

Pneumatic Components and Systems



Modular Regulators • Manifold Systems

Inline Filters • Orifice Restrictors

Needle Valves • Check Valves

Pressure/Vacuum Switches

Quick Disconnects

Plastic Fittings

Summary Catalog

Introduction to Air Logic



The Air Logic Division of Fred Knapp Engraving Company designs and manufactures a comprehensive line of pneumatic and vacuum control equipment.

Air Logic has earned a reputation for product innovation and development by designing special products to meet the customers requirements.

The Fred Knapp Engraving Company, Inc. was founded by Fred Knapp in January, 1945, in the basement of his home. The basement shop specialized in all types of steel marking stamps, engraved signs and dials.

Fred Knapp's many years of experience and expertise as a craftsman earned Knapp Engraving a strong reputation of excellence in quality. Today, family owned and operated, Fred Knapp Engraving's reputation continues to grow.

Since the main structure was completed in 1955, seven additions have been made to meet the expanding needs and diversified growth.

In addition to specializing in machine engraving, the company is recognized as an outstanding tool and die maker. Knapp Engraving has been innovative in plastic injection molding with complete tool room and plastic injection molding facilities. Knapp Engraving has produced 1000's of different kinds of plastic precision parts which range from components for aircraft instruments to spray tips for aerosol cans.

In 1975, Fred Knapp Engraving Company, Inc. purchased the Fluidic Division of Johnson Controls, which is now known as Air Logic.

Air Logic is on the leading edge of quality and excellence in customer service with immediate delivery of its products, providing its customers with the most flexible and productive systems on the market.

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Modular Regulators & Manifold Systems



Air Logic is a manufacturer of Modular Subminiature Precision Pressure Regulators and Modular Manifold Systems. The modular equipment includes Subminiature Precision Pressure Regulators, Preset Precision Pressure Regulators, Manifold Mounted Precision Pressure Regulators and a Modular Manifold System. The unique modular dovetail design allows the regulator or the manifold to be used individually or assembled into a modular combination of Pneumatic Components.

Modular Pressure Regulator

The Modular Subminiature Precision Pressure Regulator is designed for precise regulation of pressure. It is ideal for instrumentation and industrial applications. The pressure regulator has a 20 turn adjustment range from 0.5 to 100 PSI. Maximum supply is 150 PSI. Four adjustment ranges are available: 10 PSI, 30 PSI, 60 PSI and 100 PSI.

Publication 9200



R-7000 Series

Modular Preset Pressure Regulators

The Modular Precision Preset Regulator is designed to produce a precise output pressure that is preset. The regulator is ideal for instrumentation and industrial applications.

The Preset Regulator is available in two models, the standard model and the adjustable model.

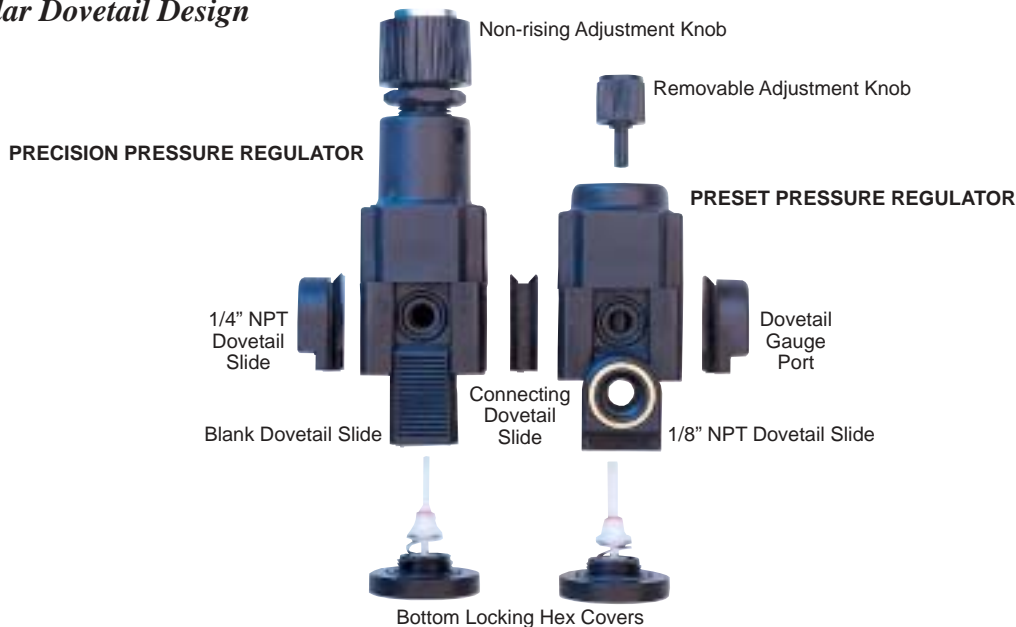
The standard model is factory preset to the desired output pressure, 0.5-40 PSI using 100 PSI supply. Specify the supply pressure if the supply is different than 100 PSI. The adjustable model is available in 4 ranges.

