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Parker Industrial Hose

Composite Hose



ENGINEERING YOUR SUCCESS.

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Composite Hose from Parker Offers Lasting Value for Petrochemical Applications

Parker composite petrochemical hose is economical, flexible, light weight, durable and resistant to abrasion, kinking and vibration. Parker composite hose assembly systems—using a new generation of hose constructions, innovative dry seal coupling technology and Parker crimping equipment—save time and expense due to quick fabrication, easy installation and superior long-lasting performance.

Designed for Petrochem Applications

Petrochemicals are everywhere, produced in diverse formulations and incorporated in a multitude of consumer and industrial products. Originating at refineries or processing plants, the chemicals are transported by a combination of pipeline systems, railcars, river barges, over-the-road trucks and ocean vessels. Since industrial hose is a vital part of manufacturing, transfer and transport processes, it is important to select the most effective and efficient hose available.

Rubber petrochemical hose is relatively heavy and inflexible.

Metal hose is stiff and frequently requires the time and expense of welded-on ends. Parker composite hose is a unique alternative to traditional rubber and metal hose. It provides lighter weight, superior flexibility, minimal force to bend and unparalleled kink and vibration resistance, making it suitable for a wide array of petrochemical fluids in loading/unloading, processing, transfer and transport applications.

Composite hose incorporates a strong yet flexible construction (see Composite Hose Features, page 4). The inner helical wire supports the hose carcass while multiple layers of tightly wound

fabric, film and seamless tubes are sandwiched between the inner and outer wires. The reinforcing layers of fabric and film provide axial strength, tensile strength and working pressure capability, while the seamless tubes provide additional resistance to leaks, permeation and attack by media flowing through the hose. The outer helical wire balances the hose construction and increases abrasion resistance, flexibility and overall hoop strength (resistance to collapse). The helical wires also provide a suitable path for conducting an electrical charge to ground. Together, these components provide a flexible, light weight hose for a variety of applications and a long service life.



Exclusive Composite Hose Assembly System

Dry Seal Technology for Rapid Fabrication and Installation

Parker composite hose has been completely redesigned and is now manufactured in a state-of-the-art production environment. The new manufacturing process precisely controls coverage and orientation of the premium-quality fabric and film, as well as the gauge, pitch and tension of the inner and outer helical wires. Parker's design and materials create consistent, high-performance, long-lasting composite hose in an automated production environment. All Parker composite hose is manufactured in the U.S.A.—eliminating long lead times due to transoceanic deliveries for standard or customized products.

Parker has also invested in a new dry seal coupling technology, a transformational process that reduces composite hose assembly fabrication time, minimizes downtime and

enhances the appearance of finished assemblies. Traditional composite hose couplings require epoxy for secure attachment to the hose. The epoxy also requires hours of curing/drying/setting time, and frequently deposits hardened epoxy residue on the hose cover. The exclusive Parker dry seal technology—available in 1" through 4" hose sizes—replaces epoxy with a rubber sleeve that neatly and securely fits around the hose wall and between the coupling stem and ferrule prior to crimping. Consequently,

Parker composite hose dry seal assemblies are ready for use in the application in a fraction of the time.

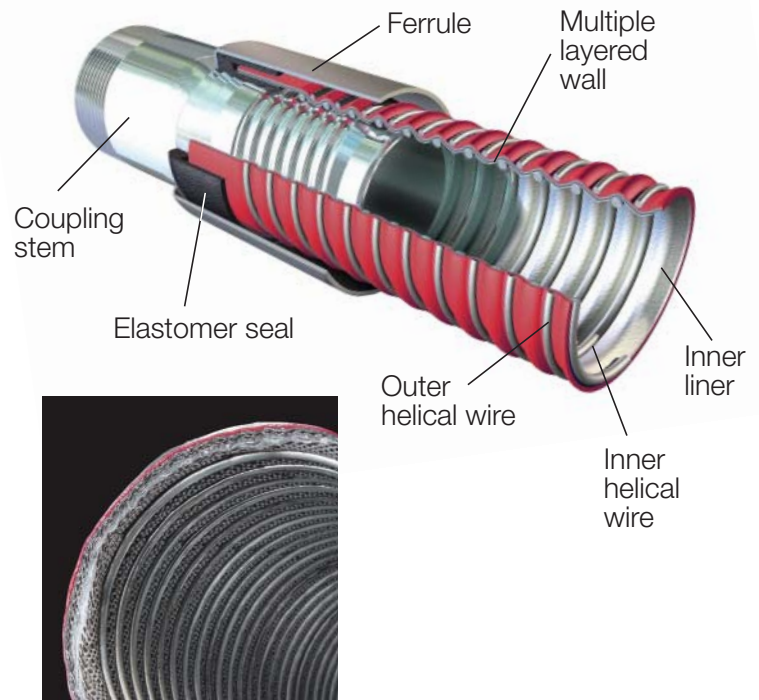
Outdated designs, outmoded materials, hand-built manufacturing technology and labor-intensive hose assembly fabrication processes are prevalent in the composite hose market. Parker now offers a modern composite hose assembly system to drive performance and productivity in the twenty-first century.



Composite Hose Features

- Inner helical wire is available in multiple materials for optimal chemical resistance, and is suitable for conducting an electrical charge to ground.
- Innermost layers of chemical- and oil-resistant polypropylene fabric or polytetrafluoroethylene (PTFE) film provide multiple-fluid compatibility.
- Middle layers of chemical- and petroleum-resistant materials—including interspersed seamless tubes—provide multiple barriers against permeation, pin-holing, seepage, weeping and catastrophic hose failure.
- Cover of PVC-coated polyester, available in multiple colors, provides excellent abrasion and weather resistance and easy identification.
- Outer helical wire is available in multiple materials for optimal chemical resistance, is suitable for conducting an electrical charge to ground and features a low coefficient of friction for easy dragging across flat surfaces.
- Inner and outer wires provide significant flexibility and vibration resistance

Parker Composite Hose and Dry Seal Coupling System



Certified Composite Hose Assembly Fabricator Program

Parker has the dedicated resources, know-how and experience to fabricate a wide variety of high-quality composite hose assemblies at the factory. Parker now offers this expertise—on a local and regional level—through its new Certified Composite Hose Assembly Fabricator Program.

Parker Certified Composite Hose Assembly Fabricators are trained and audited by Parker. They are a select group of distributors who have a background with composite hose assemblies and applications and have made the inventory, equipment, testing, training and documentation commitment to meet Parker standards.

Bulk composite hose and couplings are available only to Parker Certified Composite Hose Assembly

Dry Seal Coupling Features

All Parker composite hose couplings are designed to be used exclusively with Parker composite hose:

- Elastomer seals eliminate the use of epoxy, resulting in rapid assembly fabrication and installation
- Stem and ferrule threads designed to mate only with Parker hose helical wires
- Permanently crimped for reliability and safety
- Popular end styles and materials for easy connection and optimal petrochemical resistance
- Designed to exceed the burst pressure of the companion hose



Fabricators. Distributor-fabricated dry seal hose assemblies are available in the most popular sizes (1" through 4" hose). This dry seal technology provides clean and rapid assembly fabrication and installation by eliminating the use of epoxy and the subsequent curing/drying/set-up time.

All Parker composite hose assemblies are fabricated only by Parker or Parker-certified hose assembly fabricators. All hose assemblies are tested for electrical conductivity and hydrostatically tested to 150% of the rated working pressure. A certification document is shipped with each assembly.

Vapor Recovery Hose

Series 1000



Inner Wire:	Galvanized steel (G)
Inner Liner:	Polypropylene fabric
Hose Wall:	Multiple layers of fabric/film/tubes
Cover:	Yellow PVC-covered polyester
Outer Wire:	Galvanized steel (G)
Temp Range:	-40°F to +212°F (-40°C to +100°C)
Brand Method:	White text on black stripe
Brand Example:	PARKER 1000 VAPOR RECOVERY HOSE 100 PSI MAX WP MADE IN USA
Design Factor:	4:1
Industry Standards:	USCG 33CFR 154.810
Applications:	Petroleum and petrochemical vapor recovery in bottom loading, ship-to-shore and tank truck transfer. NOTE: Not for dry material or suction/vacuum service.
Compare To:	Apollo 110P, Dantec Danoil VR; Peraflex GGP-VRH; Tift 944 Chemflex VRH; Uni-Chem Uni-VR; Wilcox 1321

Part Number	ID (in)	ID (mm)	Approx Wt (lbs/ft)	Min Bend Rad (in)	Max Rec WP (psi)	Max Lg (ft)
1000GG-4000	4	101.6	3.0	11.0	100	70
1000GG-6000	6	152.4	4.0	16.0	100	65
1000GG-8000	8	203.2	8.0	22.0	100	65
1000GG-10000	10	254.0	18.0	35.0	100	50

Standard Wire:	G (Galvanized) inner and outer
Available Wire Options:	See table below
Alternate P/N Example:	1000GS-4000 (Galvanized inner, Stainless outer)
Coupling Rec:	Permanently attached one-piece male pipe or flanged ends; cam and groove
Assemblies:	Per customer requirement; hydrostatically tested to 150% of the rated working pressure

Available Component Materials		
Component	Description	Alpha Designation in Hose Part Number
Inner Wire	Galvanized Steel	G
	Stainless Steel (316)	S
Outer Wire	Galvanized Steel	G
	Stainless Steel (316)	S
Inner Liner	Polypropylene	-
	Polytetrafluoroethylene (PTFE)	-
Couplings	Carbon Steel	-
	Stainless Steel	-

Inner liner and inner wire selection should match that of the composite transfer hose. See pages 14-15 for additional coupling materials data.

