

OIL FIELD PRODUCTS



Our Super Choke & Kill hose for high heat service for drilling in 15,000 PSI pressure zones.
With third party witness our hose tested for 2 hours at 400 deg. F at 15,000 PSI
with 5% CO₂ gas mixed with an oil based fluid.

Spec. 090-19225-HT

Copper State's Choke & Kill Hoses and our other drilling hoses are manufactured as a single unit to specified lengths, with the end couplings built-in as an integral part of the hoses. Hoses are vulcanized with end fittings in place, curing as one integral unit. Before shipment all hoses and couplings are tested as a single unit. This system assures us of better quality control. None of our hoses are coupled away from our plant. The built-in couplings also prevents flexing fatigue at the hose ends.

SUPER "Choke and Kill"

Spec. 090-19225-HT

Abrasive Resistant Cover "Fire Retardant"

Extra tough, compounded with neoprene-base synthetic, to assure greater resistance to oil, cutting, abrasion, weather, and temperature extremes. Guide stripe provides for easy alignment.

Open-Weave Breaker Fabric

Provides maximum bonding between secondary carcass and cover.

6 & 8-Layer Wire Reinforcement

Assures maximum safety, strength, and flexibility. This all important section of the hose consists of six or eight spirally wound layers of special fatigue resistant, high-tensile steel wires, each imbedded in a thick layer of rubber and tough fabric.



Any Type End Fittings

- Hubs
- Unibolt
- Dynetor
- Unions
- API Flanges
- Graylock

Ful-Flow Coupling

No protruding parts on Coupling.

Protective Cover

Solid, 1/2 round Stainless steel protective cover available.

Steel Cable

For additional reinforcement at coupling, a cable is spirally wound at each end of hose.

Secondary Carcass

Gives added strength and safety with one ply or specially woven fabric and layer of protective rubber.

Hose & Coupling good for H₂S service.
Couplings electro plated for salt water resistance.

Regular "Choke and Kill"

Factory Tested at 15,000 P.S.I.

28 Years of Proven Service in the Field

Hose & Coupling good for H₂S service. Couplings electro plated for salt water resistance.

Style	Bore Size	O.D.	Length	Rated	Bend Radius	Straight End	Coupling wt./ea.	Stripe Color
Super Choke & Kill	2"	5.1"	Up to 150 Feet	Spec. 090-19225 22,500 psi Tested 15,000 psi W.P.	36"	54"	125 lbs.	8 Orange Bands Longitudinal Stripe and Spiral Stripe
	2½"	5.9"					140 lbs.	
	3"	6.9"					155 lbs.	
Regular Choke & Kill	2"	4.5"	Up to 150 Feet	Spec. 090-1915 15,000 psi Tested 10,000 psi W.P.	36"	42"	95 lbs.	6 Orange Bands Longitudinal Stripe and Spiral Stripe
	2½"	5"					100 lbs.	
	3"	6"					115 lbs.	
	3½"	6.9"					130 lbs.	
	4"	7.9"					145 lbs.	

Only years of research and development could produce this hose.

For years, Copper State Rubber hose engineers and rubber specialists have pooled their knowledge in an effort to design and construct a rotary drilling hose that would more than satisfy the most exacting requirements of the drilling industry. The successful result is the "Choke and Kill" 8-wire

layer Rotary Drilling Hose. The design of this hose is so advanced that it was necessary to develop new precision machinery for its production.

Independent Lab report available on request.

"Choke and Kill" Hose surge tested to 15,000 P.S.I. in .75 of a second.

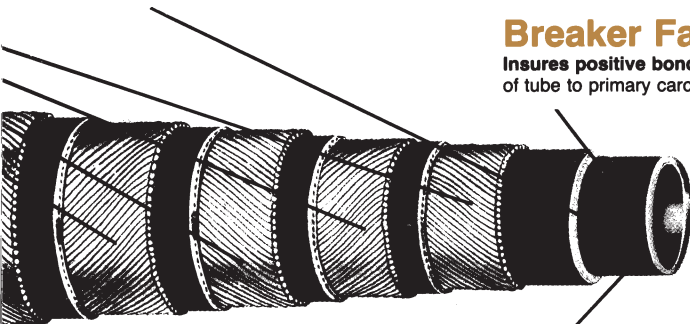
**Factory Tested at 22,500 P.S.I.
Tested to 400 Deg. F. for 2 Hours
at 15,000 P.S.I. with 5% CO₂ and Oil Based Fluids.**

Primary Carcass

Provides greatest flexibility through scientifically constructed multiple plies of premium grade, high-tensile fabric impregnated with finest quality rubber.

Breaker Fabric

Insures positive bonding of tube to primary carcass.



Oil Resistant Tube

Compounded for elevated temperatures of oil-base mud and oil emulsions. Resistant to gas permeation.



“Other Safety Features”

Couplings are built-in as an integral part of the hose. This reduces flexing fatigue at the end connections, plus the hose is less susceptible to be damaged if the bend radius is exceeded. Our flexible liner prevents any sudden rupture, without warning, at the hose ends. All Copper State hoses are built as a single unit. No Copper State hoses are coupled outside our Plant. This helps maintain our quality control after sale.

Flow Lines: Stainless steel flexible liner installed in choke & kill hose used for flow lines.

Copper State Special Well Service Hose For General Rig Use

- Burner Hose
- Test Lines
- Acidizing Lines
- Cementing Lines
- Fracking Lines
- High Pressure Jetting
- Gas Lines

Spec. 090-1920

Style	Bore Size	O.D.	Length	Rated	Bend Radius	Straight End	Coupling wt./ea.	Identification
Thermoflex Well Service Hose	2"	4"	Up to 150 Feet	10,000 psi Tested 5,000 psi W.P.	36"	42"	80 lbs.	Stainless Steel Band Welded to Coupling Body Showing: Mfg. Name - Style of Hose Date of Manufacture & Test, Working Pressure, Serial Number.
	2½"	5"					100 lbs.	
	3"	6"					115 lbs.	
	3½"	6.5"					130 lbs.	
	4"	7.0"					145 lbs.	

Thermoflex Well Service Hoses also available in 15,000 psi Test — 10,000 psi W.P.
11,250 psi Test — 7,500 psi W.P.

Spec. 090-1924
Spec. 090-1928

- Liner compounded for maximum resistance to gas permeation.
- Stainless steel liner. (optional)
- Stainless steel armored. (optional)
- Maximum operating temperature 250 Deg. F.
- H₂S and CO₂ compatible.
- Certified factory graph test reports furnished with every hose.
- Fire retardant – 700 Deg. C for 30 minutes.



Copper State Ful-Flo Rotary Hose Coupling

adds new performance features to rotary drilling and flexible vibrator hose.

1 Built-in Ful-Flo coupling has no protruding parts . . . eliminates snagging.

2 Secondary carcass and cover are both flush with and bonded to coupling body.

3 Cable is spirally wound at each end of hose for additional reinforcement at couplings and hose ends.

4 Reinforcement wires are spirally wound at precisely the same angle throughout, eliminating undesirable stress and strain on hose and coupling.

5 Forged steel, one-piece body built into the permanently bonded carcass. Stainless steel expansion ring protects rubber face of hose and prevents leakage at coupling head.

6 Built-in coupling body completely enclosed within hose wall is securely anchored to fabric and wire reinforcement. Hose has unrestricted full flow the entire length.

7 API threads cut in separate head that is screwed on and securely locked in place.

8 Coupling Weights are 4" API thread ends.

CERTIFIED FACTORY GRAPH TEST REPORTS FURNISHED WITH "EVERY" HOSE. (We test 100% of our hoses before shipment)

ROTARY DRILLING HOSE

Copper State Rotary Hose Coupling

No protruding parts Ful-Flo Coupling.



Licensed under
API Spec 7K
Approval #7K-0014

Steel Cable

For additional reinforcement at coupling, a cable is spirally wound at each end of hose.

4, 6 and 8 Layer Wire Reinforcement

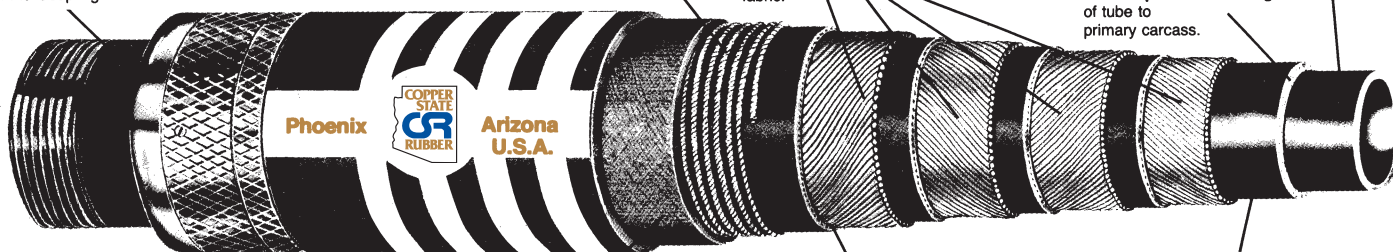
Assures maximum safety, strength, and flexibility. This all-important section of the hose consists of six spirally-wound layers of special fatigue-resistant high-tensile steel wires, each imbedded in a thick layer of rubber and tough fabric.

Oil Resistant Tube

Compounded for elevated temperatures of oil-base mud and oil emulsions.

Breaker Fabric

Insures positive bonding of tube to primary carcass.



Abrasive Resistant Cover

Extra tough, compounded with neoprene-base synthetic, to assure greater resistance to oil, cutting, abrasion, weather, and temperature extremes. Guide stripe provides for easy alignment.

Open-Weave Breaker Fabric

Provides maximum bonding between secondary carcass and cover.

Secondary Carcass

Gives added strength and safety with one ply of specially woven fabric and layer of protective rubbers.

Primary Carcass

Provides greatest flexibility through scientifically constructed multiple plies of premium grade, high-tensile fabric impregnated with finest quality rubber.

It's the hose drilling operators and tool pushers have been waiting for. Stronger, more flexible, the Copper State Rubber 4, 6 or 8-wire layer Rotary Drilling Hose provides maximum safety and hose life.

Extreme pump pressures are required for the deepest drilling operations without the added hose bulk or loss of handling ease.

Built-in flexibility, flush-type Copper State Rubber Ful-Flo couplings and alignment stripe on cover assure easier handling, better draping, and positive alignment on every type of rig.

Both today and in years ahead, drilling rig operators will discover that the new Copper State Rubber 4, 6 or 8-wire layer Rotary Drilling Hose

delivers performance in excess of the demands for pressure, abrasion and heat resistance encountered at maximum drilling depths.

Copper State Rubber now offers a new rubber compound for deep well drilling where severe service against abrasion and snagging is present. This gives added hose cover life at only a slight increase in cost.

Style	Bore Size	O.D.	Length	Rated	Stripe Color	Bend Radius	Straight End	Coupling Wt./Ea.
SUPER DRILLER Spec. 090-1912	2½"	4.50"	Up to 150 Ft.	API Grade E 15,000 PSI Tested 7,500 W.P.	5 Orange Bands and Longitudinal Stripe	36"	42"	85 lbs.
	3"	5.75"				48"		125 lbs.
MASTER DRILLER Spec. 090-1910	2½"	4.35"	Up to 150 Ft.	API Grade D 10,000 PSI Tested 5,000 PSI W.P.	4 Orange Bands and Longitudinal Stripe	36"	40"	75 lbs.
	3"	5.35"				48"		125 lbs.
IMPERIAL DRILLER Spec. 090-1908	2½"	4.35"	Up to 150 Ft.	API Grade C 8,000 PSI Tested 4,000 PSI W.P.	3 White Bands and Longitudinal Stripe	36"	36"	65 lbs.
	3"	5.35"				48"		125 lbs.
MOTION COMPENSATOR	2½"	4.35"	Up to 150 Ft.	API Grade D 10,000 PSI Tested 5,000 PSI W.P.	3 White Bands 2 Orange Bands and Longitudinal Stripe	36"	40"	75 lbs.
	3"	5.35"				48"		125 lbs.
SHALLOW WELL	2½"	3.75"	Up to 150 Ft.	6,000 PSI Tested 4,000 PSI W.P.	Identified with SS Band Welded to Coupling Body	36"	36"	45 lbs.

MOTION COMPENSATOR HOSE AVAILABLE ALSO IN API GRADE C CONSTRUCTION.

DECOKING HOSE

Copper State Rubber manufactures a high quality decoking hose to give many years of trouble-free services. Chemicals and heat conditions encountered in refinery decoking service do not affect the hoses.

The hoses are normally manufactured to specification with 4", 5" or 6", 1500# or 2500#, RTJ flanges at each end. The flanges are constructed to be butt-welded to a built in steel coupling, which is permanently bonded to the hose. A swivel flange is provided to enable easier installation of the hose by allowing the hose free rotation without disengaging the RTJ flange bolting. Additionally, an alignment stripe on the cover assures better draping, and positive alignment on every type of installation.

The hoses are available in various design working pressures at 4000, 5000 & 7500 PSI with continuous lengths to 150 feet. Factory certified visual hydrostatic test report with graph furnished with each hose.

Rotary Hose Weight Specifications

Rated Test Pressure	2½" Size	3" Size	3½" Size	4" Size
8,000 lbs.	13 lbs./ft.	16 lbs./ft.	19 lbs./ft.	22 lbs./ft.
10,000 lbs.	17 lbs./ft.	20 lbs./ft.	23 lbs./ft.	26 lbs./ft.
15,000 lbs.	25 lbs./ft.	28 lbs./ft.	38 lbs./ft.	41 lbs./ft.
22,500 lbs.	33 lbs./ft.	36 lbs./ft.		



Motion Compensator Hoses B.O.P. Control Lines Diverter Hoses Work-Over Hoses

All hoses on this page must have factory-applied fittings.



MOTION COMPENSATOR HOSES

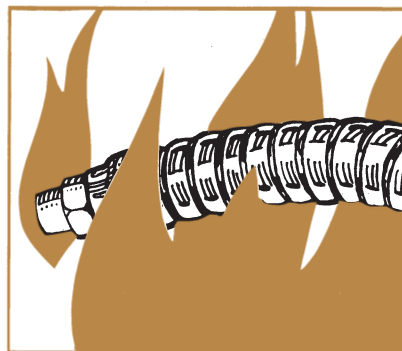
SPEC 090-2000

Hose manufactured in following sizes for all heavy motion compensators that are in service to date.

- 2" - 2500 PSI W.P.
- 3" - 2500 PSI W.P.
- 4" - 2500 PSI W.P.
- 5" - 2500 PSI W.P.

Up to 150 feet long

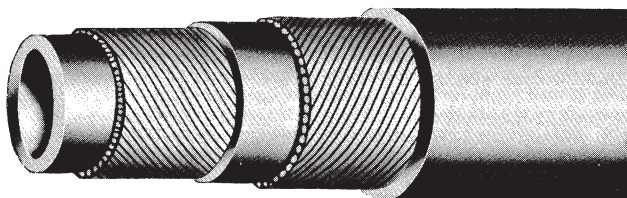
Hose manufactured with elastomers that are compatible with the fluid that is being conveyed through hose. Available in higher Working Pressure. See page 5.



B.O.P. CONTROL LINES (SAFETY FACTOR 4 to 1)

SPEC 070-5000

- Fire tested in a pre-heated oven at 2000 degrees F while under 5000 PSI pressure. Lloyd's test 700 degrees C for 40 minutes under 5000 PSI pressure.
- Constructed of multiple layers of steel braid, fire retardant materials, and sheathed in a stainless steel outer casing with male stainless steel fittings.
- B.O.P. control lines are available in the following working pressures; 5,000 PSI; 4,000 PSI; 3,500 PSI; 3,000 PSI; 2,500 PSI. Sizes 1/2", 3/4", 1", 1 1/4", and 1 1/2".



DIVERTER HOSE

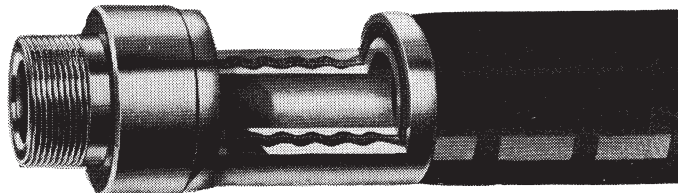
SPEC 070-1917

Spiral wire brd Construction - Suction & Discharge

Size	Approx. O.D.	Min. Bend Radius In.	Wt. Per 100 Ft.	W.P. PSI
6"	7 1/2"	36"	1200	2000
8"	9 5/8"	48"	2200	1500
10"	11 3/4"	64"	3100	1200
12"	14"	80"	4000	1000

Up to 100 ft. lengths

Flexible connection for diverter systems, to control shallow pocket blowouts. Highly abrasive oil resistant tube, withstands abrasion better than steel pipe. Made from the highest strength tensile wire that is available. (Same wire we use in our choke & kill hose.)



WORK-OVER HOSE SPEC 090-1906

A lighter weight, but a rugged hose that will operate up to 3000 PSI on slim hole drilling, core drilling, and seismograph work. Ideal for portable drilling units. Furnished with factory pressed-on couplings.

Sizes: 1 1/2"; 2"; 2 1/2"; 3"; 4".



Stainless Steel Lined Non-Permeable Flexible Flow Lines

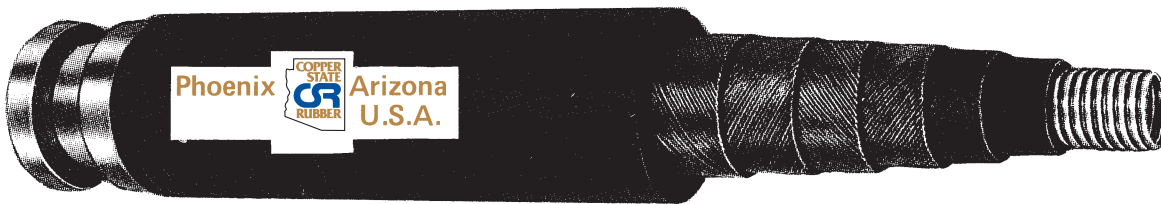
A premium quality, extremely flexible hose, available with stainless steel or high grade neoprene outer covers.
"H₂S and CO₂ compatible"

A premium quality hose for oil and gas gathering, test lines, injection lines, hydraulic control lines, acidizing lines, production lines, or risers to floating or fixed surface facilities.

