# PIPING PACKAGES

## For Fan Coil & Variable Air Volume Systems

Chilled & Hot Water Applications

ENVIRO-TEC®
BY JOHNSON CONTROLS

# PIPING PACKAGES • TABLE OF CONTENTS

ENVIRO-TEC® BY JOHNSON CONTROLS



All data herein is subject to change without notice. Some drawings are not shown in this catalog. Refer to www.enviro-tec.com for current drawings.

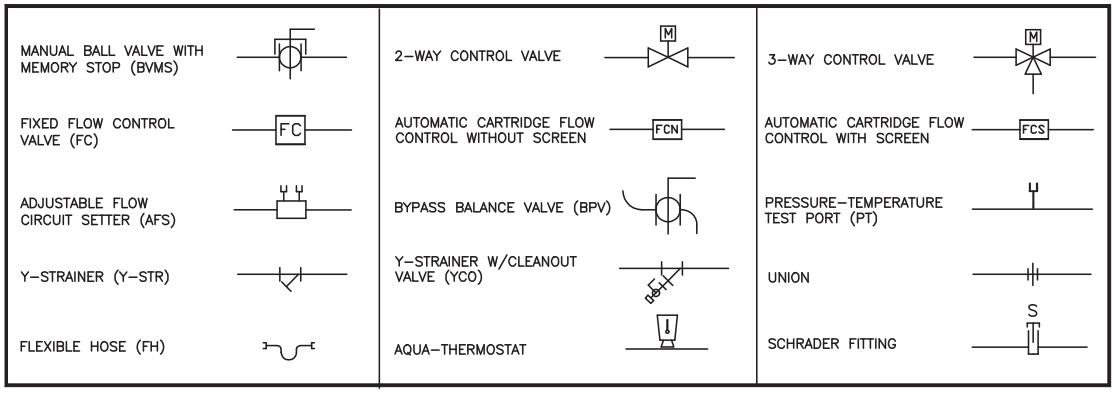
1. All the packages and components described in this brochure are optional, extra cost features. Consult your ENVIRO-TEC sales representative for details. Not all components are available on all unit models. See valve package code charts.
2. All standard valve packages and piping components described in this catalog are for chilled and hot water applications. They may also be used with ethylene and propylene glycol solutions up to 50% concentration.
3. VAV piping packages – as well as HL, HP, VF, and CDH/CDV fan coil unit packages – are factory assembled and shipped loose for field installation and wiring. All VH fan coil unit packages are factory assembled, installed, and wired.
4. HL, HP, and VF unit valve packages are designed to mount directly onto the coil connections.
5. CDH/CDV unit valve packages are configured similar to the HL unit valve packages, and require field location, wiring, and piping to the coil to fit individual application requirements.
6. Control valve actuators are removable, and may be serviced or replaced without removal of the valve body.
7. Control valves are piped normally closed to the coil. For hot water coils, control valves are available normally open.
8. 3-Way control valves are piped as mixing valves.
9. All ball isolation valves are furnished with an adjustable memory stop feature and may be used as a balancing valve.
10. When ordered, unions are installed at the water coil, and are available on VAV products, and all fan coil units except VH. Unions must be ordered on both coils of 4-pipe units. Unions are not available separately.
11. All VH units include two flexible stainless steel braided hoses and ball isolation valves per coil. This hose/valve combination provides a "union" type connection to allow coil removal.
12. Pressure/temperature (P/T) ports are located to monitor the pressure and temperature across the coil.
13. Automatic fixed flow controls (FC, FCN, FCS) are available in flow (GPM) ratings as follows:
    1/2" = 0.5 to 4.0 GPM in 0.5 GPM increments
    >4.0 to 6.0 GPM in 1.0 GPM increments
    3/4" = 3.0 to 4.0 GPM in 0.5 GPM increments
    >4.0 to 12.0 GPM in 1.0 GPM increments
    1" = 5.0 to 10.0 GPM in 1.0 GPM increments
    >10.0 to 20.0 GPM in 2.0 GPM increments
    Individual coil GPM requirements must be specified at time of order.
14. Component performance ratings such as Cv, maximum close-off pressure, operating temperature and pressure, are shown in Component Specifications.
15. Valve and component performance ratings shown are maximum values. Appearance and actual ratings may vary with individual vendor and component size.
16. Adjustable flow setter (AFS) is rated for full shut-off and replaces the return line ball isolation valve on all products except the VH fan coil unit.
17. 2-Pipe "change-over" units using a 2-way control valve will include a ¼" "bleed" tube to assure proper changeover thermostat (aquastat) operation. 2-Pipe units ordered with no control option will be considered "heat only" or "cool only" depending on coil rows, and no bleed tube will be provided.
18. Some piping packages may extend beyond the unit drain pan and/or factory auxiliary drip pan. Requirements for field furnished and installed valve package and piping insulation must be determined by others on an individual application basis.

