CIRCLE SEAL CONTROLS, INC.

# 200 Series *0 to 3000 psig Check Valves*
# H200 Series *0 to 6000 psig Check Valves*

## Features & Benefits

***Quick opening/positive closing***
- Provides a wide range of adaptability

***Large flow capacity***
- The patented sealing principle effects complete leakproof closing under all pressure conditions

***Zero leakage***
- Compact, easy installation. Efficient inline piston reduces size and weight

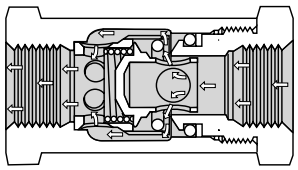
***Floating o-ring***
- The streamlined poppet and full ports offer minimum restriction to flow

## Technical Data

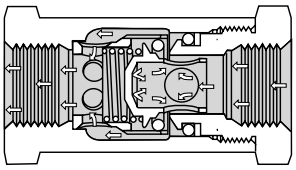
| | |
|---|---|
| **Body Construction Materials** | Aluminum, brass, steel, 303 or 316 stainless steel |
| **O-ring Materials** | Buna N, ethylene propylene, fluorosilicone, Kalrez®, neoprene, Teflon®, and Viton® |
| **Operating Pressure** | *200 Series:* to 3000 psig (207 bar)<br>*H200 Series:* to 6000 psig (414 bar) |
| **Proof Pressure** | 1.5 times operating pressure |
| **Rated Burst Pressure** | *200 Series:* 2.5 : 1<br>*H200 Series:* 4 : 1 |
| **Cracking Pressure** | 0.1 to 25 psig (0.007 to 1.72 bar) |
| **Temperature Range** | –320° F to +550° F (–196° C to +288° C)<br>*Based on o-ring & body material, see "How to Order"* |
| **Connection Sizes** | ⅛″ to 2″ |

*Note: Proper filtration is recommended to prevent damage to sealing surfaces.*

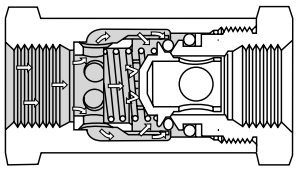
## How it Works



**Open**
Full flow passages offer minimum restriction to flow. Spring is completely removed from flow path



**Closing**
Floating o-ring automatically establishes line contact with conical metal surfaces of poppet and seat to cushion closing and insure perfect sealing.



**Closed**
O-ring only seals. Full pressure load is carried by metal-to-metal seat. Increasing pressure increases sealing efficiency; metal seat prevents any possibility of deformation or extrusion of o-ring.

**Circle Seal Controls**
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Phone (951) 270-6200 • Fax (951) 270-6201
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# 200 Series / H200 Series

### Cracking Pressure

Minimum cracking pressure available: 0.1 psig
Standard cracking pressure: see page 7
Maximum cracking pressure available: 25 psig

*Note: Cracking pressure is defined at which flow is 5cc/min except for 220 Series for which flow is approximately 0.02 cfm. When ordering a cracking pressure within the standard range or below the standard range of the cracking pressure, the dash number is a "maximum". Example: 259A–4TT–.3 (cracking pressure tolerance will be +0%, –50%). When ordering a cracking pressure equal to or greater than the upper limit of the standard cracking pressure shown above, cracking pressure tolerance will be ±10%. Example: 259A–4TT–5. Cracking pressure over 8 psig should not be specified without consulting the factory. Where 200 Series valves are supplied with higher cracking pressures, a shroud ring may be used to confine the o-ring.*

*Note: Reseat pressure is the back pressure required to seal a check valve. It varies with different springs and seals. Reseat pressure is not specified unless called out on the sales order.*

### Leakage

External: Zero
Internal:
Elastomeric seals: Zero
Teflon® seals: 0–50 psig = 5cc/min max.
50+ psig = 0.5cc/min max.