Petroleum Transfer Hose

Series 2100



Inner Wire:	Galvanized steel (G)
Inner Liner:	Polypropylene fabric
Hose Wall:	Multiple layers of fabric/film/tubes
Cover:	Blue PVC-covered polyester
Outer Wire:	Galvanized steel (G)
Temp Range:	-40°F to +212°F (-40°C to +100°C)
Brand Method:	Black text on gold stripe
Brand Example:	PARKER 2100 PETROLEUM TRANSFER HOSE XXX PSI MAX WP MADE IN USA
Design Factor:	4:1
Industry Standards:	American Bureau of Shipping (ABS) Certificate of Design Assessment 2009 Steel Vessels Rules
Applications:	Marine, plant processing, rail car, ship-to-shore, tank truck. NOTE: Not for dry material or suction/vacuum service.
Compare To:	Apollo 100P; Dantec Danoil 7 GG; Peraflex GGP Hydrocarbon; Tift 901 Fuelmaster; Uni-Chem Uni-Oil GG; Wilcox 1091/1151 GG

Part Number	ID (in)	ID (mm)	Approx Wt (lbs/ft)	Min Bend Rad (in)	Max Rec WP (psi)	Max Lg (ft)
2100GG-1000	1	25.4	0.8	5.0	250	75
2100GG-1500	1-1/2	38.1	1.0	6.0	250	75
2100GG-2000	2	50.8	1.2	6.5	250	75
2100GG-2500	2-1/2	63.5	1.6	8.0	250	75
2100GG-3000	3	76.2	2.0	9.5	250	70
2100GG-4000	4	101.6	4.4	16.0	250	70
2100GG-6000	6	152.4	7.0	20.0	250	65
2100GG-8000	8	203.2	10.0	29.0	250	65
2100GG-10000	10	254.0	23.0	40.0	150	50

Standard Wire:	G (Galvanized) inner and outer
Available Wire Options:	See table below
Coupling Rec:	Permanently attached one-piece male pipe or flanged ends; cam and groove
Assemblies:	Per customer requirement; hydrostatically tested to 150% of the rated working pressure

Available Component Materials		
Component	Description	Alpha Designation in Hose Part Number
Inner Wire	Galvanized Steel	G
Outer Wire	Galvanized Steel	G
Inner Liner	Polypropylene	-
	Polytetrafluoroethylene (PTFE) <i>Select PTFE for extremely high aromatic contact</i>	-
Couplings	Carbon Steel	-
	Stainless Steel	-

See pages 14-15 for additional coupling materials data.

Chemical Transfer Hose

Series 3100



Inner Wire:	Polypropylene-coated steel (P)
Inner Liner:	Polypropylene fabric
Hose Wall:	Multiple layers of fabric/film/tubes
Cover:	Black PVC coated polyester
Outer Wire:	Galvanized steel (G)
Temp Range:	-40°F to +212°F (-40°C to +100°C)
Brand Method:	Black text on gold stripe
Brand Example:	PARKER 3100 CHEMICAL TRANSFER HOSE 250 PSI MAX WP MADE IN USA
Design Factor:	4:1
Industry Standards:	None applicable
Applications:	Chemicals, inks, paints, plant processing, rail cars, tank trucks. NOTE: Not for dry material or suction/vacuum service.
Compare To:	Apollo 1052P; Dantec Danchem PG/PS; Peraflex PGP Standard Chemical; Tift 951 PG/PS; Uni-Chem PG/PS; Wilcox 3091PG/3094PS

Part Number	ID (in)	ID (mm)	Approx Wt (lbs/ft)	Min Bend Rad (in)	Max Rec WP (psi)	Max Lg (ft)
3100PG-1000	1	25.4	0.8	5.0	250	75
3100PG-1500	1-1/2	38.1	1.0	6.0	250	75
3100PG-2000	2	50.8	1.2	6.5	250	75
3100PG-2500	2-1/2	63.5	1.6	8.0	250	75
3100PG-3000	3	76.2	2.0	9.5	250	70
3100PG-4000	4	101.6	4.4	16.0	250	70
3100PG-6000	6	152.4	7.0	20.0	250	65
3100PG-8000	8	203.2	10.0	29.0	250	65

Standard Wire:	P (Polypropylene-coated steel inner) and G (Galvanized) outer
Available Wire Options:	See table below
Alternate P/N Example:	3100PS-4000 (Polypropylene coated inner, Stainless outer)
Coupling Rec:	Permanently attached one-piece male pipe or flanged ends; cam and groove
Assemblies:	Per customer requirement; hydrostatically tested to 150% of the rated working pressure

Available Component Materials		
Component	Description	Alpha Designation in Hose Part Number
Inner Wire	Polypropylene-coated steel	P
Outer Wire	Galvanized Steel	G
	Stainless Steel (316)	S
Inner Liner	Polypropylene	-
Couplings	Carbon Steel	-
	Stainless Steel	-

See pages 14-15 for additional coupling materials data.

Aggressive Chemical Transfer Hose

Series 4100



Inner Wire: Stainless steel (S)
Inner Liner: Polypropylene fabric
Hose Wall: Multiple layers of fabric/film/tubes
Cover: Green PVC coated polyester
Outer Wire: Stainless steel (S)
Temp Range: -40°F to +212°F (-40°C to +100°C)
Brand Method: Black text on gold stripe
Brand Example: PARKER 4100 AGGRESSIVE CHEMICAL TRANSFER HOSE 250 PSI MAX WP MADE IN USA
Design Factor: 4:1
Industry Standards: None applicable
Applications: Chemicals, inks, paints, plant processing, rail cars, tank trucks. NOTE: Not for dry material or suction/vacuum service.
Compare To: Apollo 1052S; Dantec SS/SG; Peraflex SSP/SGP Chemical; Tift 951 SS/SG; Uni-Chem SS/SG; Wilcox 4094SS/4091SG

Part Number	ID (in)	ID (mm)	Approx Wt (lbs/ft)	Min Bend Rad (in)	Max Rec WP (psi)	Max Lg (ft)
4100SS-1000	1	25.4	0.8	5.0	250	75
4100SS-1500	1-1/2	38.1	1.0	6.0	250	75
4100SS-2000	2	50.8	1.2	6.5	250	75
4100SS-2500	2-1/2	63.5	1.6	8.0	250	75
4100SS-3000	3	76.2	2.0	9.5	250	70
4100SS-4000	4	101.6	4.4	16.0	250	70
4100SS-6000	6	152.4	7.0	20.0	250	65
4100SS-8000	8	203.2	10.0	29.0	250	65

Standard Wire: S (Stainless) inner and outer
Available Wire Options: See table below
Alternate P/N Example: 4100SG-4000 (Stainless inner, Galvanized outer)
Coupling Rec: Permanently attached one-piece male pipe or flanged ends; cam and groove
Assemblies: Per customer requirement; hydrostatically tested to 150% of the rated working pressure

Available Component Materials		
Component	Description	Alpha Designation in Hose Part Number
Inner Wire	Stainless Steel (316)	S
Outer Wire	Galvanized Steel	G
	Stainless Steel (316)	S
Inner Liner	Polypropylene	-
Couplings	Carbon Steel	-
	Stainless Steel	-

See pages 14-15 for additional coupling materials data.

PTFE Chemical Transfer Hose

Series 5100



Inner Wire:	Stainless steel (S)
Inner Liner:	Polytetrafluoroethylene (PTFE / Teflon®) film
Hose Wall:	Multiple layers of fabric/film/tubes
Cover:	Red PVC coated polyester
Outer Wire:	Stainless steel (S)
Temp Range:	-40°F to +212°F (-40°C to +100°C)
Brand Method:	Black text on gold stripe
Brand Example:	PARKER 5100 PTFE CHEMICAL TRANSFER HOSE 250 PSI MAX WP MADE IN USA
Design Factor:	4:1
Industry Standards:	None applicable
Applications:	Chemicals, inks, paints, pharmaceuticals, plant processing, rail cars, tank trucks. NOTE: Not for dry material or suction/vacuum service.
Compare To:	Apollo 1052T; Dantec Danflon SS/SG; Peraflex SST/SGT Aggressive Chemical; Tift 947 Tel-Flex SS/SG; Uni-Chem Uni-Flon SS/SG; Wilcox 4124SS/4121SG

Part Number	ID (in)	ID (mm)	Approx Wt (lbs/ft)	Min Bend Rad (in)	Max Rec WP (psi)	Max Lg (ft)
5100SS-1000	1	25.4	0.8	5.0	250	75
5100SS-1500	1-1/2	38.1	1.0	6.0	250	75
5100SS-2000	2	50.8	1.2	6.5	250	75
5100SS-2500	2-1/2	63.5	1.6	8.0	250	75
5100SS-3000	3	76.2	2.0	9.5	250	70
5100SS-4000	4	101.6	4.4	16.0	250	70
5100SS-6000	6	152.4	7.0	20.0	250	65
5100SS-8000	8	203.2	10.0	29.0	250	65

Standard Wire:	S (Stainless) inner and outer
Available Wire Options:	See table below
Alternate P/N Example:	5100SG-4000 (Stainless inner, Galvanized outer)
Coupling Rec:	Permanently attached one-piece male pipe or flanged ends; cam and groove
Assemblies:	Per customer requirement; hydrostatically tested to 150% of the rated working pressure

Available Component Materials		
Component	Description	Alpha Designation in Hose Part Number
Inner Wire	Stainless Steel (316)	S
Outer Wire	Galvanized Steel	G
	Stainless Steel (316)	S
Inner Liner	Polytetrafluoroethylene (PTFE)	-
Couplings	Carbon Steel	-
	Stainless Steel	-

See pages 14-15 for additional coupling materials data.