FIRE RESISTANCE

Independent lab conducted fire test. While under constant pressure of 15,000 PSI, with 700°C. flame directed on the end fitting and hose proper, the hose developed a slight leak at the coupling after 28 minutes of exposure.

Continuous stainless steel liner eliminates gas permeation through the carcass of the hose.



Flow Lines Spec. 090-3600

Other type end fittings available

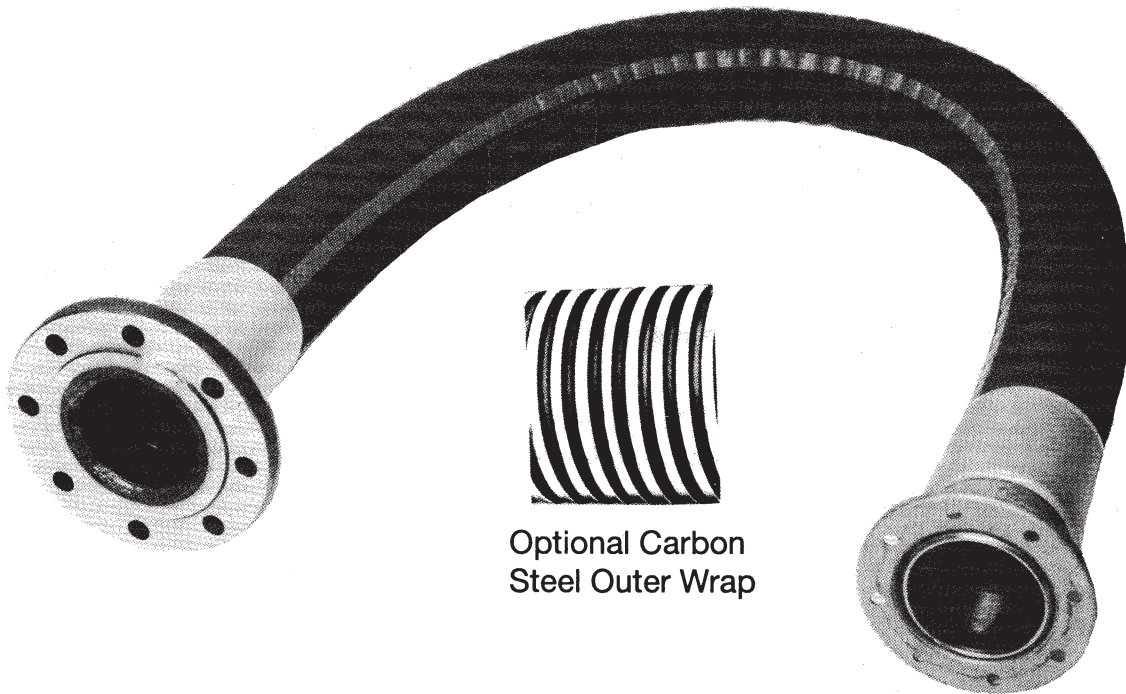
Size	O.D.	Working Pressure	Test Pressure	Weight lb/ft	Minimum Bend Radius	Built-in Couplings		
						API	Integral	Flanges
2"	4.35"	5,000 PSI	10,000 PSI	16	30"	✓	✓	✓
2.5"	4.90"	5,000 PSI	10,000 PSI	20	30"	✓	✓	✓
3"	5.75"	5,000 PSI	10,000 PSI	25	36"	✓	✓	✓
3.5"	5.85"	5,000 PSI	10,000 PSI	28	36"	✓	✓	✓
4"	6.25"	5,000 PSI	10,000 PSI	32	36"	✓	✓	✓
2"	4.5"	10,000 PSI	15,000 PSI	20	30"	✓	✓	✓
2.5"	5.0"	10,000 PSI	15,000 PSI	24	30"	✓	✓	✓
3"	6.0"	10,000 PSI	15,000 PSI	28	36"	✓	✓	✓
3.5"	6.9"	10,000 PSI	15,000 PSI	32	36"	✓	✓	✓
4"	7.9"	10,000 PSI	15,000 PSI	36	36"	✓	✓	✓
2"	5.1"	15,000 PSI	22,500 PSI	30	36"	✓	✓	✓
2.5"	5.9"	15,000 PSI	22,500 PSI	38	36"	✓	✓	✓
3"	6.9"	15,000 PSI	22,500 PSI	40	36"	✓	✓	✓



Copper State Rubber Top Drive Blower Hose

A heavy duty premium hose to prevent dangerous fumes from accumulation around the top drive unit during drilling operations. Excellent Hose for Vapor Recovery Service.

Copper State Rubber Blower Hoses are designed for long service life. Manufactured with a double thickness, abrasion resistant orange corrugated cover for maximum flexibility. Optional rust-resistant spring steel flat wire over outer cover to prevent gouging or other external damages that could occur.



Optional Carbon
Steel Outer Wrap

Spec. 070-1129 Corrugated Blower Hose

Inside Diameter	Outside Diameter	Standard Lengths	Weight per foot	Maximum Working Pressure (Air)
8"	9.75 in.	86 ft.	11 lbs.	50 PSI
10"	11.75 in.	86 ft.	12.5 lbs.	50 PSI

Construction: Multiple plies of nylon tire cord. Internal helix wire.



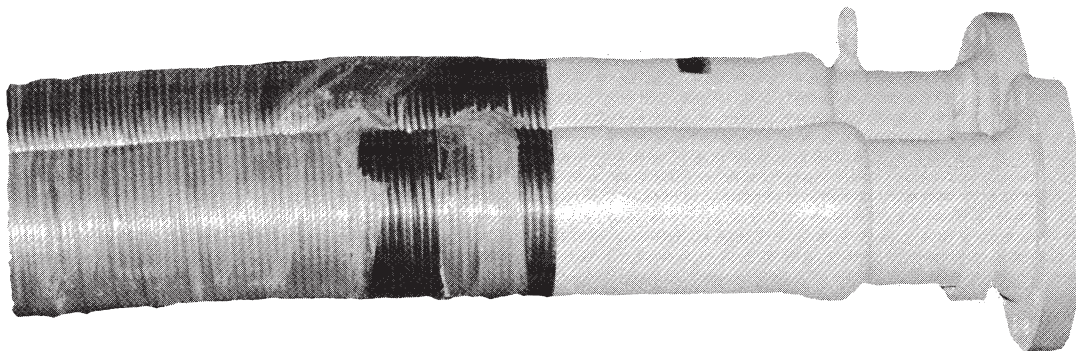
Copper State Fire Resistant Flexible Jumper Lines for Oil and Gas Production Systems

H₂S and Co₂ Compatible

A premium quality, extremely flexible hose with special polymer liner, or optional stainless steel liner, and with stainless steel outer cover.

CONSTRUCTION SPECIFICATIONS:

1. Special polymer liner or stainless steel liner.
2. Breaker strips over rubberized textile plies.
3. Reinforcement is 2, 4, or 6 highest strength coated steel plies.
4. Cushion layers of adhesive rubber bonding between reinforcement wires.
5. Special rubber adhesive bonding between the plies.
6. Fire resistant synthetic rubber bonded over reinforcement plies.
7. Stainless steel outer cover for additional fire resistance and abrasion.
8. Hubs, unbolts, dynetors, unions, API flanges and graylock end fittings can be furnished with special treatment for salt water resistance.



Jumper Lines (max. length 150 ft.) Spec. 070-1915

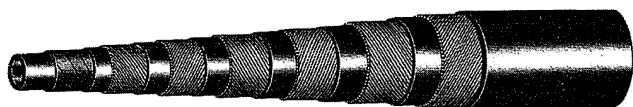
Inside Diameter	Outside Diameter	Working Pressure	Test Pressure	Weight lbs./ft.	Minimum Bend Radius
5"	6 3/4"	2500 PSI	3750 PSI	17	4 Feet
6"	8"	2000 PSI	3000 PSI	22	6 Feet
8"	10"	1500 PSI	2250 PSI	28	8 Feet
10"	12"	1200 PSI	1800 PSI	34	10 Feet
12"	14 1/4"	1000 PSI	1500 PSI	41	12 Feet

Jumper Lines are also available in lower and/or higher working pressures than those listed above.



Multi-Purpose Heavy Duty Oilfield Service Hose

Spec: 070-2WE0068



This tough, versatile hose was designed for service as a discharge hose for reverse circulation, acidizer/cement service solution equipment, mud tank jetting, instrument blow down service, and rotary/vibrator service on portable drilling units, workover rigs and seismograph equipment.

Exceeds requirements of API 7K for minimum safety factor: 2 1/2 to 1 burst pressure.

Specifications

Tube:	Black Neoprene, Hi-grade, (CR Plus)
Reinforcement:	Multiple spiral plies of special high tensile steel wire, each separated by a rubber layer.
Cover:	MSHA accepted oil, weather and abrasion resistant red synthetic rubber cover. Stainless steel outer protective armor available as an option.
Temp. Range:	-40°F to +250°F (-40° to +121°C)

I.D.	Ply	O.D.	Approx. Wt. per 100 ft.	Min. Bend Radius	Max Recom. WP (PSI)	Min Burst (PSI)
2"	6	3.000"	500	25"	5,000	20,000

H2S suitable with option terminating connections meeting requirements of MR-01-75, latest addition. Available with 7500 PSI W.P.

Also available with a synthetic outer protective cover for abrasion resistance.

Spec: 2 WEO 168



Hydraulic Pile Driver Hose

The basic design of this hose is from our oil field choke and kill hose construction, with a few modifications to adapt it for the purpose of driving pilings offshore.

This hose is designed to operate with the large hydraulic hammers that are in service today. This hose is flexible, and delivers performance in excess of the demands for pressure, pulsations, abrasion, vacuum, and heat resistance, when driving pilings.

- The inner lining consists of spiral strip-wound stainless steel.
- The second lining consists of a high quality Buna "N" oil resistant compound.
- Special spirals of synthetic materials above the second lining help to protect against deformation and cut down vibration.
- 4 spirals of copper-coated high-strength wire for the main reinforcement. Same as used in our choke and kill hose. See page 2 in our catalog.
- Neoprene cover bonded to carcass with nylon breaker strip.
- Built-in API fittings.



Hydraulic Pile Driver Hose Spec. 070-366

Inside Diameter	Maximum Length	Weight lb/ft	Working Pressure	Test Pressure	Minimum Bend Radius	Axial Loading
4"	150 ft	47	5,500 PSI	11,000 PSI	47"	50 Tons



Steam Pile Driver Hose

Flexible connection between the steam hammer and the power unit.

The basic design of this hose, with a few modifications, is our choke and kill hose construction. See page 2 of catalog.

This pile driver hose is designed to give long service life, and prevent any rubber particles from getting into the driving hammer.

- The inner lining consists of spiral strip-wound stainless steel.
- A heat-insulating ply over the strip-wound stainless steel liner.
- The second lining consists of a synthetic rubber compound rated for 450° F.
- 4 spiral braids of copper-coated high-strength wire for the main reinforcement. Same high-strength wire used in our choke and kill hose.
- Neoprene covers bonded to carcass with breaker strip.
- Built-in API connections.

This hose is flexible, and delivers performance in excess of demands for pressure, pulsations, abrasion, vacuum, and heat resistance.



Steam Pile Driver Hose Spec. 070-326

Inside Diameter	Maximum Length	Weight lb/ft	Working Pressure	Test Pressure	Minimum Bend Radius	Temperature Range (F.)
4"	150 ft	21	400 PSI	600 PSI	48"	450 °
6"	150 ft	26	400 PSI	600 PSI	60"	450 °



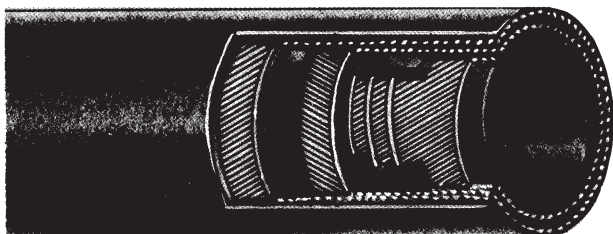
Deck Hoses - Fuel Service

Liquid Mud Service

Recommended Fittings: For trouble free service we recommend machine swaged NPT nipples or welded flanges.

All hoses on this page meet U.S. Coast Guard Requirements for oil transfer hoses.

"DOUBLE THICKNESS COVERS ON ALL DECK HOSES FOR LONGER SERVICE LIFE"

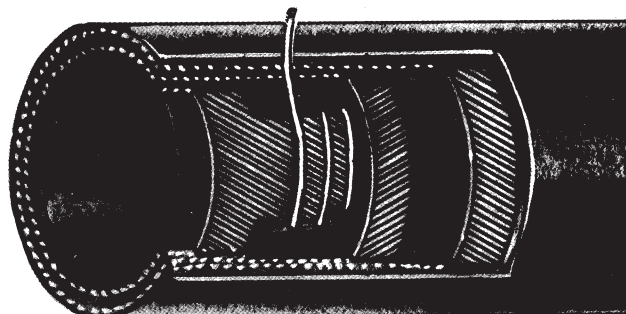


FUEL TRANSFER HOSE SPEC 070-1175

Hard Wall Suction & Discharge
Oil resistant Buna "N" tube and cover
Helix wire to prevent collapsing

Size	Approx. O.D.	Wt. Per 100 Ft.	W.P. PSI	Bending Radius
2"	3"	153	250	12"
2½"	3½"	196	250	18"
3"	4"	251	250	18"
4"	5"	340	250	24"
5"	6"	450	250	30"
6"	7"	575	200	48"
8"	9½"	800	150	54"

For fuel transfer Up to 150 ft. lengths

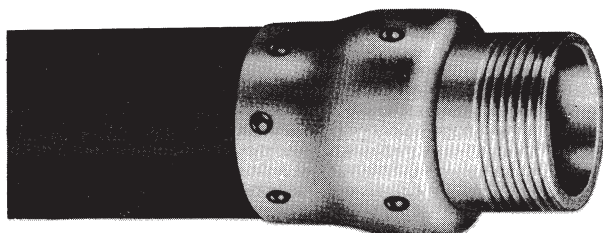


FUEL DISCHARGE SPEC 070-1205

Softwall Diesel Fuel Service
Oil resistant Buna "N" tube & cover - static wire

Size	Approx. O.D.	Wt. Per 100 Ft.	W.P. PSI
2"	3"	155	250
3"	4"	180	250
4"	5"	260	250
5"	6"	290	250
6"	7"	340	250

For fuel transfer Up to 150 ft. lengths



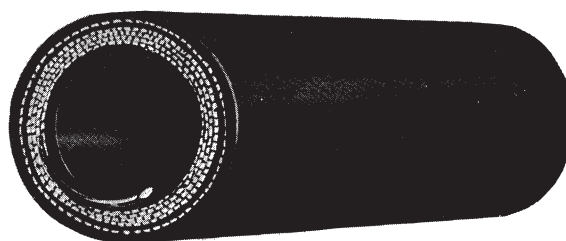
EXTRA HEAVY DUTY FUEL TRANSFER HOSE

SPEC 070-3175

Hardwall Wall Suction & Discharge
Buna "N" tube and cover
TRI-LOKT or Swaged On Hold-All Couplings
More Rugged than Spec 070-1175

Size	Approx. O.D.	Wt. Per Ft.	W.P. PSI	Test Pressure PSI	Bending Radius
2"	2 7/8"	2.5	400	600	18"
3"	4"	3.25	400	600	24"
4"	5"	4.50	400	600	36"

Ideal for liquid mud transfer
Up to 150 ft. lengths



EXTRA HEAVY DUTY SOFTWALL FUEL DISCHARGE HOSE

SPEC 070-1296

Buna "N" tube and cover
More Rugged than Spec 070-1205

Size	Approx. O.D.	Wt. Per Foot	W.P. PSI
2"	3"	2.2	400
3"	4"	2.90	400
4"	5"	4.10	400

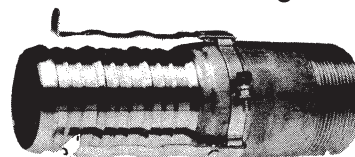
For fuel transfer Up to 150 ft. lengths



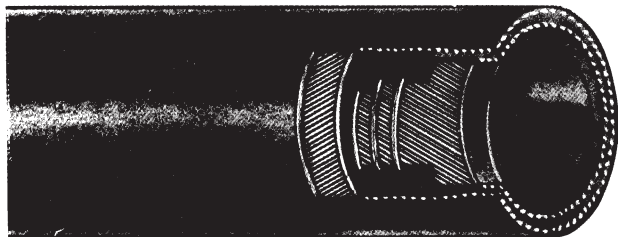
Deck Hoses - Water Service

Recommended Fittings: For trouble free service we recommend TRI-LOKT hose nipples, with type "A" and "D" cam and groove couplings screwed on, for all hoses listed on this page.

All hoses on this page meet U.S. Coast Guard requirements.



