in the hose. The flame resistant cover is designed for enclosed engine compartment applications.

**SIZE:** 1 1/2", 1 7/8", 2", 3"



### SERIES 375

#### SMOOTH FUEL FILL HOSE

Designed to meet fuel hose specifications of SAE J1527 and ISO 7840. The helical wire construction provides flexibility and collapse resistance for applications requiring a tight bend radius. This hose meets all the requirements of the USCG, NMMA, ABYC and is certified by IMCI for use in the European community. This A-2 hose is designed for fill applications where the fuel is not normally continuously in the hose. The flame resistant cover is designed for enclosed engine compartment applications.

**SIZE:** 1/2" to 8"



### Series 375-ULP

#### ULTRA-LOW PERMEATION FUEL FILL HOSE

Designed with all the flexibility of traditional rubber hose for complex shapes and easy installation. This hose features; ultra low fuel permeation and excellent permeation resistance and uses a wide range of rubber hose clamps and fittings.

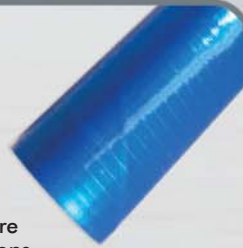


## 350°F Silicone SYSTEMS

### SERIES 202V SOFTWALL EXHAUST HOSE

Extender 202V 350°F Silicon Wet Exhaust hose is a softwall flexible hose designed to provide maximum service life in pleasure and commercial marine exhaust applications. Hose exceeds SAE J2006.  
Cover: Metallic Blue  
Construction: 4 ply polyester to SAE J2006 standards  
Temperature range: -65° to +350°F (-54° to +177°C)  
Working Pressure: 25% of burst pressure  
Warranty: 10 years

**SIZE: 1" to 18"**



### 90° ELBOW CONNECTOR EXTENDER 350°F

Extender 350°F Silicon 90° elbow connector is a softwall flexible connector designed to provide maximum service life in pleasure and commercial marine applications where vibration and minor misalignment is an issue. Connector exceeds SAE J2006.  
Cover: Metallic Blue  
Construction: 4ply polyester construction to SAE J2006 standards  
Temperature range: -65° to +350°F (-54° to +177°C)  
Warranty: 10 years

**SIZE: 2" to 4 1/2"**



### SERIES 252V 350°F HARDWALL EXHAUST HOSE

Extender 350°F Silicon Wet Exhaust hose is a hardwall highly flexible hose designed to provide maximum service life in pleasure and commercial marine exhaust applications. Hose exceeds SAE J2006  
Cover: Metallic Blue  
Construction: 2 ply polyester to SAE J2006 standards  
Temperature range: -65° to +350°F (-54° to +177°C)  
Working Pressure: 25% of Burst Pressure  
Warranty: 10 years

**SIZE: 3/4" to 10"**



### 45° ELBOW CONNECTOR EXTENDER 350°F

Extender 350°F Silicon 45° elbow connector is a softwall flexible connector designed to provide maximum service life in pleasure and commercial marine applications where vibration and minor misalignment is an issue. Connector exceeds SAE J2006.  
Cover: Metallic Blue  
Construction: 4ply polyester construction to SAE J2006 standards  
Temperature range: -65° to +350°F (-54° to +177°C)  
Warranty: 10 years

**SIZE: 2" to 4 1/2"**



### HUMP HOSE SINGLE/DOUBLE ARCH EXTENDER 350°F

Extender 350°F Silicon Hump Hose single or double arch is a soft wall highly flexible connector designed to provide maximum service life in pleasure and commercial marine exhaust applications where vibration and minor misalignment is an issue. Connector exceeds SAE J2006.



### HEATER HOSE SERIES 131V EXTENDER 350°F

Extender 350°F Silicon Heater Hose 131V is a softwall flexible hose designed to provide maximum service life in pleasure and commercial marine applications for the transfer of water or antifreeze. Extender 350 meets or exceeds SAE 20 R3 Class 4.1.4.



## 500°F Silicone SYSTEMS

Novaflex flexible, high-temperature resistant silicone rubber exhaust hoses and connectors meet SAE J2006, ABYC, NMMA, and provide superior vibration and noise abatement.

### HUMP HOSE SINGLE/DOUBLE ARCH EXTENDER 500°F

Extender 500°F Silicon Hump Hose single or double arch is a soft wall highly flexible connector designed to provide maximum service life in pleasure and commercial marine exhaust applications where vibration and minor misalignment is an issue. Hose exceeds SAE J2006  
Cover: Orange  
Construction: 2 ply Aramid to SAE J2006 standards  
Temperature range: -65° to +500°F (-54° to +260°C)  
Warranty: 10 years

**SIZE: 2" to 12"**



### SERIES 202X SOFTWALL EXHAUST HOSE

Extender 202X 500°F Silicon Wet Exhaust hose is a softwall flexible hose designed to provide maximum service life in pleasure and commercial marine exhaust applications. Hose exceeds SAE J2006.  
Cover: Orange  
Construction: 4 ply Aramid to SAE J2006 standards  
Temperature range: -65° to +500°F (-54° to +260°C)  
Working Pressure: 25% of burst pressure  
Warranty: 10 years

**SIZE: 1" to 18"**



### 90° ELBOW CONNECTOR EXTENDER 500°F

Extender 500°F Silicon 90° elbow connector is a softwall flexible connector designed to provide maximum service life in pleasure and commercial marine applications where vibration and minor misalignment is an issue. Connector exceeds SAE J2006.  
Cover: Orange  
Construction: 4 ply Aramid construction to SAE J2006 standards  
Temperature range: -65° to +500°F (-54° to +260°C)  
Warranty: 10 years

**SIZE: 2" to 4 1/2"**



### SERIES 252X 500°F HARDWALL EXHAUST HOSE

Extender 500°F Silicon Wet Exhaust hose is a hardwall highly flexible hose designed to provide maximum service life in pleasure and commercial marine exhaust applications. Hose exceeds SAE J2006  
Cover: Orange



### 45° ELBOW CONNECTOR EXTENDER 500°F

Extender 500°F Silicon 45° elbow connector is a softwall flexible connector designed to provide maximum service life in pleasure and commercial marine applications where vibration and minor misalignment is an issue. Connector exceeds SAE J2006.





**Lawrence Marine**, part of *The NovaFlex Group* is a North American hose manufacturer, that specializes in marine products. Our 50 plus years of marine experience provide the boat owner with simply the best products to meet the demanding requirements of the boating industry.

Lawrence Marine uses state of the art manufacturing processes to provide the boat owner with a choice of hoses to protect against the release of odors! Most hose will permeate over time! Choose the best hose for your needs based on your required level of odor protection, flexibility and cost.

## Sanitation Hose

Good  Better  **Best**

### New

Odor Block  
Odor Protector  
Heavy Duty PVC

**LAWRENCE MARINE**  
THE NOVAFLEX GROUP 

**GOODYEAR**  
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### Odor Block Sanitation Series 104OB

The best rubber sanitation hose available to prevent odor permeation in marine waste systems. New copolymer tube designed to exceed industry requirements and be highly flexible and easy to connect. Suction (full vacuum) and discharge applications.