Publication 9200



PR-7000 Series

Unique Modular Dovetail Design



Modular Regulators & Manifold Systems



Manifold Mounted Pressure Regulator

The Manifold Mounted Precision Pressure Regulators are designed to mount directly on pneumatic circuit boards or manifold subplates. The port connections for the supply and output are located on the base of the manifold mounted series regulator. Two recessed Buna-N o-rings are supplied for sealing the regulator to the manifold.

The Manifold Mounted Regulators are available in two models: the Adjustable Precision Regulator and the Preset Precision Regulator.

The Adjustable Precision Regulator has a 20-turn adjustment range from .5 to 100 PSI.

Publication 9200



R-6000 Series

PR-6000 Series

Modular Manifold

The Modular Manifold is designed for instrumentation and industrial applications.

The Unique Modular Dovetail design allows the manifold block to be used as an individual unit or assembled into a modular combination of pneumatic components.

The Modular Manifold is available in two models. The standard model and the filtered model.

The Manifold Block contains four individual dovetail slides and one top cover that will accept a various assortment of threaded ports or blanks.

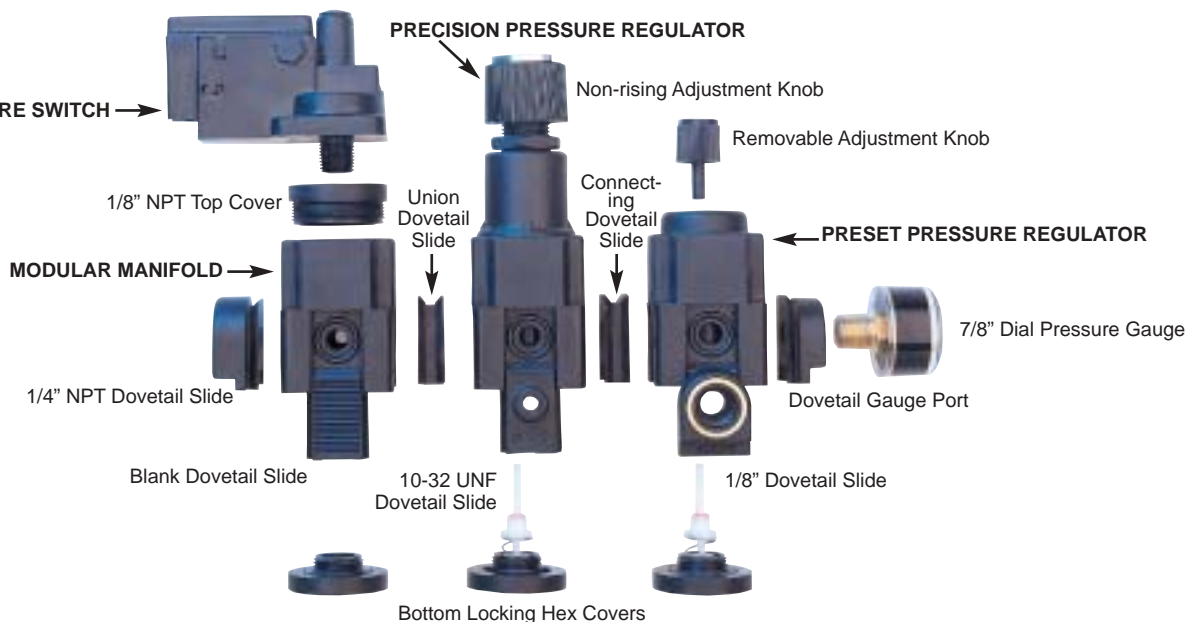
Publication 9200



M-5000 Series

Unique Modular Dovetail Design

SUBMINIATURE PRESSURE SWITCH →



Pneumatic Accessories



Air Logic is a manufacturer of various pneumatic accessories. Ideal for instrumentation, medical and industrial applications. The pneumatic accessories include Check Valves, Orifice Restrictors, Needle Valves, miniature Inline Filters, Orifice Filter combinations and Preset Flow Controls.

Inline Filters

The Inline Filters are designed for compressed air systems to remove most contaminate particles. Three models are available. An inline filter with barbs for 1/16" or 1/8" I.D. tubing, a filter encased in a 10-32 UNF housing with barbs for 1/16" or 1/8" I.D. tubing, or a filter with female 10-32 UNF threads. The filters are available in 5, 25, 43 and 73 microns. Maximum supply pressure 125 PSI. Minimum pressure drop.

Publication 9300



F-950 Series



F-960 Series



F-970 Series

F-2815 Series



F-3120 Series



Orifice Restrictors