"DOUBLE COVER THICKNESS ON ALL DECK HOSES FOR LONGER SERVICE LIFE"

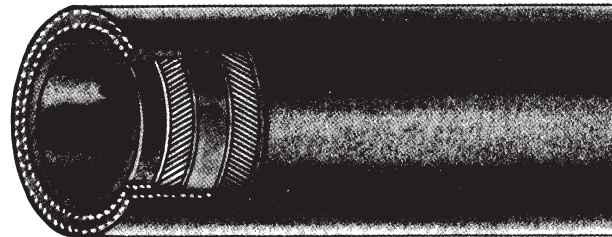


DRILL WATER HOSE SPEC 070-1127

Helix Wire To Prevent Kinking
SBR tube & cover. Salt water transfer service

Size	Approx. O.D.	Wt. Per 100 Ft.	W.P. PSI
3"	4"	214	200
4"	5"	280	200
6"	7"	540	200
8"	9½"	810	200

For deep well service Up to 150 ft. lengths

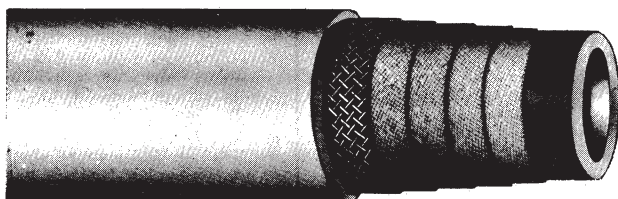


POTABLE WATER HOSE SPEC 070-1103

White food grade tube w/tan oil resistant cover

Size	Approx. O.D.	Wt. Per 100 Ft.	W.P. PSI
2"	2½"	95	200
3"	3⅝"	160	200
4"	4⅞"	212	200

Soft wall - No Helix wire, discharge only.
For use on fresh water system.
Up to 150 ft. lengths

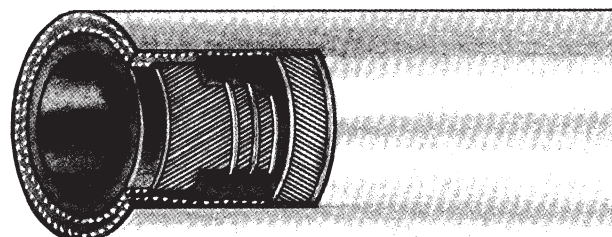


RIG WASHDOWN HOSE SPEC 070-1123

Built-in tapered nozzle

I.D.	Approx. O.D.	Wt. Per 100 Ft.	W.P. PSI
1"	1½"	63	200
1¼"	1¾"	75	200
1½"	1⅞"	87	200

Oil resistant tube and white cover
Furnished with or without built-in nozzle
Up to 150 ft. lengths



POTABLE WATER HOSE SPEC 070-1127-P

White food grade tube w/tan oil resistant cover

Size	Approx. O.D.	Wt. Per 100 Ft.	W.P. PSI
2"	3"	124	200
3"	4"	214	200
4"	5"	280	200

Helix wire reinforced for suction & discharge
For use on fresh water system. Up to 150 ft. lengths

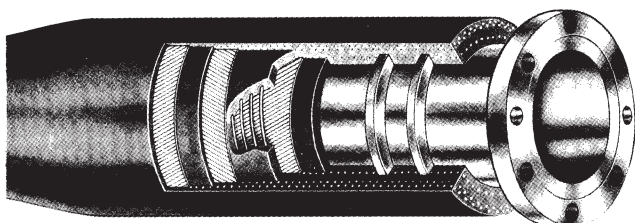


Deck Hoses - Bulk Material

Mud Pump Suction Hose

All hoses on this page meet U.S. Coast Guard requirements.

"DOUBLE COVER THICKNESS ON ALL DECK HOSES FOR LONGER SERVICE LIFE"



BULK TRANSFER HOSE SPEC 070-1951

Wire reinforced with Helix-wire - built-in nipples

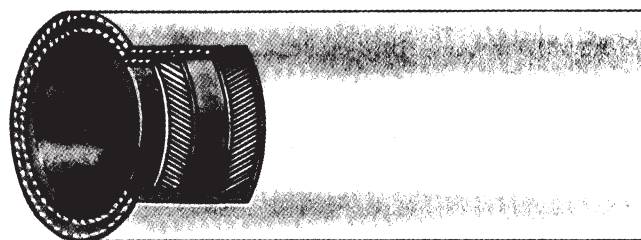
Size	Approx. O.D.	Wt. Per Ft.	W.P. PSI
3"	4"	3.25	250
4"	5"	5.00	250
6"	7 1/4"	8.60	250
8"	9 1/2"	14.8	250

Up to 150 ft. lengths

Oil resistant tube and cover

Suction & discharge service

For transferring cement or fuel from tender to drilling platform



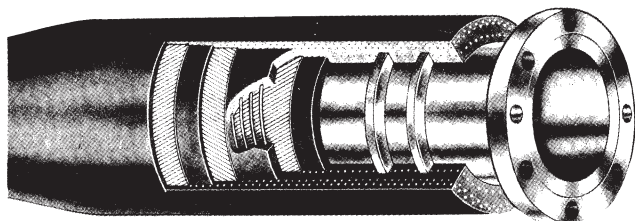
BULK MATERIAL HOSE SPEC 070-1101

Softwall No Helix Wire

SBR tube & cover for abrasive wear and weather resistance

Size	Approx. O.D.	Wt. Per 100 Ft.	W.P. PSI
3"	4"	160	200
4"	5"	212	200
5"	6"	245	200
6"	7"	292	200

Dry Cement Service Up to 150 ft. lengths
Water Discharge Service



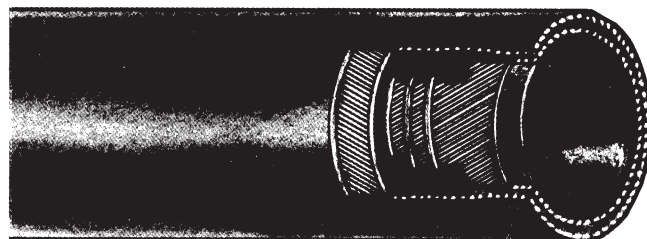
MUD PUMP SUCTION

SPEC 070-1351

Built-in nipples. Neoprene tube & cover. Helix wire.

I.D.	Ply	Wt. Per Ft. Lbs.	Wt. of Two Nipples Lbs.
4"	6	7	14
5"	6	9	19
6"	6	11	30
6 5/8"	6	13	30
8"	6	15	41
8 5/8"	6	19	41
10"	6	21	53
10 3/4"	6	26	53
12"	6	33	117

Available with flanges
Heavy duty construction



BULK MATERIAL HOSE SPEC 070-1127-B

Hardwall For Suction & Discharge

SBR tube & cover with Helix wire to prevent kinking

Size	Approx. O.D.	Wt. Per 100 Ft.	W.P. PSI
3"	4"	214	200
4"	5"	280	200
5"	6"	451	200
6"	7"	540	200

Dry cement service Up to 150 ft. lengths



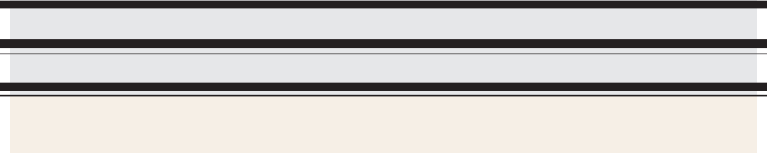
WIRE BRAIDED HOSES

General Purpose Discharge Hose Spec. 070-700 WB



CONSTRUCTION:

General Purpose Suction & Discharge Hose Spec. 070-701 WBH



General Purpose Wire Braided Air Hose Spec. 070-800 WB



CONSTRUCTION:

SUBMARINE OFFSHORE PETROLEUM LOADING HOSES

SPECIFICATIONS:

Hoses manufactured to meet or exceed hose standards published by the Oil Companies International Marine Forum, (OCIMF) for offshore mooring systems.

DESIGN FEATURES:

Pressure Rating: 225 PSI

Minimum Burst Pressure: 1125 PSI

Flow Velocity: 50 feet per second

Maximum Temporary Elongation: 2.5%

Maximum Permanent Elongation: 0.7%

CONSTRUCTION OF HOSE BODY:

Lining: Oil resistant synthetic rubber

Reinforcement: Synthetic fibre cord layers with high-tensile steel helical wires.

Cover: Synthetic rubber, highly resistant to wear from weather or abrasion.

FLANGES AND NIPPLES:

- Nipples conform to API-5L Grade A (built-in).
- Flanges conform to ANSI Standards
- Certified welding to API-1104
- All exposed surfaces of nipples and flanges are coated with zinc spraying or epoxy paint, excluding flange face.

ELECTRICAL CONTINUITY:

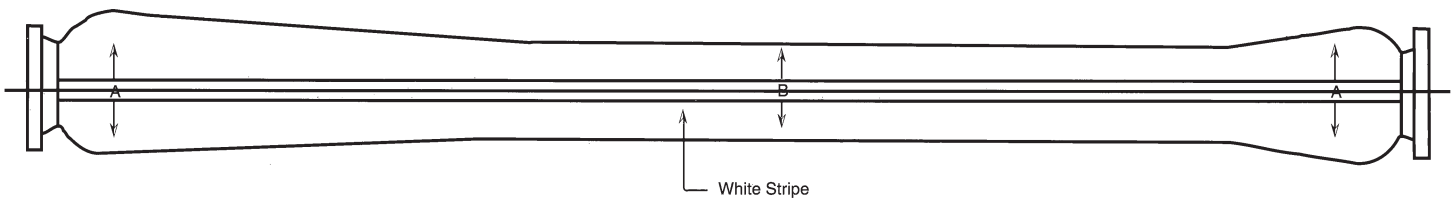
Electrical continuity on all standard hoses except tanker rail and underbuoy hoses



Spec. 070-3112

Offshore Submarine Line Hose

Standard lengths 30 and 35 feet long
Maximum length available is 50 feet.



NOMINAL INSIDE DIAMETER	OUTSIDE DIAMETER (INCHES)		WEIGHT IN AIR (LBS)		WEIGHT IN AIR PER FOOT	WEIGHT WATER (LBS)		WEIGHT WATER PER FOOT	MINIMUM BENDING
	SECTION A	B	LENGTHS 30'	35'	LBS.	LENGTHS 30'	35'	LBS.	INCHES
6"	10	8	506	572	13	242	264	5	35
8"	12	10	770	858	19	374	418	7	48
10"	14	12	990	1122	24	484	528	9	60
12"	17	14	1606	1804	39	792	880	15	73
16"	21	18	2244	2508	51	1166	1254	19	98
20"	26	22	3784	4224	86	2046	2222	36	122

All hoses whose inside diameter are 12" or more come equipped with ANSI 150 PSI weld neck flat face flanges, unless otherwise requested.

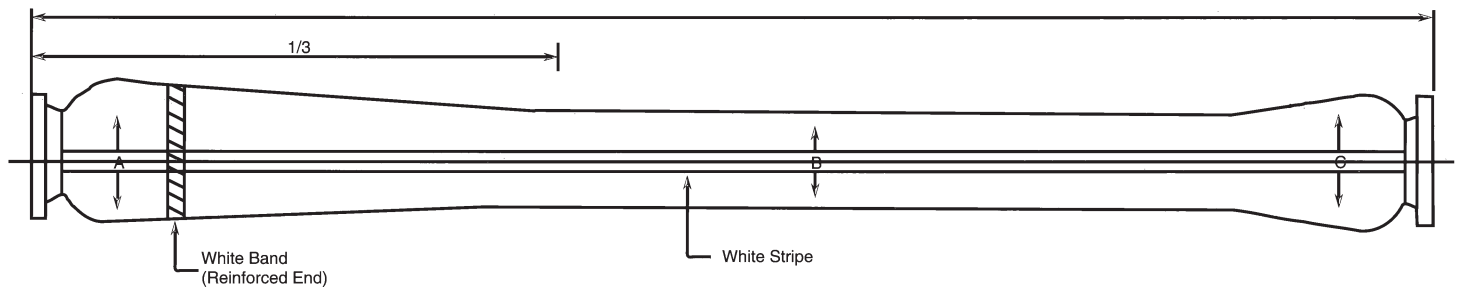
Hoses with smaller diameter than 12" are equipped with slip-on welded type flanges, unless otherwise requested.



Spec. 070-3114

Offshore Submarine Hose with special reinforced end for connection to plem

Standard lengths 30 and 35 feet long
Maximum length available is 50 feet.



NOMINAL INSIDE DIAMETER	OUTSIDE DIAMETER (INCHES)			WEIGHT IN AIR (LBS)		WEIGHT IN AIR PER FOOT	MINIMUM BENDING
	SECTION A B C			LENGTHS 30' 35'		LBS.	INCHES
6"	11	8	10	671	770	22	35
8"	14	10	12	1023	1166	34	48
10"	16	12	14	1298	1485	43	60
12"	19	14	17	2024	2310	67	73
16"	23	18	21	2904	3300	97	98
20"	28	22	26	4664	5280	155	122

All hoses whose inside diameter are 12" or more come equipped with ANSI 150 PSI weld neck flat face flanges, unless otherwise requested.

Hoses with smaller diameter than 12" are supplied with slip-on welded type flanges, unless otherwise requested.

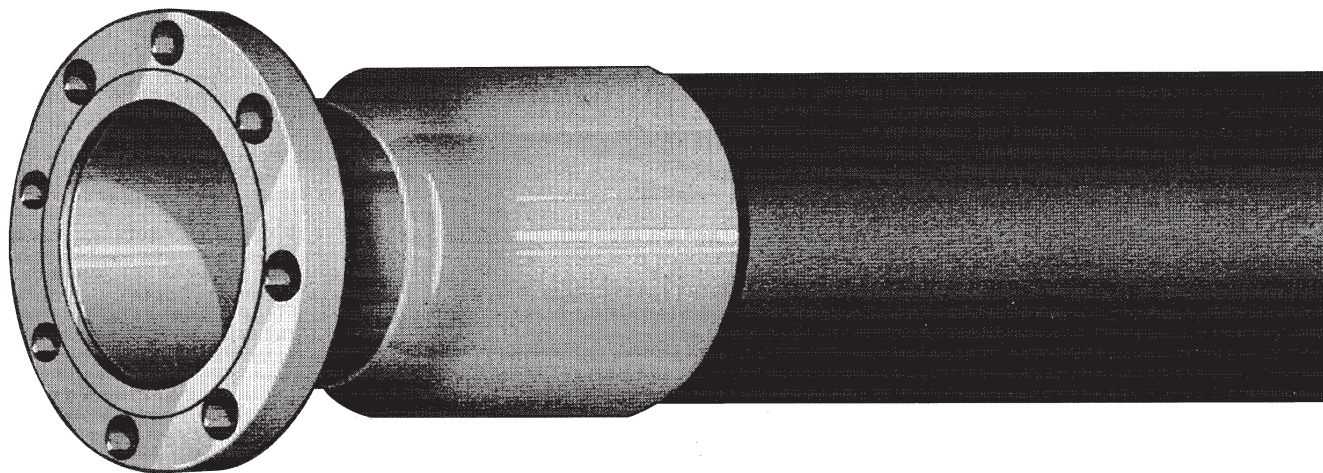


Liquid Petroleum Gas Hose

Spec. 070-386

Designed for Suction and Discharge

Service in Ship to Shore
Transfer on Docks and Jetties



Application: Recommended for the transfer of liquid or gaseous propane and butane under pressure or refrigerated. Working temperature - 60° F.

Liner: Synthetic rubber specially compounded for gas service.

Reinforcement: Multiple plies of textile cords with two embedded helical wires. Breaker strip holding plies bond the cover and liner to the carcass of the hose.

Cover: Synthetic - highly resistant to the effects of petroleum products, abrasion, and weathering. Black cover with longitudinal green stripe.

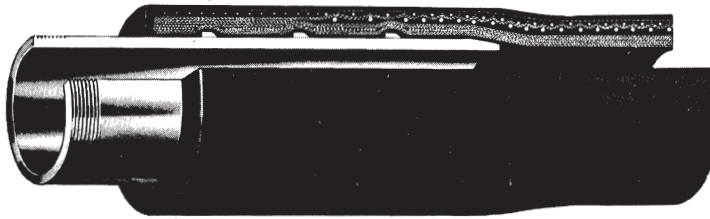
Fittings: Swaged on low temperature nipples and flanges, applied with a 200 ton press prevents leakage or coupling failure.

Inside Dia.	Working Pressure	Outside Dia.	Wt. Lbs./Ft.	Minimum Bend Radius
6"	400 PSI	9"	16	42"
8"	400 PSI	11"	24	60"
10"	400 PSI	13"	35	72"
12"	400 PSI	16"	45	86"
14"	400 PSI	18"	55	96"



- **LPG & Crude Oil Submarine Hose**
- **Tank Cleaning Hose**
- **Sand Suction Hose**
- **Premium Hose for Liquid Propane Gas Loadings**

LPG OR CRUDE OIL SERVICE

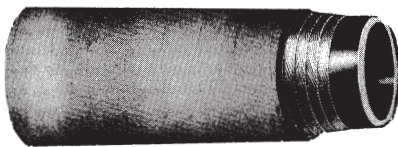


SUBMARINE O.S. & D. HOSE (L.P.G. Service - Crude Oil Service) SPEC 070-4112

Size	O.D.	Wt. Ft. (Lbs.)	W.P.	Vac.	Min. Bend Radius
6"	8.6	18.0	350	Full	36"
8"	11.3	29.3	350	Full	48"
10"	13.0	39.2	350	Full	60"
12"	15.0	48.0	350	Full	72"

Heavy duty premium quality hose manufactured to withstand the rugged service required of submarine hoses.

- Constructed of multiple plies of nylon fabric
- Built-in Helix for suction and discharge service
- Hi-grade nitrile tube and neoprene cover
- Swaged on hold-all or built-in nipples
- Lo-Temp nipples and flanges for LPG service at -60 Deg. F
- Built-in Stainless Steel Helix Wire Optional

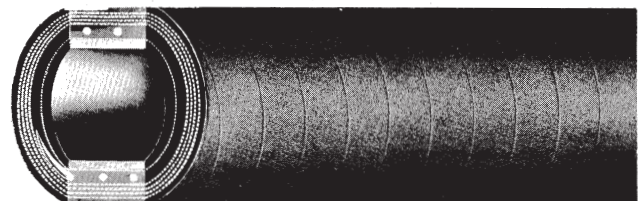


TANK CLEANING HOSE SPEC 070-1200

Size	O.D.	Ply	Wt. Per Ft.	W.P. PSI
1½"	2¼"	4	1.10	250
2"	2¾"	4	1.50	250

Oil resistant tube and cover.
Two stainless steel static wires.
Lengths to 100 ft.

For cleaning cargo bulk tanks
Equipped with brass couplings to fit cleaning system.



SAND SUCTION HOSE SPEC. 070-1387

I.D. (I.D.)	Ply	O.D. (in.)	Approx. Wt. (lb. ft.)
6"	6	8¾"	17.6
6⅝"	6	8⅞"	19.1
8"	8	10⅝"	23.6
8⅝"	8	11"	30.0
10"	10	12⅞"	35.6
10¾"	10	13⅞"	38.2
12"	12	14⅞"	43.7
12¾"	12	15⅝"	46.1
14"	12	16⅞"	49.1
15"	12	17⅞"	55.2
16"	12	18⅞"	60.3
18"	12	20⅞"	66.0

¼" - ⅜" - ½" Highly abrasive tube



All Purpose Chemical Hose

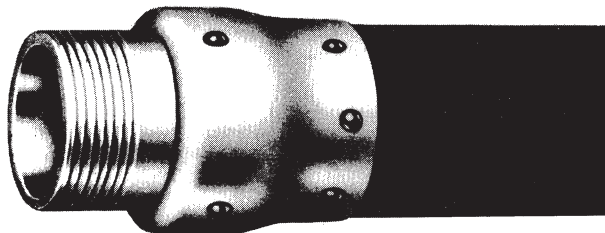
(Will handle more than 98% of known chemicals)
(Excellent for handling Methyl Tertiary Buty Ether "MTBE")

Rough Bore Suction & Discharge Hose

(Hot tar & asphalt service — maximum operating temp. 400 deg. F.

