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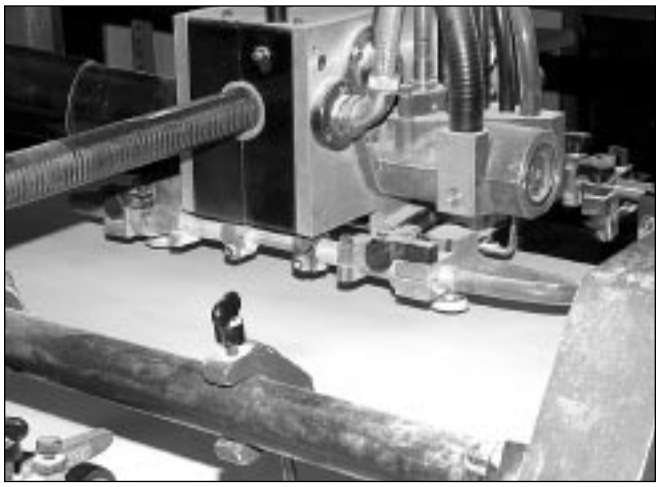
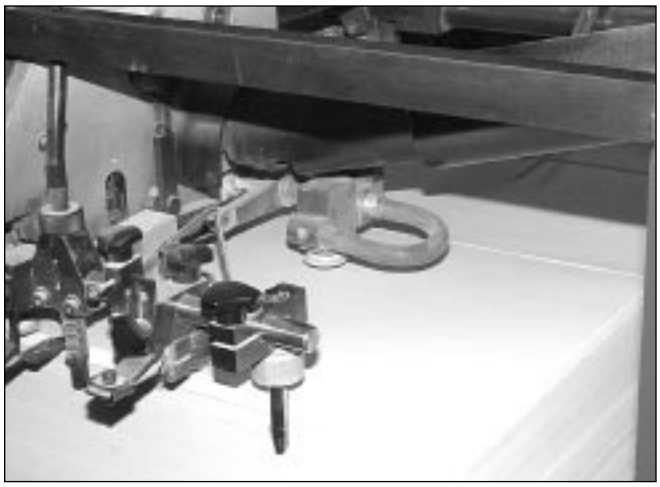
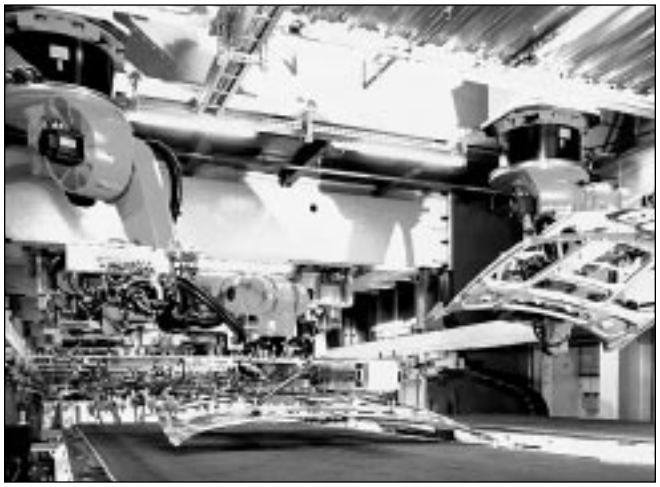
- Think systems – create technical solutions!

For paper handling...





For robotic handling…



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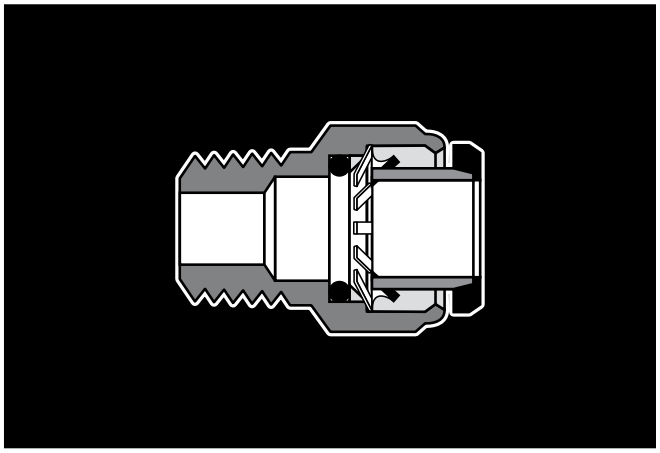

Advantages

Ready-to-use compact one-piece fitting for use with most therm special tools are needed for assembly; just insert the tubing until it bottoms. Radial claws on the stainless steel grab ring grip the tubing securely to provide retention. Brass Male pipe threads come standard with a white acrylic sealant pre-applied ("W" prefix) swivels are featured on all male pipe threaded shapes for installation in tight places and for precise positioning. Prestolok Plus should not be used for live swivel applications. The outside diameter of the tubing to be used with the fitting is marked on the release button.

Materials

Prestolok Plus Bodies: CA377, CA360, CA345

O-Ring: Nitrile (other compounds available on request)

Release Button: Polyacetal

Grab Ring: Stainless Steel

Recommended Tubing

Prestolok nickel plated and composite fittings are designed to be used with the following Parker Hannifin Parflex Division tubing.

Tubing Series	Tubing Material
E	Linear Low Density Polyethylene
PP	Polypropylene
N	Plasticized Polyamide (Nylon)
NR	Unplasticized Polyamide (Rigid Nylon)
U	Polyurethane 90 Durometer Shore A
HU	Polyurethane 95 Durometer Shore A

Other materials: Polyurethane 85 Durometer Shore A – Applications and service conditions vary and therefore the use of a tube support may be required for any 85A PU tubing.

The following commercially available O.D. – I.D. 85A tubing sizes require the use of a tube support regardless of application.

5/32" – 3/32"	3/16" – 1/8"	1/4" - .170"	1/4" – 3/16"
5/16" – 1/4"	3/8" – 5/16"	1/2" – 3/8"	

Working Pressure and Temperature Ranges

Prestolok Plus	Zero to 200°F at up to 300 PSI depending on tubing being used.

Vacuum applications are dependent upon temperature and type of tubing used.

Assembly Instructions

1. Cut thermoplastic tubing squarely, using Parker Tube Cutter PTC-001. Be certain the port or mating part is clean and free of debris.
2. Insert tubing into fitting until it bottoms. A slight twisting motion will ease the insertion. Pull on tubing to verify it is properly retained in the fitting.
3. To disassemble, simply push the release button against the body and remove tubing.

Nomenclature

Part numbers are constructed from symbols that identify the style and size of the fitting. The first series of numbers and letters identify the style and type fitting. The second series of numbers describe the size.

Example: W 68 PLP 4 2

- White Acrylic Thread Sealant — W
- Male Connector — 68
- Prestolok Plus — PLP
- 1/4" (4/16) Tube O.D. — 4
- 1/8" (2/16) Pipe Thread — 2

Sizes

Tube sizes are determined by the number of sixteenths of an inch in the tube O.D.

Specials

Fitting configurations and/or sizes other than those shown in the catalog can be furnished. It is suggested that a print or sketch be submitted with the inquiry.