Operating temperature: -40° to 200°F (-40° to 93°C)

Max Working Pressure: 75psi with worm gear clamps

150 psi with industrial couplings & clamps

150 psi with industrial couplings and bands



**Best**

Part No.	ID	MM	OD	MM	Min. Bend Radius	Burst psi 70°F (21.1°C)
104CU-01000-OB-600F	1"	25.4	1.47"	37.34	3"	600
104CU-01500-OB-600F	1.5"	38.1	2.08"	52.84	4"	600

### Odor Protector Sanitation Series 144

A newly formulated premium PVC resin specifically developed to prevent odor permeation commonly found in marine waste systems. This newly designed resin protects against odor permeation. Highly flexible and compatible with all sanitation systems. Suction and vacuum applications.

Operating temperature: 5° to 158°F (-12° to 70°C)

Max Working Pressure: 50psi with worm gear clamps



**Better**

Part No	ID	MM	OD	MM	Min. Bend Radius	Max. WP 70°F (21.1°C)
144WL-00750-00-1200	.75"	19.05	.95"	24.13	2"	50 psi
144WL-01000-00-1200	1"	25.4	1.24"	31.5	2"	50 psi
144WL-01500-00-1200	1.5"	38.1	1.80"	45.72	3.5"	38 psi

### HD Smooth PVC Sanitation Series 148

A proven hose made from approved resins. This hose has been used for years and is an excellent sanitation hose. Heavy duty thick PVC construction, suction and vacuum applications.

Operating temperature: 0° to 120°F (-12° to 70°C)

Max Working Pressure: 50psi with worm gear clamps



**Good**

Part No.	ID	MM	OD	MM	Min. Bend Radius	Max WP 70°F (21.1°C)
148WL-00750-00-1200	.75"	19.05	.95"	24.13	2"	50 psi
148WL-01000-00-1200	1"	25.4	1.24"	31.5	2"	50 psi
148WL-01125-00-1200	1.125"	28.58	1.38"	35.05	2.3"	40 psi
148WL-01250-00-1200	1.25"	31.75	1.51"	38.35	2.5"	40 psi
148WL-01500-00-1200	1.5"	38.1	1.80"	45.72	3.5"	38 psi



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## Lawrence Marine

The boat owner's answer to:

- ▶ Longer service life (10 year warranty)
- ▶ Highest temperature resistance 350°F & 500°F
- ▶ Superior flexibility for ease of installation
- ▶ Maximum vibration absorption
- ▶ Maximum noise abatement
- ▶ Step up & down sizes
- ▶ Meets or exceeds SAE 2006, ABYC, NMMA and ISO (draft)

***And, the best looking hose on the market!***

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## Series 202V 350° Softwall Exhaust Hose



Part No.	ID"	OD"	Ply	WP psi
202V-01000-00	1"	1.362	4	170
202V-01180-00	1 1/8"	1.487	4	160
202V-01140-00	1 1/4"	1.612	4	150
202V-01380-00	1 3/8"	1.737	4	135
202V-01120-00	1 1/2"	1.862	4	130
202V-01340-00	1 3/4"	2.112	4	118
202V-01870-00	1 7/8"	2.237	4	112
202V-02000-00	2"	2.362	4	110
202V-02180-00	2 1/8"	2.487	4	106
202V-02140-00	2 1/4"	2.612	4	103
202V-01380-00	2 3/8"	2.737	4	100
202V-02120-00	2 1/2"	2.862	4	94
202V-02340-00	2 3/4"	3.112	4	84
202V-02780-00	2 7/8"	3.23	4	80
202V-03000-00	3"	3.362	4	79
202V-03180-00	3 1/8"	3.48	4	77

Part No.	ID" ww	OD"	Ply	WP psi
202V-03180-00	3 1/8"	3.48	4	77
202V-03140-00	3 1/4"	3.16	4	74
202V-03120-00	3 1/2"	3.862	4	66
202Z-04000-00	4"	4.362	4	58
202V-04120-00	4 1/2"	4.862	4	56
202V-05000-00	5"	5.362	4	52
202V-05120-00	5 1/2"	5.862	4	50
202V-06000-00	6"	6.362	6	80
202V-06580-00	6 5/8"	6.99	6	75
202V-07000-00	7"	7.5	6	70
202V-08000-00	8"	8.5	6	60
202V-10000-00	10"	10.5	6	55
202V-12000-00	12"	12.5	6	50
202V-14000-00	14"	14.5	6	40
202V-16000-00	16"	16.6	6	30
202V-18000-00	18"	18.5	6	25

## Series 202X 500° Softwall Exhaust Hose (aramid fabric)



**Extender 500 202X (500°F)** change V in part no. to X—all other data the same

**Extender 350 Silicon Wet Exhaust hose** is a softwall flexible hose designed to provide maximum service life in pleasure and commercial marine exhaust applications. Hose exceeds SAE J2006.

Cover: Metallic Blue

Construction: 4 ply polyester to SAE J2006 standards

Temperature range: -65° to +350°F (-54° to +177°C)

Working Pressure: 25% of burst pressure

Warranty: 10 years

## Series 252V 350°F Hardwall Exhaust Hose (aramid fabric)



Part No.	ID"	OD"	Ply	WP psi
252V-00340-00	3/4"	1.04	2	90
252V-00780-00	7/8"	1.16	2	88
252V-01000-00	1"	1.29	2	85
252V-01180-00	1 1/8"	1.41	2	80
252V-01140-00	1 1/4"	1.54	2	76
252V-01380-00	1 3/8"	1.66	2	68
252V-01200-00	1 1/2"	1.79	2	66
252V-01340-00	1 3/4"	2.04	2	60
252V-01780-00	1 7/8"	2.16	2	57
252V-02000-00	2"	2.29	2	56
252V-02180-00	2 1/8"	2.41	2	52
252V-02140-00	2 1/4"	2.54	2	51
252V-02120-00	2 1/2"	2.79	2	43
252V-02340-00	2 3/4"	3.04	2	42
252V-02780-00	2 7/8"	3.16	2	40
252V-03000-00	3"	3.29	2	39

Part No.	ID"	OD"	Ply	WP psi
252V-03180-00	3 1/8"	3.29	2	38
252V-03120-00	3 1/2"	3.79	2	33
252V-03340-00	3 3/4"	4.04	2	30
252V-04000-00	4"	4.362	4	58
252V-04120-00	4 1/2"	4.862	4	56
252V-05000-00	5"	5.362	4	52
252V-5120-00	5 1/2"	5.862	4	50
252V-06000-00	6"	6.362	4	46
252V-06580-00	6 5/8"	6.987	4	41
252V-07000-00	7"	7.362	4	35
252V-08000-00	8"	8.362	4	30
252V-10000-00	10"	10.362	4	24
252V-12000-00	12"	12.362	4	20
252V-14000-00	14"	14.362	4	16
252V-16000-00	16"	16.362	4	13
252V-18000-00	18"	18.362	4	10

## Series 252X 500° Hardwall Exhaust Hose (aramid fabric)



**Extender 500 252X (500°F)** change V in part no. to X—all other data the same

Minimum bend radius is 4 times the ID in inches

**Extender 350 Silicon Wet Exhaust hose** is a hardwall highly flexible hose designed to provide maximum service life in pleasure and commercial marine exhaust applications. Hose exceeds SAE J2006

Cover: Metallic Blue

Construction: 2 Ply polyester to SAE J2006 standards

Temperature range: -65° to +350°F (-54° to +177°C)

Working Pressure: 25% of Burst Pressure

Warranty: 10 years



**Extender 500 Hump Hose Single Arch (aramid fabric)**



**Extender 350 Hump Hose Single Arch**



Part No	Hose ID		Cuff OD			
	Inches	MM	Inches	MM	Ply	OAL"
202V1H-02000-00	2"	50.8	3.37	60.28	4	6
202V1H-02120-00	2 1/2"	57.25	2.82	71.53	4	6
202V1H-03000-00	3"	76.2	3.37	85.65	4	6
202V1H-03120-00	3 1/2"	88.9	3.82	96.93	4	6
202V1H-04000-00	4"	101.6	4.37	111.03	4	6
202V1H-05000-00	5"	127	5.37	135.45	4	6
202V1H-06000-00	6"	152.4	6.37	161.75	4	8
202V1H-08000-00	8"	203.2	8.37	212.6	6	8
202V1H-10000-00	10"	254	10.37	260.45	6	12

**Extender 500 202X1H (500°F) change V in part # to X—all other data the same**

**Extender 350 Silicon Hump hose single arch** is a softwall flexible connector designed to provide maximum service life in pleasure and commercial marine applications where vibration and minor misalignment is an issue.