**The valve package piping and component details shown in this catalog are for standard valves and components. The suitability of all valve packages and components must be determined by others based on individual application requirements. ENVIRO-TEC assumes no responsibility for selection and/or application of valve packages and components.**

**Modulating cooling valve control can increase part load space relative humidity. ENVIRO-TEC does not encourage or endorse modulating valve control for fan coil cooling systems, and is not liable for high humidity problems that may result. Modulating heating valve control may result in low leaving air temperatures while the valve reduces flow and as setpoint is approached.**

Contact the factory for any requirements not shown in this catalog.

## CONTROL DEVICE LEGEND

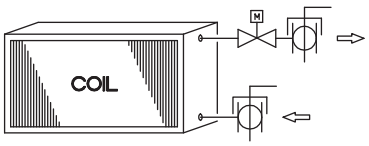


ENVIRO-TEC® BY JOHNSON CONTROLS

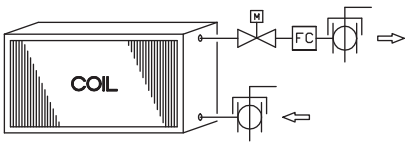
# VAV PRODUCTS AND HL, HP, VF, CDH/CDV FAN COILS

(VAV products available with 2-way packages only)

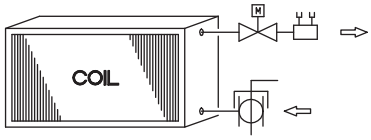
| 2-WAY PIPING PACKAGE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Package Code | Components | | | Valve Size | | | Unions | | | P/T Ports |
| | BVMS | FC | AFS | 1/2" | 3/4" | 1"* | 1/2" | 3/4" | 1"* | |
| 24 | x | | | x | x | x | x | x | x | x |
| 25 | x | x | | | | | | | | x |
| 29 | x | | x | | | | | | | x |




**Code 24**
2-Way Control Valve and Ball Valves With Memory Stop

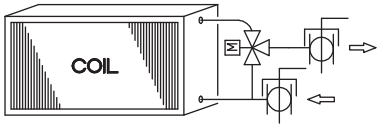



**Code 25**
2-Way Control Valve, Ball Valves with Memory Stop, and Fixed Flow Control

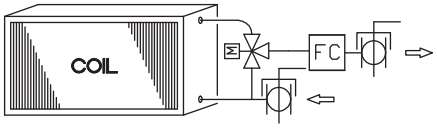



**Code 29**
2-Way Control Valve, Ball Valve with Memory Stop, and Adjustable Flow Setter

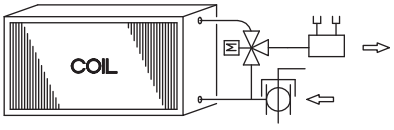
| 3-WAY PIPING PACKAGE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Package Code | Components | | | Valve Size | | | Unions | | | P/T Ports |
| | BVMS | FC | AFS | 1/2" | 3/4" | 1"* | 1/2" | 3/4" | 1"* | |
| 36 | x | | | x | x | x | x | x | x | x |
| 37 | x | x | | | | | | | | x |
| 41 | x | | x | | | | | | | x |




**Code 36**
3-Way Control Valve and Ball Valves With Memory Stop

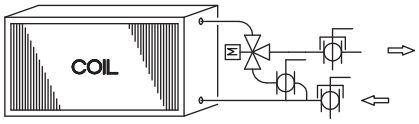



**Code 37**
3-Way Control Valve, Ball Valves with Memory Stop, and Fixed Flow Control

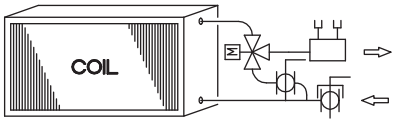



**Code 41**
3-Way Control Valve, Ball Valve With Memory Stop, and Adjustable Flow Setter

| 3-WAY PACKAGE WITH BALANCE BYPASS VALVE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Package Code | Components | | | Valve Size | | | Unions | | | P/T Ports |
| | BVMS | FC | AFS | 1/2" | 3/4" | 1"* | 1/2" | 3/4" | 1"* | |
| 50 | x | | | x | x | x | x | x | x | x |
| 53 | x | | x | | | | | | | x |