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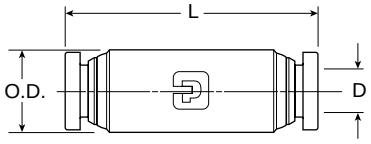
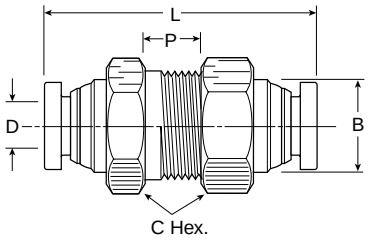
62PLP Union (Nickle Plated)



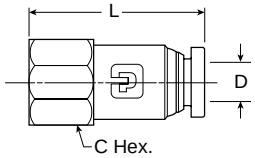
Part No.	Tube Size	O.D.	L	Flow Dia. D
62PLP-2	1/8	0.375	1.40	0.094
62PLP-3	3/16	0.437	1.41	0.156
62PLP-5/32	5/32	0.375	1.41	0.125
62PLP-4	1/4	0.500	1.43	0.188
62PLP-5	5/16	0.562	1.65	0.250
62PLP-6	3/8	0.625	1.66	0.312
62PLP-8	1/2	0.750	1.82	0.375

62PLPBH Bulkhead Union



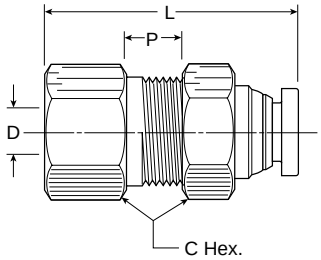
Part No.	Tube Size	B	C Hex.	P Max.	L	D
62PLPBH-2	1/8	7/16	9/16	0.39	1.40	0.094
62PLPBH-5/32	5/32	7/16	9/16	0.39	1.41	0.125
62PLPBH-4	1/4	9/16	11/16	0.29	1.43	0.188
62PLPBH-5	5/16	5/8	3/4	0.60	1.65	0.250
62PLPBH-6	3/8	3/4	7/8	0.54	1.66	0.312
62PLPBH-8	1/2	7/8	1	0.66	2.04	0.375

66PLP Female Connector (Nickle Plated)



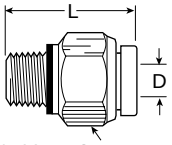
Part No.	Tube Size	B Thread (NPTF)	L	Flow Dia. D
66PLP-2-2	1/8	1/8	1.17	0.094
66PLP-3-2	3/16	1/8	1.13	0.156
66PLP-5/32-2	5/32	1/8	1.17	0.125
66PLP-5/32-4	5/32	1/4	1.38	0.125
66PLP-4-2	1/4	1/8	1.17	0.188
66PLP-4-4	1/4	1/4	1.38	0.188
66PLP-5-2	5/16	1/8	1.25	0.250
66PLP-5-4	5/16	1/4	1.45	0.250
66PLP-6-4	3/8	1/4	1.46	0.312
66PLP-6-6	3/8	3/8	1.51	0.312

66PLPBH Female Bulkhead (Nickle Plated)

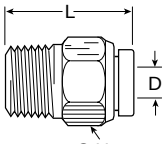


Part No.	Tube Size	Pipe Thread (NPTF)	C Hex.	P Max.	L	Flow Dia. D	Bulkhead Hole Dia. (mm)
66PLPBH-5/32-4	5/32	1/4	11/16	0.19	1.39	0.125	1/2
66PLPBH-4-4	1/4	1/4	11/16	0.24	1.35	0.188	9-16
66PLPBH-6-6	3/8	3/8	1	0.22	1.47	0.312	7/8
66PLPBH-8-6	1/2	3/8	1-1/4	0.35	1.56	0.344	1

W68PLP Male Connector (Nickle Plated)



68PLP-10x32



Part No.	Tube Size	Pipe Thread	C Hex.	L	Flow Dia. D
68PLP-2-0	1/8	10x32	3/8	0.92	0.094
W68PLP-2-1	1/8	1/16	3/8	0.79	0.094
W68PLP-2-2	1/8	1/8	7/16	0.79	0.094
W68PLP-2-4	1/8	1/4	9/16	1.02	0.094
W68PLP-3-2	3/16	1/8	7/16	0.85	0.141
W68PLP-3-4	3/16	1/4	9/16	1.01	0.156
W68PLP-5/32-2	5/32	1/8	7/16	0.80	0.125
W68PLP-5/32-4	5/32	1/4	9/16	1.03	0.125
68PLP-4-0	1/4	10x32	1/2	0.96	0.094
W68PLP-4-1	1/4	1/16	1/2	1.07	0.141
W68PLP-4-2	1/4	1/8	1/2	0.89	0.188
W68PLP-4-4	1/4	1/4	9/16	1.00	0.188
W68PLP-4-6	1/4	3/8	3/4	1.04	0.188
W68PLP-5-2	5-16	1/8	9/16	1.18	0.234
W68PLP-5-4	5-16	1/4	9/16	1.04	0.250
W68PLP-5-6	5/16	3/8	11/16	1.04	0.250
W68PLP-6-2	3/8	1/8	5/8	1.21	0.234
W68PLP-6-4	3/8	1/4	5/8	1.08	0.312
W68PLP-6-6	3/8	3/8	11/16	1.02	0.312
W68PLP-6-8	3/8	1/2	7/8	1.289	0.312
W68PLP-8-4	1/2	1/4	13/16	1.44	0.344
W68PLP-8-6	1/2	3/8	13/16	1.24	0.344
W68PLP-8-8	1/2	1/2	7/8	1.35	0.375
68PLP-5/32-4LT*	5/32	1/4-28	7/16	0.88	0.093

*SAE-LT Threads

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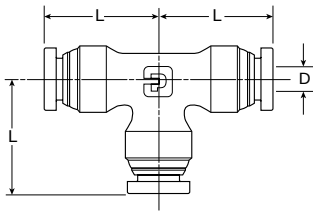
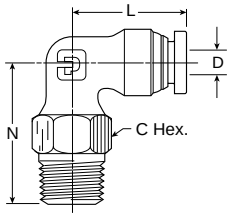
164PLP Union Tee (Nickle Plated)



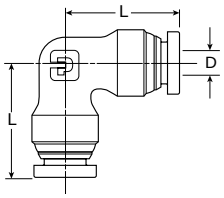
Part No.	Tube Size	L	Flow Dia. D
164PLP-2	1/8	0.74	0.094
164PLP-5/32	5/32	0.77	0.125
164PLP-3	3/16	0.82	0.156
164PLP-4	1/4	0.85	0.188
164PLP-5	5/16	0.97	0.250
164PLP-6	3/8	1.01	0.250
164PLP-8	1/2	1.15	0.375

W169PLP Male Elbow Swivel 90° (Nickle Plated)