Connector exceeds SAE J2006.

Cover: Metallic Blue

Construction: 4 Ply polyester to SAE J2006 Standards

Temperature range: -65° to +350°F (-54° to +177°C)

Warranty: 10 years

**Extender 350 Hump Hose Double Arch**



**Extender 500 Hump Hose Double Arch (aramid fabric)**

Part No.	Hose ID		Cuff OD		
	ID"	MM	OD"	MM	OAL"
202V2H-06000-00	6"	152.4	6.37	161.75	14
202V2H-08000-00	8"	203.2	8.37	212.6	14
202V2H-10000-00	10"	254	10.37	263.45	14
202V2H-12000-00	12"	304.8	12.37	314.2	14
202V2H-14000-00	14"	355.6	12.37	365	14
202V2H-16000-00	16"	406.4	16.37	415.8	14
202V2H-18000-00	18"	457.2	18.37	457.2	18

**Extender 500 202X2H (500°F) change V in part no. to X—all other data the same**

**Extender 350 Silicon Hump Hose double arch** is a softwall flexible connector designed to provide maximum service life in pleasure and commercial marine applications where vibration and minor misalignment is an issue. Connector exceeds SAE J2006.

Cover: Metallic Blue

Construction: 4 Ply polyester construction to SAE J2006 standards

Temperature range: -65° to +350°F (-54° to +177°C)

Warranty: 10 years

**Extender 350 Heater Hose 131V**



Part No.	Inches	MM	Inches	MM	WP psi
131V-00140-00	1/4"	6.35	.46"	11.68	105
131V-00380-00	3/8"	9.53	.64"	16.13	105
131V-00120-00	1/2"	12.7	.76"	19.3	112
131V-00580-00	5/8"	15.88	.93"	23.5	75
131V-00340-00	3/4"	19.05	1.07"	27.18	68
131V-01000-00	1"	25.4	1.38"	35.01	50

**Actual burst pressure is minimum 4 times working pressure**

**Extender 350 Silicon Heater Hose 131V** is a softwall flexible connector designed to provide maximum service life in pleasure and commercial marine applications for the transfer of water or antifreeze. Extender 350 meets or exceeds SAE 20 R3 Class 4.1.4.

Cover: Royal Blue

Construction: Polyester reinforcement

Temperature range: -65° to +350°F (-54° to +177°C)

Warranty: 10 years



**Extender 500 90°  
Elbow Connector  
(aramid fabric)**

**Extender 350 90°  
Elbow Connector**



Part No.	ID"	OD"	Leg Length	Radius	Wall
202V90-02000-00	2"	2.38"	6"	4"	.18"
202V90-02500-00	2.5"	3.38"	6"	4"	.18"
202V90-03000-00	3"	3.38"	6"	4"	.18"
202V90-03500-00	3.5"	3.88"	6"	4"	.18"
202V90-04000-00	4"	4.38"	6"	4"	.18"
202V90-04500-00	4.5"	4.88"	6"	4"	.18"
202V90-06000-00	6"	6.38"	6"	4"	.18"

**Extender 500 202X90 (500°F) change V in part no. to X—all other data is the same**

**Extender 350 Silicon 90° elbow connector** is a softwall flexible connector designed to provide maximum service life in pleasure and commercial marine applications where vibration and minor misalignment is an issue. Connector exceeds SAE J2006.

Cover: Metallic Blue

Construction: 4ply polyester construction to SAE J2006 standards

Temperature range: -65° to +350°F (-54° to +177°C)

Warranty: 10 years



**Extender 500 45°  
Elbow Connector  
(aramid fabric)**

**Extender 350 45°  
Elbow Connector**



Part No.	ID/MM	OD/MM	Leg Length	Radius	Wall
202V45-02000-00	2"/50.80	2.38"/60.20	6"	4"	.18"
202V45-03000-00	2.5"/63.50	76"/72.90	6"	4"	.18"
202V45-04000-00	3"/76.20	3.36"/85.60	6"	4"	.18"
202V45-04000-00	4"/101.60	4.38"/111.00	6"	4"	.18"
202V45-06000-00	6"/152.40	6.38"/161.85	6"	4"	.18"

**Extender 500 202X45 (500°F) change V in part no. to X—all other data is the same**

**Extender 350 Silicon 45° connector** is a softwall flexible connector designed to provide maximum service life in pleasure and commercial marine applications where vibration and minor misalignment is an issue. Connector exceeds SAE J2006.

Cover: Metallic Blue

Construction: 4ply polyester construction to SAE J2006 standards

Temperature range: -65° to +350°F (-54° to +177°C)

Warranty: 10 years

Lawrence Marine part of "The NovaFlex Group" has been building marine hoses for more than 50 years. We now use this manufacturing expertise to provide silicon products designed to meet the most rigorous requirements found in the Marine Industry. North American made insures a consistency of product not found in imports. Extender silicon provides long lasting, high quality products, made from ozone, heat and chemical resistant materials for added safety and economical performance!

Lawrence Marine Extender silicone products are for use as described. Products with textile reinforce can be used in wet exhaust systems and used on engine coolant systems. It is incumbent on the user or installer to insure the product is used in applications that do not exceed the rated working pressure or temperature of the product.

1. When installing the Extender Silicon unit in wet exhaust systems, place the unit downstream from the water injection point so that the maximum continuous temperature at its location does not exceed the rating of the Expender unit.
2. Install the unit over rigid piping with enough over lap to use 2 marine grade stainless steel worm gear clamps (minimum 1/2" wide) for safety. 5/8" & 3/4" clamps are recommended.
3. Inspect hose products every 6 months for serviceability (see Lawrence Marine Care, Use and Maintenance Booklet (Form# 2003-2). In case of an engine backfire, inspect the entire exhaust system for damage, leaks or separated connections.