The Orifice Restrictors are designed for use in pneumatic control circuits. The Orifice Restrictors are precision molded of polysulfone and available in three models: 1) Straight Ports for inline installation, 2) Available with barbs for 1/16" or 1/8" I.D. flexible tubing or 3) Encased in a 10 x 32 UNF barbed fitting. Available in 11 various orifice diameters from .004" to .040". The orifices are held to flow tolerances of $\pm 4\%$. Maximum pressure 100 PSI. Low cost and miniature size.

Publication 9300

Filtered Orifice Restrictors

The Filtered Orifice Restrictors are encased in a molded polysulfone housing with barbs for 1/16" or 1/8" I.D. flexible tubing. The Filtered Orifice is available in 5, 43 and 73 microns. Available in 10 various orifice diameters from .004" to .030". The orifices are precision molded of polysulfone and are held to flow tolerances of $\pm 4\%$. Maximum pressure 100 PSI. Low cost and miniature size.

Publication 9300



F-950 Series



Needle Valves

The Needle Valves are ideal for instrumentation and industrial applications. The fine angle of the needle allows for the precise control of flow. The Needle Valves are adjustable from 0 to the equivalent flow of a 0.025" diameter orifice. The flow is restricted in both directions. The various features include panel mounting, a knurled adjustment knob, stainless steel pins. Buna-N, Viton or EDPM O'rings are available. The body is available in various materials, Phosphor Bronze, Nylon or Polypropylene.

Publication 9300



F-2822-20, 30 Series

F-2822-40 Series

Check Valves

The Check Valves permit flow in one direction only. The operation of the Check Valve is based on the movement of a small disc. The disc shifts within the housing as the pressure differential changes from forward to reverse. A flat surface on one side of the disc seals off flow, while the other side allows flow to pass. Maximum forward flow and low cracking pressure. The Check Valve is available in a chemical resistant housing made of polypropylene.

Publication 9300



F-2804 Series

Preset Flow Control

The Preset Flow Control maintains a constant flow in one direction and full flow in the opposite direction. The operation of the Flow Control is based on the movement of a small disc. The disc shifts within the housing as the pressure differential changes from forward to reverse. An orifice restrictor is encased in the center of the disc. A flat surface on one side of the disc seals and permits flow through the orifice. Standard orifices available.

