

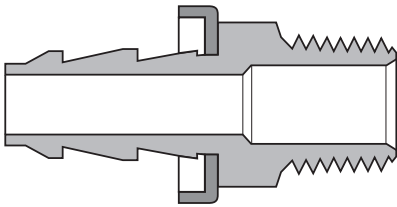


Fittings & Hose

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Push-on Hose Fittings
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Push-on Hose Fittings



Advantages

Push-on Hose Fittings are machined from the highest quality brass or stainless steel. The barbs are specifically engineered to work in conjunction with the I.D. and braid angle of Push-on Hose, ensuring a tight connection without clamps.

Assembly

Push-on Hose Fittings are designed only for use with Push-on Hose. Do not use with any other style or manufacturer of hose.

Assembly Instructions:

1. Cut hose cleanly and squarely to length.
2. Lubricate hose I.D. and barbs with light oil or soapy water.
3. Push the hose onto the fitting until it bottoms against the yellow stop ring. This ensures that all of the barbs are engaged with the hose and will also help keep the end of the hose from fraying.
4. **⚠ CAUTION: Use of clamps may damage sealing integrity of Hose and Fitting Assembly.**

Temperature Range

-40°F to 180°F (-40°C to 82°C)

Limited by media through hose assembly.

Pressure Range

Limited by hose I.D.

Nomenclature

Part numbers are constructed from symbols that identify the style, size and material of the fitting.

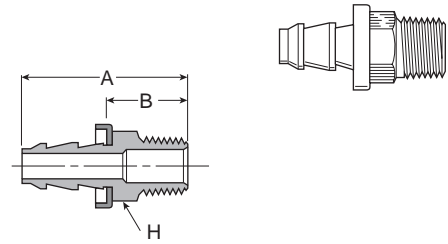
Example:

	301	82	-	4	-	4	B
Male Connector	_____						
Push-on Series	_____						
Pipe Thread Size (4/16) 1/4" Pipe	_____						
Hose I.D. Size (4/16) 1/4" I.D.	_____						
Brass Material (Blank Steel)	_____						

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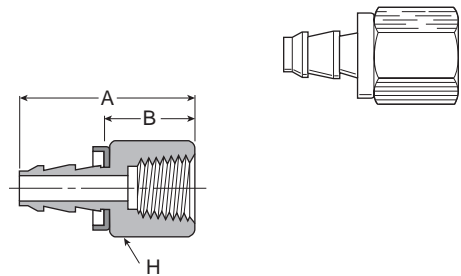
30182 Push-on Hose Barb to Male Pipe

# Part No.	Thread Inch		Hose Size Inch		A Inch mm		H Inch	B Inch mm	
30182-2-4B	1/8 x 27	-2	1/4	-4	1.39	35	7/16	.64	16
30182-4-4B	1/4 x 18	-4	1/4	-4	1.57	40	9/16	.82	21
30182-4-6B	1/4 x 18	-4	1/4	-4	1.78	45	9/16	.88	22
30182-6-6B	3/8 x 18	-6	3/8	-6	1.78	45	11/16	.88	22
30182-8-6B	1/2 x 14	-8	3/8	-6	2.03	52	7/8	1.13	29
30182-6-8B	3/8 x 18	-6	1/2	-8	1.93	49	11/16	.88	22
30182-8-8B	1/2 x 14	-8	1/2	-8	2.18	55	7/8	1.13	29
30182-12-8B	3/4 x 14	-12	1/2	-8	2.21	56	1-1/16	1.16	29
30182-8-10B	1/2 x 14	-8	5/8	-10	2.58	66	7/8	1.13	29
30182-12-12B	3/4 x 14	-12	3/4	-12	2.61	66	1-1/16	1.16	29



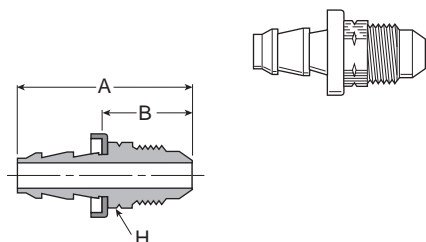
30282 Push-on Hose Barb to Male Pipe

# Part No.	Thread Inch		Hose Size Inch		A Inch mm		H Inch	B Inch mm	
30282-4-4B	1/4 x 18	-4	1/4	-4	1.56	40	3/4	.81	21
30282-6-6B	3/8 x 18	-6	3/8	-6	1.82	46	7/8	.92	23
30282-8-8B	1/2 x 14	-8	1/2	-8	2.16	55	1-1/16	1.11	28