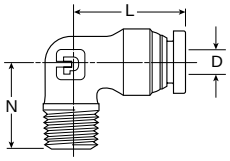
Part No.	Tube Size	Pipe Thread (NPTF)	C Hex.	L	N	Flow Dia. D
W169PLP-2-2	1/8	1/8	7/16	0.74	0.92	0.094
169PLP-2-0	1/8	10-32	3/8	0.74	0.74	0.094
W169PLP-2-4	1/8	1/4	9/16	0.74	1.10	0.094
W169PLP-3-2	3/16	1/8	7/16	0.82	0.92	0.156
W169PLP-5/32-2	5/32	1/8	7/16	0.77	0.92	0.125
W169PLP-5/32-4	5/32	1/4	9/16	0.77	1.10	0.125
169PLP5/32-0	5/32	10-32	3/8	0.85	0.74	0.188
W169PLP-4-2	1/4	1/8	7/16	0.85	0.92	0.188
W169PLP-4-4	1/4	1/4	9/16	0.85	1.10	0.188
W169PLP-4-6	1/4	3/8	11/16	0.85	1.19	0.188
169PLP-4-0	1/4	10-32	3/8	0.85	0.74	0.188
W169PLP-5-2	5/16	1/8	9/16	0.97	1.02	0.250
W169PLP-5-4	5/16	1/4	9/16	0.97	1.24	0.250
W169PLP-6-2	3/8	1/8	9/16	1.01	1.02	0.312
W169PLP-6-4	3/8	1/4	9/16	1.01	1.24	0.312
W169PLP-6-6	3/8	3/8	11/16	1.01	1.24	0.312
W169PLP-6-8	3/8	1/2	7/8	1.01	1.48	0.312
W169PLP-8-4	1/2	1/4	9/16	1.15	1.28	0.375
W169PLP-8-6	1/2	3/8	11/16	1.15	1.31	0.375
W169PLP-8-8	1/2	1/2	7/8	1.15	1.52	0.375

165PLP Union Elbow (Nickle Plated)



Part No.	Tube Size	L	Flow Dia. D
165PLP-2	1/8	0.74	0.094
165PLP-5/32	5/32	0.77	0.125
165PLP-3	3/16	0.82	0.156
165PLP-4	1/4	0.85	0.188
165PLP-5/32	5/32	0.97	0.250
165PLP-6	3/8	1.01	0.312
165PLP-8	1/2	1.15	0.375

W169PLPNS Male Elbow 90° (Nickle Plated)



Part No.	Tube Size	Pipe Thread (NPTF)	L	N	Flow Dia. D
W169PLPNS-2-2	1/8	1/8	0.74	0.67	0.094
W169PLPNS5/32-2	5/32	1/8	0.77	0.67	0.125
W169PLPNS5/32-4	5/32	1/4	0.77	0.87	0.125
W169PLPNS-4-2	1/4	1/8	0.85	0.67	0.188
W169PLPNS-4-4	1/4	1/4	0.85	0.87	0.188
W169PLPNS-5-2	5/16	1/8	0.97	0.75	0.250
W169PLPNS-5-4	5/16	1/4	0.97	0.94	0.250
W169PLPNS-6-4	3/8	1/4	1.01	0.94	0.312
W169PLPNS-6-6	3/8	3/8	1.01	1.01	0.312
W169PLPNS-6-8	3/8	1/2	1.01	1.27	0.312
W169PLPNS-8-6	1/2	3/8	1.15	1.00	0.375
W169PLPNS-8-8	1/2	1/2	1.15	1.27	0.375
169PLPNS-5/32-4LT*	5/32	1/4-28	0.60	0.48	0.090

* SAE-LT Threads

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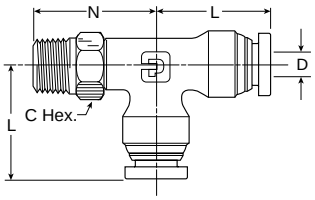
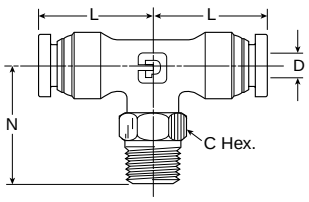
W171PLP Male Run Tee Swivel (Nickle Plated)



Part No.	Tube Size	Pipe Thread (NPTF)	C Hex.	L	N	Flow Dia. D
W171PLP-2-2	1/8	1/8	7/16	0.74	0.92	0.094
W171PLP-5/32-2	5/32	1/8	7/16	0.77	0.92	0.125
W171PLP-4-2	1/4	1/8	7/16	0.85	0.92	0.188
W171PLP-4-4	1/4	1/4	9/16	0.85	1.10	0.188
W171PLP-4-6	1/4	3/8	11/16	0.85	1.24	0.188
W171PLP-5-2	5/16	1/8	9/16	0.97	1.02	0.250
W171PLP-5-4	5/16	1/4	9/16	0.97	1.24	0.250
W171PLP-6-4	3/8	1/4	9/16	1.01	1.24	0.250
W171PLP-6-6	3/8	3/8	11/16	1.01	1.24	0.250
W171PLP-8-6	1/2	3/8	11/16	1.15	1.31	0.375
W171PLP-8-8	1/2	1/2	7/8	1.15	1.52	0.375

W172PLP Male Branch Tee Swivel (Nickle Plated)



Part No.	Tube Size	Pipe Thread	C Hex.	L	N	Flow Dia. D
W172PLP-2-2	1/8	1/8	7/16	0.74	0.92	0.094
W172PLP-3-2	3/16	1/8	7/16	0.82	0.92	0.156
W172PLP-5/32-2	5/32	1/8	7/16	0.77	0.92	0.125
W172PLP-4-2	1/4	1/8	7/16	0.85	0.92	0.188
W172PLP-4-4	1/4	1/4	9/16	0.85	1.10	0.188
W172PLP-4-6	1/4	3/8	11/16	0.85	1.10	0.188
W172PLP-5-2	5/16	1/8	9/16	0.97	1.02	0.250
W172PLP-5-4	5/16	1/4	9/16	0.97	1.24	0.250
W172PLP-6-4	3/8	1/4	9/16	1.01	1.24	0.250
W172PLP-6-6	3/8	3/8	11/16	1.01	1.24	0.250
W172PLP-8-4	1/2	1/4	9/16	1.15	1.30	0.375
W172PLP-8-6	1/2	3/8	11/16	1.15	1.31	0.375
W172PLP-8-8	1/2	1/2	7/8	1.15	1.52	0.375

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Advantages
Chemical resistant, flexible, low cost, eight colors, five tube sizes and choice of reel lengths.

Construction
Flexible polyethylene thermoplastic tubing is extruded from high molecular weight resin for increased dimensional stability, uniformity and long-term strength. Its resistance to environmental stress cracking greatly exceeds that of ordinary polyethylene tubing as measured by ASTM D-1693, (10% IGEPAL).

Applications & Approvals
Polyethylene tubing is available in black as well as seven coding colors as recommended by the Instrument Society of America. Black (EB) tubing contains an ultra-violet inhibitor which is recommended for use in sunlit areas. Ingredients of natural and color tubing (except black) listed below meet FDA requirements for food contact applications. All tubing conforms to ASTM D-1248, Type I, Class A, Category 4, Grade E5.

Temperature Range
Suggested operating temperature range is -80°F to 150°F (-62°C to 66°C).

Fitting Recommendation
- Brass fittings

Nomenclature
Part numbers are constructed from symbols that identify the style and size of the fitting. Letters identify style and material. Numbers identify size in 1/16's of an inch.