Note: for maximum service life we recommend that all purpose chemical hoses be flushed after every use.

All Purpose Chemical Hose Spec. 070-1187



CONSTRUCTION:

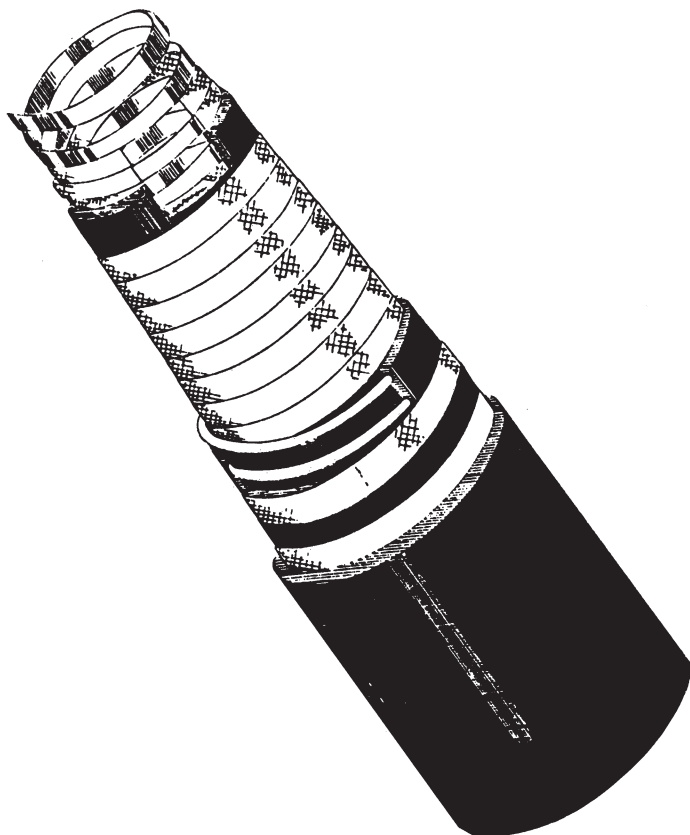
CONSTRUCTED WITH MULTIPLE PLYS OF NYLON TIRE CORD, HIGH TENSILE HELICAL STEEL WIRES, AND A HIGH GRADE NEOPRENE COVER. COLOR: BLACK W/GREEN STRIPE.

I.D.	O.D.	Approx. Wt./Ft.	Rated W.P.	Rated Burst	Min. Bend Radius
4"	5 ¹ / ₃₂ "	5.3 lbs.	300 PSI	1500 PSI	24"
6"	7 ⁵ / ₈ "	8.4 lbs.	300 PSI	1500 PSI	36"
8"	9 ³ / ₄ "	14.5 lbs.	300 PSI	1500 PSI	48"
10"	11 ⁷ / ₈ "	20.7 lbs.	300 PSI	1500 PSI	56"
12"	14"	27.4 lbs.	300 SPI	1500 PSI	66"

ULTRA HIGH MOLECULAR WEIGHT POLYETHELENE LINER. (UHMW) TEMP. RANGE - 20° TO +160°f

ALSO AVAILABLE WITH CROSSED LINKED POLYETHELENE LINER (XLPE) AND CLORINATED POLYETHELENE LINER (CPE).

Rough Bore Suction & Discharge Spec. 070-1941



I.D.	O.D.	Approx. Wt./Ft.	Rated W.P.	Rated Burst	Min. Bend Radius
4"	5 ¹ / ₁₆ "	6.0 lbs.	300 PSI	1500 PSI	24"
6"	7 ³ / ₄ "	9.0 lbs.	300 PSI	1500 PSI	36"
8"	9 ⁷ / ₈ "	15.0 lbs.	300 PSI	1500 PSI	48"
10"	12"	22.0 lbs.	300 PSI	1500 PSI	56"
12"	14 ¹ / ₈ "	29.0 lbs.	300 PSI	1500 PSI	64"

HIGH GRADE NITRILE LINER — STANDARD MAXIMUM OPERATING TEMP. 400° F FOR HOT TAR AND ASPHALT SERVICE.

CONSTRUCTION:

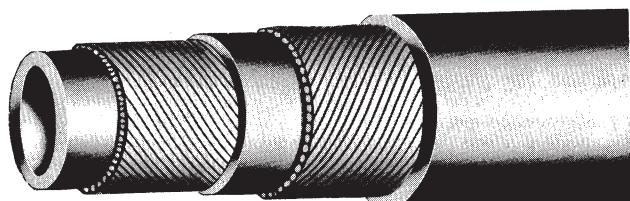
MULTIPLE PLYS OF NYLON TIRE CORD, HIGH TENSILE FLAT INNER WIRE LINER, HIGH TENSILE HELICAL STEEL WIRE IN CARCASS OF THE HOSE, AND HIGH GRADE NEOPRENE COVER. COLOR: BLACK W/WHITE STRIPE



- **Ultra High Pressure Oil Suction and Discharge Hose**
- **Floater Discharge Hose (Softwall)**

THESE HOSES EXCEED U.S. COAST GUARD REGULATIONS

(STRONGEST HOSE MANUFACTURED TO DATE
FOR THIS SERVICE.)



AVAILABLE WITH FOLLOWING LINERS:

Buna "N"	Spec. 070-1920
Neoprene	Spec. 070-1922
Viton	Spec. 070-1924
Cross Linked Polyethelene	Spec. 070-1926
Chlorinated Polyethelene (CPE)	Spec. 070-1928

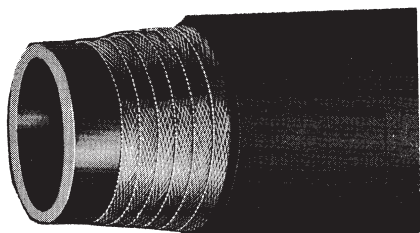
HIGH GRADE NEOPRENE COVERS.

FULL VACUUM SERVICE
Shore Flex Oil Suction & Discharge
070-1919

I.D.	O.D.	Wt. Per 100 Ft.	Working Pressure	Test Pressure	Bend Radius
2½"	4"	500 lbs.	500 PSI	750 PSI	30"
3"	4½"	600 lbs.	500 PSI	750 PSI	30"
4"	5½"	800 lbs.	500 PSI	750 PSI	36"
6"	7½"	1000 lbs.	500 PSI	750 PSI	42"
8"	9½"	1200 lbs.	500 PSI	750 PSI	54"
10"	11½"	1400 lbs.	500 PSI	750 PSI	60"

SPECIAL WIRE BRAID CONSTRUCTION – NO HELIX WIRE –
MADE FROM THE HIGHEST STRENGTH TENSILE WIRE THAT IS
AVAILABLE. SAME WIRE USED IN OUR CHOKE & KILL HOSE.

- BURST PRESSURES IN EXCESS OF 6000 PSI
- SPECIAL DESIGNED FACTORY SWAGED END FITTINGS.
- EXCELLENT HOSE FOR LOWER PRESSURE DIVERTER SYSTEMS
- AVAILABLE IN HIGHER WORKING PRESSURE



SEA WATER RESISTANT
Floater Discharge Hose

I.D.	O.D.	Wt. Per 100 Ft.	Working Pressure	Test Pressure	Bend Radius
4"	4¾"	325 lbs.	200 PSI	300 PSI	48"
6"	6¾"	550 lbs.	200 PSI	300 PSI	72"
8"	8¾"	675 lbs.	200 PSI	300 PSI	96"

HIGH GRADE NEOPRENE COVERS.
EXCELLENT HOSE FOR REGULAR DISCHARGE SERVICE OF
PETROLEUM AND CHEMICAL PRODUCTS. SOFTWALL CON-
STRUCTION — NOT FOR VACUUM SERVICE.

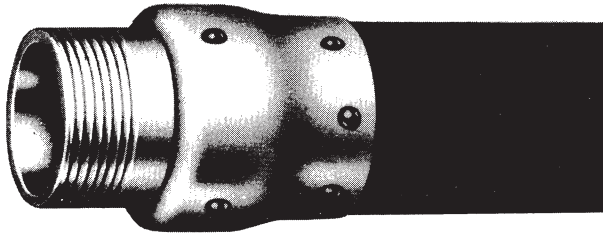
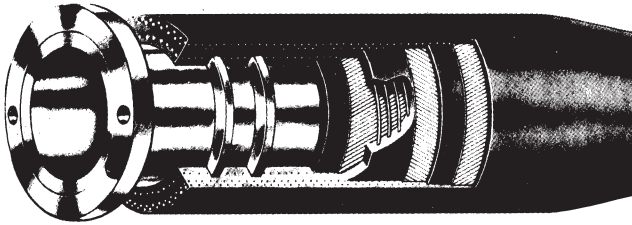
AVAILABLE WITH FOLLOWING LINERS:

Buna "N"	Spec. 070-1400
Neoprene	Spec. 070-1402
Viton	Spec. 070-1404
Cross Linked Polyethelene	Spec. 070-1406
Chlorinated Polyethelene	Spec. 070-1408

FLOATER HOSE IS DESIGNED FOR MOVEMENT OF PETROLEUM PRODUCTS
IN AREAS WITHOUT PORT FACILITIES OR UNDERWATER PIPELINES. THIS HOSE WILL FLOAT
WHEN FILLED WITH PETROLEUM PRODUCTS HAVING A SPECIFIC GRAVITY LOWER THAN SEA WATER.

Oil Suction & Discharge Hose

200 PSI Dock Hose — Full Vacuum Service



I.D.	O.D.	Approx. Wt./Ft.	rated W.P.	Rated Burst	Min. Bend Radius
3"	3 ¹³ / ₁₆ "	2.9 lbs.	200 PSI	1000 PSI	16"
4"	4 ⁷ / ₈ "	4.4 lbs.	200 PSI	1000 PSI	18"
6"	7 ⁷ / ₁₆ "	7.9 lbs.	200 PSI	1000 PSI	36"
8"	9 ³ / ₈ "	13.8 lbs.	200 PSI	1000 PSI	48"
10"	11 ⁵ / ₈ "	20.0 lbs.	200 PSI	1000 PSI	54"
12"	13 ³ / ₄ "	26.7 lbs.	200 PSI	1000 PSI	66"

Buna "N" Liner Spec. 070-1910
 Viton Liner Spec. 070-1930
 Neoprene Liner Spec. 070-1900
 Cross Linked-Polyethylene Spec. 070-1186
 Chlorinated Polyethylene Liner (CPE) Spec. 070-1057

250 PSI Dock Hose — Full Vacuum Service

I.D.	O.D.	Approx. Wt./Ft.	Rated W.P.	Rated Burst	Min. Bend Radius
3"	4"	3.0 lbs.	250 PSI	1250 PSI	16"
4"	5"	5.0 lbs.	250 PSI	1250 PSI	18"
6"	7 ¹ / ₂ "	8.0 lbs.	250 PSI	1250 PSI	36"
8"	9 ¹ / ₂ "	13.9 lbs.	250 PSI	1250 PSI	48"
10"	11 ³ / ₄ "	20.2 lbs.	250 PSI	1250 PSI	54"
12"	13 ⁷ / ₈ "	26.8 lbs.	250 PSI	1250 PSI	66"

Buna "N" Liner Spec. 070-1911
 Viton Liner Spec. 070-1931
 Neoprene Liner Spec. 070-1901
 Cross Linked-Polyethylene Spec. 070-1182
 Chlorinated Polyethylene Liner (CPE) Spec. 070-1058

300 PSI Dock Hose — Full Vacuum Service

I.D.	O.D.	Approx. Wt./Ft.	Rated W.P.	Rated Burst	Min. Bend Radius
3"	4 ¹ / ₃₂ "	3.3 lbs.	300 PSI	1500 PSI	16"
4"	5 ¹ / ₃₂ "	5.3 lbs.	300 PSI	1500 PSI	18"
6"	7 ⁵ / ₈ "	8.4 lbs.	300 PSI	1500 PSI	36"
8"	9 ³ / ₄ "	14.5 lbs.	300 PSI	1500 PSI	48"
10"	11 ⁷ / ₈ "	20.7 lbs.	300 PSI	1500 PSI	54"
12"	14.00	27.4 lbs.	300 PSI	1500 PSI	68"

Buna "N" Liner Spec. 070-1912
 Viton Liner Spec. 070-1932
 Neoprene Liner Spec. 070-1902
 Cross Linked-Polyethylene Spec. 070-1188
 Chlorinated Polyethylene Liner (CPE) Spec. 070-1059

CONSTRUCTION:

CONSTRUCTED WITH MULTIPLE PLYS OF NYLON TIRE CORD, HIGH TENSILE HELICAL STEEL WIRES, WITH OPEN WEAVE BREAKER FABRIC BONDING TUBE AND COVER TO THE CARCASS OF THE HOSES. HIGH GRADE NEOPRENE COVERS. END FITTINGS ARE BUILT-IN OR MACHINE SWAGED.

QUALITY ASSURANCE:

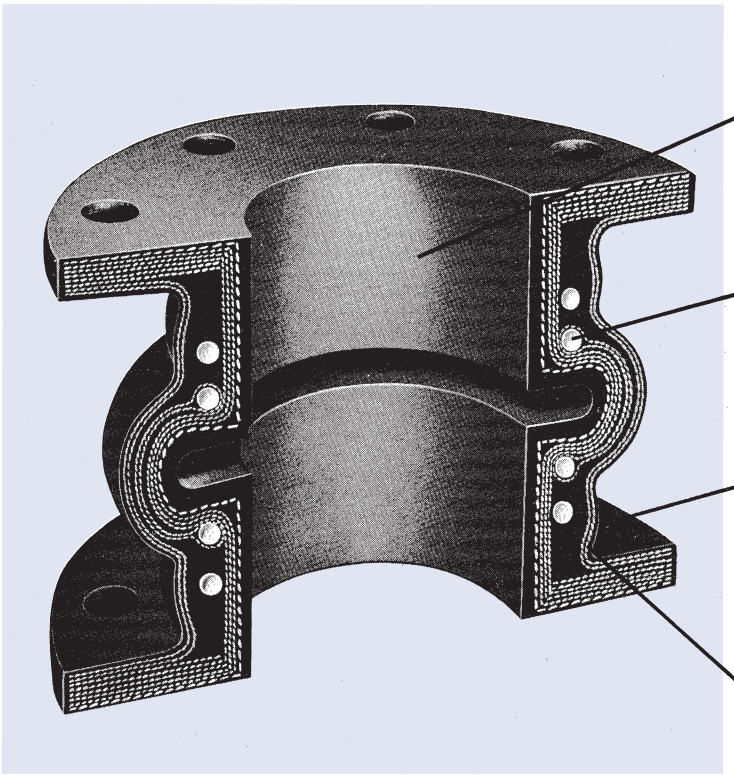
ALL COPPER STATE O. S. & D. HOSES ARE VACUUM TESTED AND PRESSURE TESTED BEFORE SHIPMENT. CERTIFIED FACTORY TEST REPORTS FURNISHED WITH EVERY HOSE. EXCEEDS U.S. COAST GUARD REGULATIONS. OIL SUCTION AND DISCHARGE HOSES ARE AVAILABLE IN BOTH SMOOTH BORE AND ROUGH BORE CONSTRUCTION.



RUBBER EXPANSION JOINTS

- Spool Type - Single Arch - Double Arch
- Spherical Type
- Wide Arch Type
- Concentric Reducer Type
- Eccentric Reducer Type

Protecting Piping and Equipment Systems
from Stress/Motion



1

ONE-PIECE CONSTRUCTION

A leakproof tube extends through the bore and forms the outside surfaces of the flanges. Natural or synthetic rubber compounds are used to meet the requirements of the application. Both tube and flange are coated with a special urethane formulation for extra resistance to aging.

2

LONGER SERVICE - HIGHER PRESSURES

Longer life and higher working pressures result from "double-protected" construction. The tied metal rings and extra plies over the arch prevent usual causes of expansion joint failure.

3

NO GASKETS

All expansion joints are supplied with full-face flanges of vulcanized rubber and fabric. This design makes gaskets unnecessary. Large sealing surface permits low bolting pressures and tends to equalize uneven surfaces to provide a tight seal.

4

RESISTS EXPOSURE

A one-piece rubber cover is especially compounded to provide optimum resistance against aging and exposure. If oil is present in the application, oil-resistant compounds are used for maximum service life.