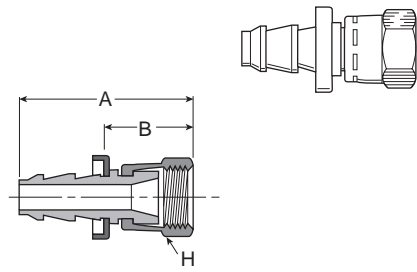
30482 Push-on Hose Barb to Male SAE 45°

# Part No.	Thread Inch		Hose Size Inch		A Inch mm		H Inch	B Inch mm		
30482-4-4B	1/4	7/16 x 20	-4	1/4	-4	1.51	38	7/16	0.76	19
30482-5-4B	5/16	1/2 x 20	-5	1/4	-4	1.61	41	9/16	0.86	22
30482-6-6B	3/8	5/8 x 18	-6	3/8	-6	1.84	47	5/8	0.94	24
30482-8-8B	1/2	3/4 x 16	-8	1/2	-8	2.15	55	3/4	1.1	28



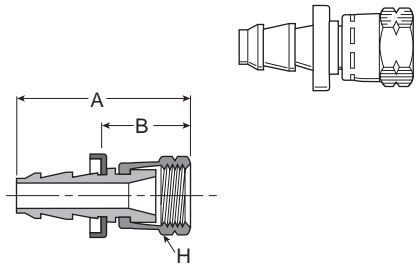
30682 Push-on Hose Barb to Female SAE JIC 37° Swivel

# Part No.	Thread Inch			Hose Size Inch		A Inch mm		H Inch	B Inch mm	
30682-4-4B	1/4	7/16 x 20	-4	1/4	-4	1.52	39	9/16	0.77	20
30682-5-4B	5/16	1/2 x 12	-5	1/4	-4	1.58	40	5/8	0.83	21
30682-6-6B	3/8	9/16 x 18	-6	1/4	-4	1.61	41	11-16	0.86	22
30682-8-6B	1/2	3/4 x 16	-8	3/8	-6	1.87	47	7/8	0.97	25
30682-8-8B	1/2	3/4 x 16	-8	1/2	-8	2.02	51	7/8	0.97	25
30682-10-8B	5/8	7/8 x 14	-10	1/2	-8	2.14	54	1	1.09	28
30682-10-10B	5/8	7/8 x 14	-10	5/8	-10	2.54	65	1	1.09	28
30682-12-12B	3/4	1-1/16 x 12	-12	3/4	-12	2.65	67	1-1/4	1.2	30



30882 Push-on Hose Barb to Female SAE 45° Swivel

# Part No.	Thread Inch			Hose Size Inch		A Inch mm		H Inch	B Inch mm	
30882-4-4B	1/4	7/16 x 20	-4	1/4	-4	1.52	39	9/16	0.76	19
30882-5-4B	5/16	1/2 x 20	-5	1/4	-4	1.58	40	5/8	0.83	21
30882-6-6B	3/8	5/8 x 18	-6	3/8	-6	1.81	46	3/4	0.91	23
30882-8-6B	1/2	3/4 x 16	-8	3/8	-6	1.87	47	7/8	0.97	25
30882-8-8B	1/2	3/4 x 16	-8	1/2	-8	2.02	51	7/8	0.97	25
30882-10-8B	5/8	7/8 x 14	-10	1/2	-8	2.14	54	1	1.09	28
30882-10-10B	5/8	7/8 x 14	-10	5/8	-10	2.54	65	1	1.09	28
30882-12-12B	3/4	1-1/16 x 14	-12	3/4	-12	2.65	67	1-1/4	1.19	30

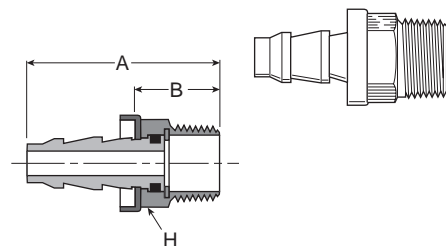


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31382 Push-on Hose Barb to Male Pipe Swivel

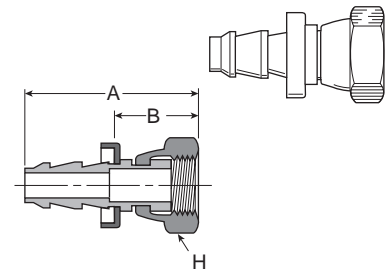
# Part No.	Thread Inch			Hose Size Inch		A Inch mm		H Inch	B Inch mm	
31382-4-4	1/4 x 18	-4	1/4	-4	1.6	41	9/16	.85	22	
31382-6-6	3/8 x 18	-6	3/8	-6	1.79	45	11/16	.89	23	
31382-8-8*	1/2 x 14	-8	1/2	-8	2.2	56	7/8	1.15	29	

