



## Bulkhead Fittings

1/2" to 4" - PVC, Corzan® CPVC and PPL



### Easy Tank Connections

Hayward Safe-T-Loc Bulkhead Fittings (Tank Adapters) easily permit safe, quick pipe connections to be made to plastic, metal or plastic tanks. Simply cut the proper size opening in the tank, slide the body of the fitting through it, and then just tighten the nut. The fitting is now ready to accept the piping connection.

### Rugged Design

Hayward Bulkhead Fittings have been designed to stand up to the most demanding applications without leaking – year in and year out. These bulkhead fittings are molded with an extremely heavy wall thickness and will withstand most abuse without failure.

### Leak Protection

All sizes of Hayward Bulkhead Fittings come standard with heavy duty buttress threads to help prevent leaks under pressure. These buttress threads are substantially stronger than the standard threads on ordinary bulkhead fittings.

### Easy Installation

A Hayward Bulkhead Fitting has been designed so that only one person is needed to install it, not two, unlike other ordinary bulkhead fittings. A special hex shape on the body end of the fitting allows it to be gripped from outside the tank while the nut is tightened.

### Can't Rust, Won't Corrode

These all-plastic bulkhead fittings will never fail due to rust or corrosion.

### Features

- Rated to 150 PSI
- EPDM or FPM Gasket Seal
- Hex Body for One Person Installation
- All-Plastic Construction
- Proven, Rugged Design

### Options

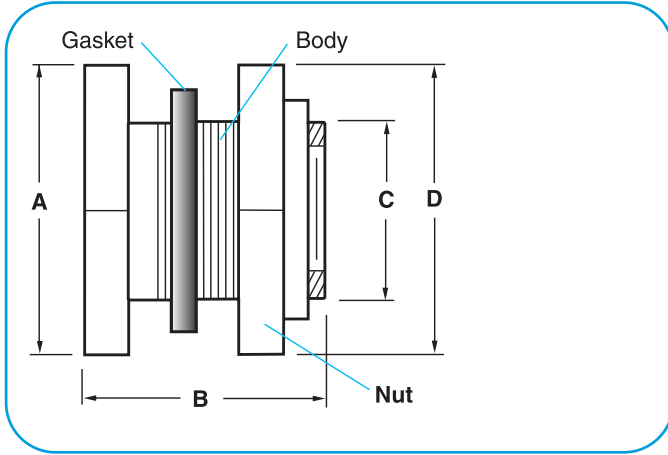
- Ready Flanges for Making Flanged Connections to Tanks

Corzan® is a trademark of Noveon, Inc.

SPECIALTY PRODUCTS



## Technical Information



### Minimum Inside Diameters of Tanks For Bulkhead Fitting Installation

Bulkhead Size	Min. Rigid Tank ID	Min. Flexible Tank ID	Max. Wall Thickness
1/2"	7.25	5.56	1.08
3/4"	10.00	7.75	1.15
1"	11.75	8.94	1.15
1-1/4"	16.25	12.19	1.02
1-1/2"	16.25	12.19	1.02
2"	25.75	19.38	1.09
3"	42.50	36.25	1.14
4"	90.00	76.81	1.69

### Dimensions - Inches / Millimeters

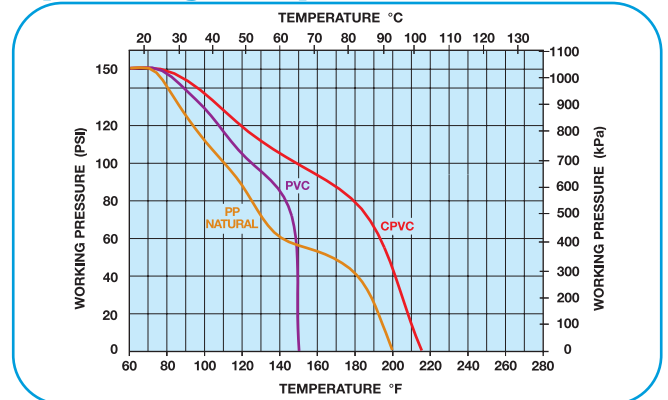
Size	A	B	C Installation Hole Size	D	Weight (lb / kg)
1/2"	2.00 / 51	2.75 / 70	1.38 / 35	2.00 / 51	0.13 / .06
3/4"	2.38 / 60	2.88 / 73	1.63 / 41	2.38 / 60	0.38 / .17
1"	2.56 / 65	2.88 / 73	1.88 / 48	2.56 / 65	0.38 / .17
1-1/4"	3.00 / 76	3.00 / 76	2.38 / 60	3.00 / 76	0.50 / .23
1-1/2"	3.00 / 76	3.00 / 76	2.38 / 60	3.00 / 76	0.50 / .23
2"	4.38 / 111	3.25 / 83	3.25 / 83	4.38 / 111	1.00 / .45
3"	6.00 / 152	3.63 / 92	4.50 / 114	6.00 / 152	2.00 / .90
4"	8.75 / 222	4.75 / 121	5.75 / 146	8.75 / 222	7.00 / 3.2