ADVANTAGES OVER METALLIC EXPANSION JOINTS

- ✓ greater resistance to shock
- ✓ natural recovery from movement
- ✓ both axial and lateral deflection
- ✓ no flex-cracking with age
- ✓ no electrolysis problem
- ✓ better insulation against vibration and sound

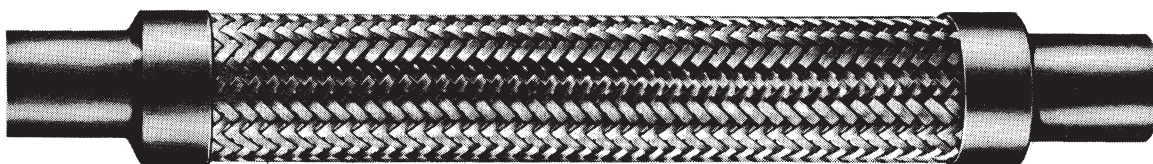
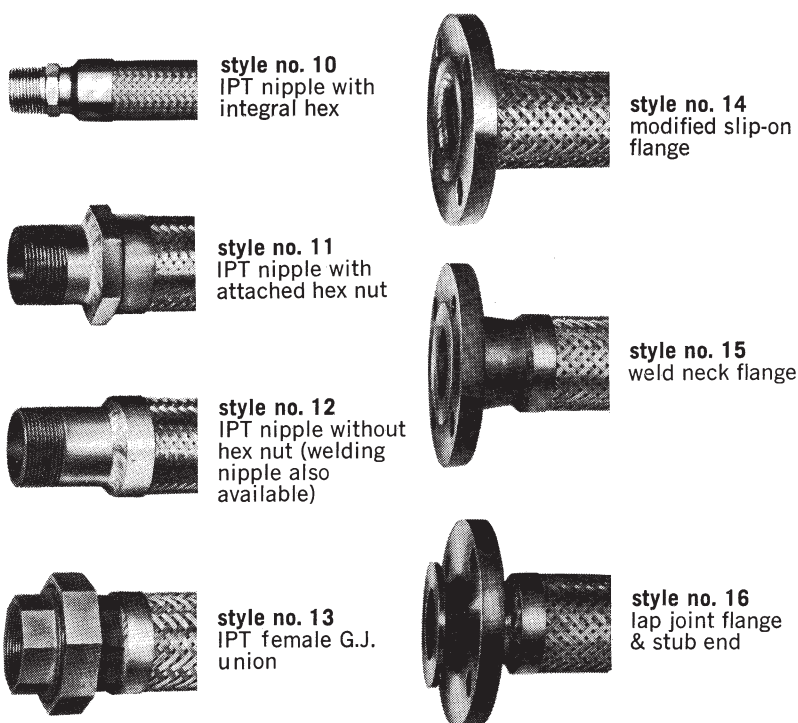
- ✓ no gaskets needed
- ✓ requires less space
- ✓ lighter weight
- ✓ easier to install
- ✓ higher working pressures
- ✓ longer service life
- ✓ requires no maintenance



Flexible Corrugated Metal Hose Assembly Metal Expansion Joints High Pressure Expansion Compensators

Monel- Stainless Steel - Bronze - Carbon Steel - Teflon

Complete Fabricating Facilities - Certified Welders
to Assure Quality and Safety of our Products - Metallic
Hoses and Joints Comply with all Governmental Regulations.



- Corrugated Metal Hose • Interlocked Metal Hose • Vibration Absorbers
- Pump Connectors • Teflon Hose
- Expansion Joints

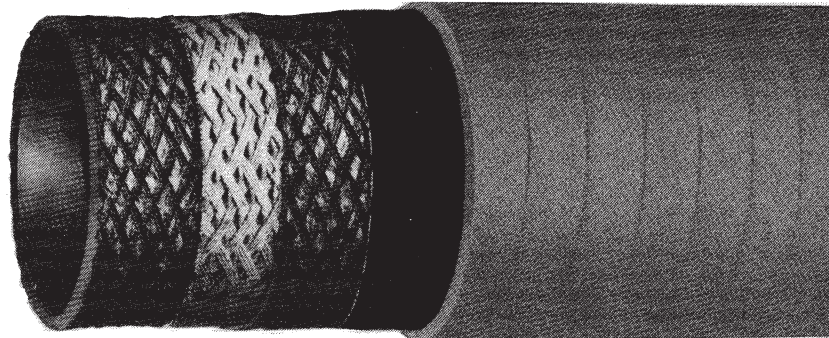
(Hoses Fabricated to Your Specifications)



Aircraft Fueling Hose

Specifically designed to handle aviation refueling operations for commercial, military, and private aircraft. Meets or exceeds requirements of API 1529/89 - BS3158/85-N.F.P.A. 407.

- High grade nitrile tube
- Carcass constructed of multiple plies of nylon tire cord
- High grade tan neoprene cover
 - Resistant to oil, fuel, weather, abrasion, and ozone



Aircraft Fueling Hose Spec. 070-1215 - Softwall

Inside Diameter	Outside Diameter	Weight lb/ft	Working Pressure
1½"	2⅝"	1.05	300 PSI
2"	2⅞"	1.20	300 PSI
2½"	3⅞"	1.60	300 PSI
3"	3⅞"	2.10	300 PSI

Test Pressure: 450 PSI

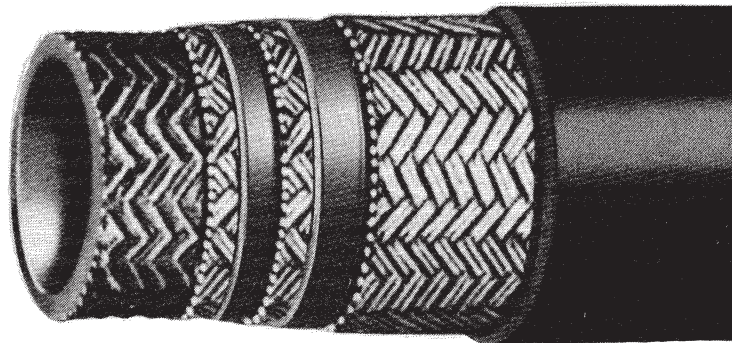
Certified factory test reports furnished with every hose. Sold in coupled lengths only. Brass reusable or permanent one-time couplings.



Jac Riser Fueling Hose

Specifically designed to be used as a flexible connection between the hydrant cart chassis and its adjustable service platform. Type C. Meets or exceeds requirements of API 1529/89 - BS3158/85-N.F.P.A. 407

- High grade nitrile tube
- Carcass constructed of multiple plies of nylon tire cord with spiral helix wire to prevent kinking.
- High grade orange neoprene cover
 - Resistant to oil, fuel, weather, and ozone



Jac Riser Fueling Hose Spec. 070-1218

Inside Diameter	Outside Diameter	Weight lb/ft	Working Pressure
3"	4"	2.6	300 PSI
4"	5"	3.6	300 PSI

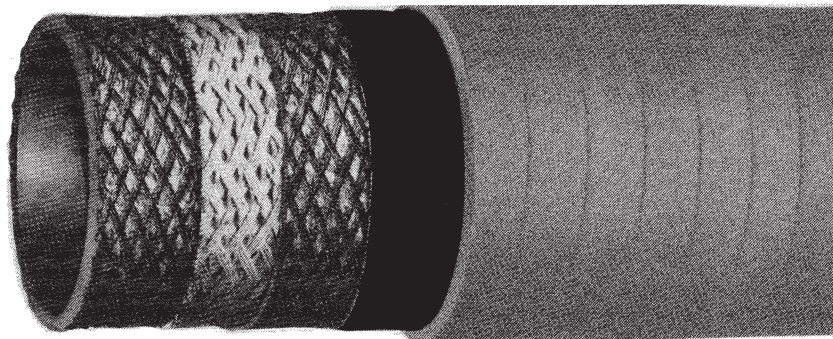
Test Pressure: 450 PSI
Certified factory test reports furnished with every hose.
Factory applied permanent swaged-on couplings.



Jet Hydrant Fueling Hose

Specifically designed for high speed fueling requirements of jet aircraft. Hose is capable of handling high surge pressures on the intake side of the hydrant cart. Type C. Meets or exceeds requirements of API 1529/89 - BS3158/85-N.F.P.A. 407.

- High grade nitrile tube
- Carcass constructed of multiple plies of nylon tire cord
- High grade orange neoprene cover
 - Resistant to oil, fuel, weather, and ozone



Jet Hydrant Fueling Hose Spec. 070-1220

Inside Diameter	Outside Diameter	Weight lb/ft	Working Pressure
3"	3 7/8"	2.4	300 PSI
4"	4 7/8"	3.4	300 PSI

Test Pressure: 450 PSI

Certified factory test reports furnished with every hose. Sold in coupled lengths only. Factory applied permanent swaged-on couplings.

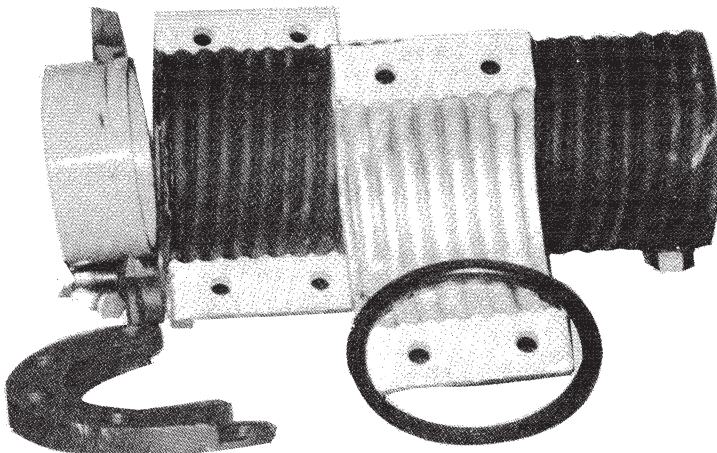


RED-E-FLEX Hose

1. **APPLICATION: RED-E-FLEX** is designed to replace metal pipe where corrosion, abrasion, attack of chemicals or other media causes frequent or expensive replacement.
2. **RUGGED**, top-quality wearing materials.
3. **ADAPTABLE** - can be installed easily for any need.
4. **COST SAVING** with less inventory and for less initial cost.
5. **MAINTENANCE**, labor and installation reduced due to ease of service.
6. **INVENTORY STOCK** needs decreased due to multiple lengths from a 100-foot length.
7. **ADAPTORS FOR SIZE CHANGES** to step-up or step-down requirements (match fit).
8. **CORRUGATED FOR FLEXIBILITY** - long recognized by any customer.
9. **SMOOTH BORE** for less turbulence and less internal wear.
10. **A "WORK HORSE"** of the hose industry everywhere.
11. **AVAILABILITY** can be assured for immediate emergency due to 100-foot lengths on hand in your warehouse.

QUICK-CONNECT COUPLING

*Duck & Rubber Flanges
are a thing of the past!*



RE-USABLE, RUGGED & HEAVY DUTY

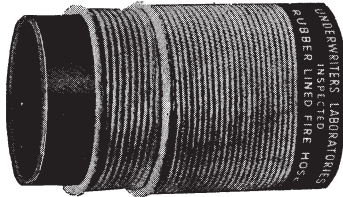
1. Quick and easy installation.
2. Cost is reduced using anodized aluminum and reusable features.
3. Grooved in two directions for extra holding power.
4. Dependable sealing of joints with double clamping principles.
5. Disassembled parts simplify connection from hose to victaulic connection.
6. Victaulic lever "clamp-lock" permits quick change-over or tear-down for system clean-out.
7. Hose always available from your own warehouse up to 100-foot lengths. No waste of hose or costly labor.



Fire Fighting Hoses

- **Standard Rubber Lined Fire Hose**
- **100% Synthetic Fire Hose - Extruded Cover & Liner**
- **100% Polyester Single Jacket**

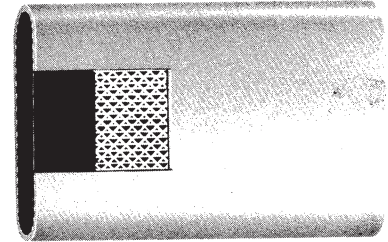
UNDERWRITERS' LABEL OR FACTORY MUTUAL APPROVED.



100 - FFH RUBBER LINED FIRE HOSE "Underwriters Label • U.S. Coast Guard Approved"

Size	Wt. Per 50 Ft. Coupled	Test Pressure
1½"	Single Jacket 21 lbs.	300
2"	Single Jacket 31 lbs.	300
2½"	Single Jacket 39 lbs.	300
1½"	Double Jacket 27 lbs.	400
2"	Double Jacket 38 lbs.	400
2½"	Double Jacket 47 lbs.	400
3"	Double Jacket 73 lbs.	400

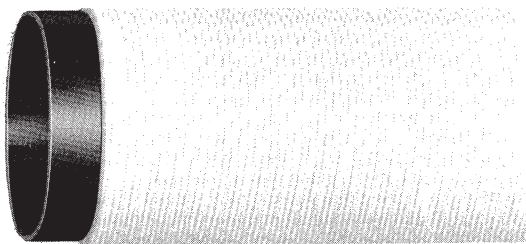
Factory applied fittings.
Available with any type thread required.



200 - FFH 100% Synthetic Extruded Cover & Liner (Red Cover)

I.D.	Coupling Bowl Size	Test Pressure	Wt. Per 50 Ft. Cpld.
1½"	1¾"	500 PSI	11.5 lbs.
2"	2"	500 PSI	16.00 lbs.
2½"	2¾"	500 PSI	21.5 lbs.
1½"	1¾"	600 PSI	16.0 lbs.
2"	2¼"	600 PSI	22.0 lbs.
2½"	2⅞"	600 PSI	31.00 lbs.
3"	3⅝"	600 PSI	40.00 lbs.

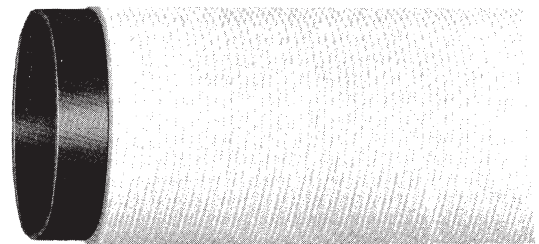
One Piece Extruded Cover and Liner.



300 - FFH 100% Polyester Single Jacket

I.D.	Coupling Bowl Size	Test Pressure	Wt. Per 50 Ft. Cpld.
1½"	1¾"	600 PSI	17 lbs.
2"	2⅝"	600 PSI	21 lbs.
2½"	2⅞"	600 PSI	30 lbs.

Neoprene Liner.
Extra Heavy Duty Service.
Oil Resistant and Mildew Proof.
Couplings: Expansion Ring Type
All Kinds of Threads Available.



400 - FFH 100% Polyester Single Jacket

I.D.	Coupling Bowl Size	Test Pressure	Wt. Per 50 Ft. Cpld.
1½"	1¾"	500 PSI	15 lbs.
2"	2⅝"	500 PSI	20 lbs.
2½"	2⅞"	500 PSI	27 lbs.
3"	3⅝"	500 PSI	37 lbs.

Neoprene Liner. Heavy Duty Service.
Oil Resistant and Mildew Proof.
Couplings: Expansion Ring Type.
All Kinds of Threads Available.



**Hydraulic Hoses
V-Belts
Air Ducting
Lightweight Transport Hose
Elephant Trunk Hose**

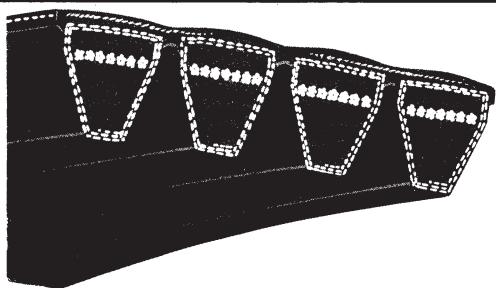


6 Spiral Wire Braids
Sizes 3/16" I.D. Through 2" I.D.

Hydraulic Control Lines

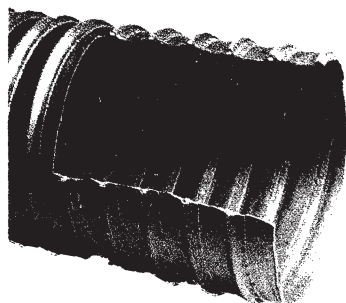
Every type hose and hose fittings.
Used in the oil field, industrial, and marine industries.

Working pressures up to 20,000 PSI.
SAE Specifications



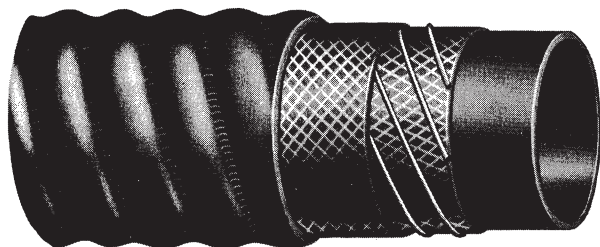
Complete V-Belt Line for Oil Field and Industrial Users.

A, B, C, D, E sections and multiple type V-drives.



Air Ducting

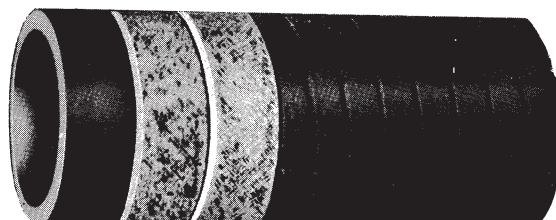
Complete line of ducting for any type industry.
Size 2" I.D. to 24" I.D.



**CORRUGATED LIGHT WEIGHT
TRANSPORT HOSE
SPEC. 070-1170**

Size	Wt. Per Lbs. Ft.	O.D.	W.P. PSI
2"	1.25	3.06	100
3"	2.00	3.56	75
4"	2.75	4.56	75
6"	5.75	6.75	75
8"	8.90	9.00	75
10"	10.00	11.00	75
12"	11.00	13.25	75

Oil resistant tube and cover
Also available in smooth cover



**ELEPHANT TRUNK HOSE
SPEC. 070-1552**

Size	Ply	O.D. (in.)	Approx. Wt. (lb. 100 ft.)
6"	2	6 ⁷ / ₁₆ "	206
8"	2	8 ⁷ / ₁₆ "	270
10"	2	10 ⁷ / ₁₆ "	359
12"	2	12 ⁷ / ₁₆ "	409
16"	2	16 ⁹ / ₁₆ "	700
20"	2	20 ¹ / ₁₆ "	890
24"	2	24 ¹ / ₁₆ "	1090

Highly abrasive tube 1/8" or 1/4". Nylon plies
Gravity flow drop hose.



Copper State Rubber Floating Roof Drain Hose

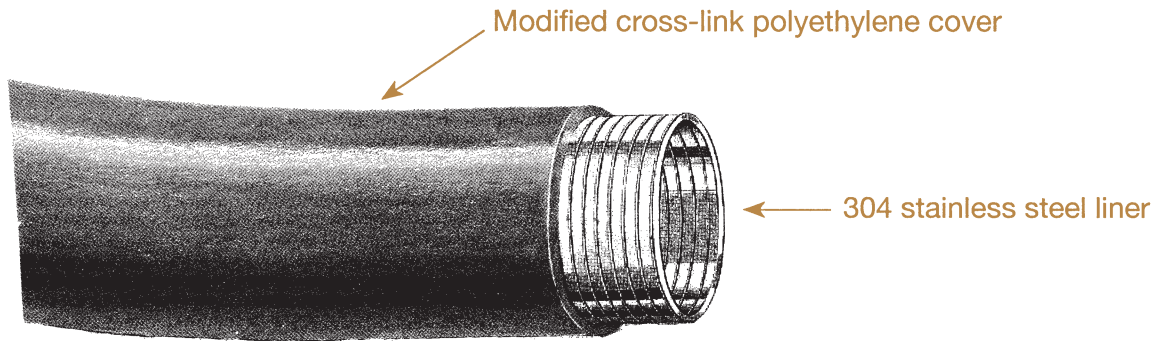
- 304 stainless steel inner liner.
- Modified cross-linked polyethylene outer cover.
- Manufactured with memory lay pattern.
- Available with any type full-flow end fittings.