* Steel



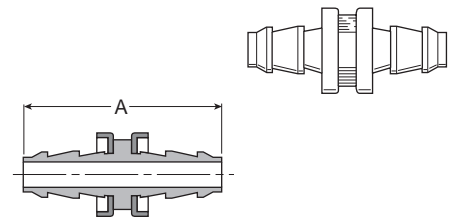
37G82 Push-on Hose Barb to Female Pipe (NPSM) Swivel with Gasket

# Part No.	Gasket	Thread		Hose Size		A		H Inch	B	
		Inch		Inch		Inch	mm		Inch	mm
37G82-4-4	07G-4	1/4- 18	-4	1/4	-4	1.55	39	11/16	0.80	20
37G82-4-6	07G-4	1/4- 18	-4	3/8	-6	1.7	43	11/16	0.80	20
37G82-6-6	07G-6	3/8- 18	-6	3/8	-6	1.75	44	7/8	0.85	22
37G82-8-8	07G-8	1/2- 14	-8	1/2	-8	2.07	53	1	1.02	26
37G82-8-10	07G-8	1/2- 14	-8	5/8	-10	2.47	63	1	1.02	26
37G82-12-12	07G-12	3/4- 14	-12	3/4	-12	2.54	65	1-1/4	1.09	28



38282 Push-on Hose Barb Union

# Part No.	Hose Size		A	
	Inch		Inch	mm
38282-4-4B	1/4	-4	1.80	46
38282-6-6B	3/8	-6	2.15	55
38282-8-8B	1/2	-8	2.51	64



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General Purpose Hose



Construction

Inner tube of oil resistant Nitrile based synthetic rubber, a single fiber braid or a two spiral fiber reinforcement and an oil and weather resistant, Neoprene or "PKR" synthetic rubber MSHA accepted, cover. The hose cover is furnished in gray as standard.

Application and Temperature Range

Widely used for shop air systems and general industrial, maintenance and automotive applications. Low pressure service hose for use with: Petroleum based hydraulic fluids and lubricating oils, and antifreeze solutions within a temperature range of -40°F to +212°F (-40°C to +100°C). Water, water / oil emulsion, and water / glycol hydraulic fluids up to +185°F (+85°C). Air up to +158°F (+70°C).

Water Service

Water, water/oil emulsion, and water/glycol hydraulic fluids up to +185°F (+85°C). Air up to +158°F (+70°C).

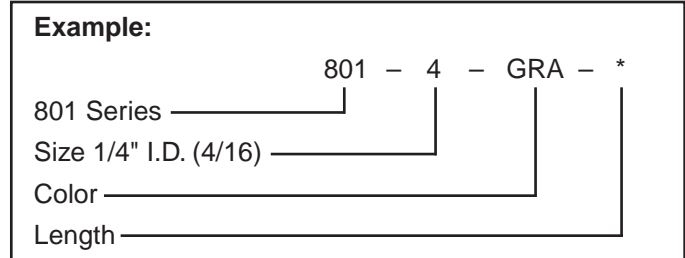
Fitting Recommendations

Use only with Push-on Hose Fittings and Quick Couplers with Push-lock Hose Barb.

Note: Push-Lok hose is recommended for vacuum applications but not for cooling lines in air conditioners and heat pumps, nor for hydraulic applications where extreme pulsations are encountered. Push-Lok is not recommended for any fuel.

Nomenclature

Part numbers are constructed from symbols that identify the style and size of the hose. Numbers identify the hose I.D. in 1/16's of an inch.










Push On Synthetic Rubber Hose Length

Part Number	I.D.	Length
801-4-GRA-600	1/4"	50 feet. / 600 inches
801-6-GRA-600	3/8"	50 feet. / 600 inches
801-8-GRA-600	1/2"	50 feet. / 600 inches
801-10-GRA-600	5/8"	50 feet. / 600 inches
801-12-GRA-600	3/4"	50 feet. / 600 inches
801-16-GRA-600	1"	50 feet. / 600 inches

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Push-on Hose 801

#														
	Part No.	Inch	mm	Inch	mm	PSI	MPa	PSI	MPa	Inch	mm	lbs/ft	kg/m	Inches of Hg
801-4	1/4	6,3	0.50	12,7	250	1,7	1000	6,8	2-1/2	65	0.09	0,13	28	95
801-6	3/8	10	0.63	15,9	250	1,7	1000	6,8	3	75	0.11	0,16	28	95
801-8	1/2	12,5	0.78	19,8	250	1,7	1000	6,8	5	125	0.18	0,27	28	95
801-10	5/8	16	0.91	23,0	250	1,7	1000	6,8	6	150	0.19	0,28	15	51
801-12	3/4	19	1.03	26,2	250	1,7	1000	6,8	7	180	0.24	0,36	15	51
801-16	1	25	1.28	32,6	175	1,2	700	4,8	10	250	0.37	0,55	15	51

⚠ DANGER: Failure or improper selection or improper use of hose, fittings, or related accessories can cause death, personal injury and property damage.