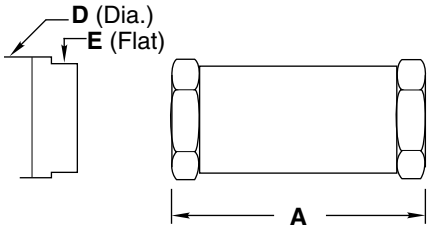
### Operating Pressure: 200 Series

| | | | |
|---|---|---|---|
| Aluminum (A) | Tube | 3/16″–1½″ | 0–3000 psig to 200° F |
| | Pipe | ⅛″–1½″ | 0–3000 psig to 200° F |
| Brass | Tube | 3/16″–1½″ | 0–3000 psig to 300° F |
| | Pipe | ⅛″–1½″ | 0–3000 psig to 300° F |
| | Pipe | 2″ | 0–1500 psig to 300° F |
| Steel | Tube | 3/16″–1½″ | 0–3000 psig to 300° F |
| | Pipe | ⅛″–2″ | 0–3000 psig to 300° F |
| Stainless steel | Tube | 3/16″–1½″ | 0–3000 psig to 450° F |
| | Pipe | ⅛″–2″ | 0–3000 psig to 450° F |

### Operating Pressure: H200 Series

| | | | |
|---|---|---|---|
| Aluminum (A) | Tube | 3/16″–1¼″ | 0–6000 psig to 200° F |
| | Pipe | ⅛″–1½″ | 0–6000 psig to 200° F |
| Brass | Tube | 3/16″–1¼″ | 0–5000 psig to 300° F |
| | Pipe | ⅛″–1½″ | 0–5000 psig to 300° F |
| Steel | Tube | 3/16″–1¼″ | 0–5000 psig to 300° F |
| | Pipe | ⅛″–2″ | 0–5000 psig to 300° F |
| Stainless steel | Tube | 3/16″–2″ | 0–6000 psig to 450° F |
| | Pipe | ⅛″–2″ | 0–6000 psig to 450° F |

## *End Connections, Dimensions (Inches) & Weights*

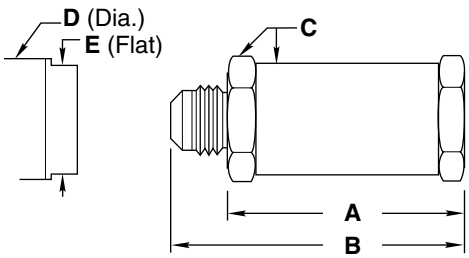



*Optional*
*(Based on availability)*

### –RR, –BB: Female Tube

| Dash No. | Tube Size | A ±0.050 | C Hex & Rd. | Opt. Dimensions D | Opt. Dimensions E | Weights *(Lbs)* Alum. | Weights *(Lbs)* All Steel |
|---|---|---|---|---|---|---|---|
| –4BB | ¼″ | 1.98 | 0.75 | — | — | 0.06 | 0.16 |
| –5BB | 5/16″ | 2.07* | 0.81 | — | — | 0.08 | 0.22 |
| –6BB | ⅜″ | 2.44 | 0.81 | — | — | 0.08 | 0.22 |
| –8BB | ½″ | 3.06 | 1.00 | — | — | 0.13 | 0.37 |
| –10BB | ⅝″ | 3.42 | 1.12 | — | — | 0.18 | 0.50 |
| –12BB | ¾″ | 3.83 | 1.50 | 1.75 | 1.50 | 0.34 | 0.88 |
| –16BB | 1″ | 4.37 | 1.75 | 2.00 | 1.75 | 0.52 | 1.50 |
| –20BB | 1¼″ | 4.99 | 2.00 | 2.25 | 2.00 | 0.68 | 2.18 |
| –24BB | 1½″ | 5.75 | 2.75 | 2.75 | 2.25 | 2.05 | 5.95 |