Publication 9300



F-2804 Series



Air Logic is a manufacturer of plastic fittings and quick disconnects. The plastic fittings include Bulkhead Connectors, Miniature Unions, Reducing Connectors, Barbed Fittings, Tees, Elbows, Crosses, 10-32 Plugs, 10-32 Nipples, Straight Swivels, Swivel Elbows and Tees (Patent # 4, 946, 204).

Bulkhead Connector

The Standard Bulkhead Connectors are precision molded of nylon and are available in two models, the Reducing and Straight Bulkhead Connector. The connector joins 1/16", 1/8" or .170 I.D. flexible tubing and are panel mounted.

Publication 9600



F-3100 Series



F-3103 Series

Multiple Bulkhead Connectors

The Multiple Bulkhead Connectors are precision molded of polysulfone and are available in two models, 10 tube connector and 32 tube connector. The 10 tube connector seals with a press fit and can be panel mounted. The 32 tube connector is joined together by two hex head screws and is panel mounted.

Publication 9600

Multiple Barbed Fittings

The Multiple Barbed Fittings are precision molded of nylon. The unique design of the barbed fitting allows the 10-32 threads to seal without a gasket. The barbed fitting does not have a molded parting line on the first barb. This prevents the fitting from leaking. The 10-32 Barbed Fittings are available with barbs for 1/16", 1/8" or .170 I.D. flexible tubing.

Publication 9600



F-3120 Series



F-3120 Series

Unions and Reducers

The Unions are precision molded of polysulfone and join together 1/16" or 1/8" I.D. flexible tubing. The Reducing Connectors are precision molded of polysulfone that join 1/16" to 1/8" I.D. or 1/16" to .170 I.D. flexible tubing.

Publication 9600



Barbed Unions, Elbows, Tees & Crosses

The barbed Unions, Elbows, Tees and Crosses are precision molded of nylon and join 1/16" I.D. or 1/8" I.D. flexible tubing together. The celcon Plastic Tee joins 1/16" I.D. flexible tubing together.

Publication 9600



F-3140 Series

F-3150 Series



F-3250 Series



F-3350 Series



Swivel Fittings

The Swivel Fittings (Patent #4,946,204) are available in three models, the Straight Swivel, the Swivel Elbow and the Swivel Tee. The swivels are available with barbs for 1/16", 3/32" or 1/8" I.D. flexible tubing. The swivels are available with 10-32 UNF threads, 1/8-27 NPT or 1/4-18 NPT. The unique design (Patent #4,946,204) allows the fitting to swivel 360°. The snap type fitting is sealed with a Buna-N o-ring. The swivel fittings are precision molded of nylon.

F-3150 Series 10-32 Threads

F-3250 Series 1/8" NPT Threads

F-3350 Series 1/4" NPT Threads

Publication 9600

Quick Disconnects

The Quick Disconnects (Patent Number 5,695,223) are available in three models: the Straight, Tee and Elbow. Depress the latching pushbutton for barb removal; reinsert to lock the barb into position. The fittings are available with barbs for 1/16", 1/8", or .170 I.D. flexible tubing. Available with 10-32 UNF threads. The unique design allows the fittings to swivel 360°. The fittings are sealed with a Buna-N o-ring. The Quick Disconnect is precision molded of Celcon.



F-4150 Series

Pressure Switches / Vacuum Switches



Air Logic is a manufacturer of miniature, precision snap-acting switches that interface from pressure signals to electrical control circuits and from vacuum signals to electrical systems. The switches are single pole, double throw for normally open, normally closed and common terminals which are available from 0.1 to 25 AMP, 15 AMP standard. For low current applications, gold contact and solid state switches are available.

Subminiature Pressure Switches

The Switches are adjustable 0.5-100 PSI with a maximum of 100 PSI supply. The switches have four mounting styles that are available: Flush Mount, Panel Mount, 1/8"-27 NPT Mount and Manifold Mount.

15 AMP Switches are standard, 0.1 to 25 AMP and Solid State Switches are available. For a low difference between the "ON" and "OFF" pressure, a Low Differential Pressure Switch is available.