**Code 50**
3-Way Control Valve, Ball Valve in Bypass, and Ball Valves With Memory Stop




**Code 53**
3-Way Control Valve, Ball Valve in Bypass, Ball Valve With Memory Stop, and Adjustable Flow Setter

## LEGEND, COMPONENT PRESSURE RATINGS

| | |
|---|---|
| **BVMS:** | Manual Ball Valves w/Memory Stop, 600 PSIG |
| **FC:** | Fixed Flow Control, 500 PSIG |
| **AFS** | Adjustable Flow Circuit Setter, 300 PSIG |
| **P/T Port:** | Pressure/Temperature Test Port, 400 PSIG |
| **Union:** | 125 PSIG (contact factory for 600 PSIG) |
| **Control Valve:** | 300 PSIG |
| **BPV:** | Balance Bypass Valve, 400 PSIG |

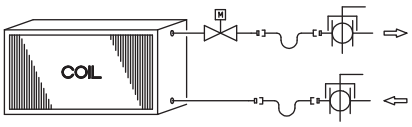
## NOTES:

1. All drawings subject to change without prior notice.
2. Diagrams show component position in relation to fluid flow. Actual valve package configuration varies with unit type, hand connection, and pipe size.
3. 1/4" bleed line is furnished on 2-pipe cool and heat auto changeover systems.

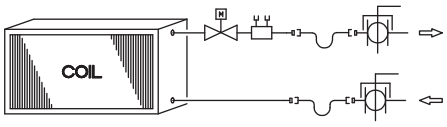
* 1" piping packages available on HP and CDH/CDV only.

# VH FAN COILS

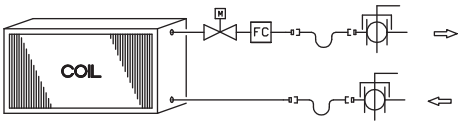
| 2-WAY PIPING PACKAGES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Package Code | Components | | | | | Valve Size | Y-CO | P/T Ports |
| | FC | AFS | Y-STR | FCN | FCS | 1/2" | | |
| 32 | | | | | | x | | x |
| 33 | | x | | | | x | | x |
| 34 | x | | | | | x | | x |
| 60 | | | x | | | x | x | x |
| 61 | x | | x | | | x | x | x |
| 62 | | x | x | | | x | x | x |
| 63 | | | | x | | x | | |
| 64 | | | | | x | x | | |