** Exception: 200T–5BB, 'A' dimension is 2.44*




*Optional*
*(Based on availability)*

### –BT: Female Tube to Male Tube
### –TB: Male Tube to Female Tube

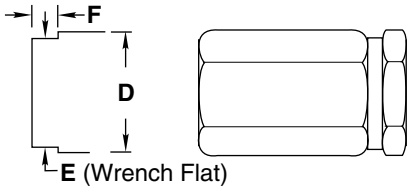
| Dash No. | Tube Size | A ±0.050 | B Ref. | C Hex & Rd. | Opt. Dimensions D | Opt. Dimensions E | Weights *(Lbs)* Alum. | Weights *(Lbs)* All Steel |
|---|---|---|---|---|---|---|---|---|
| –4BT | ¼″ | 1.53 | 2.08 | 0.75 | — | — | 0.06 | 0.15 |
| –6BT | ⅜″ | 1.98 | 2.54 | 0.81 | — | — | 0.08 | 0.21 |
| –8BT | ½″ | 2.37 | 3.03 | 1.00 | — | — | 0.12 | 0.34 |
| –12BT | ¾″ | 3.00 | 3.86 | 1.50 | 1.75 | 1.50 | 0.32 | 0.96 |
| –16BT | 1″ | 3.50 | 4.41 | 1.75 | 2.00 | 1.75 | 0.50 | 1.46 |
| –20BT | 1¼″ | 3.97 | 4.93 | 2.00 | 2.25 | 2.00 | 0.68 | 1.90 |
| –24BT | 1½″ | 4.73 | 5.81 | 2.75 | 2.75 | 2.25 | 1.82 | 5.31 |

| Dash No. | Tube Size | A ±0.050 | B Ref. | C Hex & Rd. | Opt. Dimensions D | Opt. Dimensions E | Weights *(Lbs)* Alum. | Weights *(Lbs)* All Steel |
|---|---|---|---|---|---|---|---|---|
| –4TB | ¼″ | 1.98 | 2.53 | 0.75 | — | — | 0.07 | 0.20 |
| –5TB | 5/16″ | 1.98 | 2.53 | 0.81 | — | — | 0.07 | 0.20 |
| –6TB | ⅜″ | 1.98 | 2.54 | 0.81 | — | — | 0.08 | 0.21 |
| –8TB | ½″ | 2.49 | 3.15 | 1.00 | — | — | 0.14 | 0.37 |
| –10TB | ⅝″ | 2.80 | 3.56 | 1.12 | — | — | 0.18 | 0.50 |
| –12TB | ¾″ | 3.33 | 4.19 | 1.50 | 1.75 | 1.50 | 0.37 | 1.07 |
| –16TB | 1″ | 3.74 | 4.65 | 1.75 | 2.00 | 1.75 | 0.55 | 1.60 |
| –20TB | 1¼″ | 4.39 | 5.35 | 2.00 | 2.25 | 2.00 | 0.80 | 2.30 |
| –24TB | 1½″ | 5.06 | 6.14 | 2.75 | 2.75 | 2.25 | 2.03 | 5.90 |

# 200 Series / H200 Series

## H200 Series

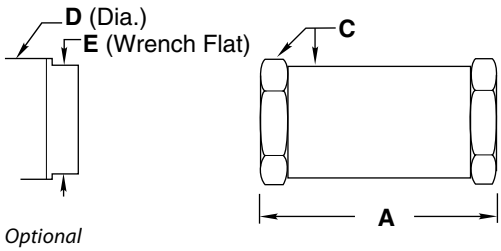
| End Connection | Alum. | Brass (Stock Size Hex) | St. Steel | Steel D Dia. | Steel E | Steel F ± 0.015 |
|---|---|---|---|---|---|---|
| –3T / –3C | 0.625 | 0.625 | 0.625 | 0.650 | 0.560 | 0.220 |
| –4T / –4B | 0.875 | 0.875 | 0.812 | 0.875 | 0.750 | 0.280 |
| –1P/–5T, –6T, –6B | 0.937 | 0.937 | 0.875 | 0.960 | 0.813 | 0.280 |
| –2P/–8T, –8B | 1.125 | 1.250 | 1.125 | 1.250 | 1.000 | 0.300 |
| –3P/–10T, –10B | 1.375 | 1.375 | 1.250 | 1.375 | 1.125 | 0.350 |
| –4P/–12T, –12B | 1.750 | 1.875 | 1.750 | 1.875 | 1.625 | 0.450 |
| –6P/–16T, –16B | 2.000 | 2.250 | 2.000 | 2.125 | 1.875 | 0.500 |
| –8P/–20T, –20B | 2.250 | 2.500 | 2.250 | 2.50 | 2.125 | 0.620 |