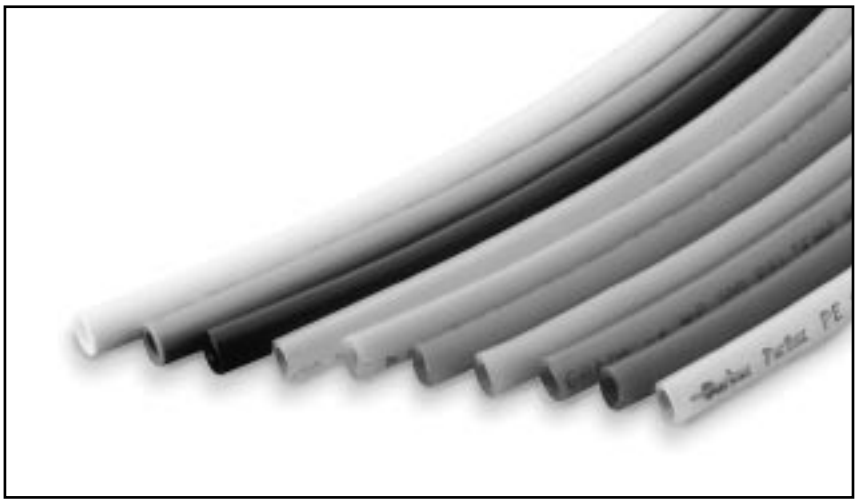
Example:

E - 6 4 - Y - 0500

- Polyethylene
- 3/8" (6/16) Tube O.D.
- 1/4" (4/16) Tube I.D.
- Color, Yellow
- Reel Footage

E Instrument Grade Tubing

Part Number	Color	O.D.	I.D.	Wall	Reel Length Feet	Working Pressure psi at 73°F	Min. Burst psi at 73°F	Min. Bend Radius Inches	Weight Per 100 Feet
E-43-0100	Natural	1/4	0.170	0.040	100	120	625	1	1.1
E-43-0500	Natural	1/4	0.170	0.040	500	120	625	1	1.1
E-43-1000	Natural	1/4	0.170	0.040	1000	120	625	1	1.1
EB-43-0100	Black	1/4	0.170	0.040	100	120	625	1	1.1
EB-43-0500	Black	1/4	0.170	0.040	500	120	625	1	1.1
EB-43-1000	Black	1/4	0.170	0.040	1000	120	625	1	1.1
E-43-R-0100	Red	1/4	0.170	0.040	100	120	625	1	1.1
E-43-R-0500	Red	1/4	0.170	0.040	500	120	625	1	1.1
E-43-B-0100	Blue	1/4	0.170	0.040	100	120	625	1	1.1
E-43-B-0500	Blue	1/4	0.170	0.040	500	120	625	1	1.1
E-43-O-0500	Orange	1/4	0.170	0.040	500	120	625	1	1.1
E-43-Y-0500	Yellow	1/4	0.170	0.040	500	120	625	1	1.1
E-43-P-0500	Purple	1/4	0.170	0.040	500	120	625	1	1.1
E-43-G-0500	Green	1/4	0.170	0.040	500	120	625	1	1.1
E-53-0500	Natural	5/16	0.187	0.062	500	145	800	1-1/8	2.1
EB-53-0500	Black	5/16	0.187	0.062	500	145	800	1-1/8	2.1
E-64-0100	Natural	3/8	0.250	0.062	100	125	675	1-1/4	2.5
E-64-0500	Natural	3/8	0.250	0.062	500	125	675	1-1/4	2.5
EB-64-0100	Black	3/8	0.250	0.062	100	125	675	1-1/4	2.5
EB-64-0500	Black	3/8	0.250	0.062	500	125	675	1-1/4	2.5
E-64-R-0500	Red	3/8	0.250	0.062	500	125	675	1-1/4	2.5
E-64-B-0500	Blue	3/8	0.250	0.062	500	125	675	1-1/4	2.5
E-64-O-0500	Orange	3/8	0.250	0.062	500	125	675	1-1/4	2.5
E-64-Y-0500	Yellow	3/8	0.250	0.062	500	125	675	1-1/4	2.5
E-64-P-0500	Purple	3/8	0.250	0.062	500	125	675	1-1/4	2.5
E-64-G-0500	Green	3/8	0.250	0.062	500	125	675	1-1/4	2.5
E-86-0100	Natural	1/2	0.375	0.062	100	90	425	2-1/2	3.6
EB-86-0100	Black	1/2	0.375	0.062	100	90	425	2-1/2	3.6
E-108-0100	Natural	5/8	0.500	0.062	100	70	325	4	4.6
EB-108-0100	Black	5/8	0.500	0.062	Coil	70	325	4	4.6



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Construction & Approvals

Flame resistant polyethylene is manufactured from a distinctively formulated compound which meets the UL94 V-2 flame classification. It also meets the flame spread, fuel contribution and smoke density requirements of the ASTM E84-81a tunnel test.

Applications

Parker series FRPE tubing is the preferred product for pneumatic control applications in the heating- ventilating-air conditioning-energy conservation industry. It is also suitable for use in petrochemical plants, petroleum refineries, pulp and paper mills, mines, steel mills and other industries where protection against intermittent flame and hot sparks is necessary.

Temperature Range

Suggested operating temperature range is -85°F to 150°F (-65°C to +66°C).

Nomenclature

Order by tubing part number and name.

Example:

FR PE 4 — 0500

- FR — Flame Resistant
- PE — Polyethylene
- 4 — 1/4" (4/16) Tube O. D.
- 0500 — Reel Footage

FRPE Flame Resistant Tubing

Part Number	Color	O.D.	I.D.	Wall	Reel Length Feet	Working Pressure psi at 73°F	Min. Burst psi at 73°F	Min. Bend Radius Inches	Weight Per 100 Feet
FRPE2.5-0500	Black	5/32	0.096	0.030	500	225	900	1/2	0.56
FRPE4-0250	Black	1/4	0.170	0.040	250	160	650	3/4	1.24
FRPE4-0500	Black	1/4	0.170	0.040	500	160	650	3/4	1.24
FRPE4-1000	Black	1/4	0.170	0.040	1000	160	650	3/4	1.24
FRPE6-0250	Black	3/8	0.250	0.062	250	195	780	1-1/2	2.90
FRPE6-0500	Black	3/8	0.250	0.062	500	195	780	1-1/2	2.90
FRPE8-0250	Black	1/2	0.375	0.062	250	135	540	1-3/4	4.05

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Nomenclature

Order by tubing part number and name.

Example:

N N — 2 — 016

Nylon

Color, Natural

1/8" (2/16) Tube O.D.

Wall Thickness in thousandths of an inch

Advantages

Flexible nylon tubing is carefully made from high-grade, abrasion-resistant, heat-and light-stabilized nylon. Resistance to stress-cracking greatly exceeds that of ordinary nylon tubing. Extremely low level water absorption.

Chemical-resistant nylon tubing has the additional benefits of better flexibility, lighter weight and resistance to flexural fatigue.

Colors

Available in natural (NN) and black (NB). Black tubing is recommended for use outdoors and in sunlit areas.

Temperature Range

Operating temperatures, depending upon conditions, are -65°F to 200°F (-54°C to 93°C) continuous.