Publication 9000.

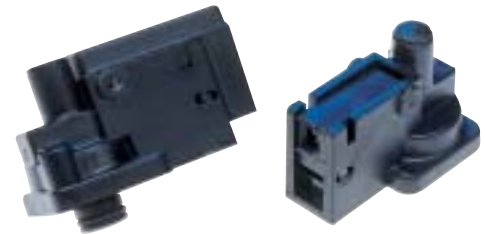
**F-5100 Series
Standard**



**F-5300 Series
Low Differential**



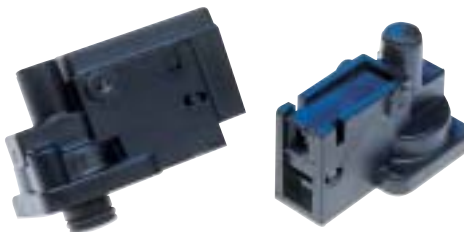
**F-5500 Series
Solid State**



**V-5100 Series
Standard**



**V-5300 Series
Low Differential**



**V-5500 Series
Solid State**

Subminiature Vacuum Switches

The Switches are adjustable from 1.5" to 28" Hg with 30" Hg maximum. The Switches have four mounting styles available: Flush Mount, Panel Mount, 1/8"-27 NPT Mount and Manifold Mount

15 AMP Switches are standard, 0.1 to 25 AMP and Solid State Switches are available. For a low difference between the "ON" and "OFF" vacuum signal, a Low Differential Vacuum Switch is available.

Publication 9000.

Switches/3-Way Valves



Miniature Pressure Switches

The Switches are available with preset and adjustable pressure settings. The F-4100-50 is preset at 5" H₂O and the F-4100-90 is preset at 15" H₂O. The F-4100-85W is adjustable 8 to 85" H₂O. The F-4100-100 and the F-4100-200 are adjustable 0.5-15 PSI.

Publication 9500



F-4100 Series



V-4100 Series

Miniature Vacuum Switches

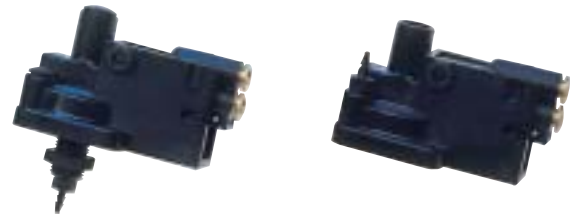
The Switches are available with preset and adjustable vacuum settings. The V-4100-0.7 is preset at .7" Hg, the V-4100-1 is preset at 1" Hg, and the V-4100-4 is adjustable from 1.5 to 4" Hg. Maximum 30" Hg.

Publication 9000

Pressure Pilot 3-Way Valve

The Pressure Piloted 3-Way Valve has an adjustable pressure pilot setpoint. The adjustable pressure pilot can be set to sense pressure between .5 to 100 PSI. Maximum supply of 100 PSI. The 3-Way Valve is Normally Open or Normally Closed. The Normally Open valve senses the adjusted pressure setpoint and turns the output off. The Normally Closed valve senses the adjusted pressure setpoint and turns the output on.

Publication 9000.

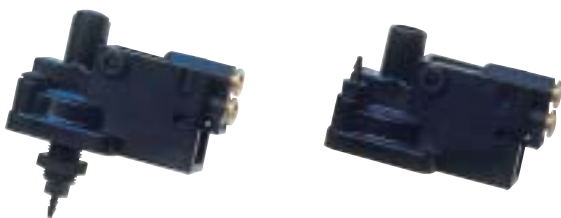


F-5700, F-5800 Series

Vacuum Piloted 3-Way Valve

The Vacuum Piloted 3-Way Valve has an adjustable vacuum pilot setpoint. The adjustable vacuum pilot can be set to sense vacuum between 1 to 28" Hg. Maximum vacuum of 29.9". The 3-Way Valve is Normally Open or Normally Closed. The Normally Open valve senses the adjusted vacuum setpoint and turns the output off. The Normally Closed valve senses the adjusted vacuum setpoint and turns the output on.