Dimensions A, C, & D are Across Flats. 1/2" to 2" Hexagon Flats, 3" & 4" Octagon Flats

### Selection Chart

Size	Material	End Conn.	Seals	Rating
1/2"-4"	PVC	Socket X Thread Thread X Thread	EPDM or FPM	150 PSI, Non Shock @ 70°F
1/2"-4"	CPVC	Socket X Thread		
1/2"-4"	Natural PPL	Thread X Thread		

### Operating Temperature/Pressure





## Self-Aligning Bulkhead Fittings

1", 2" and 3" - PVC



### No Hassle Connections

Hayward Self-Aligning Bulkhead Fittings make it easy to connect pipe to the top of domed tanks. Now it's no longer necessary to fabricate expensive, complex sections of pipe to make this, or any other, type of offset connection. Just install the fitting onto the domed tank, position the swivel connection line up to pipe and you're ready to make the straight line connection. No hassles!

### Unique Design

Hayward Self-Aligning Bulkhead Fittings feature a unique swivel ball design. The piping connection to the fitting is made into a threaded ball that swivels on a Teflon® seat. Once the connection is positioned at the desired offset angle, a plastic lock ring firmly holds it in position. Straight to offset connections of up to 27 degrees can easily be made.

### Easy Installation

No special tools are needed. Just insert the body of the fitting through the properly sized hole on the tank top and tighten the lock nut. The fitting is now ready for the pipe connection.

### All Plastic Construction

Hayward Self-Aligning Bulkhead Fittings will never rust or corrode like metal fittings. And their PVC material will not contaminate fluids that come in contact with them.

### Features

- Rated to 75 PSI
- EPDM or FPM Gasket Seal
- Easy Installation
- All Plastic Construction
- Proven, Rugged Design
- Offset Connections to 27°

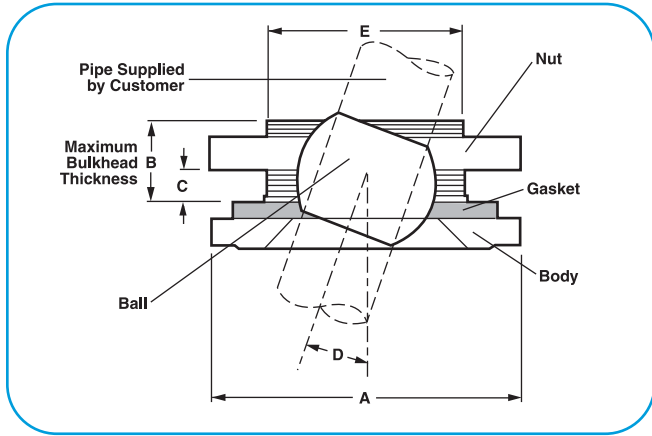
### Applications

- Straight piping connections to the tops of domed tanks or other curved surface vessels

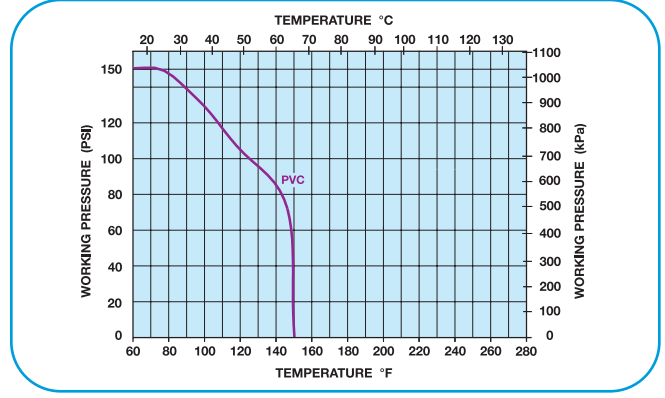
Teflon® is a registered trademark of DuPont