Bottom Loading Hose

Series 4500



Inner Wire:	Galvanized steel (G)
Inner Liner:	Polypropylene fabric
Hose Wall:	Multiple layers of fabric/film/tubes
Cover:	Blue PVC coated polyester
Outer Wire:	Galvanized steel (G)
Temp Range:	-40°F to +212°F (-40°C to +100°C)
Brand Method:	Black text on gold stripe
Brand Example:	PARKER 4500 BOTTOM LOADING HOSE 200 PSI MAX WP MADE IN USA
Design Factor:	4:1
Industry Standards:	None applicable
Applications:	Hose loading arms in bottom loading applications at bulk distributing and refining facilities. NOTE: Not for dry material or suction/vacuum service.
Compare To:	Peraflex BL-GGP Bottom Loading; Tift 901/401 Bottom Loading; Uni-Chem Uni-BL; Wilcox 4124SS/4121SG

Part Number	ID (in)	ID (mm)	Approx Wt (lbs/ft)	Min Bend Rad (in)	Max Rec WP (psi)	Max Lg (ft)
4500GG-3000	3	76.2	2.0	9.5	200	70
4500GG-4000	4	101.6	4.4	16.0	200	70

Standard Wire:	G (Galvanized) inner and outer
Available Wire Options:	See table below
Coupling Rec:	Permanently attached one-piece TTMA (Truck Trailer Manufacturers Association) flanges
Assemblies:	Per customer requirement; hydrostatically tested 150% of the rated working pressure

Available Component Materials		
Component	Description	Alpha Designation in Hose Part Number
Inner Wire	Galvanized Steel	G
Outer Wire	Galvanized Steel	G
Inner Liner	Polypropylene	-
Couplings	Carbon Steel	-
	Stainless Steel	-

See pages 14-15 for additional coupling materials data.

Complementary Products

Some applications require a rubber hose construction due to dry/particulate material media, suction/vacuum requirements, higher working pressures or elevated temperatures. It is the responsibility of the user to determine if a hose is suitable for the application, especially for chemicals at elevated temperatures. The Chemical Resistance Guide incorporated in this publication does not apply to rubber hoses. Contact Parker or refer to Parker Catalog 4800 for additional chemical, temperature and safety information, as well as other complementary products.

7216 (Black) / 7217 (Red) TRANSLITE® Petroleum Transfer Hose (1" - 8")

Series 7216/7217 incorporates a traditional robust petroleum transfer hose construction. The nitrile cover is resistant to oil and weathering. The hose is available in 200 foot continuous lengths and is qualified with permanently crimped Parker couplings.



Tube:	Black nitrile
Reinforcement:	Multiple textile plies with wire helix
Cover:	Black nitrile (7216) or red nitrile (7217); wrapped finish
Temp Range:	-40°F to +180°F (-40°C to +82°C)
Brand Method:	7216: Black text on orange stripe
Brand Method:	7217: Red text on white stripe
Brand Example:	PARKER SERIES 7216/SW309 TRANSLITE® TANK TRUCK HOSE XXX PSI MAX WP MADE IN USA 001
Design Factor:	4:1
Industry Standards:	None applicable
Applications:	<ul style="list-style-type: none">• Diesel, fuel oil, refined fuel, petroleum-based oil• In-plant connections, loading/unloading, transfer and transport
Working Pressure Range:	75 - 150 psi
Vacuum:	Full

SWC609 (Black) / SWC609R (Red) TITANFLEX® Petroleum Transfer Hose (1-1/2" - 6")

Series SWC609/SWC609R incorporates an extremely flexible and light weight corrugated petroleum transfer hose construction that provides easy installation and reliable performance in multiple applications. The nitrile cover is resistant to oil and weathering.



Tube:	Black nitrile
Reinforcement:	Multiple textile plies with dual wire helix
Cover:	Black nitrile (SWC609) or red nitrile (SWC609R); corrugated wrapped finish
Temp Range:	-40°F to +180°F (-40°C to +82°C)
Brand Method:	SWC609: Red text on black stripe
Brand Method:	SWC609R: White text on red stripe
Brand Example:	PARKER SWC609(R) TITANFLEX® PETROLEUM SUCTION HOSE XXX PSI WP MADE IN USA
Design Factor:	4:1
Industry Standards:	None applicable
Applications:	<ul style="list-style-type: none">• Diesel, fuel oil, refined fuel, petroleum-based oil• In-plant connections, loading/unloading, transfer and transport
Working Pressure Range:	125 - 250 psi
Vacuum:	Full

SWC683 (Black) / SWC683G (Green) TITANFLEX® Chemical Transfer Hose (1" - 6")

Series SWC683/SWC683G incorporates an extremely flexible and light weight corrugated chemical transfer hose construction that provides easy installation and reliable performance in multiple applications. The modified cross-linked polyethylene (MXLPE) inner tube provides excellent resistance to a wide variety of chemicals at elevated temperatures, without sacrificing flexibility. The EPDM cover is resistant to abrasion, ozone and mild chemicals.



Tube:	Tan modified cross-linked polyethylene (MXLPE)
Reinforcement:	Multiple textile plies with dual wire helix
Cover:	Black or Green EPDM; corrugated wrapped finish
Temp Range:	-40°F to +250°F (-40°C to +121°C)
Brand Method:	Red text on yellow stripe
Brand Example:	PARKER SERIES SWC683(G) TITANFLEX® MOD XLPE CHEMICAL SUCTION XXX PSI WP MADE IN USA
Design Factor:	4:1
Industry Standards:	None applicable
Applications:	<ul style="list-style-type: none"> • Chemical products • In-plant connections, loading/unloading, transfer and transport
Working Pressure Range:	125 - 250 psi
Vacuum:	Full

7373T BLUE THUNDER® UHMWPE Chemical Transfer Hose (3/4" - 4")

Series 7373T hose is designed for use with many types of chemicals and solvents in suction and discharge applications. The high grade ultra high molecular weight polyethylene (UHMWPE) inner tube is compatible with approximately 98% of commonly used chemicals and solvents. The tube has an elevated temperature rating and will not leach into and contaminate the product being conveyed. The corrugated EPDM cover provides flexibility and resistance to abrasion, mild chemicals and ozone. The hose is available in 200 foot continuous lengths.



Tube:	Translucent ultra high molecular weight polyethylene (UHMWPE)
Reinforcement:	Multiple textile plies with dual wire helix
Cover:	Blue EPDM; corrugated wrapped finish
Temp Range:	-40°F to +250°F (-40°C to +121°C)
Brand Method:	Yellow text on blue stripe
Brand Example:	PARKER SERIES 7373T BLUE THUNDER UHMW TUBE MAX WP XXX PSI MADE IN USA (MFG CODE)
Design Factor:	4:1
Industry Standards:	None applicable
Applications:	<ul style="list-style-type: none"> • Chemical products • In-plant connections, loading/unloading, transfer and transport
Working Pressure Range:	200 psi
Vacuum:	Full

SW574 TITANFLEX® Chemical/Food Transfer Hose (3/4" - 4")

Series SW574 incorporates a high quality Teflon® inner tube that resists the most corrosive petrochemicals, even at elevated concentrations and temperatures that make them the most aggressive. The high-purity tube does not leach contaminants into food products transferring through the hose. The distinctive blue EPDM cover is resistant to abrasion, ozone and mild chemicals, and the light weight and flexible hose construction provides easy installation and optimal performance in multiple applications.