Possible consequences of failure or improper selection or improper use of hose, fittings or related accessories include but are not limited to:

- Fittings thrown off at high speed.
- High velocity fluid discharge.
- Explosion or burning of the conveyed fluid.
- Electrocutation from high voltage electric power lines or other sources of electricity.
- Contact with suddenly moving or falling objects that are to be held in position or moved by the conveyed fluid.
- Dangerously whipping hose.
- Contact with conveyed fluids that may be hot, cold, toxic or otherwise injurious.
- Sparking or explosion caused by static electricity buildup.
- Sparking or explosion while paint or flammable liquid spraying.

Before selecting or using any hose or fittings or related accessories, it is important that you read and follow the instructions in the Guide below.

1.0 GENERAL INSTRUCTIONS

1.1 Scope: This guide provides instructions for selecting and using (including assembling, installing, and maintaining) hose (including all rubber and/or plastic products commonly called “hose” or “tubing”), fittings (including all products commonly called “fittings” or “couplings” for attachment to hose), and related accessories (including crimping and swaging machines and tooling). This guide is a supplement to and is to be used with, the specific publications for the specific hose, fittings and related accessories that are being considered for use.

1.2 Fail-Safe: Hose and hose assemblies can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the hose or hose assembly will not endanger persons or property.

1.3 Distribution: Provide a copy of this guide to each person that is responsible for selecting or using hose and fitting products. Do not select or use hose and fittings without thoroughly reading and understanding this guide as well as the specific publications for the products considered or selected.

1.4 User Responsibility: Due to the wide variety of operating conditions and uses for hose and fittings, the manufacturer and its distributors do not represent or warrant that any particular hose or fitting is suitable for any specific and use system. This guide does not analyze all technical parameters that must be considered in selecting a product. The user, through their own analysis and testing, are solely responsible for:

- Making the final selection of the hose and fitting.
- Assuring that the user’s requirements are met and that the use presents no health or safety hazards.
- Providing all appropriate health and safety warnings on the equipment on which the hose and fittings are used.

1.5 Additional Questions: Consult the supplier if you have any additional questions or require additional information.

2.0 HOSE AND FITTING SELECTION INSTRUCTIONS

2.1 Electrical Conductivity: Certain applications require that a hose be nonconductive to prevent electrical current flow. Other applications require the hose to be sufficiently conductive to drain off static electricity. Extreme care must be exercised when selecting hose and fittings for these or any other applications in which electrical conductivity or nonconductivity is a factor.

For applications that require hose to be electrically nonconductive, including but not limited to applications near high voltage electric lines, only special nonconductive hose can be used. The manufacturer of the equipment in which the nonconductive hose is to be used must be consulted to be certain that the hose and fittings that are selected are proper for the application. Do not use any hose or fitting for any such application requiring nonconductive hose, including but not limited to applications near high voltage electric lines, unless (I) the application is expressly approved in the technical publication for the product, (II) the hose is both orange color and marked “nonconductive”, and (III)

the manufacturer of the equipment on which the hose is to be used specifically approves the particular hose and fitting for such use.

The manufacturer does not supply any hose or fittings for conveying paint in airless paint spraying or similar applications, and hose and fittings must not be so used. A special hose and fitting assembly is required for this application, to avoid static electricity buildup. If the proper hose and fitting assembly is not used for this application, static electricity can build up and cause a spark that may result in an explosion and/or fire.

The electrical conductivity or nonconductivity of hose and fittings is dependent upon many factors and may be susceptible to change. These factors include but are not limited to the various materials used to make the hose and the fittings, manufacturing methods (including moisture control), how the fittings contact the hose, age and amount of deterioration or damage or other changes, moisture content of the hose at any particular time, and other factors.

2.2 Pressure: Hose selection must be made so that the published maximum recommended working pressure of the hose is equal to or greater than the maximum system pressure. Surge pressures in the system higher than the published maximum recommended working pressure will cause failure or shorten hose life. Do not confuse burst pressure or other pressure values with working pressure and do not use burst pressure or other pressure values for this purpose.

2.3 Suction: Hoses used for suction applications must be selected to ensure that the hose will withstand the vacuum and pressure of the system. Improperly selected hose may collapse in suction application.

2.4 Temperature: Be certain that fluid and ambient temperatures, both steady and transient, do not exceed the limitations of the hose. Care must be taken when routing hose near hot objects such as manifolds.

2.5 Fluid Compatibility: Hose selection must assure compatibility of the hose tube, cover, reinforcement, and fittings with the fluid media used. See the fluid compatibility chart in the publication for the product being considered or used.