#### LIMITED WARRANTY

WARRANTY: LAWRENCE MARINE warrants its marine products to be free from defects in material and workmanship under conditions of normal use and service when installed and used in its proper non-commercial marine application in accordance with all applicable federal, state and local laws. This warranty shall be for the term of up to ten years from date of purchase according to our literature, on the date of purchase. This warranty does not apply to products which have been damaged for any reason after leaving the control of LAWRENCE MARINE, including but not limited to damage caused by abuse, misuse, negligence, accident, modification, installation, alteration, repair, or excessive temperature or pressure. During the warranty period, if a product is found to be defective in material or workmanship, it will be replaced or repaired without charge if returned, with prior approval, in accordance with LAWRENCE MARINE'S return good policy. Damage to the product incurred during packing or return shipping of the product is not covered under this warranty. Proof of purchase must accompany the return. The foregoing obligations state LAWRENCE MARINE'S entire and exclusive liability and the buyers exclusive remedy for any claim or damages in connection with the sale or furnishing of products or parts, their design, installation or operation. LAWRENCE MARINE IN NO EVENT WILL BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY WARRANTIES, EXPRESS OR IMPLIED IN FACT OR BY LAW WHATSOEVER, AND ITS LIABILITY UNDER NO CIRCUMSTANCES WILL EXCEED THE PURCHASE PRICE FOR THE PRODUCT. LIABILITY OF LAWRENCE MARINE UNDER ANY WARRANTY WHICH MAY BE IMPLIED BY LAW, INCLUDING WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IS LIMITED SOLELY TO THE PERIOD OF TIME SET FORTH IN THIS WARRANTY. This warranty is designed as a LIMITED WARRANTY under the provisions of applicable federal law. Some states do not allow limitations on how long an implied warranty lasts or do not allow exclusion or limitation of incidental or consequential damages. So the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.



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**Lawrence Marine**, part of *The NovaFlex Group* has used it's 50 years of experience in the Marine Industry to develop a superior line of molded EPDM parts. Made in North America means high quality, consistency of product and maximum service life.

Product design capabilities in conjunction with in-plant manufacturing provides short delivery times. Let Lawrence Marine become your single source supplier of quality marine hump hose, 45° & 90° angled connectors and step or jump size connectors.

## Molded Rubber Marine Exhaust Parts

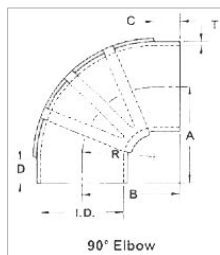
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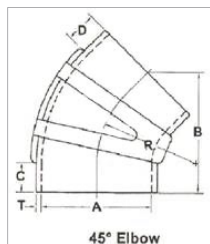
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## 90° Elbow Connector



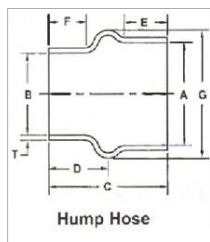
Part No.	I.D."	A	B	C	D	R	T
LM90L20	2	3.5	3.5	1.5	1.5	2	0.25
LM90L25	2.5	4	4	1.5	1.5	2.5	0.25
LM90L30	3	4.75	4.75	1	1	4.5	0.25
LM90L35	3.5	5.5	5.5	1.5	1.5	4	0.25
LM90L40R30	4 x 3	4.5	3.5	3.62	1.5	1.5	0.25
LM90L40R35	4 x 3.5	4.5	3.62	1.5	1.5	3	0.25
LM90L40	4	5.75	5.75	1.25	1.25	4.5	0.25
LM90L45	4.5	5.5	5.5	2	2	3.5	0.25
LM90L50	5	6.12	6.12	1.75	1.75	4.74	0.25
LM90L50R40	5 x 4	5.75	6	1.75	1.75	3.75	0.25
LM90L60R50	6 x 5	7	6	1.75	1.75	4.25	0.25
LM90L60	6	6.75	6.75	1.75	1.75	5	0.25
LM90L80	8	8.5	8.5	2	2	6.5	0.37
LM90L100	10	10	8.5	2	2	6.5	0.37

## 45° Elbow Connector



Part No.	I.D."	A	B	C	D	R	T
LM90L20	2	3.5	3.5	1.5	1.5	2	0.25
LM90L25	2.5	4	4	1.5	1.5	2.5	0.25
LM90L30	3	4.75	4.75	1	1	4.5	0.25
LM90L35	3.5	5.5	5.5	1.5	1.5	4	0.25
LM90L40R30	4 x 3	4.5	3.5	3.62	1.5	1.5	0.25
LM90L40R35	4 x 3.5	4.5	3.62	1.5	1.5	3	0.25
LM90L40	4	5.75	5.75	1.25	1.25	4.5	0.25
LM90L45	4.5	5.5	5.5	2	2	3.5	0.25
LM90L50	5	6.12	6.12	1.75	1.75	4.74	0.25
LM90L50R40	5 x 4	5.75	6	1.75	1.75	3.75	0.25
LM90L60R50	6 x 5	7	6	1.75	1.75	4.25	0.25
LM90L60	6	6.75	6.75	1.75	1.75	5	0.25
LM90L80	8	8.5	8.5	2	2	6.5	0.37
LM90L100	10	10	8.5	2	2	6.5	0.37

## Hump Hose



Part No	I.D." A & B	C	D	E	F	G	T
LM20H20	2	3.5	1.75	1.1	1.1	3.65	0.2
LM25H25	2.5	3.5	1.75	1.1	1.1	3.65	0.2
LM30H30	3	3.5	2.63	1.02	1.02	4.5	0.25
LM35H35	3.5	5.25	3	2.25	2.25	5	0.25
LM35H30	3.5 x 3	5	2.31	2.31	3	5	0.25
LM40H30	4 x 3	5.25	2	2	3	5.25	0.25
LM40H40	4	5.25	2.63	2	2	5.25	0.25
LM45H45	4.5	6	3	2.25	2.25	6	0.25
LM50H50	5	6	3	2.25	2.25	6.10	0.25
LM50H40	5 x 4	6	3	2.12	1.81	6.25	0.25
LM60H50	6 x 5	6	3	3.13	1.88	7.5	0.25
LM60H60	6	6	3	2.25	2.25	7.38	0.25
LM80H80	8	5	2.5	1.35	1.35	10	0.31
LM80H60	8 x 6	6	1.75	1.95	3	9.5	0.25
LM100H100	10	6	3	2	2	11.5	0.25

## Sleeves (Step Down) & Reducers Connectors



SLEEVE



REDUCER

Part No	I.D." B & C	A	D	E	F
LM25RS20	2.5 x 2	2.92	2.5	1	0.21
LMS30	3	3.5	3.07	n/a	0.25
LMRS30R20	3 x 2	3.42	3.5	1	0.21
LMS40	4	4.5	3.5	n/a	0.25
LMS50	5	5.5	3.5	n/a	0.25



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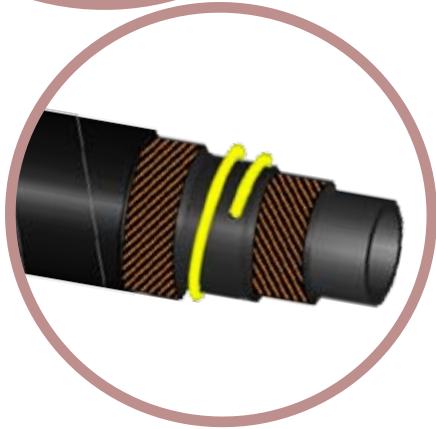
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# Novaflex Marine

## Novaflex 200XP



### Rust and Crush Resistant Exhaust Hose

An exhaust hose for the 21st century. Meets the performance standards for SAEJ2006 and due to its unique design provides added service life.