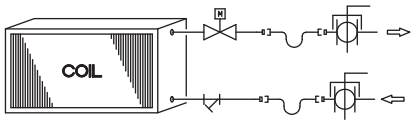

**Code 32**
2-Way Control Valve Only



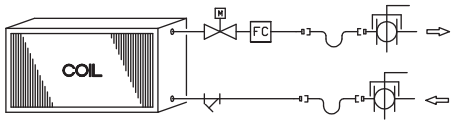

**Code 33**
2-Way Control Valve and Adjustable Flow Setter



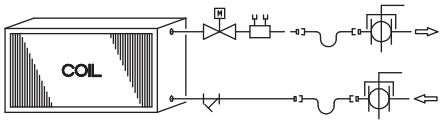

**Code 34**
2-Way Control Valve and Fixed Flow Control



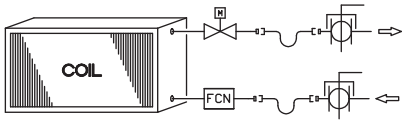

**Code 60**
2-Way Control Valve and Y Strainer



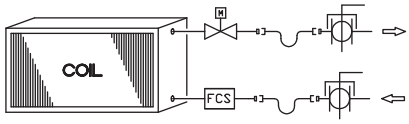

**Code 61**
2-Way Control Valve, Fixed Flow Control, and Y Strainer




**Code 62**
2-Way Control Valve, Adjustable Flow Control, and Y Strainer




**Code 63**
2-Way Control Valve and Auto Cartridge Flow Control




**Code 64**
2-Way Control Valve and Auto Cartridge Flow Control with Screen

## LEGEND, COMPONENT PRESSURE RATINGS

**FC:** Fixed Flow Control, 500 PSIG
**AFS:** Adjustable Flow Circuit Setter, 300 PSIG
**Y-STR:** Y Strainer, 400 PSIG
**FCN:** Fixed Cartridge Flow Control w/ PT Ports and No Screen, 230 PSIG
**FCS:** Fixed Cartridge Flow Control with PT Ports and Screen, 230 PSIG
**Y-CO:** Y-Strainer Cleanout, 400 PSIG
**P/T Port:** Pressure/Temperature Test Port, 400 PSIG
**Control Valve:** 300 PSIG

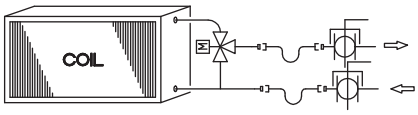
## NOTES:

1. All drawings subject to change without prior notice.
2. Diagrams show component position in relation to fluid flow. Actual valve package configuration varies with unit type, hand connection, and pipe size.
3. 1/4" bleed line is furnished on 2-pipe cool and heat auto changeover systems.

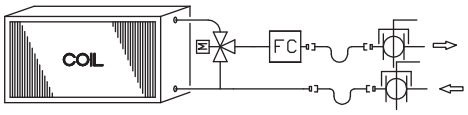
ENVIRO-TEC® BY JOHNSON CONTROLS

# VH FAN COILS

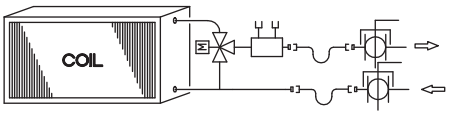
| 3-WAY PIPING PACKAGES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Package Code | Components | | | | | Valve Size | Y-CO | P/T Ports |
| | FC | AFS | Y-STR | FCN | FCS | 1/2" | | |
| 43 | | | | | | x | | x |
| 44 | x | | | | | x | | x |
| 45 | | x | | | | x | | x |
| 46 | | | x | | | x | x | x |
| 47 | x | | x | | | x | x | x |
| 48 | | x | x | | | x | x | x |
| 65 | | | | x | | x | | |
| 66 | | | | | x | x | | |



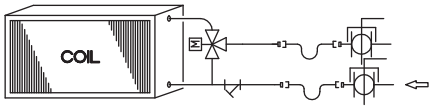

**Code 43**
3-Way Control Valve Only



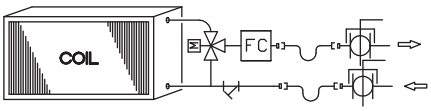

**Code 44**
3-Way Control Valve and
Fixed Flow Control



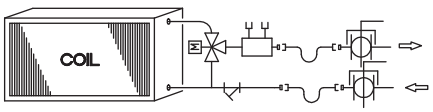

**Code 45**
3-Way Control Valve and
Adjustable Flow Setter



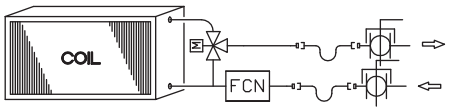

**Code 46**
3-Way Control Valve and Y Strainer



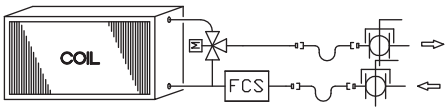

**Code 47**
3-Way Control Valve, Fixed Flow
Control and Y Strainer




**Code 48**
3-Way Control Valve,
Adjustable Flow Setter and Y Strainer




**Code 65**
3-Way Control Valve and
Auto Cartridge Flow Control




**Code 66**
3-Way Control Valve and Auto
Cartridge Flow Control With Screen

## LEGEND, COMPONENT PRESSURE RATINGS

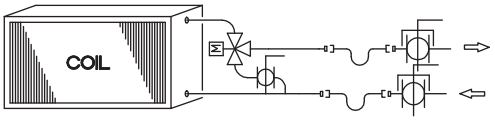
**FC:** Fixed Flow Control, 500 PSIG
**AFS:** Adjustable Flow Circuit Setter, 300 PSIG
**Y-STR:** Y Strainer, 400 PSIG
**FCN:** Fixed Cartridge Flow Control w/ PT Ports and No Screen, 230 PSIG
**FCS:** Fixed Cartridge Flow Control with PT Ports and Screen, 230 PSIG
**Y-CO:** Y-Strainer Cleanout, 400 PSIG
**P/T Port:** Pressure/Temperature Test Port, 400 PSIG
**Control Valve:** 300 PSIG