## Technical Information



## Operating Temperature/Pressure



## Dimensions - Inches / Millimeters

Size	A	B	C	D Angle	E	Weight (lb / kg)
1"	4.38 / 111	2.00 / 51	1.25 / 32	27 degrees	3.25 / 83	1.90 / .86
2"	6.00 / 152	2.00 / 51	1.06 / 27	25 degrees	4.50 / 114	4.80 / 2.2
3"	8.75 / 222	2.50 / 64	1.25 / 32	20 degrees	5.75 / 146	11.10 / 2.3

## Selection Chart

Size	Material	End Conn.	Seals	Rating
1", 2", 3"	PVC	Thread x Thread	EPDM or FPM	75 PSI @ 70°F

## Minimum Inside Diameters of Tanks for Bulkhead Fitting Installation

Bulkhead Size	Min. Rigid Tank I.D.	Min. Flexible Tank I.D.
1"	25.75"	19.38"
2"	42.50"	36.25"
3"	90.00"	76.81"





## Vacuum Breaker



### **Reliable Venting of Tanks and Piping Systems**

Hayward's all-plastic, corrosion-resistant Vacuum Breaker allows quick and trouble-free draining of tanks and piping systems. The vacuum breaker is normally closed at positive internal pressures. As the tank or piping system is being drained the Vacuum Breaker automatically opens and allows air to enter the tank or system.

### **Advanced Design for Fast Draining**

Hayward Vacuum Breakers allow a tank or piping system to be drained at the rate of up to 300 gpm. For even faster draining requirements, just install additional vacuum breakers. For instance, three installed on a tank would allow a drainage rate of 900 gpm with properly-sized drains.

### **Easy Installation**

Hayward Vacuum Breakers have a 3/4" NPT end connection for easy installation into a piping system. Installation onto a tank is also quick and easy. For this use, the Vacuum Breaker was designed to fit perfectly into the socket connection of a 1 1/2" Hayward Bulkhead Fitting. Just solvent-weld the Vacuum Breaker into the fitting and then install the fitting onto the tank. That's all there is to it.

### **Never a Problem with Corrosion**

Because of its all-plastic construction, a Hayward Vacuum Breaker will never rust or corrode – and it can survive corrosive environments and harsh weather conditions without the need for painting or expensive epoxy coating.

### **Features**

- All-Plastic Construction
- Easy Installation
- Eliminates Siphoning Problems
- Compact
- No Metal Parts to Stick or Jam

### **Options**

- All-Plastic Bulkhead Fittings for Easy Tank Installation



## Technical Information

### Specifications

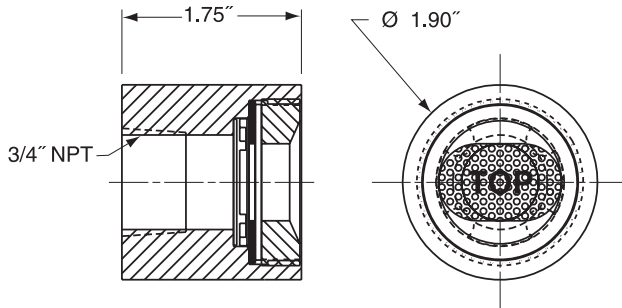
<b>Body Material:</b>	PVC
<b>Membrane:</b>	FPM
<b>Piping Connection:</b>	3/4" NPT
<b>Tank Connection:</b>	Uses Bulkhead Fitting
<b>Maximum Pressure:</b>	150 PSI @ 70°F
<b>Operation:</b>	Normally closed. Automatically opens when subjected to a vacuum and closes at positive pressures.
<b>Maximum Drain Rate:</b>	300 GPM