Publication 9000.



V-5700, V-5800 Series



Air Logic designs and manufactures a comprehensive line of pneumatic Interface Devices and Sensing Elements. The various devices include both fluidic and moving diaphragm control components, each to be used where its own advantages are needed. The Interface Devices include Test Point Indicators, Diaphragm Amplifiers, Diaphragm Comparators, Sensor Venturis, Spring Sensors and a Vacuum Generator.

Test Point Indicator

The Test Point Indicator is a simple low pressure on-off indicator which actuates at 4" H₂O. The indicator may be permanently installed in fluid systems for observing logic sequencing in routine operation.

Publication 9400



F-2913 Series



F-4014 Series

Diaphragm Amplifier

The Diaphragm Amplifiers are miniature pneumatic 3-way interface devices for piloting valves and small cylinders. Input signals of 3 to 8 inches of water will control output pressures up to 35 PSI.

Publication 9400

Diaphragm Comparator

The Diaphragm Comparator is a versatile control circuit component for both fluidic and pneumatic signal levels. The comparator performs many functions including those of an analog pressure comparator, an analog pressure repeater and a digital signal isolator. Maximum pressure is 25 PSI.

Publication 9400



F-4103 Series



F-4419 Series

Spring Sensor

The Spring Sensor is a contact limit sensor. The coil spring leaks when the 2" long rod is deflected. Operating range, 0 to 30 PSI.

Deflection force: 1 ounce

Deflection: 6° minimum, 45° maximum

Publication 9400

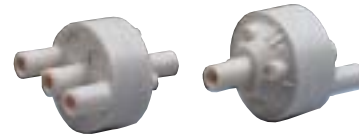


Vacuum Generator

The Vacuum Generator is designed to produce a low flow vacuum using the venturi principle. The vacuum generator converts compressed air to a vacuum consuming 4.9 SCFH with a 13 PSI supply.

When air is allowed to flow through the generator, the high velocity of the air passing through the center port draws a vacuum through the side ports. Two red vinyl caps are provided to cap the unused output port. Subminiature size.

Publication 9400



V-4417 Series



F-4417 Series



F-4417-40 Series

Sensor Venturi

The Sensor Venturi gives definite "on" or definite "off" signal with bleed-type fluidic sensor. Multiple model F-4417-40 contains four venturis and indicators.

Publication 9400

Introductory Kits

Two models are available. An Introductory Fluidic Logic Kit which contains 12 fluidic NOR Logic Elements mounted on a patchboard of numbered input and output terminals. All accessories and a nine lesson Instruction Manual are included.

The 2nd Kit available is an Advanced Fluidic Logic Kit with 24 fluidic NOR logic elements, diaphragm amplifiers, cylinders, back pressure limit sensors and all accessories. A fifteen lesson manual covers basic NOR logic circuits through typical industrial sequence control design.

Publication 9500



F-3602-120



F-3602-240



Air Logic is a manufacturer of pneumatic Logic Controls. The control elements include both fluidic and moving control components. The Logic Controls include two Training Fluidic Logic Kits, Fluidic NOR Logic Elements, a Manifold Card and Summing Impact Modulator.

Fluidic NOR Logic Elements

A basic element from which all logic circuits can be constructed. Plugs into F-3802-60 Manifold Card. Fluidic Transverse Impact Modulator principle has no moving parts, half-millisecond response, high recovery and fan out.

Publication 9500



F-3702 Series



F-3705 Series



F-3802-60 Series

Manifold Card

Plug-in mounting and supply manifold for six NOR Logic Elements. Numbered connecting terminals for 1/16" I.D. tubing. Packaged with two F-3802-5 Manifold Card Plugs for unused element sockets.

Publication 9500

Summing Impact Modulator

A two-input analog fluidic pressure comparison element. Operating range is 0 to 15 psig. As proportional amplifier, has positive or negative gain. Used in Schmitt Trigger and pressure comparison circuits.