## NOTES:

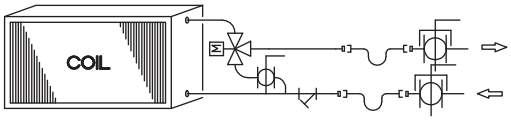
1. All drawings subject to change without prior notice.
2. Diagrams show component position in relation to fluid flow. Actual valve package configuration varies with unit type, hand connection, and pipe size.
3. 1/4" bleed line is furnished on 2-pipe cool and heat auto changeover systems.

# VH FAN COILS

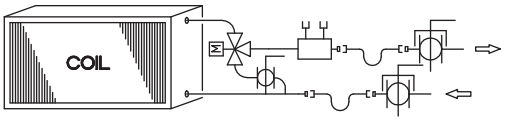
| 3-WAY PIPING PACKAGES WITH BALANCE BYPASS VALVE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Package Code | Components | | | | | Valve Size | Y-CO | P/T Ports |
| | FC | AFS | Y-STR | FCN | FCS | 1/2" | | |
| 56 | | | | | | x | | x |
| 58 | | x | | | | x | | x |
| 57 | | | x | | | x | x | x |
| 59 | | x | x | | | x | x | x |



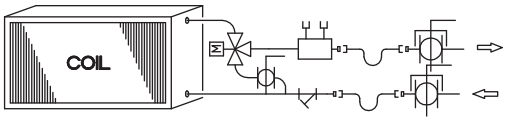

**Code 56**
3-Way Control Valve and
Balance Valve in Bypass




**Code 57**
3-Way Control Valve,
Balance Valve in Bypass and Y Strainer




**Code 58**
3-Way Control Valve, Balance Valve in Bypass
and Adjustable Flow Setter




**Code 59**
3-Way Control Valve, Balance Valve in Bypass,
Adjustable Flow Setter and Y Strainer

## LEGEND, COMPONENT PRESSURE RATINGS

| | |
|---|---|
| **FC:** | Fixed Flow Control, 500 PSIG |
| **AFS:** | Adjustable Flow Circuit Setter, 300 PSIG |
| **Y-STR:** | Y Strainer, 400 PSIG |
| **FCN:** | Fixed Cartridge Flow Control w/ PT Ports and No Screen, 230 PSIG |
| **FCS:** | Fixed Cartridge Flow Control with PT Ports and Screen, 230 PSIG |
| **Y-CO:** | Y-Strainer Cleanout, 400 PSIG |
| **P/T Port:** | Pressure/Temperature Test Port, 400 PSIG |
| **Control Valve:** | 300 PSIG |
| **BPV:** | Balance Bypass Valve, 400 PSIG |

## NOTES:

1. All drawings subject to change without prior notice.
2. Diagrams show component position in relation to fluid flow. Actual valve package configuration varies with unit type, hand connection, and pipe size.
3. 1/4" bleed line is furnished on 2-pipe cool and heat auto changeover systems.

# PIPING PACKAGE GUIDE SPECIFICATIONS

Provide a standard factory assembled valve piping package to consist of a 2 or 3 way, on/off, motorized electric control valve and two ball isolation valves. Control valves are piped normally closed to the coil. Maximum entering water temperature on the control valve is 200°F, and maximum close-off pressure is 40 PSIG (1/2"), 20 PSIG (3/4"), or 17 PSIG (1"). Maximum operating pressure shall be 300 PSIG.

Option: Provide 3-wire floating point modulating control valve (fail-in-place) in lieu of standard 2-position control valve with factory assembled valve piping package.

Option: Provide normally open control valve for hot water coils.

Option: Provide high pressure close-off actuators for 2-way control valves. Maximum close-off pressure is 50 PSIG (1/2"), 25 PSIG (3/4)", or 20 PSIG (1").

Option: Provide either a fixed or adjustable flow control device for each piping package.

Option: Provide unions and/or pressure-temperature ports for each piping package.

Piping package shall be completely factory assembled, including interconnecting pipe, and shipped separate from the unit for field installation on the coil, so as to minimize the risk of freight damage.