2.6 Permeation: Permeation (that is, see page through the hose) will occur from inside the hose to outside when hose is used with gases, liquid and gas fuels, and refrigerants (including but not limited to such materials as helium, fuel, oil, natural gas, or freon). This permeation may result in high concentrations of vapors which are potentially flammable, explosive, or toxic, and in loss of fluid. Dangerous explosions, fires, and other hazards can result when using the wrong hose for such applications. The system designer must take into account the fact that this permeation will take place and must not use hose if this permeation could be hazardous. The system designer must take into account all legal, government, insurance, or any other special regulations which govern the use of fuels and refrigerants. Never use a hose even though the fluid compatibility is acceptable without considering the potential hazardous effects that can result from permeation through the hose assembly.

Permeation of moisture from outside the hose to inside the hose will also occur in hose assemblies, regardless of internal pressure. If this moisture permeation would have detrimental effects (particularly but not limited to refrigeration and air conditioning systems), incorporation of sufficient drying capacity in the system or other appropriate system safeguards should be selected and used.

- 2.7 Size:** Transmission of power by means of pressurized fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage due to heat generation or excessive fluid velocity.
- 2.8 Routing:** Attention must be given to optimum routing to minimize inherent problems (kinking or flow restriction due to hose collapse). Freon® is a registered trademark of the E.I. DuPont De Nemours Co., Inc.
- 2.9 Environment:** Care must be taken to ensure that the hose and fittings are either compatible with or protected from the environment (that is, surrounding conditions) to which they are exposed. Environmental conditions include but are not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals, and air pollutants that can cause degradation and premature failure.
- 2.10 Mechanical Loads:** External forces can significantly reduce hose life or cause failure. Mechanical loads which must be considered include excessive flexing, twist, kinking, tensile or side loads, bend radius, and vibration. Use of swivel type fittings or adapters may be required to ensure no twist is put into the hose. Applications must be tested prior to hose selection.
- 2.11 Physical Damage:** Care must be taken to protect hose from wear, snagging and cutting, which can cause premature hose failure.
- 2.13 Length:** When establishing a proper hose length, motion absorption, hose length changes due to pressure, and hose and machine tolerances must be considered.
- 2.14 Specifications and Standards:** When selecting hose and fittings, government, industry, and manufacturer specifications and recommendations must be reviewed and followed as applicable.
- 2.15 Hose Cleanliness:** Hose components may vary in cleanliness levels. Care must be taken to ensure that the assembly selected has an adequate level of cleanliness for the application.
- 2.16 Fire Resistant Fluids:** Some fire resistant fluids require the same hose as petroleum oil. Some use a special hose, while a few fluids will not work with any hose at all. See instructions 2.5 and 1.5. The wrong hose may fail after a very short service. In addition, all liquids may burn fiercely under certain conditions, and leakage may be hazardous.
- 2.17 Radiant Heat:** Hose can be heated to destruction without contact, by such nearby items as hot manifolds or molten metal. The same heat source may then initiate a fire. This can occur despite the presence of cool air around the hose.
- 2.18 Welding and Brazing:** Heating of plated parts, including hose fittings and adapters, above 450°F (232°C) such as during welding, brazing, or soldering may emit deadly gases.
- 2.19 Radiation:** Radiation affects all materials used in hose assemblies. Since the long term effects may be unknown, do not expose hose assemblies to radiation.

3.0 HOSE AND FITTING ASSEMBLY AND INSTALLATION INSTRUCTIONS

- 3.1 Pre-Installation Inspection:** Prior to installation, a careful examination of the hose must be performed. All components must be checked for correct style, size, catalog number, and length. In addition, the hose must be examined for cleanliness, obstructions, blisters, cover looseness, or any other viable defects.
- 3.2 Hose and Fitting Assembly:** Do not assemble fittings onto a hose that is not specifically listed by the manufacturer for that fitting unless authorized in writing by the chief engineer. Do not assemble one manufacturer's fitting on another manufacturer's hose.
- The published instructions must be followed for assembling fittings on the hose. These instructions are provided in the fitting catalog for the specific fitting being used.
- 3.3 Related Accessories:** Do not crimp or swage any hose or fitting with anything but the proper listed swage or crimp machine, and dies, and in accordance with published instructions. Do not crimp or swage one manufacturer's hose fitting with another's crimp or swage die unless authorized in writing by their chief engineer.