*Optional*
*(Based on availability)*

## –PP: Female Pipe

| Dash No. | Tube Size | A ±0.050 | B Ref. | C Hex & Rd. | Opt. Dimensions D | Opt. Dimensions E | Weights *(Lbs)* Alum. | Weights *(Lbs)* All Steel |
|---|---|---|---|---|---|---|---|---|
| –1PP | ⅛″ | 1.70 | 0.81 | — | — | 0.05 | 0.15 | 0.14 |
| –2PP | ¼″ | 2.25 | 1.00 | — | — | 0.12 | 0.36 | 0.34 |
| –3PP | ⅜″ | 2.43 | 1.12 | — | — | 0.15 | 0.46 | 0.43 |
| –4PP | ½″ | 2.93 | 1.50 | 1.50 | 1.25 | 0.32 | 0.98 | 0.92 |
| –6PP | ¾″ | 3.37 | 1.75 | 1.75 | 1.50 | 0.49 | 1.50 | 1.41 |
| –8PP | 1″ | 3.99 | 2.00 | 2.00 | 1.75 | 0.73 | 2.25 | 2.11 |
| –10PP | 1¼″ | 4.50 | 2.75 | 2.75 | 2.25 | 1.60 | 5.00 | 4.80 |
| –12PP | 1½″ | 5.35 | 2.75 | 2.75 | 2.25 | 1.73 | 5.34 | 4.97 |
| –16PP | 2″ | 6.10 | — | 3.50 | 2.75 | 2.60 | 8.00 | 7.50 |

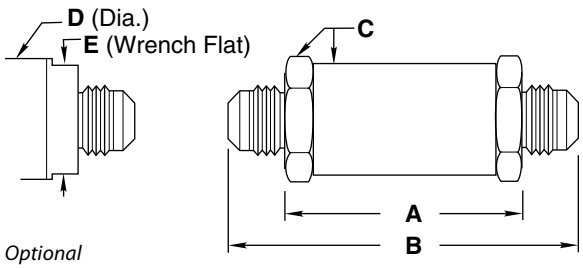



*Optional*
*(Based on availability)*

## –TT: Female Tube

| Dash No. | Tube Size | A ±0.050 | B Ref. | C Hex & Rd. | Opt. Dimensions D | Opt. Dimensions E | Weights *(Lbs)* Alum. | Weights *(Lbs)* All Steel |
|---|---|---|---|---|---|---|---|---|
| –3TT | 3⁄16″ | 0.97* | 1.93* | 0.56* | — | — | 0.03 | 0.08 |
| –4TT | ¼″ | 1.53 | 2.63 | 0.75 | — | — | 0.07 | 0.18 |
| –5TT | 5⁄16″ | 1.53 | 2.63 | 0.81 | — | — | 0.07 | 0.20 |
| –6TT | ⅜″ | 1.53 | 2.63 | 0.81 | — | — | 0.07 | 0.20 |
| –8TT | ½″ | 1.81 | 3.12 | 1.00 | — | — | 0.13 | 0.35 |
| –10TT | ⅝″ | 2.06 | 3.58 | 1.12 | — | — | 0.18 | 0.49 |
| –12TT | ¾″ | 2.50 | 4.23 | 1.50 | 1.75 | 1.50 | 0.35 | 1.00 |
| –16TT | 1″ | 2.87 | 4.69 | 1.75 | 2.00 | 1.75 | 0.53 | 1.50 |
| –20TT | 1¼″ | 3.37 | 5.29 | 2.00 | 2.25 | 2.00 | 0.79 | 2.30 |
| –24TT | 1½″ | 4.04 | 6.21 | 2.75 | 2.75 | 2.25 | 1.80 | 5.22 |

*Exception: 200T–3TT: 'A' dimension is 1.00, 'B' dimension is1.96, 'C' dimension is 0.625*