### Easy to Install onto Tanks

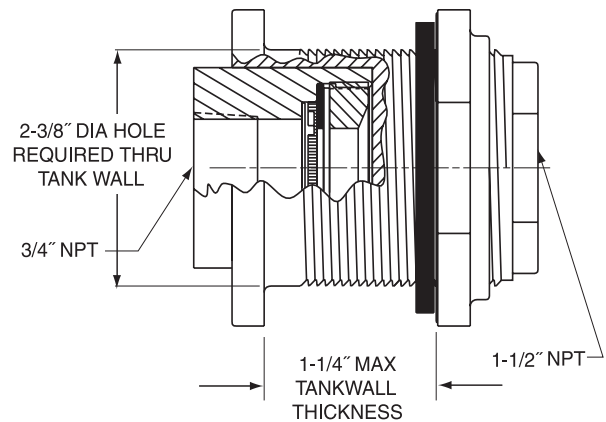
Just solvent-weld the vacuum breaker into the socket connection of a standard Hayward 1 1/2" bulkhead fitting. Then install the bulkhead fitting onto the tank. No extra piping is needed.



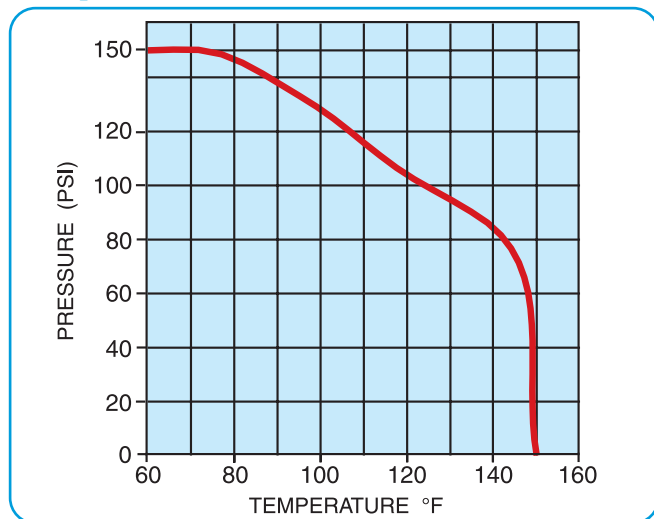
### Dimensions



### Vacuum Breaker Installed in Bulkhead



### Temperature/Pressure Chart





## Pipeline Accessories



### Gauge Guards - PVC, Corzan® CPVC, PPL and PVDF

Gauge guards isolate and protect gauges and other instruments from the process media. They work in any position in both vacuum and pressure applications. Hayward gauge guards can be supplied without a gauge or with either a 0 to 30, 0 to 60 or 0 to 160 PSI gauge installed.



#### Features

- 1/4" x 1/4" or 1/4" x 1/2" Threaded NPT Connections
- FPM Membrane
- Air Bleed Port for Gauge Installation
- All Plastic, No Rust or Corrosion
- No Metal Fasteners
- Low Profile, Compact Design
- Work in any Position

### Valve-Safe Lockouts

Hayward valve lockouts are made from PPL and are used to prevent tampering or other unauthorized valve operation. Lockouts can be used to secure the valve in either the open or closed position.



#### Features

- Simple Trigger Mechanical Design
- Lockout/Tagout Clasp

#### Features

- Use With up to Three Padlocks
- Valve Handle is Completely Enclosed
- Impact Resistant

### Ready Flanges - PVC, Corzan® CPVC and PPL - 1" to 4"

Hayward Ready Flanges easily convert socket PVC and CPVC valves or threaded PPL valves to flanged connections. Ready Flanges feature a one-piece body with an integral nipple, eliminating the need for an extra fabricated joint and preventing a possible leak path.

Corzan® is a trademark of Noveon, Inc.