Tube:	White FEP
Reinforcement:	Multiple textile plies with dual wire helix
Cover:	Blue EPDM; wrapped finish
Temp Range:	-40°F to +300°F (-40°C to +149°C)
Brand Method:	Red text on yellow stripe
Brand Example:	PARKER SERIES SW574 TITANFLEX CHEMICAL/FOOD QUALITY HOSE XXX PSI WP MEETS FDA/3A/USDA/PMO REQUIREMENTS MADE IN USA
Design Factor:	4:1
Industry Standards:	FDA, PMO, USDA, 3A
Applications:	<ul style="list-style-type: none"> • Chemical, food products • In-plant connections, loading/unloading, transfer and transport
Working Pressure Range:	200 - 400 psi
Vacuum:	Full

Technical Data

Dry Seal Coupling Components* (1" through 4" hose only)

Parker Part Number	Description	Material	Hose I.D.	Weight (lbs/ea)	Std Pack Qty
CHEMICAL HOSE • Series 3100, 4100, 5100					
01DF-16-16C	Rigid Male Pipe Stem	316 Stainless Steel	1	0.58	10
01DF-24-24C	Rigid Male Pipe Stem	316 Stainless Steel	1-1/2	1.13	10
01DF-32-32C	Rigid Male Pipe Stem	316 Stainless Steel	2	1.98	6
01DF-40-40C	Rigid Male Pipe Stem	316 Stainless Steel	2-1/2	2.31	4
01DF-48-48C	Rigid Male Pipe Stem	316 Stainless Steel	3	3.98	4
01DF-64-64C	Rigid Male Pipe Stem	316 Stainless Steel	4	6.72	2
100DF-16C	Ferrule	304 Stainless Steel	1	0.26	10
100DF-24C	Ferrule	304 Stainless Steel	1-1/2	0.44	10
100DF-32C	Ferrule	304 Stainless Steel	2	0.57	6
100DF-40C	Ferrule	304 Stainless Steel	2-1/2	0.85	4
100DF-48C	Ferrule	304 Stainless Steel	3	1.07	4
100DF-64C	Ferrule	304 Stainless Steel	4	2.15	2
DFS-16V	Seal	Viton® (red dot for identification)	1	0.05	10
DFS-24V	Seal	Viton® (red dot for identification)	1-1/2	0.10	10
DFS-32V	Seal	Viton® (red dot for identification)	2	0.12	6
DFS-40V	Seal	Viton® (red dot for identification)	2-1/2	0.15	4
DFS-48V	Seal	Viton® (red dot for identification)	3	0.18	4
DFS-64V	Seal	Viton® (red dot for identification)	4	0.23	2
PETROLEUM HOSE • Series 1000, 2100					
01DF-16-16	Rigid Male Pipe Stem	Carbon Steel	1	0.58	10
01DF-24-24	Rigid Male Pipe Stem	Carbon Steel	1-1/2	1.13	10
01DF-32-32	Rigid Male Pipe Stem	Carbon Steel	2	1.98	6
01DF-40-40	Rigid Male Pipe Stem	Carbon Steel	2-1/2	2.31	4
01DF-48-48	Rigid Male Pipe Stem	Carbon Steel	3	3.98	4
01DF-64-64	Rigid Male Pipe Stem	Carbon Steel	4	6.72	2
100DF-16	Ferrule	Carbon Steel	1	0.26	10
100DF-24	Ferrule	Carbon Steel	1-1/2	0.44	10
100DF-32	Ferrule	Carbon Steel	2	0.57	6
100DF-40	Ferrule	Carbon Steel	2-1/2	0.85	4
100DF-48	Ferrule	Carbon Steel	3	1.07	4
100DF-64	Ferrule	Carbon Steel	4	2.15	2
DFS-16N	Seal	Nitrile (plain/no dot)	1	0.03	10
DFS-24N	Seal	Nitrile (plain/no dot)	1-1/2	0.06	10
DFS-32N	Seal	Nitrile (plain/no dot)	2	0.08	6
DFS-40N	Seal	Nitrile (plain/no dot)	2-1/2	0.10	4
DFS-48N	Seal	Nitrile (plain/no dot)	3	0.12	4
DFS-64N	Seal	Nitrile (plain/no dot)	4	0.15	2

*Available only to Certified Composite Hose Assembly Fabricators.

Seals are packaged in black poly bags with Parker labels.

Standard Factory Couplings

Coupling End Style	Coupling Material Standard Hose Series 1000, 2100	Coupling Material Standard Hose Series 3100, 4100, 5100	Coupling Material Standard Hose Series 4500	Hose I.D.										
				1"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"	10"		
Cam & Groove Female	Carbon Steel (Aluminum optional)	316 Stainless Steel	n/a	■	■	■	■	■	■					
Cam & Groove Male	Carbon Steel (Aluminum optional)	316 Stainless Steel	n/a	■	■	■	■	■	■					
Ferrules	Carbon Steel	304 Stainless Steel (316SS optional)	Carbon Steel	■	■	■	■	■	■	■	■	■	■	■
Flange Fixed or Floating ANSI 150#	Carbon Steel	304 Stainless Steel (316SS optional)	n/a			■	■	■	■	■	■	■	■	■
Flange Fixed or Floating ANSI 300#	Carbon Steel	304 Stainless Steel (316SS optional)	n/a			■	■	■	■	■	■	■	■	■
Flange Stem	Carbon Steel	316 Stainless Steel	n/a			■	■	■	■	■	■	■	■	■
Male Pipe Stem	Carbon Steel	316 Stainless Steel	n/a	■	■	■	■	■	■	■	■	■		
TTMA (Truck Trailer Mfrs Assn)	n/a	n/a	Carbon Steel					■	■					

Composite Hose Chemical Resistance Guide

Chemical or Material Conveyed	Hose Inner Wire				Coupling Material		Seal Material	
	w/Polypropylene Hose Liner		w/PTFE Hose Liner		Inserts/Stems	Stainless Steel (316)	Nitrile (Petroleum Applications)	Viton® (Chemical Applications)
A = Suitable for use @ 140°F B = Suitable for use @ AMBIENT temperatures C = Suitable for INTERMITTENT service only F = Unsuitable - NOT RECOMMENDED ● = No data (contact Parker)	Galvanized	Polypropylene	Stainless Steel	Stainless Steel	Carbon Steel	Stainless Steel (316)	Nitrile (Petroleum Applications)	Viton® (Chemical Applications)
	G	P	S	S				
1,3-Pentadiene	C	C	C	A	C	A	●	●
2-Ethylhexylamine	C	B	B	A	C	A	●	●
2-Ethyl-3-Propylacrolein	C	C	C	A	C	A	●	●
2-Hydroxyethyl Acrylate	C	C	C	B	C	B	●	●
2-Methyl Pentene	C	C	C	A	C	A	●	●
Acetaldehyde 100%	F	C	C	A	F	A	F	F
Acetaldehyde 40%	F	B	B	A	F	A	F	F
Acetic Acid 60%	F	A	A	A	F	A	F	F
Acetic Acid, Glacial	F	B	B	A	F	A	F	F
Acetic Anhydride	F	B	B	A	F	A	F	F
Acetoacetic Ester	F	B	B	A	F	A	F	F
Acetone	A	A	A	A	A	A	F	F
Acetone Cyanohydrin	F	B	B	A	F	A	F	F
Acetonitrile	B	B	B	A	B	A	C	F
Acetophenone	B	B	B	A	B	A	F	F
Acetyl Chloride	F	F	F	A	F	A	F	B
Acetylacetone	B	B	B	A	B	A	C	F
Acetylene Dichloride	B	B	B	A	B	A	A	F
Acrolein (Acrylaidenhyde)	B	B	B	A	B	A	B	F
Acrylamide (<50%)	F	C	C	B	F	B	●	●
Acrylic Acid	F	B	B	B	F	B	B	A
Acrylonitrile	F	A	A	A	F	A	B	F
Adipic Acid (Aqueous)	A	A	A	A	A	A	A	A
Adiponitrile	B	B	B	A	B	A	●	●
Allyl Alcohol	A	A	A	A	A	A	A	B
Allyl Bromide	C	C	C	A	C	A	F	B
Allyl Chloride	C	C	C	B	C	B	F	A
Aluminum Salt Solutions	F	A	B	A	F	A	A	A

Chemical or Material Conveyed	Hose Inner Wire				Coupling Material		Seal Material	
	w/Polypropylene Hose Liner		w/PTFE Hose Liner		Inserts/Stems	Stainless Steel (316)	Nitrile (Petroleum Applications)	Viton® (Chemical Applications)
A = Suitable for use @ 140°F B = Suitable for use @ AMBIENT temperatures C = Suitable for INTERMITTENT service only F = Unsuitable - NOT RECOMMENDED ● = No data (contact Parker)	Galvanized	Polypropylene	Stainless Steel	Stainless Steel	Carbon Steel	Stainless Steel (316)	Nitrile (Petroleum Applications)	Viton® (Chemical Applications)
	G	P	S	S				
Alums	F	A	A	A	F	A	A	A
Aminoethyl Ethanolamine	F	B	B	A	F	A	●	●
Ammonia Solution	F	A	A	A	F	A	C	B
Ammonium Chloride Solution	F	A	C	C	F	C	C	A
Ammonium Hydroxide	B	A	B	A	B	A	B	B
Ammonium Nitrate Solution	F	A	B	B	F	B	A	A
Ammonium Sulfate Solution	F	A	A	A	F	A	A	A
Amyl Acetate	C	C	C	A	C	A	F	A
Amyl Alcohol	B	B	B	A	B	A	A	A
Amyl Chloride	C	C	C	B	C	B	F	A
Aniline	F	C	C	A	F	A	F	B
Animal Oils	A	A	A	A	A	A	A	A
Anisole	C	C	C	B	C	B	●	B
Antimony Chloride	F	B	F	F	F	F	A	A
Aqua Regia	F	C	F	F	F	F	F	A
Arcenic Chloride	F	B	F	F	F	F	C	F
Arsenic Acid	F	B	C	B	F	B	A	A
Aviation Fuel	C	C	C	B	C	B	A	A
Barium Carbonate	A	A	A	A	A	A	A	A
Barium Chloride Solution	F	A	F	F	F	F	A	A
Barium Hydroxide	F	A	A	A	F	A	A	A
Barium Salts	F	A	B	B	F	B	A	A
Barium Sulfate	F	A	A	A	F	A	A	A
Beer	F	A	A	A	F	A	A	A
Benzaldehyde	F	C	C	A	F	A	F	F
Benzene	F	C	C	A	F	A	F	A
Benzoic Acid	F	C	A	A	F	A	F	A
Benzyl Alcohol	A	A	A	A	A	A	F	A

NOTE: This chemical resistance chart is intended as a guide only. Please consult Parker's technical department for chemicals not listed or for other extreme service conditions.