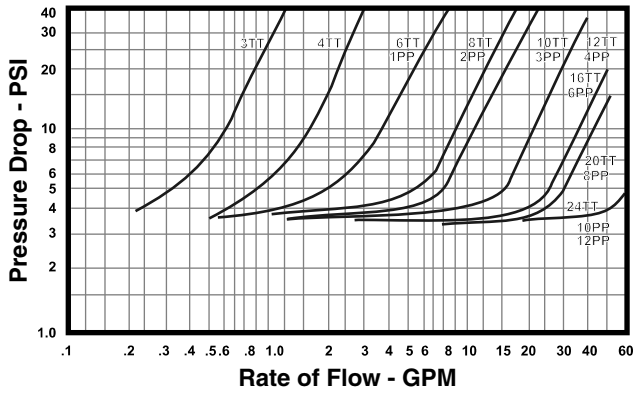

*Optional*
*(Based on availability)*

# 200 Series / H200 Series

## *Flow Curves*

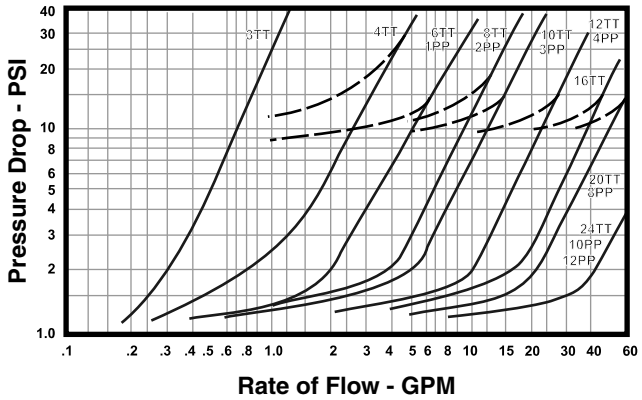
Models 223, 233, 249, 299

**Hydraulic Fluid (MIL-H-5606)**



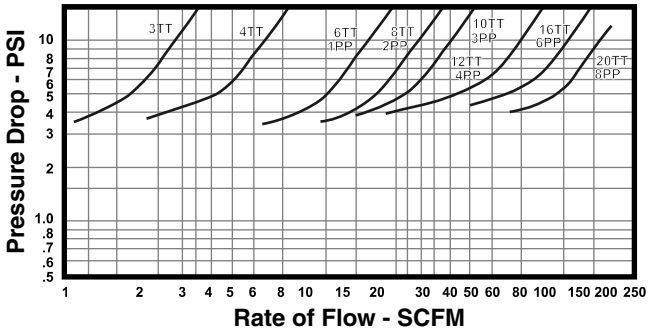

Models 220*, 259, 279

**Hyraulic Fluid (MIL-H-5606)**



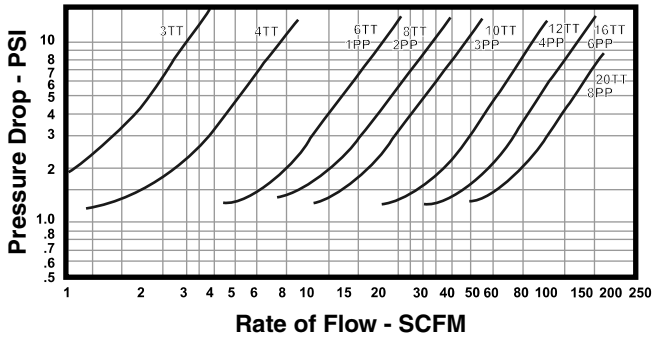

Models 223, 233, 249, 299

**Air (Discharge to Atmosphere)**



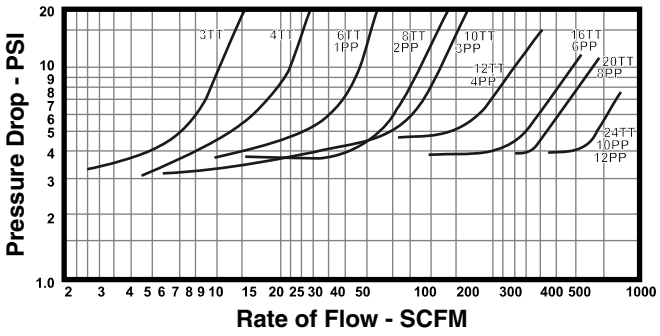

Models 220*, 259, 279

**Air (Discharge to Atmosphere)**



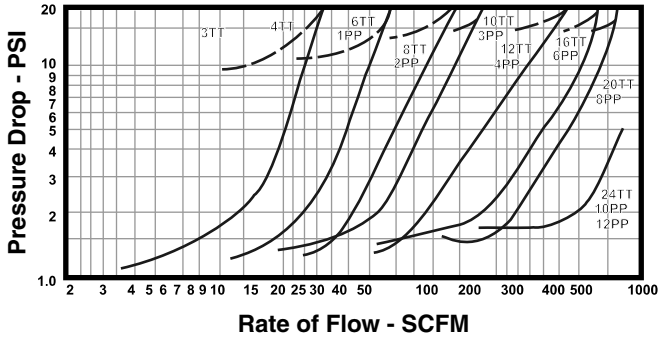

Models 223, 233, 249, 299

**Air (100 PSI Inlet Pressure)**




Models 220*, 259, 279

**Air (100 PSI Inlet Pressure)**




### Flow Rates

| Valve size | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tube | 3 | 4 | 6 | 8 | 10 | 12 | 16 | 20 | 24 | 32 |
| | Pipe | — | — | 1 | 2 | 3 | 4 | 6 | 8 | 10–12 | 16 |
| Cv (nominal) | | 0.30 | 0.7 | 1.6 | 2.7 | 3.5 | 6.6 | 10.3 | 12.5 | 23.2 | 51 |

# 200 Series / H200 Series

## How to Order

**H 2 49 T1 – 4TT (L) – 1**

### VARIATION

- **H** Modified construction for 6000 psig service (¼″ to 1½″ tube, ⅛″ to 1¼″ pipe and larger)
- **K** Cryogenic service, special cleaning and testing (stainless steel valves only)

### O-RING MATERIAL, TEMPERATURE & CRACKING PRESSURE RANGE

- **49** Buna N, –65° F to +250° F, 2–4 psig
- **59** Buna N, –65° F to +275° F, 0.5–1 psig
- **69** Buna N (fuels), –65° F to +180° F, 0.5–1 psig
- **62** Ethylene propylene, –65° F to +300° F, 2–4 psig
- **64** Fluorosilicone, –80° F to +350° F, 0.5–1 psig
- **65** Kalrez®, –40° F to +550° F, 0.5–1 psig
- **33** Neoprene, –40° F to +300° F, 2–4 psig
- **53** Neoprene, –40° F to +250° F, 0.5–1 psig
- **24** Silicone, –70° F to +450° F, 0.5–1 psig
- **32** Viton®, –20° F to +400° F, 0.5–1 psig
- **20*** Teflon®, –100° F to +400° F, 8 psig maximum
- **20*** Teflon® (K220T), –320° F to +165° F, 8 psig maximum
- **80*** Teflon® (no cyrogenic testing), –320° F to +165° F, 8 psig

### MATERIAL

- **A** 2024–T4/T351 aluminum††
- **B** Brass††