- No metal parts to rust, provides longer life in salt & fresh water environments
- Holds it's shape - special kink resistant design - not subject to damage like metal wire hose
- Highly flexible - ease of routing
- Easy to install - uses all standard rubber hose clamps
- Superior resistance to heat aging - 250°F

Part No	ID"	OD"	Weight/ft lbs	Max Lengths
200XP-00750-00	.75	1.24	0.30	100 ft
200XP-01000-00	1.00	1.49	0.40	100 ft
200XP-01250-00	1.25	1.8	0.50	100 ft
200XP-01500-00	1.50	2.02	0.60	100 ft
200XP-02000-00	2.00	2.56	0.80	100 ft
200XP-02500-00	2.50	3.06	1.00	100 ft
200XP-03000-00	3.00	3.57	1.20	100 ft
200XP-03500-00	3.50	4.07	1.50	100 ft
200XP-04000-00	4.00	4.57	1.65	100 ft

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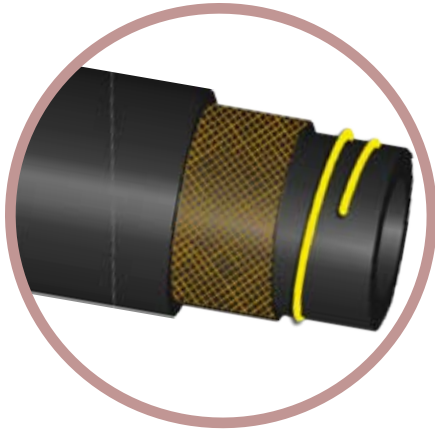
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# Novaflex Marine

## Novaflex 375XP



### Rust and Crush Resistant Fuel Fill Hose

An fuel fill hose for the 21st century. Meets the performance standards for SAEJ1527 and provides added service life due to its unique design.

- No metal parts to rust, provides longer life in salt & fresh water environments
- Holds its shape - special kink resistant design - not subject to damage like metal wire hose
- Highly flexible - ease of routing
- Easy to install - uses all standard rubber hose clamps
- Superior resistance to heat aging
- Resistant to oxygenated & sour fuels

Part No	ID"	OD"	Weight/ft lbs	Max Lengths
375XP-00750-00	0.75	1.15	0.30	100 ft
375XP-01000-00	1.00	1.40	0.60	100 ft
375XP-01500-00	1.50	1.90	0.60	100 ft
375XP-02000-00	2.00	2.40	0.80	100 ft

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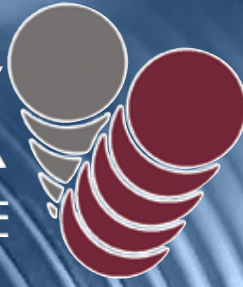
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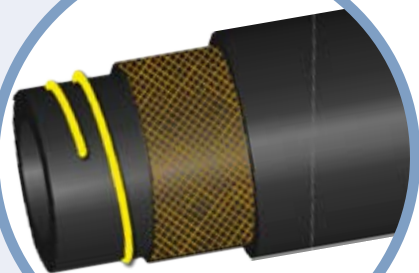


## NovaFlex 375XP

### **Rust and Crush Resistant Fuel Fill Hose**

**An fuel fill hose for the 21st century.  
Meets the performance standards  
for SAEJ1527 and provides added  
service life due to its unique design.**

- No metal parts to rust, provides longer life in salt & fresh water environments
- Holds its shape - special kink resistant design - not subject to damage like metal wire hose
- Highly flexible - ease of routing
- Easy to install - uses all standard rubber hose clamps
- Superior resistance to heat aging
- Resistant to oxygenated & sour fuels



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## Silicon Rubber & EPDM Molded or reinforced connectors

Novaflex Marine Extender silicone and EPDM rubber products are for use as described. Products with textile reinforcement can be used in wet exhaust systems and used on engine coolant systems. It is incumbent on the user or installer to insure the product is used in applications that do not exceed the rated working pressure or temperature of the product.

1. When installing the Extender Silicon or EPDM units in wet exhaust systems, place the unit downstream from the water injection point so that the maximum continuous temperature at its location does not exceed the rating of the Expendor unit.
2. Install the unit over rigid piping with enough over lap to use 2 marine grade stainless steel worm gear clamps (minimum 1/2" wide). For additional safety 5/8" & 3/4" clamps are recommended.
3. Inspect all rubber & plastic products every 6 months for serviceability. In case of an engine backfire, inspect the entire exhaust system for damage, leaks or separated connections. All inspection information in this booklet can be applied to connectors.

Molded parts have no reinforcement. It is important to strap and support all parts to prevent movement and possible disconnection due to vibration. In addition it is important to insure that the weight of hoses and other equipment attached to connectors do not place forces on the connectors that will promote disconnection at the attachment point.

#### LIMITED WARRANTY

NOVAFLEX MARINE warrants its marine products to be free from defects in material and workmanship under conditions of normal use and service when installed and used in its proper non-commercial marine application in accordance with all applicable federal, state and local laws. This warranty shall be for the term of up to ten years from date of purchase according to our literature, on the date of purchase. This warranty does not apply to products which have been damaged for any reason after leaving the control of NOVAFLEX MARINE, including but not limited to damage caused by abuse, misuse, negligence, accident, modification, installation, alteration, repair, or excessive temperature, ozone or pressure. During the warranty period, if a product is found to be defective in material or workmanship, it will be replaced or repaired without charge if returned, with prior approval, in accordance with NOVAFLEX MARINE'S return good policy. Damage to the product incurred during packing or return shipping of the product is not covered under this warranty. Proof of purchase must accompany the return. The forgoing obligations state NOVAFLEX MARINE'S entire and exclusive liability and the buyers exclusive remedy for any claim or damages in connection with the sale or furnishing of products or parts, their design, installation or operation. NOVAFLEX MARINE IN NO EVENT WILL BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY WARRANTIES, EXPRESS OR IMPLIED IN FACT OR BY LAW WHATSOEVER, AND ITS LIABILITY UNDER NO CIRCUMSTANCES WILL EXCEED THE PURCHASE PRICE FOR THE PRODUCT. LIABILITY OF NOVAFLEX MARINE UNDER ANY WARRANTY WHICH MAY BE IMPLIED BY LAW, INCLUDING WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IS LIMITED SOLELY TO THE PERIOD OF TIME SET FORTH IN THIS WARRANTY. This warranty is designed as a LIMITED WARRANTY under the provisions of applicable federal law. Some states do not allow limitations on how long an implied warranty lasts or do not allow exclusion or limitation of incidental or consequential damages. So the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.



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## Marine Hose

Proper hose use  
care and maintenance

Duty to Warn Form # 2003- 2  
Effective: Oct. 2003 rev 10.05

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**Novaflex Marine, part of "The Novaflex Group"** has implemented a quality policy to supply to our customers the correct hose or hose assembly for the application.

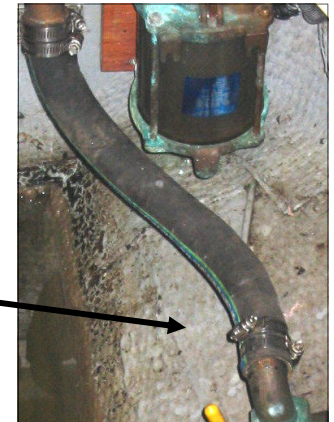
Consistent with this policy **The Novaflex Group** has prepared this Technical Booklet to assist our customers and users of Novaflex Marine hose assemblies with information directed toward maximum safe hose assembly life and user safety. This booklet also addresses **Novaflex's** "Duty to Warn" responsibility regarding misuse of these products.

*The information contained in this booklet is intended to be a guide. It is the responsibility of the user to apply this information in the appropriate manner to insure safe operating procedures.*



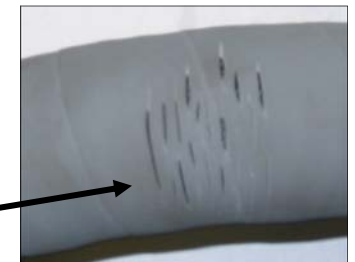
Crushed vent ducting, will impede proper & safe venting of fumes. Replace damaged duct.