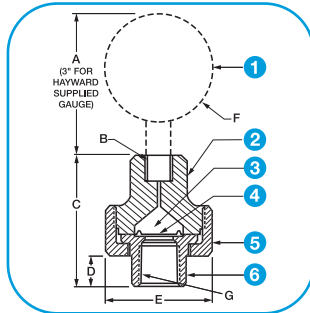
#### Features

- Integral Molded Nipple
- 150# ANSI Bolt Pattern
- Easy, One-Step Installation



## Technical Information

### Gauge Guards



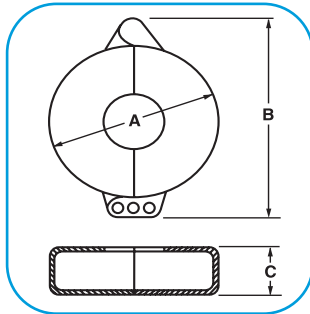
#### Parts List

1. Gauge/Instrument
2. Body
3. Oil-Filled Upper Chamber with Installed Gauge
4. FPM Membrane
5. Union Nut
6. End Connector

### Dimensions - Inches / Millimeters

Size	A	B	C	D	E	F	G
1/4" x 1/4"	3.0 / 76	1/4" NPT	2.69 / 68	0.61 / 15	2.25 / 57	2.3 / 58	1/4"
1/4" x 1/2"	3.0 / 76	1/4" NPT	2.69 / 68	0.61 / 15	2.25 / 57	2.3 / 58	1/2"

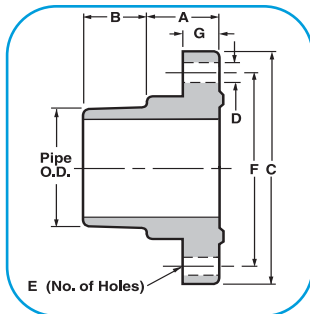
### Valve-Safe Lockouts



### Dimensions - Inches / Millimeters

Size	A	B	C
1/2" to 2" Ball Valves	5.50 / 140	7.00 / 178	1.75 / 44
2-1/2" to 6" Ball Valves	14.50 / 368	16.00 / 406	3.00 / 76

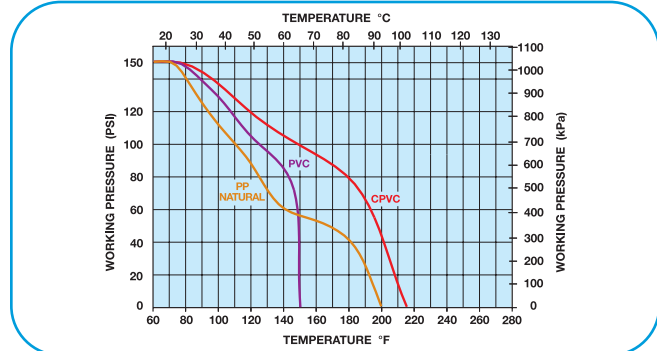
### Ready Flanges



### Dimensions - Inches / Millimeters

Size	A	B	C	D	E	F	G	Weight (lb / kg)
1"	1.25 / 32	1.19 / 30	4.50 / 114	0.56 / 14	4	3.13 / 80	.56 / 14	0.50 / .23
1-1/2"	1.50 / 38	1.44 / 37	5.00 / 127	0.56 / 14	4	3.88 / 99	0.75 / 19	0.75 / .34
2"	1.65 / 42	1.54 / 39	6.00 / 152	0.75 / 19	4	4.75 / 121	0.75 / 19	1.25 / .57
3"	1.98 / 50	1.84 / 47	7.50 / 191	0.75 / 19	4	6.00 / 152	1.00 / 25	2.75 / 1.25
4"	2.36 / 60	2.31 / 54	9.00 / 229	0.75 / 19	8	7.50 / 191	1.13 / 29	4.50 / 2.04

### Operating Temperature/Pressure







## Manual Top Works Lever Handle for Ball Valves



HCTB1200STACTV  
LH1SR  
LK2

Manual top works are available for two-way and three-way ball valves up to 6" in size and butterfly valves up to 4" in size. Typical top works components include a lever handle, fail-safe spring return, and mechanical limit switches. The limit switches are available with a variety of features and in various materials of construction.

### Lever Handle Assembly with Mounting Only

**LH1**—Lever handle assembly is constructed of zinc titanium alloy with a lever of mild steel, baked epoxy coated with plastic hand grip. The shaft is stainless steel. All mounting hardware is stainless steel.

### Lever Handle Assembly with Fail-Safe Spring Return Options

**LH1SR**—Lever handle assembly with spring module on top. Spring module is sized to close or open the valve on release of the lever handle. The spring module is a weatherproof sealed, zinc and titanium alloy housing with baked epoxy coating. Mounting hardware is stainless steel.