- **A1** 6061–T6/T651 aluminum††
- **S** Steel†
- **T** 303 stainless steel†
- **T1** 316 stainless steel

### CRACKING PRESSURE

Call out dash number if not standard

- **1** 1 psig

### SPECIAL CHARACTERISTICS

- **030** Hole in poppet head, thousandth of an inch
- **L** Lock wire

### SIZE & END CONNECTIONS (INLET/OUTLET)

Pipe sizes in ⅛″ increments
Tube sizes in 1⁄16″ increments

- **P** Female pipe, NPT
- **T** Male tube, AS4395 (MS33656)
- **B** Female tube, AND10050
- **C** Gyrolok® tube fittings
- **D** Male straight thread, AS4395 (MS33656) w/ cone point removed
- **E** Flareless male tube, MS33514 (SAE)
- **F** Male tube, SAE flare 45°
- **H** Hose, MS33658
- **J** Female tube, MS33649
- **K** British parallel pipe (male)
- **L** British parallel pipe (female)
- **R** Female tube, SAE straight thread, MS16142
- **S** British taper pipe (male)
- **X** British taper pipe (female)
- **U** Bulkhead tube, AS4396 (MS33657)

* *For Teflon®, specify stainless steel body material. The stainless steel valve design provides a Teflon® static seal for use in systems with low or high temperatures or with liquids or gases which would cause excessive swell or shrinkage of elastomeric compounds.*

† *Not available for PED applications.*

†† *For PED applications, brass bodies are limited to a maximum temperature of +100° F (+38° C), aluminum bodies are limited to a maximum temperature of +200° F (+93° C)*

**Repair Kits**

In normal service, the only part(s) which may require replacement is(are) the seal(s). A repair kit may be ordered by placing a 'K/' in front of the complete part number (i.e. K/H249T1–4TT(L)–1).

## For Your Safety

It is solely the responsibility of the system designer and user to select products suitable for their specific application requirements and to ensure proper installation, operation, and maintenance of these products. Material compatibility, product ratings and application details should be considered in the selection. Improper selection or use of products described herein can cause personal injury or property damage.