- 3.4 Parts:** Do not use any hose fitting part (including but not limited to socket, shell, nipple, or insert) except with the correct mating parts, in accordance with instructions, unless authorized in writing by the chief engineer of the appropriate manufacturer.
- 3.5 Reusable/Permanent:** Do not reuse any reusable hose product that has blown or pulled off a hose. Do not reuse a permanent (that is, crimped or swaged) hose fitting or any part thereof.
- 3.6 Minimum Bend Radius:** Installation of a hose at less than the minimum listed bend radius may significantly reduce the hose life. Particular attention must be given to preclude sharp bending at the hose/fitting juncture.
- 3.7 Twist Angle and Orientation:** Hose installations must be such that relative motion of machine components does not produce twisting.
- 3.8 Securement:** In many applications, it may be necessary to restrain, protect, or guide the hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care must be taken to ensure such restraints do not introduce additional stress or wear points.
- 3.9 Proper Connection of Ports:** Proper physical installation of the hose requires a correctly installed port connection while ensuring that no twist or torque is transferred to the hose.
- 3.10 External Damage:** Proper installation is not complete without ensuring that tensile loads, side loads, kinking, flattening, potential abrasion, thread damage, or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.
- 3.11 System Checkout:** All air entrapment in hydraulic lines must be eliminated, all systems must be pressurized to the maximum system pressure and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.

4.0 HOSE AND FITTING MAINTENANCE INSTRUCTIONS

- 4.1 Visual Inspection Hose/Fitting:** Any of the following conditions require immediate shut down and replacement of the hose assembly
- Fitting slippage on hose.
 - Damaged, cut or abraded cover (any reinforcement exposed).
 - Hard, stiff, heat cracked, or charred hose.
 - Cracked, damaged, or badly corroded fittings.
 - Leaks at fitting or in hose.
 - Kinked, crushed, flattened or twisted hose.
 - Blistered, soft, degraded, or loose cover.
- 4.2 Visual Inspection All Other:** The following items must be tightened, repaired or replaced as required:
- Leaking port conditions.
 - Remove excess dirt buildup.
 - Clamps, guards, shields.
 - System fluid level, fluid type and any air entrapment.
- 4.3 Functional Test:** Operate the system at maximum operating pressure and check for possible malfunctions and freedom from leaks. Personnel must avoid potential hazardous areas while testing and using.
- 4.4 Replacement Intervals:** Specific replacement intervals must be considered based on previous service life, government or industry recommendations, or when failure could result in unacceptable downtime, damage, or injury risk. See instructions 1.2.

Media	GPH	Media	GPH
Acetaldehyde	P	Gas (Oil) (2)	G
Acetic Acid	G	Gas (Natural) (4)	(2)
Acetone	P	Gasoline (Aromatic and Non-Aromatic) (2)	L
Acetylene	(2)	Glue	(3)
Air (4)	G	Glycerine	G
Alcohols (Menthanol-Ethanol) (6)	G	Glycol to 150°F	G
Ammonium Chloride	G	Greases	G
Ammonium Hydroxide	L	Heptachlor (Insecticide)	—
Anhydrous Ammonia (2)	P	Hexane (2)	L
Aniline	L	Houghto Safe—600 Series	
Animal Oils (6)	G	(Hydraulic Fluid/Water Glycol)	G
Aromatic Hydrocarbons	P	Houghto Safe—1000 Series	
Asphalt	G	(Phosphate Ester Base)	G
Baygon (Insecticide)	—	Hydraulic Fluid—Petroleum Base	G
Beer	G	Hydraulic Fluid—Phosphate Ester Base	G
Benzene	L	Hydraulic Fluid—Water Glycol Base	G
Brake Fluid (DOT #3)	P	Hydraulic Oil	L
Butane (2) (4)	G	Hydrochloric Acid	—
Butter (6)	G	Hydrofluoric Acid	L
Calcium Chloride Solutions	L	Hydrogen Gas (2) (4)	G
Carbon Dioxide (4)	G	Hydrolube	
Carbon Monoxide (4)	G	(Hydraulic Fluid/Water Glycol Base)	G
Carbon Tetrachloride	L	IRUS 902	
Castor Oil	G	(Hydraulic Fluid/Water-Oil Emulsion)	G
Chlorinated Hydrocarbon Base Fluids	P	Isocyanates	—
Chlorinated Petroleum Oil	—	Isooctane (2)	L
Chlorinated Solvents	L	Isopropyl Alcohol	—
Chlorine Gas, Dry	G	Kerosene (2)	L
Chlordane (Insecticide)	—	Ketones	P
Chloroform	P	Lacquer Solvents	P
Chromic Acid	G	Lactic Acid	G
Citric Acid Solutions	G	Lime	G
Crude Petroleum Oil	G	Lindol	
Cyclohexane (2)	—	(Hydraulic Fluid/Phosphate Esters)	—
Cygon (Insecticide)	—	Linseed Oil	G
Diazinon (Insecticide)	—	LP-Gas	(2)
Diesel Fuel (2)	L	Lubricating Oils (Diester Base)	—
Diester Oils	—	Lubricating Oils (Petroleum Base)	G
Enamels	L	Malathion (Insecticide)	—
Ethanol (6)	L	Magnesium Hydroxide	G
Ethers	L	Magnesium Salts	G
Ethylene Glycol (to 150°F)	G	Mercury	G
Ethylene Oxide	—	Meropa Oil (Sulphur Base)	—
Fatty Acid	G	Methane	(2)
Formaldehyde	G	Methanol	P
Formic Acid	G	Methoxychlor (Insecticide)	—
Freon 12 (5)	G	Methyl Alcohol	P
Freon 22 (5)	G	Methylene Chloride	L
Fruit Juices (6)	G	Methyl Ethyl Keytone (MEK)	P
Fuel Oil (2)	L	Methyl Ethyl Keytone Peroxide (MEKP)	—

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 J12.