### Lever Handle Assembly with Fail-Safe Spring Return and Limit Switch Option

**LH1SRS2**—Lever handle assembly with spring module and manual limit switch on top. Spring is sized to close or open the valve on release of the lever handle and at the same time, cause the cams inside the switch housing to close the switch contacts at each end of the stroke.



## Manual Top Works Options



LH1LS

### **Lever Handle Assembly with Limit Switch Option**

**LH1LS**—Lever handle assembly with limit switch on top. The limit switch housing is available in three basic types.

### **Standard Limit Switch, Type #1 Zinc/Titanium Alloy/Epoxy**

Unless otherwise specified, the limit switch assembly used with this lever handle will be a top-mounted switch, zinc/titanium-epoxy coated enclosure, NEMA 4, 2 SPDT switches rated at 10 amps. The switch assembly mounts directly on top of the lever handle assembly with stainless steel hardware. Features include: small and compact, NEMA 4, 2 SPDT mechanical switches wired to terminal strip, 2 adjustable cams, exterior epoxy coated, position indicator, 1/2" conduit connection. Switch options: proximity, hazardous duty.

### **NEMA 4X Beacon 2 SPDT 15 Amps**

#### **Suffix S4**

NEMA 4, 4X black and yellow beacon, self-locking cam mechanism eliminates set screws and allows instantaneous manual setting, 2 mechanical switches prewired to terminal strip, "Micro" brand switches with roller-type lever, 8-point terminal strip for SPDT, and two 1/2" NPT conduit connections. Switches are UL & CSA listed.

### **Optional Limit Switch, Type #3**

#### **Suffix SA2 to SA4**

### **Aluminum, NEMA 4 & 7, 2 SPDT, 15 Amps**

#### **Suffix SA2**

NEMA 4, 4X, 7 & 9, Class 1, Groups C & D, Class 2, Groups E, F & G, Division 1 & 2, flat cover, self-locking cam mechanism eliminates set screws and allows instantaneous manual setting, two mechanical switches prewired to terminal strip, "Micro" brand switches with roller-type lever, 8-point terminal strip for SPDT, and two 1/2" NPT conduit connections. Switches are UL & CSA listed.

### **Aluminum, NEMA 4 & 7, Beacon, 2 SPDT, 15 Amps**

#### **Suffix SA4**

NEMA 4, 4X, 7 & 9, Class 1, Groups C & D, Class 2, Groups E, F & G, Division 1 & 2, black and yellow beacon, self-locking cam mechanism eliminates set screws and allows instantaneous manual setting, two mechanical switches prewired to terminal strip, "Micro" brand switches with roller-type lever, 8-point terminal strip for SPDT, and two 1/2" NPT conduit connections. Switches are UL & CSA listed.



## Manual Top Works Spring Return Handle

### Manual Valves Actuator Model

	Use Mounting Kit Listed	Lever Handle Only	Lever Handle Assembly with:		
			Lever w/ Fail-Safe Spring Return Option	Lever w/ Limit Switch Option Type 1	Lever w/Spring Return & Limit Switch
Blocked End Valve Size	Kit#	LH1	LH1SR	LH1LS	LH1SRS
1/4", 3/8", 1/2"	LK1	✓	✓	✓	✓
3/4"	LK1	✓	✓	✓	✓
1"	LK2	✓	✓	✓	✓
1 1/4"	LK2	✓	✓	✓	✓
1 1/2"	LK2	✓	✓	✓	✓
2"	LK2	✓	✓	✓	✓
2 1/2", 3"	LK3	✓	✓	✓	
4", 6"	LK3	✓		✓	
Three-Way Valve Size (NT)					
1/2"	LK1	✓	✓	✓	✓
3/4"	LK1	✓	✓	✓	✓
1"	LK2	✓	✓	✓	✓
1 1/2"	LK2	✓	✓	✓	✓
2"	LK2	✓	✓	✓	✓
3"	LK3	✓		✓	
4", 6"	LK3	✓		✓	
Butterfly Valve Size					
1 1/2" / 2", 3"	LK4		✓	✓	✓
4"	LK5			✓	