Clamps installed with screw tightening heads in line . It is recommended to off set as seen below.

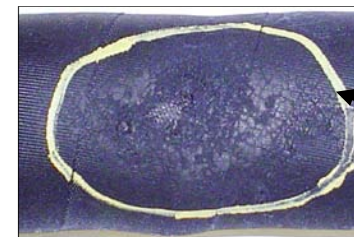


Hard Wall hose kinked flat. Hose needs to be replaced.

Hose with cover cracks due to age or the effects of ozone. Hose covers over time harden and should be replaced if this condition is found (note, if boat has an ozone generator on board, this could accelerate this condition).



Cracks



Hose with cover charred area from high heat or extreme aging due to heat or ozone.

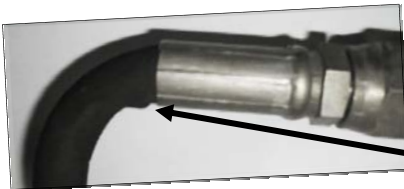
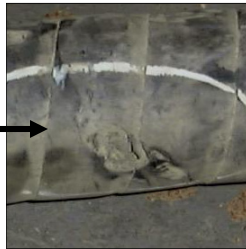
## Examples of common damage that signal rubber & plastics should be replaced

The below examples are the most common visual signs that a hose is demonstrating danger signals. Examples of hose damage are not limited to what is shown, there may be other situations that can result in severely shorting hose life. When inspecting hose, tubing, ducting or other rubber or plastic product always err on the side of safety! **“When in doubt, remove from service”**.

Hose cover melted due to contact with high heat or hot engine parts.



Hole in hose cover that exposes reinforcement.



Hose bent too tight, damaged at end of coupling.

Plastic hose kinked



Exhaust hose with cover worn, exposing reinforcement.



### Introduction

## General Instructions for Hose Use, Care and Maintenance

***This technical booklet is intended solely for the use of Novaflex Marine’s customers as a guide for the use, care and maintenance of Novaflex Marine hose.***

Novaflex Marine customers have requested information pertaining to the use, care and maintenance of marine assemblies. As a result The Novaflex Group has developed this technical booklet to improve users understanding of marine hose. **This information is available to all users of Novaflex Marine products.**

Hoses are designed to convey products and to operate in a dynamic work environment. This operation can present a serious safety hazard if safe operating procedures are not followed! **“All hose will fail in time!”** This Novaflex booklet is designed to supplement safe operating procedures, not replace them. All hose and couplings are designed for specific uses and it is critical for the user to understand how and what is important for the safe and correct use of a hose assembly. It is always necessary to know the data presented in this booklet concerning the intended service and application of any particular hose **before** you use or request a hose.

Every hose user should have in place a safety procedure to implement in the event of a hose failure.

Should you have any questions on any topic covered in this booklet, contact **Novaflex Marine at: (800)334-4270 or (336)578-2161.**

## STAMPED

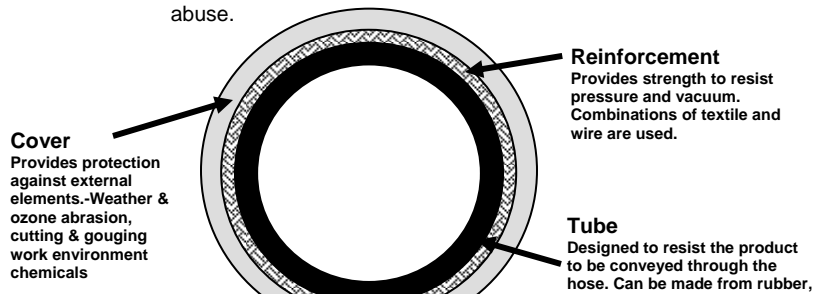
<b>'S' Size</b>	The hose inside diameter (I.D.) and length required to meet the applications requirements (i.e. 3" x10 ft)
<b>'T' Temperature</b>	Maximum & minimum temperature of the product conveyed through the hose assembly. (i.e. 200° F)
<b>'A' Application</b>	Describe the actual use of the hose (i.e. Ship to Shore unloading, LPG transfer, in plant chemical use, etc.)
<b>'M' Material Conveyed</b>	Air, water, the specific chemical, product or material conveyed ( i.e. compressed air).
<b>'P' Pressure</b>	The pressure or vacuum at which the material is being conveyed through the hose assembly. ( i.e. 100 psi ).
<b>'E' Ends</b>	Type of end connections required to attach the NovaFlex hose to the mating connection (i.e. NPT male, Cam & Groove, Acme swivel etc).
<b>'D' Delivery</b>	Date the product is required (i.e. June 6, 2003).

Once the information in the acronym "STAMPED" referenced above is obtained, it is essential that a hose and coupling combination meet all of the "STAMPED" requirements as recommended by Novaflex Marine. "Always use the printed information from Novaflex Marine to insure accuracy of any recommendation." Do not exceed the printed, recommended service criteria.

It is the ultimate objective to obtain maximum safe service life for a product; to accomplish this Novaflex Marine recommends the user maintain specific care during the use of the hose assembly to insure continued safe operations.

## Elements of a Hose

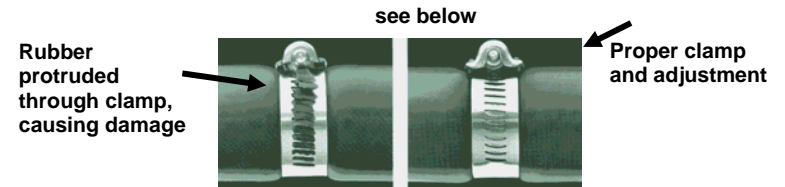
<b>Tube</b>	Its purpose is to handle the liquid, solid or gaseous material the hose is transferring. The tube is the innermost element of the hose and is intended to be resistant to the product conveyed.
<b>Reinforcement</b>	Its purpose is to withstand the working forces necessary to transfer the product conveyed by the hose tube in the application. Typically this is rated in a maximum rated working pressure (WP) in pounds per square inch (psi).
<b>Cover</b>	Its primary purpose is to protect the tube and reinforcement from external factors such as, abrasion, weather, ozone and external abuse.



## General instructions for Hose Clamps and Marine Hose

There are numerous manufactures of hose clamps, Novaflex Marine does not recommend any particular brand. There are common practices for the use of clamps and preferred clamp styles. Improperly attached clamps can cause damage to hose, hose ejection from the fixture or leaky connections resulting in spills. A superior type of hose attachment method is a permanently attached crimped or swaged coupling system. Due to the vastly different hose attachment applications common in boat building, worm drive bands have become the convenient method of choice.

1. Each manufacture of hose clamps rates their clamps differently. Novaflex Marine recommends that a worm gear type hose clamp not be used on any hose with working pressures over 75 psig with out the manufactures approval. This max working pressure will change by hose ID.
2. Novaflex Marine recommends clamps that are made with an inner liner to prevent rubber extrusion through the screw slots.