(NEW TYPE CONSTRUCTION)

Copper State Rubber Floating Roof Drain Hoses are 100% impervious to the following:

• **Hydrocarbons** • **Aromatics** • **Hydrogen Sulfide**

1. No internal ballast – full flow units.
2. Hoses are one continuous length.
3. Full-flow carbon steel nipples and 150 lb. rotating carbon steel flanges both ends.
4. Hoses are skid-mounted to prevent damage during shipping.
5. 304 stainless liner is .20 inches (5mm) thick.
Cross-link polyethylene exterior cover is .25 inches (6 mm) thick.



Spec. 070-1188-SSL

Specifications – Roof Drain Hose

Inside Diameter	3"	4"	6"
Inside Diameter	3"	4"	6"
Outside Diameter	3.8"	4.8"	7"
Weight per ft.	4.3 lbs.	5.4 lbs.	10.2 lbs.
Minimum Bend Radius	2.3 ft.	2.5 ft.	3.5 ft.
Working Pressure	35 PSI	35 PSI	35 PSI
Test Pressure	70 PSI	70 PSI	70 PSI
Collapse Pressure	2500 PSI	1200 PSI	800 PSI
Temperature Range	-12° to 225° F	-12° to 225° F	-12° to 225° F



Chemical Tank Hose Composite Hose Floating Roof Drain Hose



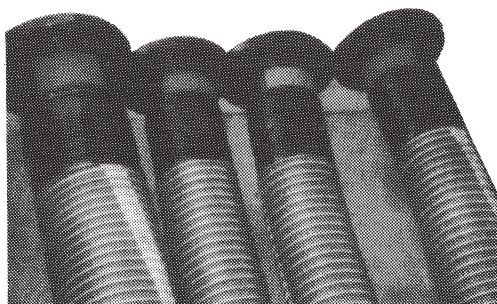
TANK TRUCK HOSE

(The hose to replace all tank truck hose)

SPEC. 070-1176

- Handles 95% of all known chemicals.
- Lightweight, flexible
- Cross linked polyethylene liner.
- Corrugated for flexibility.
- Designed for tank truck use.

I.D. (in.)	O.D.	Wt. Ft. (lbs.)	W.P. PSI
2"	2 ⁹ / ₁₆ "	1.25	100 PSI
3"	3 ⁵ / ₈ "	1.90	100 PSI
4"	4 ⁵ / ₈ "	2.60	100 PSI



COMPOSITE HOSE

Flexible lighter weight oil suction and discharge hose for handling petrochemicals, solvents, and refined products.

CONSTRUCTION

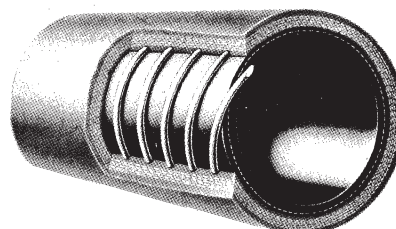
Inner Wire: Galvanized carbon steel, stainless steel, or polypropylene covered wire.

Carcass: Polypropylene fabrics and film. Teflon tube and polypropylene fabrics and film.

I.D. (in.)	Work Pressure PSI	Burst Pressure	Wt. (lbs. ft.)	Bend Radius
3"	200	800	2.50	11"
4"	200	800	4.40	16"
6"	200	800	7.00	20"
8"	200	800	12.00	29"

This hose is ideally suited for ship side handling and barge loadings.

321 STAINLESS STEEL COVER



ROOF DRAIN HOSE

(CONVENTIONAL TYPE CONSTRUCTION)

ROOF DRAIN HOSE

SPEC. 070-1178-VC (Viton Cover)

SPEC. 070-1178-BC (Buna "N" Cover)

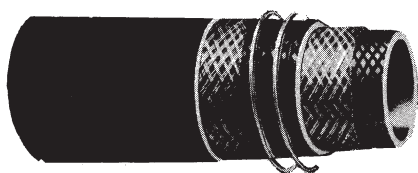
Size	Ply	Approx. O.D.	Approx. Wt. Lbs. Ballasted	Test Pressure PSI
3"	4 ply	4 ¹ / ₄ "	7.00	225 PSI
4"	4 ply	5 ¹ / ₄ "	9.50	225 PSI
6"	4 ply	7 ¹ / ₂ "	22.00	225 PSI

- 100% aromatic proof - Viton cover - Neoprene tube
- 70% aromatic proof - High grade Buna "N" cover - Neoprene tube.
- Stainless steel flexible outer scuff cover available.
- Hose manufactured with memory lay pattern.
- Helix wire to prevent kinking.
- Lengths to 150 feet.
- Every length tested, serial numbered, and crated before shipment.
- Also manufacture stainless steel covered flexible foam lines, for floating roof tanks, that withstands over 2000 deg. F.

Copper State Rubber excels in the manufacture of non-standard rubber hose products, that are not included in catalogs. We can design and build hoses to your job requirements and specifications.

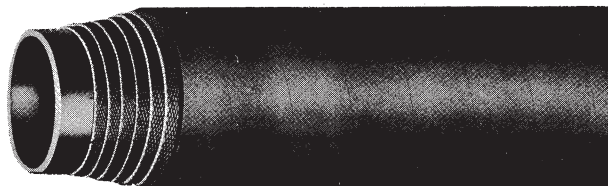


Water Suction Hose Water Discharge Hose Steam Cleaner Hose Sand Blast Hose



Spec. 070-400
**CONTRACTORS
WATER SUCTION**
Helix Wire • Suction & Discharge

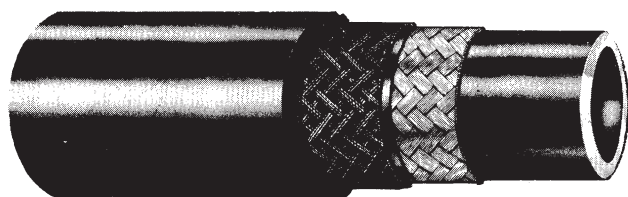
I.D. In.	O.D. In.	Wt. Per Ft. Lbs.	W.P. PSI
1½"	2"	.79	150
2"	2⅞"	1.26	150
3"	3⅞"	1.84	150
4"	4⅝"	2.56	150
4½"	5⅛"	3.20	150
5"	5⅝"	3.50	100
6"	6⅜"	4.25	100
8"	9⅛"	6.50	100
10"	11¼"	8.50	75
12"	13¼"	10.25	75



Spec. 070-700
**CONTRACTORS RUBBER
COVERED WATER DISCHARGE
HOSE**

I.D. In.	O.D. In.	Wt. Per Ft. Lbs.	W.P. PSI
1½"	1⅞"	.49	150
2"	2⅞"	.64	150
3"	3⅞"	.93	150
3½"	3⅞"	1.07	150
4"	4⅞"	1.22	150
4½"	4⅞"	1.37	150
5"	5⅞"	1.51	100
6"	6⅞"	1.80	100
8"	8½"	3.20	75
10"	10¾"	4.50	75
12"	12¾"	6.25	75

Constructed with nylon fabric plies.



Spec. 070-800

STEAM CLEANER HOSE

I.D. (in.)	Wire Braid	O.D.	Approx. Wt. (lb./100 ft.)
½"	1	1⅛"	50
¾"	1	1⅜"	69

High pressure steam cleaning service, with tube compounded to withstand exposure to steam and detergents.

150 PSI W.P., 366°F.



Spec. 070-900

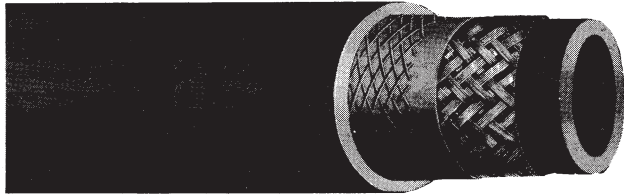
SAND BLAST HOSE

I.D. In.	Ply	O.D.	Approx. Wt. (lb./100 ft.)	W.P. PSI
¾"	4	1½"	67	150
1"	4	1⅞"	98	150
1¼"	4	2⅝"	117	150
1½"	4	2⅞"	132	150
2"	4	2⅞"	165	125

¼" static-dissipating tube.
Tough abrasion resistant cover.



Jetting Hose All Purpose Air Hose General Purpose Suction and Discharge Hose

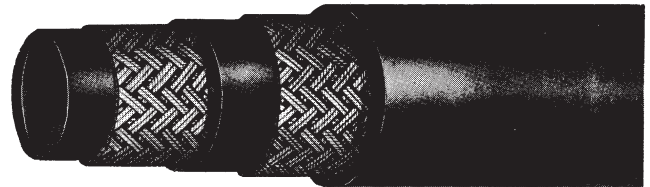


JETTING HOSE SPEC. 070-600

Size	Approx. O.D.	Wt. Per Ft.	W.P. PSI
2"	3"	2.5	1000
3"	4"	3.5	1000
4"	5"	6.0	1000
6"	7 1/4"	9.0	1000

For high pressure jetting service.
Wire braid construction.

Ideal hose for leg jetting service.
Factory swaged on couplings

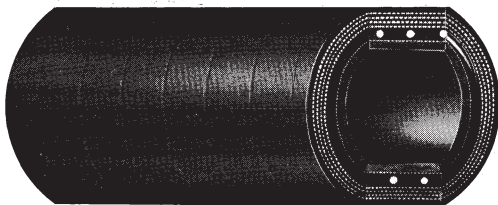


Spec. 070-300 ALL PURPOSE AIR HOSE

Size	Approx. O.D.	Wt. Per C Feet	W.P. PSI
3/8"	23/32"	21	300
1/2"	7/8"	28	300
3/4"	1 3/16"	43	300
1"	1 1/2"	64	300
1 1/4"	1 25/32"	77	300
1 1/2"	2 1/32"	90	300
2"	2 7/8"	150	500
3"	3 7/8"	220	500
4"	5 1/16"	295	500

Oil resistant tube and cover.

A general purpose hose suited for most any type air service.
Red cover 3/8" thru 1 1/2". Yellow cover 2" thru 4".



Spec. 070-1177

General Purpose Suction
and Discharge Hose.
Lower Pressure Hose for
Collection of Materials Diverted
to Open End Discharge.

Neoprene Liner - Internal Helix Wire to Prevent Collapsing

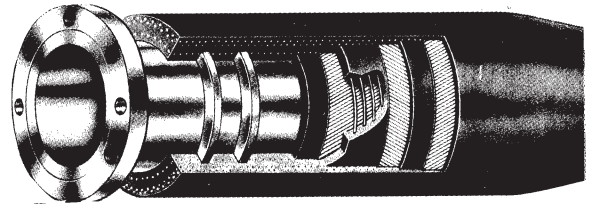
Size	Approx. O.D.	Wt. Per Foot	Working Pressure	Bend Radius
6"	7 1/2"	4Lbs.	100 PSI	60"
7"	8 1/2"	5Lbs.	100 PSI	60"
8"	9 1/2"	6Lbs.	100 PSI	60"
10"	11 1/2"	8Lbs.	100 PSI	72"
12"	13 1/2"	10Lbs.	100 PSI	74"
14"	15 1/2"	12Lbs.	100 PSI	78"



FLEX-LINE HOSES (FLEXIBLE RUBBER PIPE) SUPER HEAT STEAM HOSES

FLEX-LINE HOSE

(Flexible Pipe)



Working Pressure	Type Hose	Spec. # & Tube	Spec. # & Tube	Spec. # & Tube	Spec. # & Tube
25 lbs.	Flex-Line	070-1250 Gum	070-1260 Neoprene	070-1270 Butyl	070-1280 GRS
50 lbs.	Flex-Line	070-1251 Gum	070-1261 Neoprene	070-1271 Butyl	070-1281 GRS
75 lbs.	Flex-Line	070-1252 Gum	070-1262 Neoprene	070-1272 Butyl	070-1282 GRS
100 lbs.	Flex-Line	070-1253 Gum	070-1263 Neoprene	070-1273 Butyl	070-1283 GRS
150 lbs.	Flex-Line	070-1254 Gum	070-1264 Neoprene	070-1274 Butyl	070-1284 GRS
250 lbs.	Flex-Line	070-1255 Gum	070-1265 Neoprene	070-1275 Butyl	070-1285 GRS

APPLICATION: Flexible Rubber Pipe is designed to replace metal pipe where corrosion, abrasion, attack of chemicals or other media causes frequent or expensive replacement.

STANDARD CONSTRUCTION has flanged steel nipples. Also available with Duck & Rubber flanged or beaded ends.

LENGTHS AND SIZES	
100 Ft.	up to 6" I.D.
75 Ft.	up to 14" I.D.
25 Ft.	up to 16" I.D.

Consult factory on sizes over 14" I.D.



SUPER HEAT STEAM HOSE SPEC. 070-500

Size	Approx. O.D.	Wt. Per 100 Ft.	W.P. PSI
1/2"	1 1/8"	55	250-450°F
3/4"	1 25/64"	74	250-450°F
1"	1 21/32"	94	250-450°F
1 1/4"	1 63/64"	126	250-450°F
1 1/2"	2 11/32"	198	250-450°F
2"	2 29/32"	250	250-450°F

Rupture proof wire braid
EPDM tube and cover.

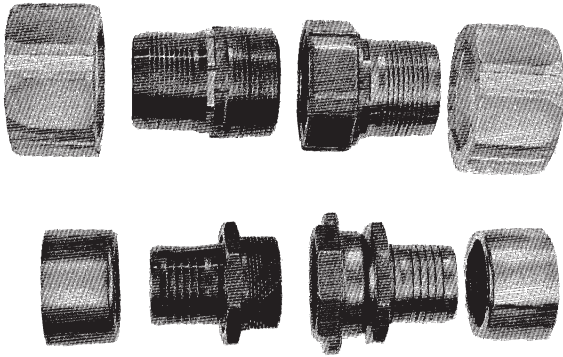


SUPER HEAT STEAM HOSE SPEC. 070-500-N

Size	Approx. O.D.	Wt. Per 100 Ft.	W.P. PSI
1/2"	1 1/8"	55	250-450°F
3/4"	1 25/64"	74	250-450°F
1"	1 21/32"	94	250-450°F
1 1/4"	1 63/64"	126	250-450°F
1 1/2"	2 11/32"	198	250-450°F
2"	2 29/32"	250	250-450°F

Rupture proof wire braid
EPDM tube and Neoprene cover

Couplings



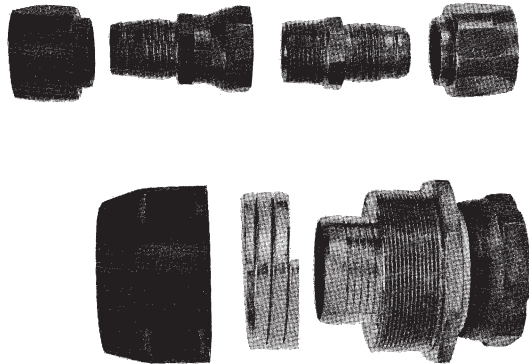
Non-Reattachable Petroleum Transfer

Application: For coupling fuel oil, tank truck, LP-gas hose and aircraft fueling hose.

Size Range: 3/4" to 4".

Description: Solid brass forging with serrated shank and ferrule. Solid male, swivel female. NPT male threads, NPSH female threads. Washer seal.

Attachment: Internally expanded.



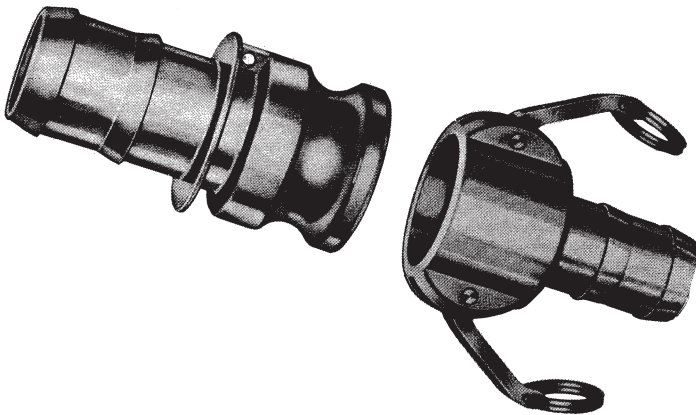
Reattachable Petroleum Transfer

Application: For coupling fuel oil, tank truck, LP-gas hose and aircraft fueling hose.

Size Range: 3/4" to 4".

Description: Solid brass forged body and sleeve or solid forged yellow brass with spiral steel wire compression ring and cast brass sleeve. NPT male and NPSM female swivel. Washer seal.

Attachment: When body and sleeve are screwed together, tapered surface compress ring squeezes hose wall between ring and serrated surface of shank.



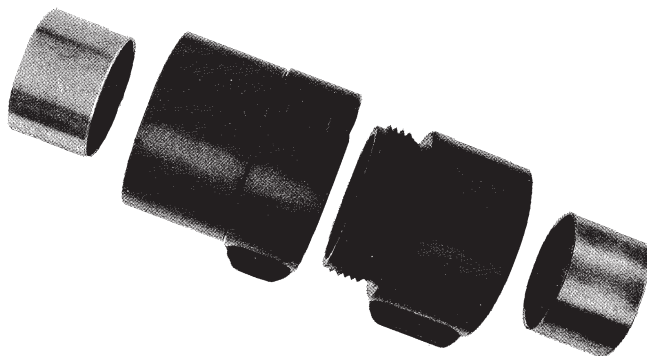
Quick Disconnect (Kamlock)

Application: Low and medium pressure water, petroleum and chemical transfer where fast connection is desired. Can also be used for suction service.

Size Range: 1/2" to 6".