Top Mounted Limit Switch, Zytel® Enclosure	Add Suffix to Part # Above
NEMA 4X, Flat Cover, 2 SPDT, 15 Amps	S2
NEMA 4X, Beacon, 2 SPDT, 15 Amps	S4
Top Mounted Limit Switch Aluminum/ Epoxy Enclosure	
Aluminum, NEMA 4 & 7, 2 SPDT, 15 Amps	SA2
Aluminum, NEMA 4 & 7, Beacon, 2 SPDT, 15 Amps	SA4

\* To use Type 2 limit switch in place of Type 1, Select the desired Lever Handle from columns marked LH1 or LH1SR and enter the Type 2 limit switch suffix.

EXAMPLE: L H 1 S R S 4 Lever handle with fail-safe spring return option mounted with a NEMA 4X limit switch, Zytel enclosure, beacon, 2 SPDT (single pole, double throw) switches rated at 15 amps.



# Glossary of Actuation Terms

**AUTOMATIC RESET:** (Electric) A component of the thermal overload device that permits it to automatically engage when the temperature falls to an acceptable level.

**AMPERAGE RATING AUXILIARY LIMIT SWITCH:** The maximum current carrying capacity of the extra limit switches contained within the actuator housing.

**CONDUIT ENTRY, SIZE NPT:** The electrical entrance into the housing of the actuator through which the operating wires are connected. The exterior of the entrance hole is usually tapped with an NPT thread (National Pipe Thread).

**CONSTANT TORQUE OUTPUT:** (Pneumatic) The torque in inch pounds developed by a double acting pneumatic rack and pinion or vane type actuator as measured at the beginning and end of a stroke or at any point in between.

**CYCLE TIME:** The time required for an actuator to rotate one complete cycle (typically 90° or 180°), expressed in seconds.

**DESIGN TYPE:** The basic design type of the actuator in terms of the method used to deliver rotational torque to the output shaft.

**DIRECT MOUNTING:** A method used to attach a valve to an actuator, being coupled without the use of separate bracketry or special mounting hardware.

**DISCRETE MOUNTING BRACKET:** A method used to attach a valve to an actuator, being a separate part from either the valve, actuator or both.

**DPDT:** Double Pole, Double Throw

**DUTY CYCLE:** (Electric) The ratio of actual motor run time as compared to 100%. (Example: an actuator with a 20% duty cycle, having a required run time of 5 seconds to rotate 90° would require an off time of 25 seconds before it can be cycled another 90°.)

**EMF:** Electro-Magnetic Force

**ENCLOSURE MATERIALS, (TOP & BOTTOM):** Material of construction of the actuator base, (bottom) and cover, (top).

**END OF STROKE TRAVEL STOPS, (ADJUSTABLE):** A mechanical component on the actuator that can be adjusted to position the valve either open or closed.

**EXTERIOR FINISH:** The exterior coating or finish used to protect the actuator housing from corrosion.

**EXTERNAL HARDWARE:** The materials of construction of the fasteners and/or other hardware used to assemble the actuator components.

**FEMALE OUTPUT SHAFT:** The output drive of the actuator having a recessed opening into which the valve stem or coupling shaft fits.

**HIGH AMBIENT LIMIT:** The maximum operating temperature of the actuator, as designated by the actuator manufacturer.

**HYSTERESIS:** The cumulative rotational twist resulting from the "take-up" of clearances between the fitting dimensions of the ball, stem, coupling and actuator mechanism.

**INTEGRAL MOUNTING BRACKET:** A method used to attach a valve to an actuator, being a part of either the valve, actuator or both.

**INTERNAL AIR PORTING:** The high pressure (100 PSI) air passages contained within the actuator that shuttle the air pressure to either side of the torque producing components.

**LOW AMBIENT LIMIT (°F):** The minimum operating temperature of the actuator as set by the actuator's manufacturer, expressed in degrees Fahrenheit.

**LOW AMBIENT LIMIT W/OUT "T": (HEATER & THERMOSTAT)** The minimum operating temperature of the actuator, as designated by the actuator manufacturer without the use of a heater & thermostat.

**MALE OUTPUT SHAFT:** The output drive of the actuator consisting of an externally protruding shaft.

**MANUAL OVERRIDE, (DE-CLUTCHING):** (Electric) An actuator component that allows mechanical turning of the valve, while simultaneously disengaging the gear train.