Fitting Recommendations

- Brass fittings

N Flexible Tubing

Nylon Part No.	Color	Nom. Tube O.D.	Nom. Tube I.D.	Average Wall Thick.	*Min. Burst Pressure at 73°F psi	Min. Bend Radius Inches	Std. Reel Length Feet
NN-2-016	Natural	1/8	0.093	0.016	1000	1/4	250
NB-2-016	Black	1/8	0.093	0.016	1000	1/4	250
NN-2-031	Natural	1/8	0.064	0.031	2000	1/4	250
NB-2-031	Black	1/8	0.064	0.031	2000	1/4	250
NN-2.5-025	Natural	5/32	0.106	0.025	1200	1/2	250
NB-2.5-025	Black	5/32	0.106	0.025	1200	1/2	250
NN-3-025	Natural	3/16	0.138	0.025	1000	5/8	250
NB-3-025	Black	3/16	0.138	0.025	1000	5/8	250
NN-3-046	Natural	3/16	0.096	0.046	2000	7/16	250
NB-3-046	Black	3/16	0.096	0.046	2000	7/16	250
NN-4-035	Natural	1/4	0.180	0.035	1000	7/8	250
NB-4-035	Black	1/4	0.180	0.035	1000	7/8	250
NN-4-040	Natural	1/4	0.170	0.040	1250	7/8	250
NB-4-040	Black	1/4	0.170	0.040	1250	7/8	250
NN-4-062	Natural	1/4	0.127	0.062	2000	1/2	250
NB-4-062	Black	1/4	0.127	0.062	2000	1/2	250
NN-5-040	Natural	5/16	0.233	0.040	1250	1-1/8	250
NB-5-040	Black	5/16	0.233	0.049	1250	1-1/8	250
NN-6-050	Natural	3/8	0.275	0.050	1250	1-1/8	250
NB-6-050	Black	3/8	0.275	0.050	1250	1-1/8	250
NN-6-093	Natural	3/8	0.190	0.093	2000	3/4	250
NB-6-093	Black	3/8	0.190	0.093	2000	3/4	250
NN-8-062	Natural	1/2	0.375	0.062	1000	1-1/4	250
NB-8-062	Black	1/2	0.375	0.062	1000	1-1/4	250
NN-8-124	Natural	1/2	0.253	0.124	2000	1	250
NB-8-124	Black	1/2	0.253	0.124	2000	1	250

*Suggested working pressure is 1/4 of burst pressure.

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Fitting Recommendations

- Brass fittings

Nomenclature

Order by tubing part number and name.

Example:

N	B	R	2	016
Nylon				
	Color, Black			
		Rigid		
			1/8" (2/16) Tube O.D.	
				Wall Thickness in thousandths of an inch

Advantages

Series NR semi-rigid nylon tubing offers better chemical resistance than series N, good resistance to high ambient temperature and low moisture absorption. NR has a high tensile strength which will give excellent coupling retention in high pressure, temperature and vibration environments.

Construction

Parker series NR tubing is manufactured from a semi-rigid nylon II material. The tubing does not contain plasticizers.

Applications & Approvals

NR tubing is specified for machine tool lubricating systems, marine control systems, process lines for chemicals and oils and other applications requiring a high quality nylon tube.

Temperature Range

The recommended operating temperature range for service at rated pressures with compatible fluids is -60°F to 200°F (-51°C to 93°C).

NR Semi-rigid High Strength Tubing

Nylon Part No.	Color	Nom. Tube O.D.	Nom. Tube I.D.	Average Wall Thick.	*Min. Burst Pressure at 73 °F psi	Min Bend Radius Inches	Std. Reel Length Feet
NNR-2-017	Natural	1/8	0.091	0.017	1700	1/2	500
NBR-2-017	Black	1/8	0.091	0.017	1700	1/2	500
NNR-2-026	Natural	1/8	0.073	0.026	2500	3/8	500
NBR-2-026	Black	1/8	0.073	0.026	2500	3/8	500
NNR-3-024	Natural	3/16	0.140	0.024	1700	3/4	500
NBR-3-024	Black	3/16	0.140	0.024	1700	3/4	500
NNR-3-039	Natural	3/16	0.110	0.039	2500	5/8	500
NBR-3-039	Black	3/16	0.110	0.039	2500	5/8	500
NNR-4-035	Natural	1/4	0.180	0.035	1700	1	250
NBR-4-035	Black	1/4	0.180	0.035	1700	1	250
NNR-4-050	Natural	1/4	0.150	0.050	2500	7/8	250
NBR-4-050	Black	1/4	0.150	0.050	2500	7/8	250
NNR-5-040	Natural	5/16	0.233	0.040	1700	1-1/2	250
NBR-5-040	Black	5/16	0.233	0.040	1700	1-1/2	250
NNR-6-048	Natural	3/8	0.279	0.048	1700	1-3/4	250
NBR-6-048	Black	3/8	0.279	0.048	1700	1-3/4	250
NNR-6-075	Natural	3/8	0.225	0.075	2500	1-1/2	250
NBR-6-075	Black	3/8	0.225	0.075	2500	1-1/2	250
NNR-8-062	Natural	1/2	0.376	0.062	1500	2-3/8	250
NBR-8-062	Black	1/2	0.376	0.062	1500	2-3/8	250
NNR-8-075	Natural	1/2	0.350	0.075	2200	2-1/2	250
NBR-8-075	Black	1/2	0.350	0.075	2200	2-1/2	250

*Suggested working pressure is 1/4 of burst pressure.

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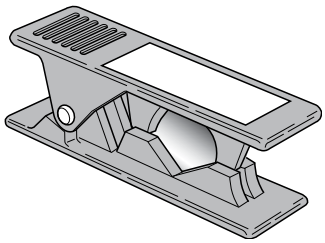
PTC Plastic Tube Cutter

Part No. PTC



An easy to handle razor/edged tube cutter, closes automatically, assuring clean and square cuts.

May be used with polyethylene, polypropylene, nylon and other plastic tubing.

How To Use

Insert plastic tube to desired length, allow tube cutter to close, then apply pressure until tube snaps off.