Description: Aluminum, bronze, stainless steel, Monel, malleable iron. Washer seal. No threads. Adapters, dust plugs and caps also available.

Attachment: Bands or clamps.



Expansion Ring

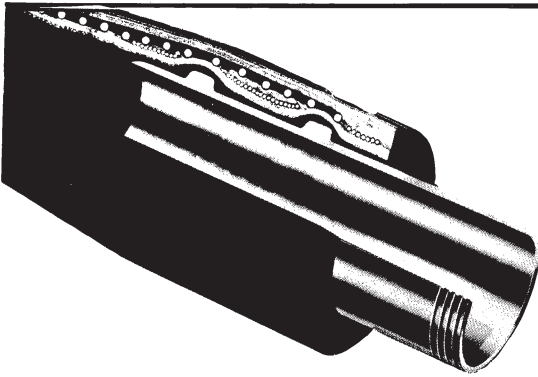
Application: For use on Fire Hose or water discharge service.

Size Range: 1" to 4".

Description: Extruded or forged aluminum and cast brass rocker lug. Pin lug available on some styles. Threads as specified. Washer seal.

Attachment: Expansion ring is internally expanded against hose.

Couplings



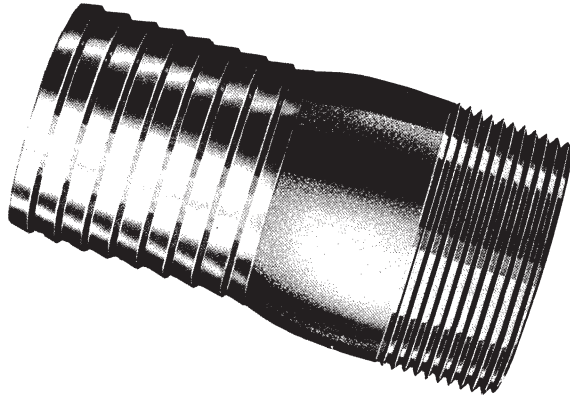
Built-In Nipples

Application: Recommended on handmade hose for heavy-duty suction or discharge service.

Size Range: Steel — 2" to 20" Aluminum — 4" to 12".

Description: Steel or aluminum with bands to add extra holding strength.

Attachment: Nipples are built into hose at time of manufacture.



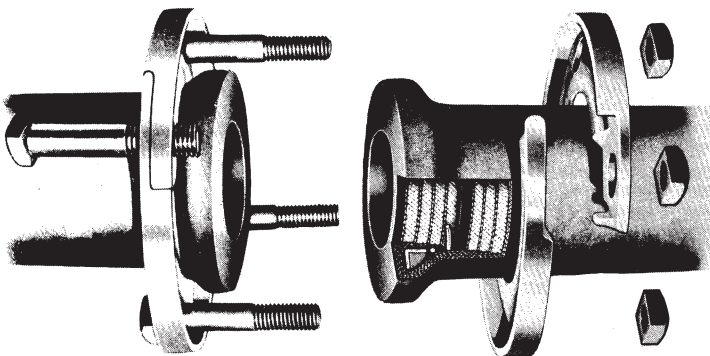
Combination Nipple

Application: For low or medium pressure service with water, material handling and water suction. For use with straight ends.

Size Range: 1/2" to 12".

Description: Tubular steel, stainless, malleable iron, aluminum or brass with serrated shank. NPT male threads or grooved.

Attachment: Clamps or bands.



Flex-Line Ends (Beaded Ends)

Application: Used where rubber seal/surface is required when handling abrasive, corrosive or caustic materials.

Size Range: 1" to 20" (Working pressure ratings vary depending on size).

Description: Hose end is flared out by building the reinforcement and rubber around an angle iron ring and extending tube over their enlargement. Available on handmade hose only.

Attachment: Splint flanges.



Flex-Line Ends (Full Face Rubber Flanges)

Application: Used where rubber seal/surface is required when handling abrasive, corrosive or caustic material.

Size Range: 1-1/2" to 20" (Working pressure ratings vary depending on size).

Description: A full rubber flange reinforced with heavy fabric and backed by a solid steel ring. Available on handmade hose only.

Attachment: Standard flange attachment.

Couplings

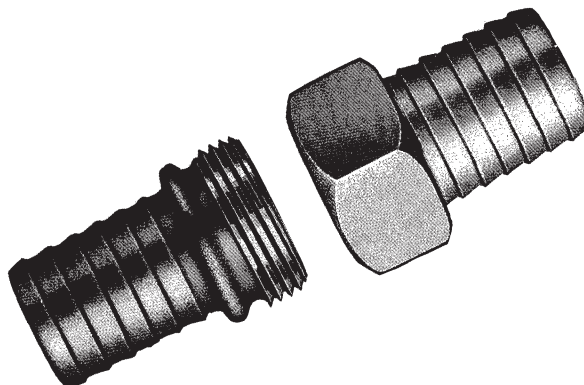
Short Shank

Application: Low pressure water and general purpose up to 50 psi.

Size Range: 3/8" through 6".

Description: Sets, male and female ends. Cast brass with serrated shank. NPSH, GHT washer seal.

Attachment: Clamps, bands or ferrules.



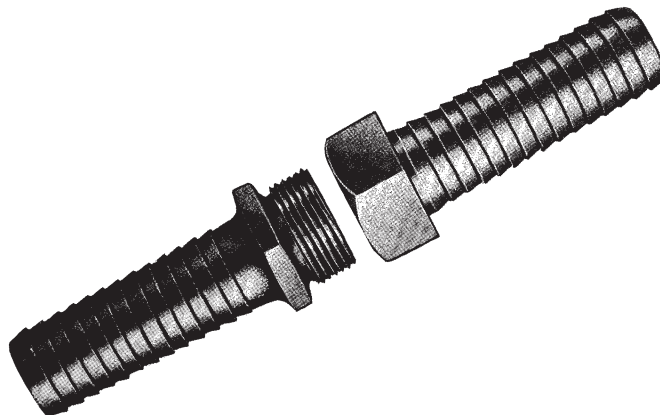
Long Shank

Application: Low or medium pressure air, water or general purpose in suction or discharge service.

Size Range: 1/4" through 3".

Description: Sets, male and female ends. Cast brass. Solid male and swivel female. Serrated shanks. NPSH or GHT thread.

Attachment: Two clamps or bands.



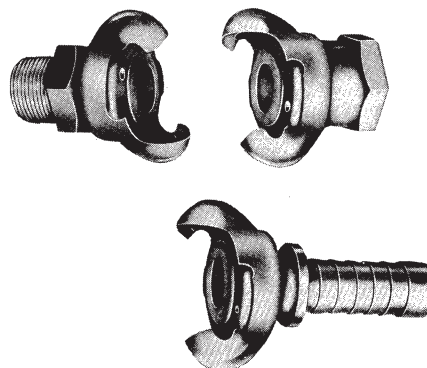
Universal Quick Acting

Application: For low or medium pressure air or water service.

Size Range: 3/8" through 1".

Description: Made of cadmium-plated, malleable iron or cast bronze. Several type ends available. Locking fingers provide positive washer seal.

Attachment: Interlocking clamps.



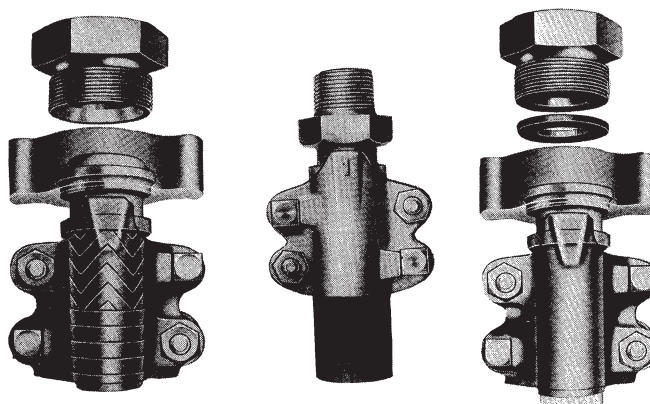
Interlocking Clamp

Application: For high pressure steam, air, LPG, spray and anhydrous ammonia.*

Size Range: 1/4" through 4".

Description: Cadmium-plated, malleable iron. Inserts and speed may be either steel or malleable iron. Male and female threads both NPT. Ground joint or washer seal.

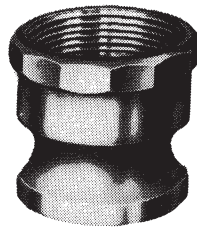
Attachment: Two or four bolt interlocking clamps. (Inserts should be attached with only interlocking clamps.)



Cam and groove couplings

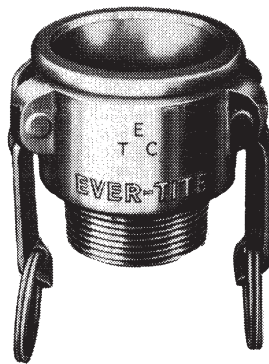
Part A

Male Adapters —
Female Thread



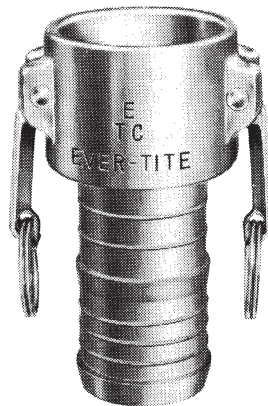
Part B

Female Couplers —
Male Thread



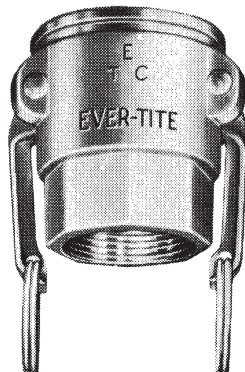
Part C

Female Couplers —
Hose Shank



Part D

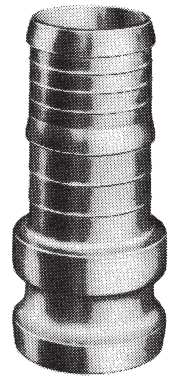
Female Couplers —
Female Thread



Available in aluminum, brass, cast iron,
stainless steel, and polypropylene

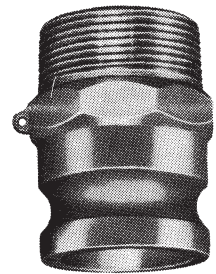
Part E

Male Adapters —
Hose Shank



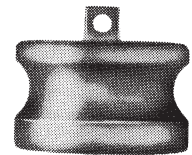
Part F

Male Adapters —
Male Thread



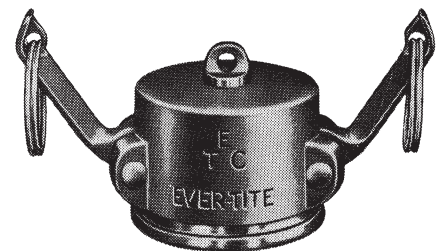
Dust Plug

For Use
With Couplers



Dust Cap

For Use
With Adapters
(Locking Handles
Available)



RMA TOLERANCES

Measure uncoupled hose or hose with rubber flanges from end of rubber to end of rubber. Coupled or steel flanged hose assemblies are measured from end of steel to end of steel.

A. HANDBUILT HOSE — WIRE & NONWIRE

SIZE	I.D. (INCH)	O.D. (INCH)
1" - 2"	± .031	± .062
Over 2" - 3-1/2"	± .047	± .062
Over 3-1/2" - 4"	± .062	± .062
Over 4" - 12"	+ .062	+ .125
	— .250	— .250
Over 12"	+ .125	+ .125
	— .250	— .250

B. SPECIFIED CUT LENGTHS OF HOSE

LENGTH	TOLERANCE (INCH)
12" & Under	± .125
Over 12" - 24"	± .188
Over 24" - 36"	± .250
Over 36" - 48"	± .375
Over 48" - 72"	± .500
Over 72"	± 1%

C. WIRE REINFORCED — MADE TO ORDER HOSE

HOSE LENGTH	TOLERANCE (INCH)
To 5 Ft.	± 1
5' - 10'	+ 2 or - 1
10' - 25'	± 2
25' Over	± 1%

STORAGE RECOMMENDATIONS

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

The warehousing area should be relatively cool, dark, and free from dampness and mildew. All items should be stored on a first-in, first-out basis, since even under these conditions, an unusual length of shelf life could deteriorate certain products.

The ideal storage temperature for rubber products is 50 to 70°F (10—21.1°C) with a maximum limit of 100°F (58°C). If stored below 32°F (0°C), some products may become stiff and should be warmed before being placed in service. Rubber products should not be stored near sources of heat, such as radiators, base heaters, etc. Nor should they be stored under conditions of high or low humidity.

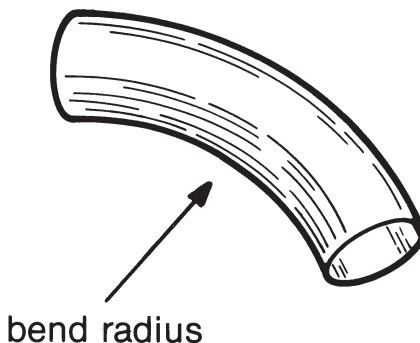
To protect against the adverse effects of ozone, rubber products should not be stored near electrical equipment that may generate ozone or stored for any lengthy period in geographical areas of known high ozone. Conditions of direct and reflected sunlight should also be avoided.

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

However, after all precautions have been taken it should be noted that hoses have a tendency to shrink during storage.

HOSE BEND RADIUS

The Bend Radius is the radius of the bent section of hose measured to the innermost surface of the curved portion. It is important because the minimum bend radius is the maximum amount a hose can be bent without being kinked or damaged.



General formula to determine bend length:

Angle of Bend

$$\frac{360^\circ}{\text{Angle of Bend}} \times 2 \pi r = \text{minimum length of hose to make bend}$$

$r = \text{given bend radius of average hose (3/4 foot per each 1" of hose I.D.)}$

Example: to make a 90° bend with a hose with a 6" I.D.
 $r = 3/4' \times 6 = 4.5'$

$$\frac{90^\circ}{360^\circ} \times 2 \times 3.14 \times 4.5 = 7'$$

$$.25 \times 2 \times 3.14 \times 4.5 = 7'$$

7' then is the minimum length of hose that can be bent without damaging it. Remember that the bend should take place over the entire minimum length and not a portion of it. In addition, the formula does not mean that 7' will be long enough to meet application needs. It only means that if the 90° bend takes place in less than 7', the hose could be damaged.

However, hose can be constructed to a tighter bend radius to meet your specific needs. Please call us.

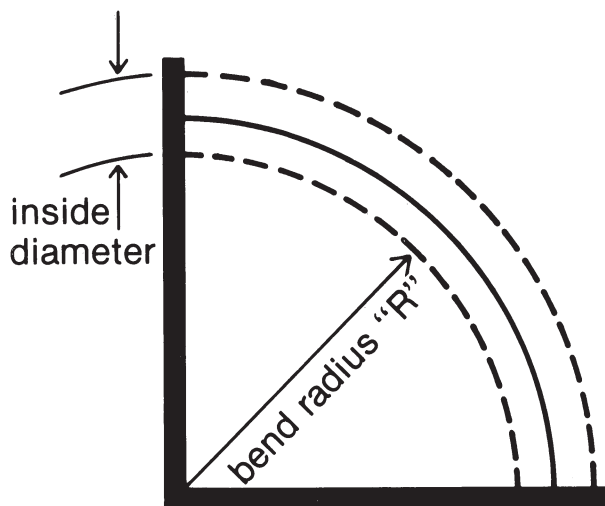


Table of Chemical, Oil and Solvent Resistance of Hose

Resistance Rating

A – Good Resistance, usually suitable for service.

F – Fair Resistance, the chemical has some deteriorative effects, but the elastomer is still adequate for moderate service.

C – Depends on Condition, moderate service may be possible if chemical exposure is limited or infrequent.

X – Not Recommended, unsuitable for service.

I – Insufficient information, not enough data available at the time of publication to determine rating.

Elastomers/Plastics

NR	Natural Rubber	FKM	Fluorocarbon rubber
IR	Isoprene, synthetic	CM	Chloro-polyethylene
SBR	Styrene-butadiene	ECO/CO	Epichlorohydrin
CR	Chloroprene	XLPE	Cross-linked polyethylene
NBR	Nitrile-butadiene	PTFE	Polytetrafluoroethylene
IIR	Isobutene-isoprene	PVC	Polyvinyl Chloride
CSM	Chloro-sulfonyl-polyethylene	PA*	Polyamide*
EPDM	Ethylene-propylene-diene terpolymer	UHMWPE**	ultra high molecular weight polyethylene**
MQ	Dimethyl-polysiloxane		

Material		NR or IR										ECO or CO						
		SBR	CR	NBR	HR	CSM	EPDM	MQ	FKM	CM	XLPE	UHMWPE**	PTFE	PVC	PA*			
Acetic acid, dilute, 10%		F	C	C	X	A	C	A	A	X	A	F	A	A	A	A	X	
glacial		C	X	X	F	F	C	F	F	X	A	X	A	A	A	X	X	
Acetic acid anhydride		C	C	F	X	F	A	I	C	X	A	X	A	A	A	X	X	
Acetone		A	A	F	A	A	F	A	A	X	A	X	A	A	A	X	A	
Acetylene		A	A	F	A	A	F	A	C	A	I	I	A	A	A	X		
Air	68°F (20)°C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Air	150°F (65)°C	A	A	A	A	A	A	A	A		A	A	A	A	A	F	A	
Aluminum chloride	150°F (65)°C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	F	X	
Aluminum fluoride	150°F (65)°C	A	A	A	A	A	A	A	F			A	A	A	A	X	F	
Aluminum sulfate	150°F (65)°C	A	A	A	A	A	A	A	A	A	A	I	A	A	A	A	F	
Alums	150°F (65)°C	A	A	A	A	A	A	A	A		A	I	A	A	A	A	F	
Ammonia gas, anhydrous		A	A	A	A	A	A	A	A	X	A	I	A	A	A	X	F	
Ammonia, 10% water solution		F	F	F	A	A	A	A	A	A			A	A	A	A	A	
30% water solution		F	F	F	A	A	F	A	A	A			A	A	A	F	F	
Ammonium chloride		A	A	A	A	A	A	A	C	A	A	A	A	A	A	A	F	
Ammonium hydroxide		C	F	F	F	A	A	A	A	A	A	I	A	A	A	F	A	
Ammonium nitrate,		A	A	A	A	A	A	A	A		I	A	A	A	A	F	F	
Ammonium phosphate, monobasic		A	A	A	A	A	A	A	A		A	I	A	A	A	F	A	
dibasic		A	A	A	A	A	A	A	A		I	I	A	A	A	F	A	
tribasic		A	A	A	A	A	A	A	A		I	I	A	A	A			
Ammonium sulfate		A	A	A	A	A	A	A	A	A	A	I	A	A	A	A	F	
Amyl acetate		F	X	X	X	F	X	A	A	X	C	X	A	A	A	X	F	
Amyl alcohol		A	A	A	A	A	A	A	A	A	A	A	A	A	A	X	F	
Aniline, Aniline oil		X	X	C	X	A	X	C	C	A	C	X	A	A	A	X	X	
Aniline dyes		F	F	F	F	A	F	C	C			I	I	A	A	X	X	
Asphalt		X	X	F	F	X	F	X		A		A	X	A	A	X	A	
Barium chloride		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Barium hydroxide		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	F	
Barium sulfide		A	A	A	A	A	A	A	A	A	I	A	A	A	A	A	X	
Beer		A	A	A	A	A	A	A	A	A	I	A	A	A	A	A	A	
Beet sugar liquors		A	A	A	A	A	A	A	A	A	I	I	A	A	A	A	A	
Benzene, Benzol		x	X	X	C	X	X	X	C	A	C	X	A	C	A	X	F	

*A variety of PA types were included in this data. For the specific chemistry and performance characteristics, contact the individual manufacturer.