**MANUAL OVERRIDE:** An actuator component that allows mechanical turning of the valve.

**MAXIMUM OPERATING PRESSURE (PSI):** (Pneumatic) The pressure limitation established as the maximum safe operating pressure.

**MOTOR BRAKE/MECHANICAL BRAKE - (STANDARD ON BUTTERFLY VALVES):** (Electric) A mechanical device that is designed to apply a force to a motor shaft to prevent back drive of the actuator geartrain resulting from hydraulic pressure transfer of the process fluid through the valve.

**MIN/MAX WIRE SIZE:** The minimum and maximum wire size that the actuator requires or that will fit into the actuator's terminal connections.

**MODULATING SERVICE:** The ability of the actuator to be used in systems that require continuous control, typically with a positioner.

**MOTOR DRIVE ROTATION:** (Electric) The rotation of the actuator output shaft in either one direction (uni-directional) or two directions (reversing).

**MOTOR SWITCHES (SPDT):** (Electric) The switches that control the motor's starting and stopping. (SPDT means Single Pole Double Throw).

**MOTOR THERMAL PROTECTOR:** (Electric) A device that protects the motor against overheating and subsequent burn-out due to (typically a 120 VAC 25% duty cycle motor is protected at 100°C) heat buildup resulting from excessive starting, stopping or continuous running.

**MOUNTING POSITION:** The ability of the valve/actuator to be physically mounted in the piping system.

**NEMA RATING (AVAILABLE):** 1, 4, 4X, 7, 9 National Electrical Manufacturers Association Rating.

**NUMBER OF PISTONS:** (pneumatic) The number of torque producing surfaces within the actuator.

**PERMANENT LUBRICATION:** A type of lubrication sealed within the actuator to prolong cycle life.

**PISTON SEALING MATERIAL:** (Pneumatic) The type of elastomer used to maintain an airtight seal between the piston and the cylinder.

**POSITION INDICATOR W/LED:** Light emitting diodes which, when illuminated, indicate visual confirmation of the valve's position in terms of open or closed.

**POSITION INDICATOR:** A mechanical or electrical device that allows visual confirmation of the valve's position in terms of open or closed, (e.g., Red = "closed" or Green = "open".)

**PREWIRED TO TERMINAL STRIP:** Internal component wire leads or printed circuit board connector pins which terminate at a terminal strip to which field wiring can be attached.

**REVERSING:** The output shaft of the actuator rotates in both CW and CCW directions.

**SELF-LOCKING GEAR TRAIN:** (Electric) Design of an actuator gear train that locks the actuator output shaft, thus preventing valve rotation.

**SPDT:** Single Pole, Double Throw.

**SPRING CONFIGURATION (QTY/TYPE):** (Pneumatic) The quantity and design configuration of the springs used within a pneumatic actuator that affect the spring return, (fail-safe) function.

**STANDARD VOLTAGE (AC):** Unless otherwise specified, the voltage of all electrical devices in this catalog will be considered to be 115/120 VAC/60 Hz. All ratings, performance or specifications are based on standard voltage.

**START/FINISH TORQUE:** (Pneumatic) The torque in inch pounds, as measured at the actuator output shaft of a pneumatic actuator containing a spring return feature. The torque developed at the beginning of the stroke when the spring is fully compressed (START) and the torque at the end of the stroke (FINISH) when the spring has dissipated its stored energy.

**START/STALL TORQUE:** (Electric) The torque in inch pounds, as measured at the actuator output shaft at the instant of the start of rotation, and at maximum stall when the motor is restricted from rotation while energized.

**TWO STAGE SHUT-OFF, (DRIBBLE CONTROL):** The closing of the valve in two, or more, distinct motions. The first movement, partially closing such that the remaining flow is small. The second movement, fully closing the valve.

**UNI-DIRECTIONAL:** The output shaft of the actuator rotates in only CW direction, as viewed from the top of the actuator.

**UNIFORM BEARING LOAD DISTRIBUTION:** The design of the torque producing components to be supported by bearing surfaces that allow high cycle life.

**VOLTAGE VARIATIONS:** The variations of optional voltages available for all products offered.