Media	GPH	Media	GPH
Methyl Isobutyl Keytone (MIBK)	P	Silicone Oil	—
Milk (6)	G	Skydrol 500, 7000	P
Mineral Oil	G	Soap Solutions	G
Mineral Spirits	P	Soda Water (6)	G
Motor Oils	G	Sodium Borate	G
Naphtha	P	Sodium Carbonate	(3)
Natural Gas (4)	(2)	Sodium Chloride Solutions	G
Nitric Acid	G	Sodium Hydroxide, 50%	L
Nitrobenzene	P	Sodium Hypochlorite	L
Nitrogen Gas (4)(5)	G	Steam	P
Oil	G	Stoddard Solvent	L
Oil of Turpentine	G	Straight Synthetic Oils (Phosphate Ester and Phosphate Ester Base)	P
Oleic Acid	L	Chlorinated Hydrocarbon Base	—
OS 45 Hydraulic Fluid (Silicate Ester Base)	—	Sulphur	G
Oxygen Gas (4) (5) (6)	G	Sulphur Hexafluoride Gas (4) (5)	—
Ozone	G	Sulphuric Acid	P
Paint Solvents (Oil Base) (7)	P	Toluene	P
Paints (Oil Base) (7)	P	Toluol	P
Pentane (2)	L	Transmission Fluid	—
Perchloric Acid	L	Trichloroethylene	L
Perchlorethylene	L	Trisodium Phosphate Solutions	G
Petroleum Ether	P	Turpentine	G
Petroleum Oils	G	Ucon (Hydraulic Fluid — Water Glycol Base)	G
Phenols	L	Varnish	P
Phosphate Esters (Above 150°F)	P	Vinegar (6)	G
Phosphate Esters (to 150°F)	P	Water (to 135°F) (6)	G
Polyol Esters	P	Water (Above 135°F) (6)	L
Potassium Hydroxide, 50%	L	Water Glycols (to 135°F)	G
Propane (4) (5)	(2)	Water Glycols (Above 135°F)	G
Propylene Glycol	L	Water in Oil Emulsions (to 135°F)	G
Pydraul F-9, 150,160 (to 135°)	P	Water in Oil Emulsions (Above 135°F)	L
Pydraul 312 C, 625 (to 135°F)	P	Whiskey (6)	G
Quintolubric 822 Fluid	—	Wood Oil	G
Salt Water	(3)	Xylene	P
Sevin (Insecticide in Water)	—	Zinc Chloride	G
Silicone Grease	—		

F

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.

- 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 Parker Hannifin Corporation, 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.
- Hose applications for these fluids must take into account legal and insurance regulations. This does not imply AGA or UL compliance.
- Satisfactory at some concentrations and temperatures, unsatisfactory in others.
- 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.
- Chemical compatibility **does not** imply low permeation rates. Consult the supplier for a recommendation for your specific requirements.
- Does not imply NSF or FDA compliance.
- Chemical compatibility does not imply acceptability for use in **airless paintspray** applications. These applications require a special **conductive** hose.

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 Wilkerson valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Wilkerson 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 Wilkerson 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 Wilkerson technical service department if you have any questions or require any additional information. See the Wilkerson publication for the product being considered or used, or call 269-629-2550, or go to www.wilkersoncorp.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, ketones, 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.

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: Wilkerson published Installation Instructions must be followed for installation of Wilkerson valves, FRLs and vacuum components. These instructions are provided with every Wilkerson valve or FRL sold, or by calling 269-629-2550, or at www.wilkersoncorp.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 Wilkerson valve and FRL sold, or are available by calling 269-629-2550, or by accessing the Wilkerson web site at www.wilkersoncorp.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.

Warning: Use Limitations

Wilkerson's warranties are void, and Wilkerson assumes no responsibility for any resulting cost, loss, injury or any other damages whatsoever, with respect to any plastic bowl unit for which a bowl guard is standard equipment if the unit is placed in service without the bowl guard and, except as otherwise specified in writing by Wilkerson, with respect to any Wilkerson products which are used in other than compressed air service. Specific warnings with respect to these and other use limitations appear elsewhere in this catalog.

Wilkerson maintains a policy of ongoing product development and improvement. We therefore reserve the right to change dimensions specification and design without notice.

Do not place plastic bowl unit in service without bowl guard installed.