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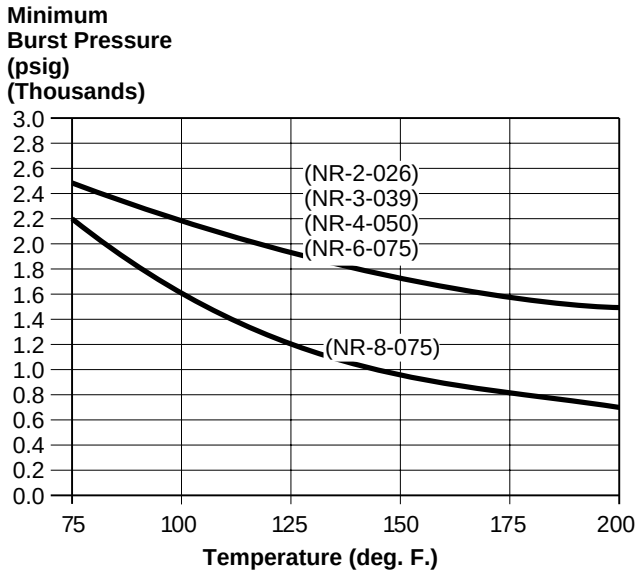
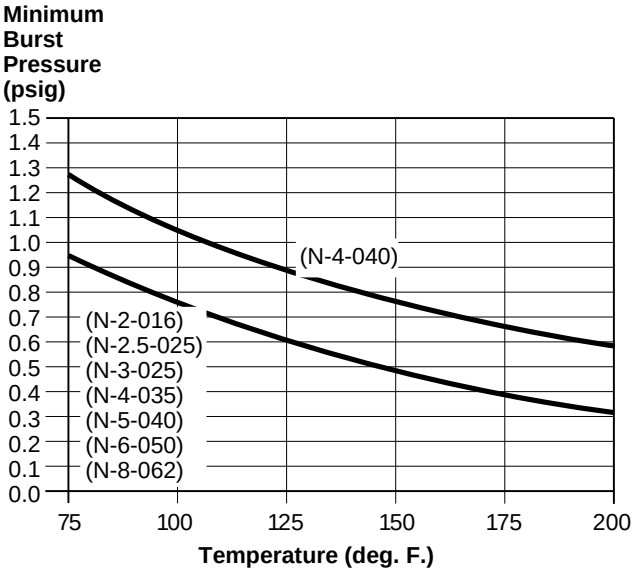
Nylon Semi-Rigid Tubing

NR Series (NNR, NBR)
1/8 thru 1/2 O.D. Inches



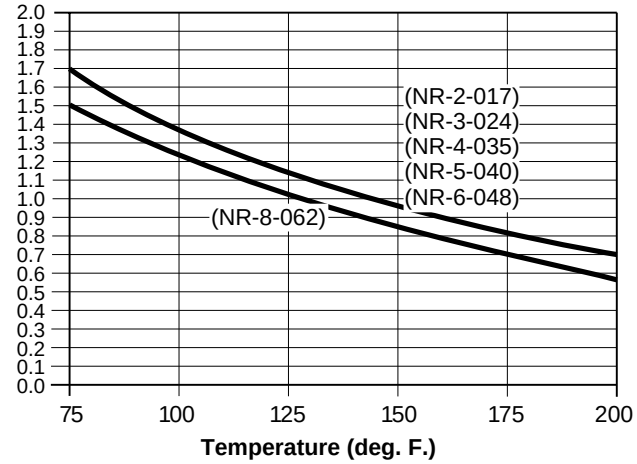
Nylon Flexible Tubing

N Series (NN, NB)
1/8 thru 1/2 O.D. Inches



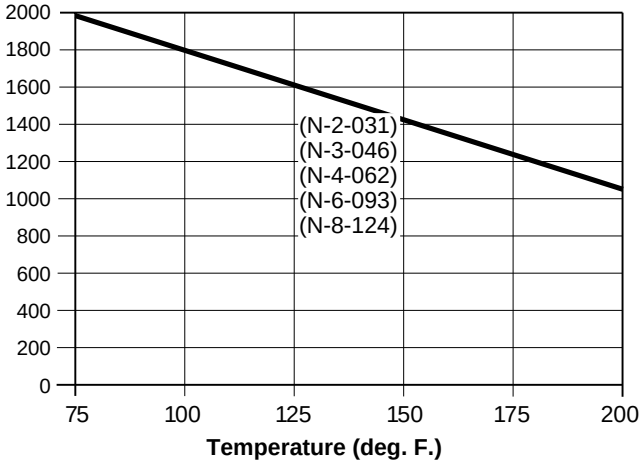
Nylon Semi-Rigid Tubing

NR Series (NNR, NBR)
1/8 thru 1/2 O.D. Inches



Nylon Flexible Tubing

N Series
1/8 thru 1/2 O.D. Inches



Suggested working pressures are 1/4 of burst pressure at system operating temperature.

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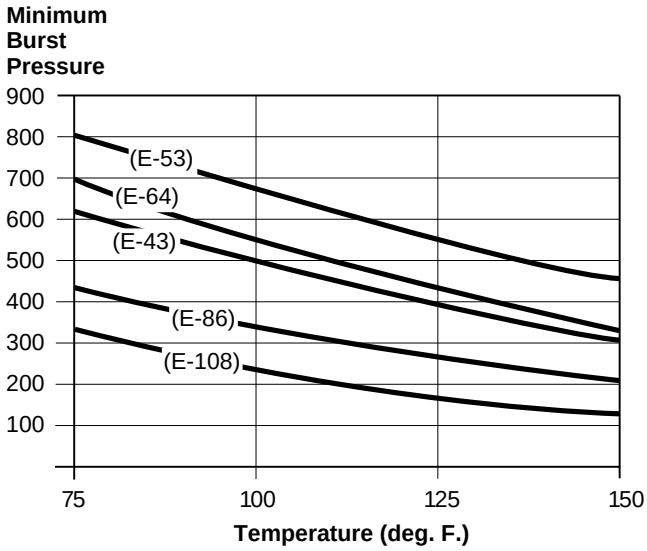
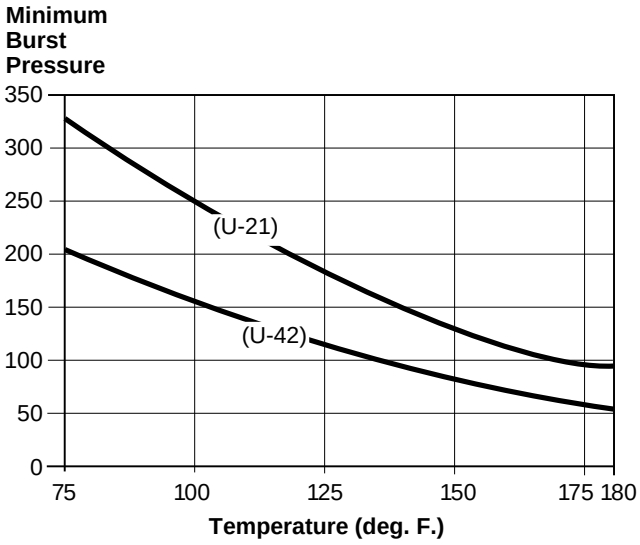
Polyethylene Tubing

Laboratory Grade E Series
1/4 thru 5/8 O.D.



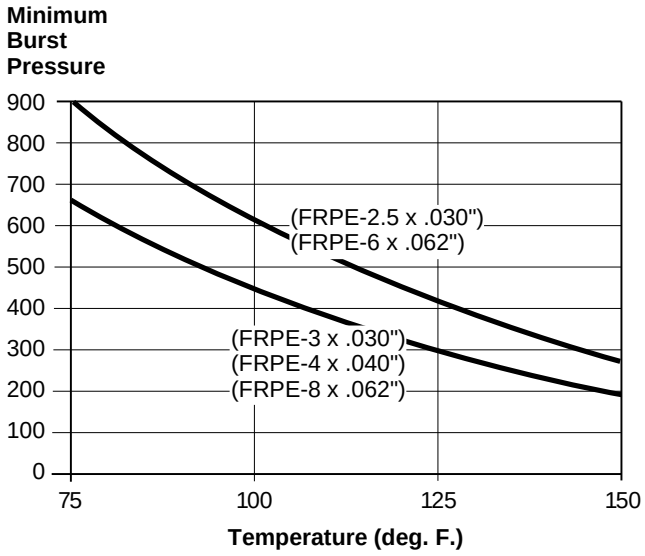
Polyethylene Tubing

"U" Series
1/8 thru 1/4 O.D.
Polyether Base



Polyethylene Tubing

Flame Resistant FRPE Series
5/32 thru 1/2 O.D.