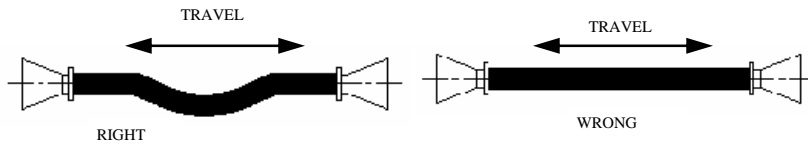


3. All hose is subject to cold flow. This is the loss of compression over time due to stress placed on rubber or plastic over time. Clamps should be retightened periodically, inspect for leaks and tighten to stop a leak. Replace if leak persist.
4. Do not over tighten clamps, this could cause the clamps to cut into the rubber or plastic resulting in shortened service life. Never exceed the torque rating recommended by the manufacture of the clamp!
5. In many applications it is prudent to use 2 clamps per connection end to obtain a safe seal or meet industry requirements (USCG, SAE, NMMA or ABYC). It is incumbent on the installer to know the requirements and use correct procedures. If 2 clamps are used, offset the screw tightening head approximately 180° to get the best seal.
6. Use only marine grade stainless steel clams to resist the effects of corrosion.

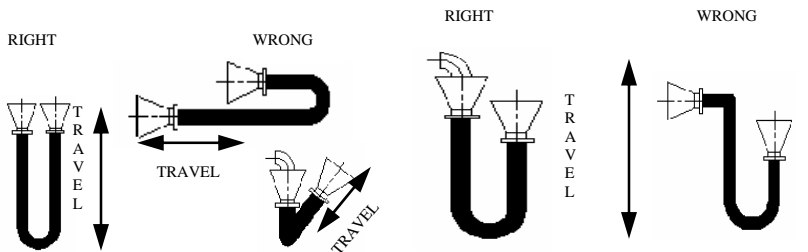
## Correct Assembly Installation

Satisfactory performance and appearance depends upon proper hose installation. Excessive length destroys the trim appearance and adds unnecessary stress to the hose if it causes the hose to exceed minimum bend radius. Hose assemblies of insufficient length may cause coupling pull out or over stress the hose causing short service life.

The diagrams below offer suggestions (for other configurations contact **Novaflex Marine** for proper hose installation).

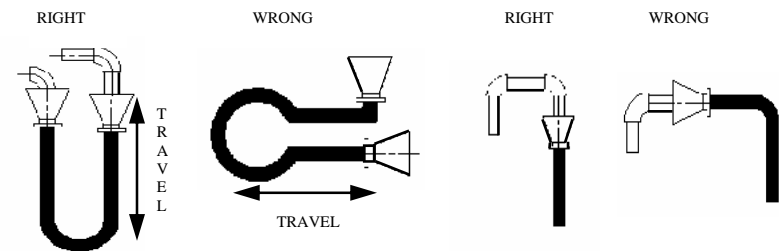


Under pressure hose may change in length. Always provide some slack for the hose to move -4 to + 5%.



Prevent twisting, torque or distortion, hose should be bent in same plane as motion.

Never place sharp hose bends near coupling. Hose should be installed so that flexing takes place in one plane only & direction of motion must be perpendicular.



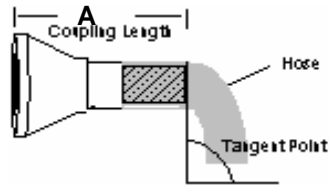
When the hose minimum bend radius is exceeded, use angled adaptors to meet radius requirements

Avoid hanging hose from horizontal fixtures.

## Operator requirements for a safe hose assembly

1. Working Pressure (WP) should never be exceeded. Never leave liquids or gasses trapped in a hose with each end sealed or valves closed. Thermal expansion of some products may cause pressures to exceed working pressure.
2. Always rate the Working Pressure of the coupled hose assembly by the lowest rated element (hose WP or coupling WP which ever is lowest).
3. Only use the hose assembly for the service marked on the hose or for the service recommended in the printed literature.
4. Have a **HOSE INSPECTION & TEST PLAN** to insure unsafe hoses and / or worn or damaged couplings or clamps are removed from service.
5. Test all hose assemblies as required every six (6) months (or sooner) to insure the assembly is safe for continued use. (Use RMA, USCG, OSHA, NFPA, LPGA , SAE or other regulatory agency recommendation for pressure testing along with these guidelines.) If pressure testing is not possible, the hose should be inspected every 6 months for signs of ageing or damage.
6. Educate your self as to the conditions associated with unsafe hose; develop an inspection program that causes your hose to be inspected on a regular basis. Hose users remember **"When in doubt, remove the hose from service!"** Maintain a **HOSE Inspection & Test Plan that requires a visual inspection** at least every 6 months.
7. Always use a coupling made from material suitable for the application and product conveyed. (Refer to alloy Charts).
8. Check the hose attachment for slippage. Look for misalignment, exposed cover from under the clamp. If there are questions contact Novaflex Marine.
9. In many cases hose may be installed through bulk heads or walls, because of vibration on a vessel, the hose cover could be worn excessively over time. If there is this possibility hoses should be protected from this potential damage with a protective cover.

10. When measuring a hose for specific installation, it is important to remember that the tangent point for hose bending is at the end of the hose nipple portion inside the hose. It is recommended to add a minimum of 6" to dimension A shown below :



Always keep the bend radius of the hose within the recommended dimensions published for the specific hose. (see catalog)

11. It is common in some applications to attach hose by sliding the hose over a pipe or other fixed connections and clamping the hose to this attachment fixture. The use of worm gear type hose clamps is recommended for low pressure applications (generally less than 75 psi WP). When hose clamps are employed the installer must follow the recommended installation procedures for correct hose retention. It is best practice to pressure test new applications to verify the attachment method is functional.
12. Use of Worm Gear Clamps— see page 13.

**Do** – Inspect and or test hoses every six (6) months or sooner to 1.5 times the working pressure or to industry recommended pressures based on RMA, USCG, OSHA, DOT, API, NPGA or others.

**Do – Be** educated on how to inspect a hose before each use to insure it is safe to use along with correct hose use and care. – Error on the side of safety! **“When in doubt, remove the hose from service!”**

**Do** – Store hose in a flat coil. Be sure no kinks are left in the coil. Lay it on the floor, a shelf or table. Long lengths are best stored on hose reels.

**Do** – Protect hose from the effects of ozone (O<sub>3</sub>), the active form of oxygen which is more prevalent than most people think. Store away from electrical or ozone producing equipment. Paper, wood and rags are good O<sub>3</sub> absorbers.

**Don't** – Crush or kink hose. Avoid repeated bending which may eventually break the reinforcement of the hose leading to a rupture.

**Don't** – Substitute hose types. All hoses are not equal. Consult your hose supplier for the correct recommendations.

**Don't** – Use a hose if any of the reinforcement is exposed through the cover due to cuts, gouges, cracks or just prolonged use.

**Don't** – Exceed the working pressure of the hose for any reason (including pressure spikes).

**Don't** – Use damaged or worn fittings. Check to see if the coupling is loose or has moved, has worn threads, worn gasket or is corroded. Successful hydro testing will help verify the integrity of the coupled assembly.

**Don't** – Store hose after use, without rinsing & draining if it carried substances that ultimately deteriorate the hose tube.

**Don't** – Use a hose outside its recommended temperature limits.

**Don't** – Take short cuts, use the correct hose and attachments methods as required by USCG, NMMA, SAE & ABYC.

**Don't** – Use hose in an area that has higher levels of ozone. Ozone will cause rubber and plastics to deteriorate. Ozone is produced by electric motors and other electrical equipment. In areas of above normal ozone, rubber & plastic product life will be shortened and will void **Novaflex Marine warranties.**

**Don't** – Store hose below –20°F. Boat storage in the winter can subject plastics and rubber products to temperatures below their lowest rating.