Publication 9500



F-4102 Series

Chemical Resistance of Polysulfone



When using products made from polysulfone, please check material compatibility. Certain chemicals or contaminants can attack polysulfone and cause the product to fail. The chemical resistance data given in these tables is based on laboratory testing in normal conditions. The rating should only be used as a guide.

Inorganic Chemicals (22° C.) 73° F.	Organic Chemicals (22° C.) 73° F.	Organic Chemicals (continued) (22° C.) 73° F.
Acids	Acetic Acid, 10%	MEK, 100%
Chromic Acid, 12%	Acetic Acid, 20%	Methanol, 100%
Chromic Acid, 60%	Acetic Acid, 50%	Methylene Chloride, 100%
Hydrobromic Acid, 20%	Acetic Acid, Glacial	Morpholine
Hydrochloric Acid, 10%	Acetic Anhydride	Oleic Acid, 100%
Hydrochloric Acid, 15%	Acetone, 5%	Oxalic Acid, 20%
Hydrochloric Acid, 20%	Acetone, 100%	Pyridine
Hydrochloric Acid, 37%	Acetonitrile, 100%	Sorbic Acid, 100%
Hydrofluoric Acid, 50%	Benzene, 100%	1,1,2,2-Tetrachloroethane, 100%
Nitric Acid, 10%	Butanol, 100%	Tetrachloroethylene, 100%
Nitric Acid, 20%	Butyl Acetate, 100%	Toluene, 100%
Nitric Acid, 40%	Butyl CELLOSOLVE Solvent, 100%	1,1,1-Trichloroethane,
Nitric Acid, 71%	Butylated Hydroxy Anisole, 100%	Trichloroethylene, 100%
Phosphoric Acid, 20%	Butylated Hydroxy Toluene, 100%	Tributyl Phosphate
Phosphoric Acid, 50%	Calcium Propionate	Turpentine, 100%
Phosphoric Acid, 85%	CARBITOL Solvent, 100%	"Varsol", 100%
Phosphoric Acid, 100%	Carbon Tetrachloride, 100%	VM&P Naptha, 100%
Sulfuric Acid, 40%	CELLOSOLVE Solvent, 100%	Xylene, 100%
Sulfuric Acid, 65%	Chlorobenzene, 100%	
Sulfuric Acid, 75%	Chloroform, 100%	Pipe Seal Compounds
Sulfuric Acid, 85%	Citric Acid, 40%	"Loc-Tite" AV 100%
Sulfuric Acid, 95%	Cottonseed Oil, 100%	"Loc-Tite" B, 100%
Bases	Crude Oil, Texas, 100%	"Loc-Tite" E, 100%
Ammonia, 15%	Cyclohexane, 100%	"Masters" Metallic, 100%
Ammonia, 29%	Cyclohexanone, 100%	"Permatex" #2, 100%
Potassium Hydroxide, 20%	Diethyl ether, 100%	"Teflon" TF-15, 100%
Potassium Hydroxide, 35%	Diisopropyl ether, 100%	
Sodium Hydroxide, 5%	Diethyl Phthalate, 100%	Miscellaneous Commercial Products
Sodium Hydroxide, 10%	Ethanol, 100%	"Clobber"
Sodium Hydroxide, 25%	Ethanolamine, 100%	Acidic Drain Cleaner, 100%
Sodium Hydroxide, 50%	Ethyl Acetate, 100%	"Copperbrite" Copper Cleaner, 100%
Other	2-Ethyl Butyric Acid, 100%	"Duckseal Sealant," 100%
Ammonium Persulfate, 24%	Ethylene Diamine, 92%	Oils:
Ammonium Persulfate, 40%	Ethylene Glycol, 100%	ASTM Oil #1, 100%
Antimony Trichloride, Sat.	Formaldehyde, 100%	ASTM Oil #2, 100%
Black Liquor	"Freon" 11, 100%	ASTM Oil #3, 100%
Calcium Chloride, Sat.	"Freon" 22, 100%	ASTM Oil #10, 100%
Calcium Hypochlorite	"Freon" BF, 100%	Silicones:
†Chlorine, 100% Wet	"Freon" TMC, 100%	"Silastic" 140, 100%
Cupric Chloride, Sat.	Furfural	RTV-88 (GE), 100%
Ferrous Sulfate, Sat.	Gasoline, 100%	RTV-106 (GE)
Green Liquor	Glucose	RTV-109 (GE)
Hydrogen Peroxide, 100%	Glycerine, 100%	"Zephiran" Disinfectant, 100%
Oxygen	n-Heptane, 100%	
Ozone	n-Hexane, 100%	Key to ratings:
Potassium Nitrate, Sat.	Isooctane, 100%	R Recommended
Sodium Carbonate, 1.7%	Isopropanol, 100%	LR Limited Recommendation (many applications possible depending on stress level).
Sodium Hypochlorite, 5 1/4%	Kerosene, 100%	NR Not Recommended
Sodium Hypochlorite, 17%	Lactic Acid, 60%	* No data
Sodium Silicate, 1.7%	Lauric Acid	
Water	Linseed Oil, 100%	
Zinc Chloride, Sat.	Malonic Acid, 100%	