Chemical or Material Conveyed	Hose Inner Wire			Coupling Material		Seal Material	
	w/Polypropylene Hose Liner		w/PTFE Hose Liner	Inserts/Stems	Stainless Steel (316)		Nitrile (Petroleum Applications) Viton® (Chemical Applications)
	G	P	S	S	Carbon Steel	Stainless Steel (316)	Nitrile (Petroleum Applications) Viton® (Chemical Applications)

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Bleach (12.5% CL)	F	B	C	B	F	B	F	B
Borax (Aqueous)	A	A	A	A	A	A	A	A
Boric Acid	F	A	A	A	F	A	A	A
Brine	F	A	C	F	F	F	A	A
Butadiene	B	B	B	B	B	B	F	B
Butanol	B	B	B	A	B	A	A	A
Butyl Acetate	C	C	C	B	C	B	F	F
Butyl Alcohol	A	A	A	A	A	A	A	A
Butyl Benzene	B	B	B	B	B	B	F	A
Butyl Carbitol Acetate	C	C	C	B	C	B	B	A
Butylamine	F	B	C	B	F	B	C	F
Butyric Acid	B	B	B	A	B	A	C	C
Calcium Acetate	B	B	B	B	B	B	F	B
Calcium Alkyl Salicylate	F	A	A	A	F	A	•	•
Calcium Carbonate	F	A	A	A	F	A	A	A
Calcium Chloride	F	A	C	C	F	C	A	A
Calcium Hydroxide	F	A	A	A	F	A	A	A
Calcium Hypochlorite	F	B	C	B	F	B	F	A
Calcium Nitrate	F	A	A	A	F	A	A	A
Camphor Oil	C	C	C	B	C	B	B	A
Caprylic Acid	A	A	A	A	A	A	C	B
Carbinols	B	B	B	A	B	A	A	F
Carbinol Acetate	C	C	C	B	C	B	B	B
Carbolic Acid	F	A	A	A	F	A	C	A
Carbolic Oils	C	C	C	B	C	B	•	•
Carbon Bisulfide	F	B	B	B	F	B	F	A
Carbon Disulfide	C	C	C	A	C	A	F	A
Carbon Monoxide	F	A	A	A	F	A	C	A
Carbon Tetrachloride	C	C	C	B	C	B	C	A
Carbonic Acid	F	A	A	A	F	A	A	A
Cashew Nutshell Oil	B	B	B	B	B	B	•	•
Castor Oil	F	B	B	B	F	B	A	A
Caustic Potash (<50%)	F	A	B	A	F	A	A	C
Caustic Soda (<50%)	F	A	B	A	F	A	B	C
Cellosolve	B	B	B	B	B	B	F	C
Cetyl Acid	F	B	B	B	F	B	•	•
Chlorinated Solvents	F	B	B	B	F	B	F	A
Chlorine (Dry)	F	F	F	A	F	A	B	A
Chlorobenzene	C	C	C	A	C	A	F	A
Chloroform	C	C	C	A	C	A	F	A
Chrome Alum	F	A	A	A	F	A	A	A
Chromic Acid Aqueous	F	C	C	A	F	A	F	C
Citric Acid	F	A	A	A	F	A	B	A
Coal Tar Naptha	F	B	B	A	F	A	A	A
Copper Chloride	F	A	F	F	F	F	A	A
Copper Nitrate	F	A	A	A	F	A	A	A
Creosote	B	B	B	A	B	A	A	A
Crotonaldehyde	C	C	C	B	C	B	F	F
Crude Oil	A	A	A	A	A	A	A	A
Cumene	B	B	B	A	B	A	C	A
Cyclohexane	B	B	B	B	B	B	B	A
Cyclohexylamine	F	B	B	A	F	A	C	F
Cyclotane	B	B	B	A	B	A	•	•
Decanol	B	B	B	B	B	B	B	A
Decyl Alcohol	B	B	B	B	B	B	A	B
Decylbutyl Phthalate	B	B	B	B	B	B	F	C
Detergents (2%)	A	A	A	A	A	A	A	A
Dextrin	A	A	A	A	A	A	A	A
Diacetone Alcohol	B	B	B	A	B	A	F	F
Diaminoethylamine	C	B	B	A	C	A	•	•
Diamylamine	C	B	B	A	C	A	B	F
Dibromoethane	F	B	B	A	F	A	F	A
Dibutyl Ether	C	C	C	B	C	B	F	C
Dibutyl Phthalate	B	B	B	A	B	A	F	F
Dibutylamine	C	B	B	A	C	A	F	F
Dichloroacetic Acid	F	C	F	F	F	F	F	C
Dichlorobenzene	C	C	C	B	C	B	F	B
Dichlorobutane	C	C	C	A	C	A	F	A
Dichloroethane	C	C	C	B	C	B	F	A
Dichloroethyl Ether	C	C	C	A	C	A	F	C
Dichloroethylene	C	C	C	B	C	B	F	A
Dichloropropane	C	C	C	B	C	B	F	A
Dichloropropylene	C	C	C	B	C	B	•	•

Chemical or Material Conveyed	Hose Inner Wire			Coupling Material		Seal Material	
	w/Polypropylene Hose Liner		w/PTFE Hose Liner	Inserts/Stems	Stainless Steel (316)		Nitrile (Petroleum Applications) Viton® (Chemical Applications)
	G	P	S	S	Carbon Steel	Stainless Steel (316)	Nitrile (Petroleum Applications) Viton® (Chemical Applications)

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 • = No data (contact Parker)

Diethylbenzene	B	B	B	A	B	A	•	•
Diesel Oil	B	B	B	B	B	B	A	A
Diethanolamine	F	A	A	A	F	A	B	F
Diethyl Sulphate	F	B	B	A	F	A	F	A
Diethylamine	F	B	B	A	F	A	C	F
Diethylaminoethanol	C	B	B	A	C	A	•	•
Diethylene Dioxide	C	B	B	A	C	A	F	F
Diethylene Glycol Diethyl Ether	B	B	B	A	B	A	•	•
Diethylene Glycol	A	A	A	A	A	A	A	A
Diisobutyl Ketone	B	B	B	A	B	A	F	F
Diisobutylamine	B	B	B	B	B	B	B	A
Diisobutylene	C	C	C	B	C	B	A	A
Diisooctyl Adipate	B	B	B	A	B	A	F	C
Diisooctyl Phthalate	A	A	A	A	A	A	F	B
Diisopropanolamine	F	B	B	A	F	A	B	C
Diisopropylether	B	B	B	A	B	A	B	B
Dimethyl Ethanolamine	F	B	B	A	F	A	•	•
Dimethyl Formamide	A	A	A	A	A	A	C	F
Dimethyl Hydrogen Phosphite	F	C	C	B	F	B	•	•
Dimethyl Ketone	A	A	A	A	A	A	F	F
Dimethyl Phthalate	B	B	B	A	B	A	F	C
Dimethyl Sulphate	F	B	B	A	F	A	F	F
Dimethyl Sulphide	B	B	B	A	B	A	F	C
Dimethylamine	F	B	B	A	F	A	C	F
Dimethylcyclohexylamine	F	B	B	B	F	B	•	•
Dinitrobenzene	C	C	C	A	C	A	F	A
Dioctyl Phthalate	B	B	B	A	B	A	F	B
Dioctyl Sebacate	B	B	B	A	B	A	F	B
Dioctylamine	B	B	B	A	B	A	B	F
Dioxane	C	B	B	A	C	A	F	F
Dipentene	B	B	B	A	B	A	C	A
Diphenyl Ether	B	B	B	A	B	A	F	A
Diphenyl Phthalate	B	B	B	A	B	A	F	C
Dipropylamine	B	B	B	A	B	A	•	•
Dipropylene Glycol	A	A	A	A	A	A	A	A
Disulphuric Acid	F	F	F	C	F	C	•	•
Dodecyl Alcohol	B	B	B	A	B	A	A	B
Dodecyl Benzene	B	B	B	B	B	B	F	A
Dodecyl Phenol	B	B	B	B	B	B	•	•
Dodecyltoulene	B	B	B	B	B	B	F	A
Emulsifiers	F	A	A	A	F	A	•	•
Epichlorohydrin	B	B	B	A	B	A	F	F
Ethanoic Acid	F	B	B	A	F	A	C	F
Ethanolamine	B	A	A	A	B	A	B	F
Ethoxy Ethanol	C	C	C	B	C	B	A	C
Ethoxy Ethyl Acetate	C	C	C	A	C	A	F	F
Ethoxy Propanol	C	C	C	B	C	B	•	•
Ethyl Acetate	C	C	C	A	C	A	F	F
Ethyl Acrylate	B	B	B	A	B	A	F	F
Ethyl Alcohol	A	A	A	A	A	A	A	B
Ethyl Aluminum Dichloride	F	F	F	C	F	C	F	B
Ethyl Butanol	B	B	B	A	B	A	A	B
Ethyl Butylamine	C	B	B	B	C	B	•	•
Ethyl Chloride	C	C	C	A	C	A	F	B
Ethyl Cyclohexane	C	C	C	A	C	A	•	•
Ethyl Cyclohexylamine	C	C	C	B	C	B	•	•
Ethyl Ether	F	C	C	A	F	A	C	F
Ethyl Formate	F	B	B	A	F	A	F	F
Ethyl Iodide	C	C	C	B	C	B	F	B
Ethyl Isobutyl Ether	F	B	B	A	F	A	F	•
Ethyl Methacrylate	C	C	C	A	C	A	•	•
Ethyl Methyl Ketone	B	B	B	B	B	B	F	F
Ethyl Phthalate	A	A	A	A	A	A	F	•
Ethyl Silicate	A	A	A	A	A	A	A	A
Ethyl Sulphate	B	B	B	A	B	A	F	F
Ethyl Vinyl Ether	B	B	B	A	B	A	•	•
Ethylamine	C	B	B	A	C	A	C	F
Ethylbenzene	B	B	B	A	B	A	F	A
Ethylene Carbonate	C	B	B	A	C	A	•	•
Ethylene Chloride	C	C	C	A	C	A	F	A
Ethylene Chlorohydrin	B	B	B	A	B	A	F	A
Ethylene Cyanhydrin	F	C	C	A	F	A	B	A
Ethylene Diamine	B	B	B	A	B	A	A	F