Suggested working pressures are 1/4 of burst pressure at system operating temperature.

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	All Brass Body Fittings (Except Prestolok) Rating	Prestolok Fitting Rating
Acetic Acid	4	4
Acetic Anhydride	4	4
Acetone	1	4
Alum	4	4
Aluminum Chloride	4	4
Aluminum Sulfate	4	4
Ammonium Hydroxide	4	4
Ammonium Chloride	4	4
Ammonium Nitrate	4	4
Ammonium Sulfate	4	4
Amyl Acetate	2	4
Aniline	3	4
Aniline Dyes	3	4
Asphalt	1	2
Barium Chloride	4	4
Beer	2	4
Beet Sugar Syrups	2	2
Benzoic Acid	2	4
Black Liquor, Sulfate Process	4	4
Bleaching Powder, Wet	4	4
Borax	1	2
Bordeaux Mixture	2	2
Boric Acid	2	2
Bromine, Dry	1	4
Bromine, Moist	4	4
Butyric Acid	3	4
Calcium Bisulfite	4	4
Calcium Chloride	4	4
Calcium Hydroxide	2	2
Calcium Hypochlorite	4	4
Cane Sugar Syrups	2	2
Carbolic Acid	2	4
Carbon Dioxide, Dry	1	1
Carbon Dioxide, Moist	3	3
Carbon Disulfide	1	4
Carbon Tetrachloride, Moist	4	4
Castor Oil	1	1
Chlorine, Dry	1	4
Chlorine, Moist	4	4
Chloracetic Acid	4	4
Chloroform, Dry	1	4

	All Brass Body Fittings (Except Prestolok) Rating	Prestolok Fitting Rating
Citric Acid	3	3
Coffee	1	4
Copper Chloride	4	4
Copper Sulfate	4	4
Corn Oil	2	2
Cottonseed Oil	2	2
Creosote	2	2
Crude Oil	3	3
Ethers	1	4
Ethyl Acetate	2	4
Ethyl Chloride	3	3
Ethylene Glycol	2	2
Ferric Chloride	4	4
Formaldehyde	3	3
Furfural	3	4
Gelatine	1	1
Glucose	1	1
Glycerine	1	1
Hydrobromic Acid	4	4
Hydrochloric Acid	4	4
Hydrocyanic Acid	4	4
Hydrofluoric Acid	4	4
Hydrofluosilicic Acid	4	4
Hydrogen Peroxide	3	4
Hydrogen Sulfide, Moist	3	4
Lacquers	1	4
Lacquer Solvents	1	4
Lactic Acid Cold	3	3
Lime	1	1
Lime-Sulfur	2	4
Linseed Oil	2	2
Magnesium Chloride	4	4
Magnesium Hydroxide	1	2
Magnesium Sulfate	3	3
Methyl Chloride, Dry	1	4
Milk	2	4
Nitric Acid	4	4
Nitrogen	1	1
Oleic Acid	3	3
Oxalic Acid	3	3
Palmitic Acid	3	3

1 — SATISFACTORY
2 — FAIR
3 — RECOMMEND TESTING
4 — UNSATISFACTORY

	All Brass Body Fittings (Except Prestolok) Rating	Prestolok Fitting Rating
Phosphoric Acid	4	4
Potassium Chloride	4	4
Potassium Cyanide	4	4
Potassium Dichromate, Acid	4	4
Potassium Hydroxide	3	3
Potassium Sulfate	2	2
Sea Water	3	3
Soap Solutions	2	2
Sodium Bicarbonate	3	3
Sodium Bisulfate	4	4
Sodium Bisulfite	4	4
Sodium Carbonate	2	2
Sodium Chloride	4	4
Sodium Cyanide	4	4
Sodium Hydroxide	3	3
Sodium Hypochlorite	4	4
Sodium Nitrate	3	3
Sodium Peroxide	4	4
Sodium Phosphate	2	2
Sodium Silicate	2	2
Sodium Sulfite	4	4
Sodium Thiosulfate	2	2
Steam	3	4
Stearic Acid	3	3
Sulfur, Dry	1	4
Sulfur Chloride, Dry	1	4
Sulfur Dioxide, Dry	1	4
Sulfur Dioxide, Moist	4	4
Sulfur Trioxide, Dry	1	4
Sulfuric Acid	4	4
Sulfurous Acid	4	4
Tar	2	2
Tartaric Acid	3	3
Toluene	1	4
Trichloracetic Acid	4	4
Trichlorethylene, Dry	1	3
Trichlorethylene, Moist	3	3
Vinegar	4	4
Zinc Chloride	4	4
Zinc Sulfate	4	4

1 — SATISFACTORY

2 — FAIR

3 — RECOMMEND TESTING

4 — UNSATISFACTORY

This brass compatibility chart is a ready reference for brass fittings with various media. It is intended as a guide to chemical compatibility and has been compiled from the best available sources. Many factors (concentration, temperature, intermittent or continuous exposure, etc.) have a bearing upon the suitability of any material and, therefore, no guarantee, expressed or implied, is made to compatibility in any specific set of circumstances.