Plastic bowl units are sold only with bowl guards with the exception to miniature units (C04, F00, L00, & M00). To minimize the danger of flying fragments in the event of plastic bowl failure, the bowl guards should not be removed. If the unit is in service without the bowl guard installed, manufacturer's warranties are void, and the manufacturer assumes no responsibility for any resulting loss.

If the unit has been in service and does not have a bowl guard, order one and install before placing back in service.

Caution

Certain compressor oils, chemicals, household cleaners, solvents, paints and fumes will attack plastic bowls and can cause bowl failure. Do not use near these materials. When bowl becomes dirty replace bowl or wipe only with a clean, dry cloth. Reinstall bowl guard or buy and install a bowl guard. Immediately replace any crazed, cracked, damaged or deteriorated plastic bowl with a bowl or a new plastic bowl and bowl guard.

Caution

Except as otherwise specified by the manufacturer, this product is specifically designed for compressed air service, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquids or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to the unit or result in a combustible condition or hazardous external leakage. Before using with fluids other than air, or for non-industrial applications, or for life support systems, consult Wilkerson Operations for written approval.

Some of the Materials that will Attack Polycarbonate Plastic Bowls

Acetaldehyde	Chloroform	Milk of Lime (CaOH)
Acetic acid (conc.)	Cresol	Nitric Acid (conc.)
Acetone	Cyclohexanol	Nitrobenzene
Acrylonitrile	Cyclohexanone	Nitrocellulose Lacquer
Ammonia	Cyclohexene	Phenol
Ammonium Fluoride	Dimethyl Formamide	Phosphorous Hydroxy Chloride
Ammonium Hydroxide	Diozane	Perchloroethylene
Ammonium Sulfide	Ethgane tetrachloride	Phosphorous
Anaerobic adhesives	Ethyl Acetate	Propionic Acid
Trichloride and Sealants	Ethyl Ether	Pyridine
Antifreeze	Ethylamine	Sodium Hydroxide
Benzene	Ethylene Chlorohydrin	Sodium Sulfide
Benzoic Acid	Ethylene Dichloride	Styrene
Benzyl Alcohol	Ethylene Glycol	Sulfuric Acid (conc.)
Brake Fluids	Formic Acid (conc.)	Sulphural Chloride
Bromobenzene	Freon (Refrig. & Propell.)	Tetrahydronaphthalene
Butyric Acid	Gasoline (High Aromatic)	Tiophene
Carbolic Acid	Hydrazine	Toluene
Carbon Disulfide	Hydrochloric Acid (conc.)	Turpentine
Carbon Tetrachloride	Lacquer Thinner	Xylene & Others
Caustic Potash Solution	Methyl Alcohol	
Caustic Soda Solution	Methylene Chloride	
Chlorobenzene	Methylene Salicylate	

Trade Names of some Compressor Oils, Rubber Compounds and other Materials that will Attack Polycarbonate Plastic Bowls.

Atlas "Perma-Guard"	National Compound #N11
Buna N	"Nylock" VC-3
Cellulube #150 and #220	Parco #1306 Neoprene
Crylex #5 cement	*Permabond 910
*Eastman 910	Petron PD287
Garlock #98403 (polyurethane)	Prestone
Haskel #568-023	Pydraul AC
Hilgard Co.'s hil phene	Sears Regular Motor Oil
Houghton & Co. oil #1120, #1130 & #1055	Sinclair oil "Lily White"
Houtosafe 1000	Stauffer Chemical FYRQUEL #150
Kano Kroil	Stillman #SR 269-75 (polyurethane)
Keystone penetrating oil #2	Stillman #SR 513-70 (neoprene)
*Loctite 271	Tannergas
*Locite 290	Telar
*Loctite 601	Tenneco anderol #495 & #500 oils
*Loctite Teflon-Sealant	Titon
Marvel Mystery Oil	*Vibra-tite
Minn. Rubber 366Y	Zerex
*When in raw liquid form.	

We cannot possibly list all harmful substances, so check with Mobay or the General Electric office for further information on polycarbonate plastic.

The trade names "EconOmist" and "Flow-Guide" are registered at the United States Patent Office.

"Auto-Fill", "Dial-Air", "Flex-Drain", "Mainliner" and "Whirl-Flo" are tradenames of Wilkerson.

Claims and Shortages: Risk of loss passes to buyer when goods are delivered to the carrier. Inspect all shipments for damage at time of receipt. Claims should be filed by the consignee against the carrier.

Changes: Wilkerson maintains a policy of ongoing product development and improvement. We therefore reserve the right to change dimensions, specifications and design without notice.



Offer of Sale

The items described in this document and other documents or descriptions provided by The Company, its subsidiaries and its authorized distributors, are hereby offered for sale at prices to be established by The Company, 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 The Company, 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 The Company. 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 judgments 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.