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Chemical or Material Conveyed	Hose Inner Wire			Coupling Material	Seal Material		
	w/Polypropylene Hose Liner		w/PTFE Hose Liner	Inserts/Stems	Seal Material		
	Galvanized	Polypropylene	Stainless Steel	Carbon Steel	Stainless Steel (316)	Nitrile (Petroleum Applications) Viton® (Chemical Applications)	
A = Suitable for use @ 140°F B = Suitable for use @ AMBIENT temperatures C = Suitable for INTERMITTENT service only F = Unsuitable - NOT RECOMMENDED • = No data (contact Parker)	G	P	S	S	Carbon Steel	Stainless Steel (316)	Nitrile (Petroleum Applications) Viton® (Chemical Applications)

Ethylene Dibromide	C	B	B	A	C	A	F	B
Ethylene Dichloride	C	C	C	A	C	A	F	B
Ethylene Glycol	A	A	A	A	A	A	A	A
Ethylene Oxide	F	B	B	A	F	A	F	F
Ethylhexanoic Acid	F	B	B	B	F	B	•	•
Ethylhexyl Acrylate	F	B	B	A	F	A	•	F
Ethylhexyl Alcohol	A	A	A	A	A	A	•	•
Ethylpropyl Ether	B	B	B	A	B	A	F	C
Ethylpropyl Ketone	C	C	C	A	C	A	F	F
Fatty Acids	F	A	A	A	F	A	B	A
Fatty Alcohols	A	A	A	A	A	A	•	•
Ferric Salts	F	A	B	B	F	B	A	A
Fluosilicic Acid	F	A	A	A	F	A	B	A
Formaldehyde Solutions	A	A	A	A	A	A	A	A
Formamide	F	A	B	A	F	A	A	F
Formic Acid	F	A	B	A	F	A	B	F
Fruit Juices	F	A	A	F	F	A	A	A
Fuel Oils	B	B	B	A	B	A	A	A
Furfural	C	C	C	A	C	A	F	F
Furfuryl Alcohol	C	C	C	A	C	A	F	F
Gallic Acid Solution	C	A	A	A	C	A	B	B
Gasoline	B	B	B	A	B	A	A	A
Gelatine (aqueous)	A	A	A	A	A	A	A	A
Gluconic Acid	C	A	A	A	C	A	C	A
Glucose (aqueous)	A	A	A	A	A	A	A	A
Glycerine	A	A	A	A	A	A	A	A
Glycolic acid (aqueous)	F	A	A	A	F	A	A	A
Glycols (aqueous)	A	A	A	A	A	A	A	A
Grease	B	B	B	A	B	A	A	A
Green Sulphate Liquor	F	B	B	B	F	B	•	•
Heptane	B	B	B	A	B	A	A	A
Heptanol	A	A	A	A	A	A	A	B
Heptanone	B	B	B	A	B	A	•	•
Heptene	B	B	B	A	B	A	•	•
Heptonic Acid	F	B	B	A	F	A	A	A
Hexamethylene Diamine	F	B	B	A	F	A	•	•
Hexamethylene Tetramine	F	B	B	A	F	A	•	•
Hexamethyleneimine	F	C	C	B	F	B	•	•
Hexane	B	B	B	A	B	A	A	A
Hexanol	A	A	A	A	A	A	A	A
Hexene	B	B	B	B	B	B	B	A
Hexylamine	F	B	B	A	F	A	C	F
Hexylene Glycol	A	A	A	A	A	A	A	A
Hydrazine Hydrate	F	B	B	A	F	A	B	F
Hydrobromic Acid	F	A	F	F	F	F	C	A
Hydrochloric Acid	F	C	F	F	F	F	F	A
Hydrofluoric Acid	F	B	F	F	F	F	F	A
Hydrofluosilicic Acid	F	A	A	A	F	A	B	A
Hydrogen Peroxide Solution	F	B	B	B	F	B	F	B
Hydrogen Sulfide (aqueous)	F	A	F	F	F	F	F	F
Hydroquinone	A	A	A	A	A	A	F	F
Iodine Solution	F	B	F	F	F	F	F	C
Iron Salts	F	A	F	A	F	A	A	A
Isoamyl Acetate	C	C	C	A	C	A	F	F
Isoamyl Alcohol	B	B	B	A	B	A	A	A
Isoamyl Bromide	F	B	F	F	F	F	F	B
Isoamyl Butyrate	B	B	B	A	B	A	F	F
Isoamyl Chloride	F	C	C	B	F	B	F	B
Isoamyl Ether	B	B	B	A	B	A	F	F
Isobutraldehyde	F	F	C	B	F	B	C	F
Isobutyl Acetate	C	C	C	B	C	B	F	F
Isobutyl Acrylate	B	B	B	A	B	A	•	•
Isobutyl Alcohol	A	A	A	A	A	A	B	B
Isobutyl Bromide	F	B	F	F	F	F	F	B
Isobutyl Chloride	F	B	F	F	F	F	F	B
Isobutyl Ether	C	C	C	A	C	A	F	F
Isobutyl Formate	C	C	C	C	C	C	•	•
Isobutylamine	F	B	B	A	F	A	F	F
Isobutylmethyl Ketone	B	B	B	A	B	A	F	F
Isodecyl Alcohol	A	A	A	A	A	A	A	B
Isooctane	C	C	C	A	C	A	A	A
Isopentane	C	C	C	A	C	A	A	A
Isophorone	B	B	B	B	B	B	F	F

Chemical or Material Conveyed	Hose Inner Wire			Coupling Material	Seal Material		
	w/Polypropylene Hose Liner		w/PTFE Hose Liner	Inserts/Stems	Seal Material		
	Galvanized	Polypropylene	Stainless Steel	Carbon Steel	Stainless Steel (316)	Nitrile (Petroleum Applications) Viton® (Chemical Applications)	
A = Suitable for use @ 140°F B = Suitable for use @ AMBIENT temperatures C = Suitable for INTERMITTENT service only F = Unsuitable - NOT RECOMMENDED • = No data (contact Parker)	G	P	S	S	Carbon Steel	Stainless Steel (316)	Nitrile (Petroleum Applications) Viton® (Chemical Applications)