## Do's and Don'ts of Hose Care and Use

Hose is a very vulnerable link in most process and transfer applications. **All hose will fail in time!** It handles valuable and potentially dangerous materials, and hose failures can be expensive in terms of lost product, ruined equipment, spill clean up, and – most important personal injuries.

For this reason, hose is carefully designed and built to do a specific job safely and economically. Yet, unfortunately, the years of research and development invested in hose construction can be canceled by improper storage, misuse, and other abuse by the hose user, warehousemen, and other work personnel.

Novaflex Marine & The Novaflex Group recommends careful observation of the following points to improve service, safety and economy for the hose you use.

**Do** – Use hose designed and recommended for the service intended. Contact Novaflex Marine and our staff will assist you in the selection of the best hose product for your requirements.

**Do** – Make sure hose is easily identifiable as to the type and use. Where dangerous misuse can occur, use different fittings or end connections.

**Do** – Make sure your Novaflex Marine Hose is the correct length for the job intended. Remember to engineer for a possible -4% contraction to +5% elongation at max working pressure on the hose assembly.

**Do** – Set up regular hose inspections before each use so that damaged or worn hose assemblies can be replaced.

**Do** – Attach hose using proper elbows and nipples, so that its operation (including its own weight and heavy end connections) will not cause it to bend sharply at the coupling. Support hose ends with heavy couplings attached.

**Do** – Avoid placing hose in applications in which vibration, rubbing or damage from other external materials may occur. It is easy to install protective covers on hose.

**Do** – Check manufacturer's chemical resistant charts to insure the hose will transfer the products **before** it is put in the hose.

**Do** – Store hose in a cool, dry, dark and clean place.

**Do** – Only use hose that is rated for below the water line applications, by the manufacture .

**Do** – Wear safety clothing, gloves, boots, hard hat and eye protection

## General instructions for Novaflex Marine hose and hose connection inspection

(Information obtained from RMA Hose Handbook IP-2 [1987]& National Propane Gas Association Flyer# 114-91 & # 134-81)

All hose should be externally inspected prior to each use and thoroughly inspected every six (6) months or sooner. All hose should be hydrostatically tested to 1.5 times working pressure (or to appropriate industry standards) every six (6) months to verify the hose assembly's integrity. When hose hydrostatic testing is not an option to verify hose integrity, it becomes incumbent on the hose user to be more diligent in their visual inspection to identify damaged or aged hose for replacement . **"All hose will fail in time!"**

### INSPECT FOR:

1. Look for cuts, gouges, cracks, or worn spots, cracks in the hose cover that expose textile or wire reinforcement.
2. Inspect for soft spots, bulges in cover, sections of mashed flat hose or kinked areas.
3. Carefully examine a length of the hose (18" in length adjacent to where the hose is attached) for any damage such as kinks, soft spots, cover cracks, or permanent deformation of the hose from its original form.
4. Check hose attachment for any slippage which is evidenced by misalignment of the coupling or scored/exposed areas on the hose cover next to the coupling which indicates movement of the hose.
5. Check attachments for worn threads, loose clamps or bands, worn gaskets, worn or broken handles & clamps.
6. Inspect for hose cover blisters or loose outer cover. This may indicate conveyed product is passing through the carcass of the

### CORRECTIVE ACTION

- Remove hose from service. Contact Novaflex Marine for instructions
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- Remove hose from service. Remove suspect couplings or clamps from the hose and replace. If hose is damaged or suspect replace.
- Remove hose from service. Contact Novaflex Marine for instructions.

## INSPECT FOR:

7. Inspect couplings & clamps for any worn parts that may prevent normal function, damage to any safety device that prevents them from working, worn threads, excessive corrosion or rust, or cracks in any part of the coupling or clamp.

8. Inspect for hardness of the hose cover. Hoses older than 5 years may start to develop cover hardness and crack over time permitting moisture in to the reinforcement.

## CORRECTIVE ACTION

Remove hose from service. If possible remove suspect couplings from the hose, replace with new coupling.

Replace with new hose.

## General Instructions for Hose Hydrostatic Testing and Inspection

(Information obtained from RMA Hose handbook IP-2 [1987])

Hydrostatic testing is the recommended practice to verify hose serviceability. The hose user must determine when testing is not practicable and implement the best alternative, a visual inspection. A visual inspection of hose as described previously should be made for loose cover, kinks, bulges, soft spots, cover hardness and/or cracks which indicate conditions that require hose to be replaced. In addition the attachment method (clamps or couplings) should be closely examined for damage or movement.

When periodic inspection includes a hydrostatic test, pressure the hose assembly for one minute at 150% of the recommended working pressure of the hose. During the hydrostatic test, the hose should be straight, not coiled or in a kinked position. Water is the usual test medium. Never exceed working pressure (25% of the rated burst pressure).

### Safety Warning:

Before conducting any pressure tests on hose, provisions must be taken to ensure the safety of personnel performing the test and to prevent any possible damage to property. Only trained personnel using proper tools and procedures should conduct any pressure test.

1. Air or other compressed gases should not be used for pressure testing.
2. All air should be removed from the hose prior to testing by bleeding it through an outlet valve attached to one end of the hose.
3. Hose to be pressure tested should be restrained by placing steel rods or strap close to each end and at approximate 10 foot intervals along its length to keep the hose from "whipping" if failure occurs. The steel rods or straps are to be firmly anchored to the test structure in such a manner that they do not restrict the movement of the hose under pressure.
4. The outlet ends of the hose should be placed so that an ejected fitting will be restrained by a wall, sand bags, etc.
5. Provision must be made to protect personnel from the forces of the pressure media if a failure occurs. Personnel must never stand in front or in back of hose ends during test.

## General instructions for proper hose storage

(Information obtained from RMA Hose Handbook IP-2[1987])

Hose products in storage can be affected adversely by temperatures, humidity, ozone, sunlight, oils, solvents, corrosive liquids and fumes, insects, rodents and radioactive materials.

The appropriate method for storing hose depends to a great extent on its size (diameter and length), the quantity to be stored and the way in which it is packaged. Hose should **not be piled or stacked to such an extent that the weight of the stack creates distortions on the hose lengths stored at the bottom(plastic hoses are very susceptible to this on hot days).**

Since hose products vary considerably in size, weight and length, it is not practical to establish definite recommendations on this point. Hose having a very light wall will not support as much load as a hose having a heavier wall or hose having a wire reinforcement. Hose shipped in coils or bales should be stored so that the coils are in a horizontal plane.

Whenever feasible, hose products should be stored in their original shipping containers, especially when such containers are wooden crates or cardboard cartons which provide some protection against the deteriorating effects of oil, solvents and corrosive liquids; shipping containers also afford some protection against sunlight and ozone.

Certain rodents and insects will damage hose, protection from these elements should be provided.

The ideal temperature for storage of hose products ranges from 50° – 75°F(10°-24°C) with a maximum of 100°F (38°C). If stored below 32°F (0°C) some products will become stiff and will require warming before bending or being put in service. Hose product should not be stored near sources of heat, such as radiators, heaters etc. Nor should they be stored under conditions of high or low humidity.

To avoid the effect of ozone, hose should not be stored near electrical equipment that may generate ozone. Direct or reflected sunlight even through windows should be avoided. Florescent or mercury lamps may create light waves harmful to hose. Protection from such lighting should be provided.

Items should always be stored on a first in first out basis, even under the best of conditions, unusually long shelf life can deteriorate plastic or rubber hose.