PRODUCT WARRANTY

WARRANTY: All references hereunder to "products" includes all pneumatic and vacuum control equipment, systems and other items which are manufactured and/or distributed by Seller. Seller warrants products manufactured and/or distributed by it to be free from defects in materials and workmanship arising from normal usage of the products, provided such defects appear or are discovered within 1 year after the purchase date of the products and, provided further, that Buyer notifies Seller of such defects in writing within 30 days after the appearance or discovery thereof. All transportation charges incurred in connection with this warranty shall be borne by Buyer. If within such period, any such products shall be proven to Seller's satisfaction to be defective, such products shall be replaced or their price refunded, at Seller's option. Seller's obligations for non-performance, defective products, or any damage caused by its products or their use, and Buyer's exclusive remedy therefor, shall be limited to such replacement or refund and shall be conditioned upon Seller's receiving written notice, together with a demand for such replacement or refund, within the time period specified herein. This exclusive remedy shall not be deemed to have failed its essential purpose under any circumstances so long as Seller is willing and able to replace defective products or refund the purchase price within the time specified. **SELLER'S PRICES ARE BASED ON THIS POLICY LIMITING ITS LIABILITY. IF BUYER DESIRES FOR SELLER TO PROVIDE A WARRANTY GREATER THAN THAT WHICH IS STATED ABOVE, THEN SELLER WILL ADJUST UPWARDS THE PRICE FOR THE PRODUCTS DESCRIBED HEREIN OR ON THE FACE SIDE HEREOF TO REFLECT THE ADDITIONAL EXPENSE TO SELLER WHICH SUCH A WARRANTY OBLIGATION WOULD CAUSE.**

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It shall be the sole responsibility of Buyer and/or User to comply with all federal, state and local rules and regulations concerning the use of products described herein or on the face hereof and shall not be the responsibility of Seller.

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No waiver, alteration or modification of the foregoing shall be valid, unless made in writing and signed by an executive officer of Seller. Seller reserves the right to alter product designs and materials, when conditions warrant, without notice.

WARNING: Do not use these products when pressures or temperatures can exceed their rated operating conditions. See the applicable product specifications.

When using products made from polysulfone, please check material compatibility. Certain chemicals or contaminants can attack polysulfone and cause the product to fail.

Seller's products are not sold for applications in any medical equipment intended for use as a component of any life support system unless a specified written agreement pertaining to such intended use is executed between Seller and Buyer. Such agreement will require the equipment manufacturer either to contract for additional reliability testing of Seller's products and/or a commitment to undertake such testing as a part of its manufacturing process. In addition, Buyer must agree to indemnify and hold harmless Seller from any claims arising out of the use of Seller's products in life support equipment.

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