Isophorone Diamine	F	C	C	B	F	B	•	•
Isophorone Diisocyanate	C	C	C	B	C	B	•	•
Isoprene	B	B	B	A	B	A	•	•
Isopropanolamine	F	B	B	A	F	A	F	F
Isopropyl Acetate	C	C	C	B	C	B	F	F
Isopropyl Alcohol	A	A	A	A	A	A	B	B
Isopropyl Benzene	B	B	B	B	B	B	F	A
Isopropyl Chloride	F	B	F	B	F	B	F	B
Isopropyl Ether	F	B	F	A	F	A	C	F
Isopropyl Toluene	B	B	B	B	B	B	F	A
Isopropylamine	F	B	B	A	F	A	B	F
Isovaleraldehyde	F	C	C	B	F	B	•	•
Jams	B	A	A	A	B	A	A	A
Jet Fuel	C	C	C	A	C	A	A	A
Kerosene	B	B	B	A	B	A	A	A
Ketones	B	B	B	A	B	A	F	F
Lactic Acid	F	A	B	A	F	A	C	A
Lanolin	A	A	A	A	A	A	A	A
Lard	A	A	A	A	A	A	A	A
Latex	A	A	A	A	A	A	A	A
Lauryl Alcohol	B	B	B	A	B	A	A	B
Lead Acetate	F	A	A	A	F	A	C	C
Lead Salts	F	A	B	B	F	B	A	A
Ligroin	C	C	C	B	C	B	A	A
Limonene	B	B	B	A	B	A	•	•
Linseed Oil	A	A	A	A	A	A	A	A
Lubricating Oil	B	B	B	A	B	A	A	A
Magnesium Salts	F	A	B	B	F	B	A	A
Maleic Acid Solution	F	A	B	B	F	B	F	A
Maleic Anhydride Solution	F	B	B	B	F	B	F	A
Malic Acid Solution	F	B	B	B	F	B	B	A
Manganese Salts	F	A	B	B	F	B	A	A
Meat Juices	F	A	A	A	F	A	•	•
Mercuric Chloride	F	A	F	F	F	F	B	A
Mesityl Oxide	B	B	B	A	B	A	F	F
Methacrylic Acid	F	B	B	A	F	A	•	•
Methaxlene	F	B	B	B	F	B	•	•
Methyl Acetate	C	C	C	A	C	A	F	F
Methyl Acetone	B	B	B	A	B	A	F	F
Methyl Acrylate	B	B	B	A	B	A	F	F
Methyl Alcohol	A	A	A	A	A	A	A	C
Methyl Butylaldehyde	F	F	F	B	F	B	•	•
Methyl Carbitol	A	A	A	A	A	A	C	•
Methyl Cellosolve	B	B	B	B	B	B	C	F
Methyl Cellosolve Acetate	C	C	C	B	C	B	•	•
Methyl Chloride	C	C	C	A	C	A	C	A
Methyl Cyanide	B	B	B	A	B	A	C	F
Methyl Cyclohexane	B	B	B	A	B	A	F	B
Methyl Formate	C	C	C	A	C	A	F	C
Methyl Isobutyl Ketone	C	C	C	A	C	A	F	F
Methyl Methacrylate	C	C	C	A	C	A	F	F
Methyl Nitrobenzene	B	B	B	B	B	B	•	•
Methyl Pentene	B	B	B	A	B	A	•	•
Methylacetate Acetate	F	C	C	B	F	B	F	F
Methylamine	C	B	B	B	C	B	B	F
Methylamly Ketone	B	B	B	A	B	A	•	•
Methylamly Acetate	C	C	C	A	C	A	C	C
Methylamly Alcohol	B	B	B	A	B	A	•	•
Methylbutyl Alcohol	A	A	A	A	A	A	•	•
Methylbutyl Ketone (MBK)	B	B	B	A	B	A	•	•
Methylene Bromide	C	C	C	A	C	A	B	C
Methylene Chloride	C	C	C	B	C	B	F	C
Methylethyl Ketone	C	C	C	A	C	A	F	F
Methylethyl Pyridine	C	C	C	B	C	B	•	•
Methylheptyl Ketone	F	B	B	B	F	B	•	•
Methylstyrene	B	B	B	A	B	A	•	•
Methylter-Butyl Ether (MTBE)	C	C	C	A	C	A	F	F
Mineral Oil	B	B	B	A	B	A	A	A
Mineral Spirits	B	B	B	A	B	A	A	A
Molasses	A	A	A	A	A	A	F	A
Monochlorobenzene	C	B	B	B	C	B	F	B
Monoethanolamine	B	A	A	A	B	A	B	C
Monoethylamine	C	B	B	A	C	A	F	•

NOTE: This chemical resistance chart is intended as a guide only. Please consult Parker's technical department for chemicals not listed or for other extreme service conditions.

Chemical or Material Conveyed	Hose Inner Wire			Coupling Material	Seal Material	
	w/Polypropylene Hose Liner		w/PTFE Hose Liner	Inserts/Stems	Seal Material	
	Galvanized	Polypropylene	Stainless Steel	Carbon Steel	Stainless Steel (316)	Nitrile (Petroleum Applications) Viton® (Chemical Applications)

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Monoisopropanolamine	F	B	B	B	F	B	B	F
Monoisobenzene	B	B	B	A	B	A	•	•
Morpholine	C	B	B	A	C	A	F	A
Naptha	B	B	B	A	B	A	A	A
Naptha Solvent	C	C	C	A	C	A	A	A
Napthalene Solution	A	A	A	A	A	A	F	A
Neohexane	B	B	B	B	B	B	A	A
Nickel Chloride	F	A	C	B	F	B	A	A
Nickel Salts	F	A	B	B	F	B	A	A
Nitric Acid (>60%)	F	F	F	C	F	C	F	C
Nitric Acid (10%)	F	A	A	A	F	A	F	C
Nitric Acid (60%)	F	C	C	C	F	C	F	C
Nitrobenzene	B	B	B	A	B	A	F	B
Nitropropane	C	C	C	A	C	A	F	F
Nitrotoluene	B	B	B	A	B	A	C	C
Nonane	B	B	B	A	B	A	A	A
Nonyl Alcohol	B	B	B	A	B	A	A	B
Nonyl Phenol	C	B	B	A	C	A	•	•
Octane	B	B	B	A	B	A	A	A
Octanol	B	B	B	A	B	A	B	A
Octyl Acetate	C	C	C	A	C	A	F	F
Octyl Acrylate	B	B	B	A	B	A	•	•
Octyl Carbinol	B	B	B	A	B	A	A	B
Oils	B	B	B	A	B	A	A	A
Oleic Acid	F	B	B	A	F	A	B	C
Oleum	F	F	F	B	F	B	F	F
O-Nitrophenol Solution	F	A	A	A	F	A	C	F
Oxalic Acid	F	B	B	A	F	A	B	A
Palm Oil	B	B	B	A	B	A	A	A
Parrafin Wax	A	A	A	A	A	A	A	A
Pentane	B	B	B	A	B	A	A	A
Pentanol	A	A	A	A	A	A	A	B
Pentanone	B	B	B	A	B	A	F	F
Pentene	B	B	B	A	B	A	B	A
Perchloroethylene	C	C	C	A	C	A	C	A
Perchloric Acid	F	B	F	F	F	F	F	A
Petrolatum	A	A	A	A	A	A	A	A
Petroleum	A	A	A	A	A	A	A	A
Petroleum Ether	C	C	C	A	C	A	A	A
Petroleum Naptha	C	C	C	A	C	A	A	A
Phenol	B	A	A	A	B	A	F	A
Phenoxyethanol	C	C	C	B	C	B	•	•
Phenylhydrazine	F	C	C	B	F	B	•	•
Phosphoric Acid	F	A	A	A	F	A	C	A
Phosphorus	F	F	F	F	F	F	•	•
Phosphorus Oxchloride	F	C	F	F	F	F	F	A
Phosphorus Pentoxide	F	A	B	B	F	B	•	•
Phosphorus Trichloride	F	B	A	A	F	A	F	A
Phthalic Acid	F	B	B	B	F	B	•	•
Phthalic Anhydride	F	F	F	F	F	F	•	•
Picric Acid	F	B	B	B	F	B	C	C
Pine Oil	B	B	B	A	B	A	C	B
Pinene	B	B	B	A	B	A	A	A
Plasticisers	B	B	B	A	B	A	•	•
Polyethylene Glycol	B	B	B	A	B	A	A	A
Polyethylene Polyamines	F	C	C	A	F	A	A	A
Polypropylene Glycol	B	B	B	A	B	A	A	A
Potassium Salts	F	A	B	A	F	A	A	A
Propionaldehyde	F	C	C	A	F	A	C	F
Propionic Acid	F	B	B	A	F	A	C	F
Propionic Anhydride	F	C	C	B	F	B	•	•
Propionitrile	C	C	C	C	C	C	F	F
Propyl Acetate	C	C	C	A	C	A	F	F
Propyl Alcohol	A	A	A	A	A	A	A	A
Propylamine	F	B	B	A	F	A	C	F
Propylene Glycol	A	A	A	A	A	A	A	A
Propylene Oxide	F	B	B	B	F	B	F	F
Prussic Acid	F	A	A	A	F	A	•	•
Pyridine	F	B	B	A	F	A	F	F
Pyrosulphuric Acid	F	F	F	B	F	B	C	C
Salt Solution	F	A	B	A	F	A	A	A
Sea Water	F	A	B	B	F	B	A	A

Chemical or Material Conveyed	Hose Inner Wire			Coupling Material	Seal Material	
	w/Polypropylene Hose Liner		w/PTFE Hose Liner	Inserts/Stems	Seal Material	
	Galvanized	Polypropylene	Stainless Steel	Carbon Steel	Stainless Steel (316)	Nitrile (Petroleum Applications) Viton® (Chemical Applications)