**UHMWPE molecular weight 4 million minimum.

Table of Chemical, Oil and Solvent Resistance of Hose

Material	NR or IR	ECO or										CO	XLPE	UHMWPE**	PTFE	PVC	PA*
		SBR	CR	NBR	HR	CSM	EPDM	MQ	FKM	CM							
Benzene, petroleum ether and														F	A	X	A
Benzene, petroleum naphtha	X	X	C	F	X	F	X	C	A		I	I	A	F	A	X	A
Black sulfate liquor	A	A	A	A	A	A	A	A		I	I	A	A	A	A	C	X
Blast furnace gas	C	C	A	C	C	C	C	C	A	I	I	A	A	A	A	X	A
Borax	A	A	A	A	A	A	A	A	A	I	I	A	A	A	A	A	A
Boric acid	A	A	A	A	A	A	A	A	A	I	A	A	A	A	A	A	F
Bromine	X	X	X	X	X	C	X	F	A	C		F	X	A	X	X	X
Butane	X	X	F	A	X	A	X	A	A	A	A	A	A	A	A	X	A
Butyl acetate	C	X	X	X	F	X	F	A	X	F	X	A	A	A	A	X	A
Butyl alcohol, Butanol	A	A	A	A	A	A	A	A	A	F	I	A	A	A	A	X	C
Calcium bisulfate	C	C	A	A	F	A	F	C	A	A	I	A	A	A	A	A	
Calcium chloride	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Calcium hydroxide	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Calcium hypochlorite	X	X	X	X	A	F	A	C	A	A	F	F	A	A	A	A	X
Caliebe liquors	A	A	A	A	A	A	A	A			I	A	A	A	A	A	A
Cane sugar liquors	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbolic acid, phenol	C	C	C	C	C	C	A	A	A	A	A	A	A	A	A	X	X
Carbon dioxide, dry/wet	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbon disulfide	X	X	X	X	X	X	X	C	A	C		C	C	C	A	X	C
Carbon monoxide	150°F (65°C)	C	C	C	C	F	C	A	A	I		A	A	A	A	A	C
Carbon tetrachloride	X	X	X	C	X	X	X	C	A	C	F	A	C	A	A	X	X
Castor oil	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Cellosolve acetate	F	F	X	X	A		A	C	C			A	A	A	A	X	F
CFC-12	X	X	A	A	F		F	X	A		A	I			A	X	F
China wood oil, tung oil	X	X	F	A	A	F	A	A	C		I	A	A	A	A		F
Chlorine, dry/wet	X	X	X	X	X	X	X	X	C	C	X	F	X	X	A	X	X
Chlorinated solvents	X	X	X	X	X	X	X	C	C	X		A	F	A	A	X	C
Chloroacetic acid	X	C	C	C	X	A	I	C	X			A	A	A	A	X	X
Chlorosulfonic acid	X	X	C	C	X	X	X	C	X			F	X	A	X	X	
Chromic acid	X	X	X	X	C	A	I	C	C	A		F	C	A	C	C	
Citric acid	A	A	A	F	A	A	A	A	A	A	A	A	A	A	A	A	F
Coke oven gas	C	C	C	C	C	A		A	X	A	X	C	X	A	A	X	A
Copper Chloride	150°F (65°C)	C	A	F	A	A	F	A	A	A	I	A	A	A	A	A	X
Copper sulfate	150°F (65°C)	C	A	A	A	F	A	A	A	A	A	A	A	A	A	A	A
Corn oil	X	C	F	A	A	F	C	A	A	A	A	A	A	A	A	F	A
Cottonseed oil	X	C	F	A	A	F	C	A	A	A	I	A	A	A	A	F	A
Creosote, coal tar	X	X	F	A	X	F	X	C	F		X	A	A	A	A	X	X
wood	X	X	F	A	X		X	C	A			A	A	A	A	X	X
Creosols, cresylic acid	C	X	X	C	C	F	X	C		F		A	F	A	A	X	X
Dichlorobenzene	X	X	X	X	X	X	X	X	A		X	X	X	X	A	X	A
Dichloroethylene	X	X	X	X	X	X	X	X	A	X	X	C	C	A	X	C	
Diesel fuel	X	X	X	A	X	F	X	X	A	A	A	F	F	A	X	A	
Diethanolamine 20%	C	X			A	X	A	X	X			A	A	A		A	
Diethylamine	F	F	F	C	F	X	F	F	X			A	A	A			
Dilsopropylamine	F			F		C						A	A	A			
Diethylphthalate	X	X	X	X	F	X	F	X	F		F	A	F	A	X	A	
Ethers	C	C	C	C	C	F	X	C	X	A		A	F	A	X	A	
Ethyl acetate	F	X	X	X	F	X	F	F	X	F	X	A	F	A	A	X	A
Ethyl alcohol	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	F	F
Ethyl cellulose	F	F	F	F	F		F	C	X	F		A	A	A	X	C	
Ethyl chloride	A	F	F	X	A	F	A	C	F	F	F	F	C	A	X	A	
Ethylene glycol	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Ferric chloride	A	A	A	A	A	A	A	A	I	A	A	A	A	A	A	A	C
Ferric sulfate	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Formaldehyde	A	A	C	A	A	A	A	A	A	A	F	A	A	A	F	C	
Formic acid	A	A	C	F	A	A	A	A	X	A	F	F	A	A	X	X	
Fuel oil	X	X	A	A	X	F	X	C	A	F	A	A	F	A	A	F	A
Furfural	X	C	C	X	A	F	C	C	X	A	X	A		A	X	X	
Gasoline, unleaded	X	X	X	A	X	X	X		A	C	A	A	F	A	X	A	
Gasoline + MTBE	X	X	X	A	X	X	X	C	A	C	A	A	F	A	X		
Hi Test + MTBE	X	X	X	A	X	X	X	C	A	C	A	A	F	A	X		

*A variety of PA types were included in this data. For the specific chemistry and performance characteristics, contact the individual manufacturer.

**UHMWPE molecular weight 4 million minimum.

Table of Chemical, Oil and Solvent Resistance of Hose

Material		NR or										ECO or							PTFE	PVC	PA*
		IR	SBR	CR	NBR	HR	CSM	EPDM	MQ	FKM	CM	CO	XLPE	UHMWPE**							
Gelatin		A	A	A	A	A	A	A	A	A		A	A	A	A	A	A				
Glucose		A	A	A	A	A	A	A	A	A		A	A	A	A	A	A				
Glue		F	F	A	A	F	A	A	A	C		A	A	A	A	A	F				
Glycerine, glycerol		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
Green sulfate liquor		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	X				
HFC-134A		F	X	A	A	A	F	A		X	F		A			A					
Hydraulic fluids:																					
Petroleum		X	X	A	A	X	F	X			A	A		A		A	A				
Phosphate ester alkyl		X	X	C	X	A	X	A			A	X			A	X	A				
Phosphate ester aryl		X	X	X	X	C	X	C			C	X			A	X	A				
Phosphate ester blends		X	X	X	X	X	X	C			C	X			A	X	A				
Silicate ester		X	X	C	C	X	C	X			C	C			A	X	A				
Water glycol		A	A	A	A	A	A	A	A	A	A	A		A	A	X	A				
Hydrobromic acid		C	X	C	C	A	A	A	C	A	A		I	A	A	A	X				
Hydrochloric acid		A	X	X	X	C	C	C	C	A	A	X	A	A	A	C	X				
Hydrocyanic acid		F	F	C	F	C	A	C	A	A			A	A	A	F	X				
hydrofluic acid		X	X	X	X	C	A	C	X	A	A		A	F	A	F	X				
Hydrofluosilicic acid		A	F	F	F	A		A	A	A	A		I	A	A	C	X				
Hydrogen gas		F	F	A	A	A		A	A	A		A	A	A	A	A	A				
Hydrogen peroxide		X	X	C	C	C	C	C	A	A	A		I	C	A	C	C				
Hydrogen sulfide, dry		C	C	C	C	A	A	A	C	F			A	A	A	A	X				
wet		C	C	C	C	A	A	A	C	C		F	A	A	A	A	X				
Isobutyl alcohol		A	A	A	F	A	A	A	A	F			A	A	A	F	C				
Isopropyl alcohol		A	A	A	F	A	A	A	A	F		A	A	A	A	F	C				
Isooctane		X	X	F	A	X	A	X	X	A	A	A	A	A	A	A	A				
Kerosene		X	X	F	A	X	C	X	C	A	A	A	A	F	A	A	A				
Lacquers		X	X	X	X	C	X	X		X		X	F	F	A	A	A				
Lacquers solvents		X	X	X	X	C	X	X		X		X	F	F	A	A	A				
Lactic acid		C	C	C	C	C	A	C	A	A			A	A	A	A	C				
Linseed oil		C	X	F	A	A	A	A	A	A	A	A	A	A	A	A	A				
Lubricating oil, crude		X	X	F	A	X	C	X	C	A		A	A	A	A	A	A				
refined		X	X	F	A	X	C	X	C		A	A	A	A	A	A	A				
Magnesium chloride	150°F (65°C)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
Magnesium hydroxide	150°F (65°C)	A	F	F	F	A	A	A	F	A	A	A	A	A	A	A	A				
Magnesium sulfate	150°F (65°C)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
Mercuric chloride		F	F	C	F	A	A	A	A	A		A	A	A	A	A	C				
Mercury		A	A	A	A	A	A	A	A	A		A	A	A	A	A	A				
Methyl alcohol, methanol		A	A	A	A	A	A	A	A	C	A	F	A	A	A	A	F				
Methyl chloride		C	C	C	C	C	X	C	X	A			F	C	A	A	X				
Methyl ethyl ketone		X	X	X	X	F	C	A	C	X	C	X	A	A	A	A	A				
Methyl isopropyl ketone		X	X	X	X	F	C	C	C	X	F	X	A	A	A	A	A				
MTBE													A			A					
Milk		C	C	F	F	A	A	A	A	A	A	A	A	A	A	A	A				
Mineral oils		X	C	F	A	X	F	X	A	A	A	A	A	A	A	A	A				
Natural gas		C	C	A	A	C	A	X	C	A	A	A	A	A	A	A	A				
Nickel chloride	150°F (65°C)	A	A	A	A	A	A	A	A	A	A	I	A	A	A	A	A				
Nickel sulfate	150°F (65°C)	A	A	A	A	A	A	A	A	A	A	I	A	A	A	A	A				
Nitric acid, crude		X	X	X	X	C	C	X	X	C	A	X	F		A	X	X				
diluted 10%		X	X	C	X	C	A	C	C	C	A	X	I	A	A	F	X				
concentrated 70%		X	X	X	X	C	C	X	X	C	X	X	F	X	A	X	X				
Nitrobenzene		X	X	X	X	X	X	X	C	F	C	X	A	F	A	X	X				
Oleic acid		X	F	C	F	F	F	A	C	A			A	A	A	X	A				
Oleum		X	C	C			I		C				I	X	A	X	X				
Oxalic acid		F	C	F	A	A	A	A	A	A	F	A	A	A	A	F	A				
Oxygen		F	C	A	A	A		A	A	A	A	F	A	A	A	A	A				
Palmitic acid		X	F	A	A	F	F	F	C	A	A	F	A	A	A	C	C				
Perchloroethylene		X	X	X	C	X	X	X	C	A	C	F	A	C	A	X	X				
Petroleum oils and crude		X	X	F	A	X	C	X	C	A	C	A	A	X	A	X	X				

*A variety of PA types were included in this data. For the specific chemistry and performance characteristics, contact the individual manufacturer.

**UHMWPE molecular weight 4 million minimum.

Table of Chemical, Oil and Solvent Resistance of Hose

		NR										ECO						
		IR	SBR	CR	NBR	HR	CSM	EPDM	MQ	FKM	CM	CO	XLPE	UHMWPE**	PTFE	PVC	PA*	
Material																		
Phosphoric acid, crude pure 45%	200°F (95)°C)	A	C	C	C	C	A	C	C	A	A		A	A	A	F		
		A	C	C	C	C	A	C	C	A	A		A	A	A	F	C	
Picric acid, molten		C	C	C	C	C		I				I	X	A	X	X		
water solution		A	C	F	F	A	A	I	A	A		I	A	A	X	X		
Potassium chloride		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Potassium cyanide		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Potassium hydroxide		F	F	C	C	A	A	A	A	C	A	A	A	A	A		C	
Potassium sulfate		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Propane		X	X	F	A	X	F	X	A	A	A	A	A	A	A	A	A	
Sewage		C	C	F	A	C	A	C	C	A		I	A	A	A			
Soap solutions		A	A	F	A	A	A	A	A	A	A	A	A	A	A			
Soda ash, sodium carbonate		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Sodium bicarbonate, baking soda		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Sodium bisulfate		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
Sodium chloride		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Sodium cyanide		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Sodium hydroxide		F	F	C	C	A	C	A	A	C	A	F	A	A	A	C	C	
Sodium hypochlorite		X	X	X	X	A	F	A	C	A	A	F	F	C	A	A	C	
Sodium metaphosphate		A	A	C	A	A	F	A	A	A	A	I	A	A	A	F	A	
Sodium nitrate		C	C	C	C	A	A	A	C		A	A	A	A	A	A	A	
Sodium perborate		C	C	C	C	A	A	A	A	A			A	F	A			
Sodium peroxide		C	C	C	C	A	A	A	C	A			A	C	A	X	X	
Sodium phosphate, monobasic		A	F	C	F	A	A	A	A	A	A		A	A	A			
dibasic		A	F	C	F	A	A	A	A				A	A	A			
tribasic		A	F	C	F	A	A	A	A				A	A	A	X	A	
Sodium silicate		A	A	A	A	A	A	A	A	A	A	I	A	A	A	A	A	
Sodium sulfate		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
Sodium sulfide		A	A	A	A	A	A	A	A	A	A	I	A	A	A	A	C	
Sodium thiosulfate, “hypo”		A	A	A	A	A	A	A	A	A	A	I	A	A	A	A		
Soybean oil		X	C	F	A	A	A	A	A	A	A	A	A	A	A	X	A	
Stannic chloride		A	A	A	A	F	A	F	A	A	A	I	A	A	A	A	C	
Steam	450°F (230)°C)	C	C	C	C	C	C	F	C	X		X	X	X	A	X	X	
Stearic acid		X	X	C	F	F	C	F	A	I		F	A	A	A	F	A	
Sulfur		F	F	A	F	A	A	A	F	A		F	C	A	A	F	A	
Sulfur chloride		X	X	C	C	X	A	X	C	A			A		A	X	X	
Sulfur dioxide, dry		C	C	C	C	C	A	C	A	A		I	I	A	A	X	X	
Sulfur trioxide, dry		X	C	C	C	C	F	C	A	A			I	X	A	X	X	
Sulfuric acid, 10%		A	A	A	A	A	A	A	A	A	A	A	A	A	A	F	X	
11%-75%		C	C	C	C	F	A	C	C	A	A	F	A	A	A	F	X	
76%-95%		X	X	X	X	C	A	X	X	A	X	X	A	A	A	C	X	
fuming		X	X	X	X	X	X	X	X	A	X	X	X	X	A	X	X	
Sulfurous acid		C	C	C	C	C	A	C	C	A	A	C	A	A	A	C	X	
Tannic acid			A	C	A	C	A	A	A	A	A	A	I	A	A	A	A	A
Tar			X	X	C	C	X	C	X	C	F		F	X		A		
Tartaric acid			A	C	C	C	F	A	F	A	A	A	F	A	A	A	A	A
Toluene, Toluol			X	X	X	C	X	X	X	C	A	C	X	A	C	A	X	C
Trichloroethylene		X	X	X	X	X	X	X	C	A	C	X	A	F	A	X	X	
Turpentine		X	X	X	F	X	X	X	C	A	F	A	A	F	A	X	A	
Urea, water solution		A		A	A	A	A	A	A				A	A	A	X	A	
Vinegar		C	C	C	C	A	A	A	A	A			A	A	A	A	A	
Vinyl acetate		X	X	X	X	A	X	F		A				A	A	X		
Water, acid mine		A	A	C	A	A	A	A	A	A	A	I	A	A	A	A		
Water, fresh		A	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	
Water, distilled		A	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	
Whiskey and wines		A	A	A	C	A	A	A	A	A	A	I	A	A	A	X	A	
Xylene, xylol		X	X	X	C	X	X	X	C	A	X	X	A	C	A	X	A	
Zinc chloride		C	C	C	C	A	A	A	A	A	A	I	A	A	A	A	A	
Zinc sulfate		A	A	A	A	A	A	A	A	A	A	I	A	A	A	A	X	

*A variety of PA types were included in this data. For the specific chemistry and performance characteristics, contact the individual manufacturer.

**UHMWPE molecular weight 4 million minimum.

NOTES



NOTES