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Media	E "E" Series Polyethylene	FRPE Flame Resistant Polyethylene	N Nylon "N"	NR Nylon "NR"
Acetaldehyde	L	—	L	G
Acetates	G	—	L	G
Acetic Acid	L	—	L	G
Acetic Anhydride	L	—	P	L
Acetone	G	L	L	G
Acetyl Bromide	L	—	L	—
Acetyl Chloride	L	—	L	—
Air	G	G	G	G
Alcohols	G	G	G	G
Aluminum Salts	G	G	G	G
Ammonia	G	L	G	G
Amyl Acetate	G	—	L	G
Aniline	L	—	L	L
Animal Oils	L	—	G	G
Arsenic Salts	G	G	G	G
Aromatic Hydrocarbons	P	P	L	G
Barium Salts	G	G	G	G
Benzaldehyde	P	P	L	G
Benzene (Benzol)	P	P	L	G
Benzyl Alcohol	P	P	L	L
Bleaching Liquors	G	—	L	L
Boric Acid Solutions	G	G	G	G
Bromine	L	—	L	P
Butane	L	—	P	G
Butanol	G	G	G	G
Butyl Acetate	G	G	G	G
Calcium Salts	G	G	G	G
Carbon Dioxide	G	G	G	G
Carbon Disulfide	L	—	L	G
Carbon Tetrachloride	P	P	L	L
Caustic Potash	G	—	G	G
Caustic Soda	G	—	G	G
Chloracetic Acid	L	—	L	L
Chlorine (Dry)	L	—	L	P
Chlorine (Wet)	L	—	L	P
Chlorobenzene	P	P	L	L
Chloroform	P	P	L	L
Chromic Acid	L	—	P	P
Copper Salts	G	G	G	G
Cresol	P	P	L	P
Cyclohexanone	L	—	L	G
Ethers	L	—	L	G
Ethyl Acetate	G	—	L	G
Ethyl Alcohol	G	G	L	G
Ethylamine	L	—	L	L
Ethyl Bromide	P	P	L	L
Ethyl Chloride	P	P	L	L
Fatty Acids	L	P	G	G
Ferric Salts	G	—	G	G
Formaldehyde	G	—	L	G
Formic Acid	L	G	L	P
Freon	L	—	L	G
Gasoline	P	P	G	G
Glucose	G	G	G	G
Glycerine	G	G	G	G
Hydriodic Acid	L	—	P	L
Hydrochloric Acid (Conc.)	L	—	L	L
Hydrochloric Acid (Med. Conc.)	L	—	L	G
Hydrofluoric Acid	L	—	P	P
Hydrogen Peroxide (Conc.)	L	—	L	G
Hydrogen Peroxide (Dil.)	L	—	L	G
Hydrogen Sulfide	G	—	G	G
Iodine	L	—	G	G
Kerosene	L	—	G	G
Ketones	G	—	G	G
Lacquer Solvent	L	—	L	L
Lactic Acid	G	—	G	G
Lead Acetate	G	—	G	G
Linseed Oil	L	—	G	G
Magnesium Salts	G	—	G	G
Naphtha	L	G	G	G
Natural Gas	L	—	G	G
Nickel Salts	G	—	G	G
Nitric Acid (Conc.)	P	G	P	P
Nitric Acid (Dil.)	P	P	L	L
Nitrobenzene	P	P	L	L
Nitrogen Oxides	L	—	L	L
Nitrous Acid	L	—	L	L
Oils (Animal and Mineral)	L	—	G	G
Oils (Vegetable)	L	—	L	G
Oxygen	G	G	G	G
Perchloric Acid	P	P	P	P
Phenol	P	P	P	P
Potassium Salts	G	G	G	G
Pyridine	L	—	L	L
Silver Nitrate	G	G	G	G
Soap Solutions	G	G	G	G
Sodium Salts	G	G	G	G
Stearic Acid	L	—	G	G
Sulfur Chloride	L	—	L	L
Sulfuric Acid (Conc.)	P	P	P	P
Sulfuric Acid (Dil.)	P	P	G	L
Sulfurous Acid	P	P	L	L
Tannic Acid	G	—	G	G
Tanning Extracts	G	—	G	G
Titanium Salts	G	G	G	G
Toluene (Toluol)	P	P	L	G
Trichloracetic Acid	L	—	P	P
Trichlorethylene	P	P	G	L
Turpentine	L	—	G	G
Urea	G	—	G	G
Uric Acid	G	—	G	G
Water	G	G	G	G
Xylene (Xylol)	P	P	L	G
Zinc Chloride	G	—	G	G

Ratings Code (1)

G — Good to excellent. Little or no swelling, tensile or surface changes. Preferred choice.

L — Marginal or conditional. Noticeable effects but not necessarily indicating lack of serviceability. Further testing suggested for specific application. Very long term effects such as stiffening or potential for crazing should be evaluated.

P — Poor or unsatisfactory. Not recommended without extensive and realistic testing.

— — Not tested.

NOTE: For Footnotes (1), (2), (3), (4), (5), (6), & (7), See Page 19.

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Footnotes for Chemical Compatibility Guides for Thermoplastic Fittings, Tubing and Hose

(1) The Chemical Compatibility Guides are simplified rating tabulations based on immersion tests at 75°F. Higher temperatures tend to reduce ratings. **Since final selection depends on pressure, media and ambient temperature and other factors not known to The Company, no performance guarantee is expressed or implied.** Ratings do not imply compliance with specialized codes such as FDA, NSF, AGA or UL and do not cover possible fluid discoloration, taste or odor effects. For conveying foodstuffs use FDA sanctioned materials, and for potable water use NSF approved materials. For chemicals not listed, or for advice on particular applications, please consult the supplier.

(2) Hose applications for these fluids must take into account legal and insurance regulations. This does not imply AGA or UL compliance.

(3) Satisfactory at some concentrations and temperatures, unsatisfactory in others.

(4) For high pressure gases, the cover should be pinpricked and the pressure must not be released quickly. Chain or restrain the hose to prevent personal injury in the event of damage or failure.

(5) Chemical compatibility **does not** imply low permeation rates. Consult the supplier for a recommendation for your specific requirements.

(6) Does not imply NSF or FDA compliance.

(7) Chemical compatibility does not imply acceptability for use in **airless paint spray** applications. These applications require a special **conductive** hose.

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Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

⚠ WARNING:

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

1.1. Scope: This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.

1.2. Fail-Safe: Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.

1.3 Relevant International Standards: For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See www.iso.org for ordering information.

1.4. Distribution: Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.

1.5. User Responsibility: Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:

- Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
- Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
- Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
- Assuring compliance with all applicable government and industry standards.

1.6. Safety Devices: Safety devices should not be removed, or defeated.

1.7. Warning Labels: Warning labels should not be removed, painted over or otherwise obscured.

1.8. Additional Questions: Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

2.1. Flow Rate: The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.

2.2. Pressure Rating: Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.

2.3. Temperature Rating: Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.

2.4. Environment: Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.

2.5. Lubrication and Compressor Carryover: Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.

2.6. Polycarbonate Bowls and Sight Glasses: To avoid potential polycarbonate bowl failures:

- Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
- Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, keytones, esters or certain alcohols.
- Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

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2.7. Chemical Compatibility: For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5

2.8. Product Rupture: Product rupture can cause death, serious personal injury, and property damage.
- Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
- Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
- Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

3.1. Component Inspection: Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.

3.2. Installation Instructions: Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.

3.3. Air Supply: The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

4.1. Maintenance: Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.

4.2. Installation and Service Instructions: Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.

4.3. Lockout / Tagout Procedures: Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – (Lockout / Tagout)

4.4. Visual Inspection: Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
- Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
- Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
- Any observed improper system or component function: Immediately shut down the system and correct malfunction.
- Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

4.5. Routine Maintenance Issues:
- Remove excessive dirt, grime and clutter from work areas.
- Make sure all required guards and shields are in place.

4.6. Functional Test: Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.

4.7. Service or Replacement Intervals: It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
- Previous performance experiences.
- Government and / or industrial standards.
- When failures could result in unacceptable down time, equipment damage or personal injury risk.

4.8. Servicing or Replacing of any Worn or Damaged Parts: To avoid unpredictable system behavior that can cause death, personal injury and property damage:
- Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
- Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
- Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.

4.9. Putting Serviced System Back into Operation: Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

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Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors, are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. 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 such item, when communicated to Parker Hannifin Corporation, its subsidiaries or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1.Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from Parker Hannifin Corporation. THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED.

NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGN OR SPECIFICATIONS.

5. Limitation of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitations, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. 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 items sold hereunder, 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.

8. 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 (2) 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.

9. Taxes: Unless otherwise indicated on the face hereof, 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 the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. 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 Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter "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 an item sold pursuant to this contract 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 an item sold hereunder 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 said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item 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 items 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 item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgements resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

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