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Sewage	F	B	B	B	F	B	A	A
Silicon Oil	A	A	A	A	A	A	A	A
Silver Halides	F	A	F	F	F	F	C	C
Silver Salts	F	A	B	B	F	B	A	A
Soap Solution	B	A	A	A	B	A	A	A
Sodium Chloride	F	A	F	F	F	F	A	A
Sodium Dichromate	F	B	F	F	F	F	F	C
Sodium Hydrosulfide	F	A	B	B	F	B	C	B
Sodium Hydroxide	F	A	B	B	F	B	C	C
Sodium Hypochlorite	F	C	F	F	F	F	F	A
Sodium Salts	F	A	B	B	F	B	B	A
Sodium Thiosulfate	F	A	B	B	F	B	A	A
Starch(aqueous)	B	A	A	A	B	A	A	A
Styrene Monomer	B	B	B	A	B	A	F	A
Sugar Syrup	A	A	A	A	A	A	A	A
Sulphamic Acid	F	A	A	A	F	A	B	C
Sulphur Dioxide	F	C	C	C	F	C	C	A
Sulphur Liquid	F	F	F	F	F	F	B	A
Sulphuric Acid (<20%)	F	B	C	B	F	B	B	A
Sulphuric Acid (>85%)	F	C	C	B	F	B	F	A
Sulphuric Acid (20%-80%)	F	B	F	C	F	C	F	A
Sulphurous Acid	F	B	B	B	F	B	C	A
Sulphuryl Chloride	F	F	F	F	F	F	C	A
Tall Oil	A	A	A	A	A	A	A	A
Tallow	A	A	A	A	A	A	A	A
Tannic Acid	F	A	A	A	F	A	C	A
Tartaric Acid	F	A	B	A	F	A	C	A
Tetrachloroethane	C	C	C	A	C	A	F	A
Tetrachloroethylene	C	C	C	A	C	A	F	A
Tetraethylene Glycol	B	B	B	A	B	A	A	A
Tetrahydrofuran	F	C	B	A	F	A	F	F
Tetrahydronapthalene	C	C	C	A	C	A	•	•
Tetrathylene Pentamine	F	B	B	B	F	B	•	•
Thionyl Chloride	F	F	F	C	F	C	•	•
Tin Halides	F	A	F	F	F	F	A	A
Tin Salts	F	A	B	F	F	F	A	A
Titanium Tetrachloride	F	C	F	F	F	F	B	A
Toluene	C	C	C	A	C	A	C	A
Toulene Diisocyanate	B	B	B	A	B	A	C	B
Transmission Oil	B	B	B	A	B	A	B	A
Tributyl Phosphate	B	B	B	A	B	A	F	F
Tributylamine	B	B	B	A	B	A	B	F
Trichloroacetic Acid	F	A	B	B	F	B	C	F
Trichlorobenzene	F	C	C	A	F	A	F	B
Trichloroethane	C	C	C	A	C	A	F	A
Trichloropropane	C	C	C	A	C	A	F	A
Tricresyl Phosphate	B	B	B	A	B	A	F	A
Tridecanol	B	B	B	A	B	A	A	B
Triethylamine	F	B	B	B	F	B	A	F
Triethylbenzene	B	B	B	A	B	A	•	•
Triethylene Glycol	A	A	A	A	A	A	A	A
Triethylene Tetramine	F	B	B	A	F	A	•	•
Trimethyl Acetic Acid	F	A	A	A	F	A	•	•
Trimethyl Benzene	B	B	B	A	B	A	B	A
Trioctyl Phosphate	B	B	B	A	B	A	F	B
Trithanolamine	F	B	B	A	F	A	•	•
Tritolyl Phosphate	B	B	B	A	B	A	F	A
Turpentine	C	C	C	A	C	A	B	A
Urea/AmmoniumSalt Solution	B	A	B	A	B	A	A	A
Valeraldehyde	C	C	C	A	C	A	C	F
Vaseline	A	A	A	A	A	A	A	A
Vinegar	F	A	A	A	F	A	C	A
Vinyl Acetate	F	B	B	A	F	A	F	A
Vinyl Ethyl Ether	C	C	C	A	C	A	•	•
Vinyl Toluene	B	B	B	A	B	A	F	A
Vinylidene Chloride	C	C	C	A	C	A	F	A
White Spirits	B	B	B	B	B	B	A	A
Wine	F	B	B	A	F	A	A	A
Xylene/Xylenol	B	B	B	A	B	A	C	A
Yeast(aqueous)	F	A	A	A	F	A	A	A
Zinc Halides	F	A	F	F	F	F	A	A
Zinc Salts	F	A	B	B	F	B	A	A

NOTE: This chemical resistance chart is intended as a guide only. Please consult Parker's technical department for chemicals not listed or for other extreme service conditions.

Composite Hose S.T.A.M.P.E.D. Form

How to use this form:

1. Inform the customer you will be using an application format called S.T.A.M.P.E.D.
2. Ask the customer the pertinent questions outlined on the form, in sequence.
3. After completing the form, ask the customer to confirm their answers as you repeat them, in sequence.
4. Submit the form for quotation from Parker Industrial Hose Division.
Email: indhosequote@parker.com
Fax: (440) 268-2122

For additional information, contact Customer Service:
(866) 810-4673

Other considerations may help to clarify application parameters:

1. Abrasion
2. Electrical conductivity
3. Environment
4. Flammability
5. Flow rate
6. Fluid velocity
7. Movement (type, distance, frequency)
8. Ozone
9. Permeation (vapor conveying hose)
10. Routing
11. Salt Water
12. Static electricity
13. Ultraviolet light
14. Vibration (frequency rate – Hz, amplitude – “G” load)

NOTE: All composite hose assemblies are tested to 150% of working pressure.

Customer Information

Company: _____ Contact: _____
 Street Address: _____
 City, State, Zip: _____
 Office Phone: _____ Cell Phone: _____
 Fax: _____ E-mail: _____

Size

I.D.:	Length (OAL)*:
Inner Wire Material:	
Outer Wire Material:	

Temperature

Media Temperature	Min. °F/°C:	Max. °F/°C:
Environmental Temperature	Min. °F/°C:	Max. °F/°C:

Application

Type/Description:

Material/Media

Material Conveyed:

Pressure

Max Working Pressure (PSI):

Ends

End 1

Material:	Termination Style/Size:
-----------	-------------------------

End 2

Material:	Termination Style/Size:
-----------	-------------------------

Delivery

Quantity Required:	Date Required:
Ship Via:	

Special Brand/Other Requirements

*NOTE: A characteristic of composite hose is elongation:

- a) The length of hose ordered should be the overall length (OAL) including the end fittings. OAL measurements should be from flange face to flange face, seat to seat, end of threads to end of threads, etc. In the as-fabricated condition, after testing, the OAL should be within +5%/-2% of the specified OAL.
- b) The maximum change in length at the maximum test pressure should not exceed 12% of initial length.
- c) Because of elongation under pressure, contact Parker for applications where length-in-use is critical. If in question, this data should be added to the purchase order.

Notes

Offer of Sale

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods or work described will be referred to as "Products."

- 1. Terms and Conditions.** Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is expressly conditioned on Buyer's assent to these Terms and Conditions and to the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional term or condition of Buyer's order or any other document issued by Buyer.
- 2. Price Adjustments; Payments.** Prices stated on the reverse side or preceding pages of this document are valid for 30 days. After 30 days, Seller may change prices to reflect any increase in its costs resulting from state, federal or local legislation, price increases from its suppliers, or any change in the rate, charge, or classification of any carrier. The prices stated on the reverse or preceding pages of this document do not include any sales, use, or other taxes unless so stated specifically. Unless otherwise specified by Seller, all prices are F.O.B. Seller's facility, and payment is due 30 days from the date of invoice. After 30 days, Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.
- 3. Delivery Dates; Title and Risk; Shipment.** All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon tender to the carrier at Seller's facility (i.e., when it's on the truck, it's yours). Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferral of shipment at Buyer's request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's changes in shipping, product specifications or in accordance with Section 13, herein.
- 4. Warranty.** Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of twelve months from the date of delivery to Buyer or 2,000 hours of normal use, whichever occurs first. This warranty is made only to Buyer and does not extend to anyone to whom Products are sold after purchased from Seller. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**
- 5. Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 60 days after delivery or, in the case of an alleged breach of warranty, within 30 days after the date within the warranty period on which the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for any amount due to Seller from Buyer) must be commenced within thirteen months from the date of tender of delivery by Seller or, for a cause of action based upon an alleged breach of warranty, within thirteen months from the date within the warranty period on which the defect is or should have been discovered by Buyer.
- 6. LIMITATION OF LIABILITY.** UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. **IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**
- 7. Contingencies.** Seller shall not be liable for any default or delay in performance if caused by circumstances beyond the reasonable control of Seller.
- 8. User Responsibility.** The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.
- 9. Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.
- 10. Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.
- 11. Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.
- 12. Improper use and Indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.
- 13. Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.
- 14. Limitation on Assignment.** Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.
- 15. Entire Agreement.** This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.
- 16. Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.
- 17. Termination.** This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer.
- 18. Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.
- 19. Indemnity for Infringement of Intellectual Property Rights.** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.
- 20. Taxes.** Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.
- 21. Equal Opportunity Clause.** For the performance of government contracts and where dollar value of the Products exceed \$10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRRA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.



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