NOTE: Photos are for representation purposes only. Vendors and models subject to change without notice.

## Manual Ball Valve w/Memory Stop (BVMS)

An adjustable stop position lever to limit travel of the On/Off handle. This allows the ball valve to be closed, and returned to the balance setting position without re-testing the system. 1/2" size shown.

| Nominal Size: | 1/2" | 3/4" | 1" |
|---|---|---|---|
| Body Material: | Brass | Brass | Brass |
| Ball: | Hard Chrome Plated | Hard Chrome Plated | Hard Chrome Plated |
| Seats: | Teflon | Teflon | Teflon |
| Stem Seal: | (2) Viton O-Rings | Teflon | Teflon |
| Connection: | Sweat | Sweat | Sweat |
| Pressure Rating (psig): | 600 | 600 | 600 |
| Temp. Rating, °F: | 325 | 325 | 325 |
| Cv: | 17 | 32 | 27 |

## Flexible Hose Kits, 18" (FH)

| | |
|---|---|
| Materials: | EPDM inner lined, Kevlar® reinforced hose with stainless steel outer covering |
| Flow Rates: | 0.5 to 12.0 GPM, based on application |
| Pressure Temp. Rating (450 PSIG test pressure) | 375 PSIG @ 250°F |
| Minimum Burst Pressure: | 1500 PSI |
| Flame Spread: | Not greater than 25 per UL 723 |
| Smoke Development: | Not greater than 50 per UL 723 |
| Ball Valve w/Memory Stop: | Full port brass |
| Ball: | Stainless steel |
| Seats: | Teflon |
| Stem Seal: | (2) Viton O-Rings |
| Pressure Rating: | 600 PSIG WOG |
| Temperature Rating: | 325°F |
| Cv: | 20 |

Available in 1/2" size only.

## Typical 2-Way, 2-Position Control Valve

A 2-position water control valve driven open with spring return upon a call for heating or cooling to maintain space temperature. In open position, water can flow through the unit's water coil to heat or cool the space depending on supply water temperature. In closed position, water cannot flow through the water coil. Control valves are piped normally closed to the coil as standard. Valve actuators can be line or low (24VAC) voltage.

| Nominal Size | 1/2" 2-Way | 3/4" 2-Way | 1" 2-Way |
|---|---|---|---|
| Body Material: | Brass | Brass | Brass |
| Connection: | Sweat | Sweat | Sweat |
| Pressure Rating (psig): | 300 | 300 | 300 |
| Temperature Rating, °F: | 200 | 200 | 200 |
| Cv: | 2.5 | 5.0 | 8.0 |
| Maximum Close-off Pressure, Std. (PSIG): | 40 | 20 | 17 |
| High Close-off: | 50 | 25 | 20 |
| Power Consumption: | 7VA | 7VA | 7VA |

NOTE: Photos are for representation purposes only. Vendors and models subject to change without notice.

## Typical 3-Way, 2-Position Control Valve

A 2-position water control valve driven open with spring return (bypass) upon a call for heating or cooling to maintain space temperature. Energized, the bypass port is blocked, and water can flow through the unit's water coil to heat or cool the space depending on the supply water temperature. De-energized, water cannot flow through the water coil but is forced to flow through the bypass port, bypassing the coil. Control valves are piped normally closed to the coil as standard (in full bypass). Valve actuators can be line or low (24VAC) voltage.

| Nominal Size | 1/2" 3-Way | 3/4" 3-Way | 1" 3-Way |
|---|---|---|---|
| Body Material: | Brass | Brass | Brass |
| Connection: | Sweat | Sweat | Sweat |
| Pressure Rating (psig): | 300 | 300 | 300 |
| Temperature Rating, °F: | 200 | 200 | 200 |
| Cv: | 3.0 | 5.0 | 8.0 |
| Maximum Close-off Pressure (PSIG): | N/A | N/A | N/A |
| Power Consumption: | 7VA | 7VA | 7VA |

## Typical 2-Way Modulating Control Valve

A 3-wire floating point, fail-in-place (non-spring return) modulating water control valve, driven open or closed upon a call for heating or cooling to maintain space temperature. In the open position, water can flow through the unit's water coil to heat or cool the space depending on supply water temperature. In the closed position, water cannot flow through the water coil. Factory furnished 2-way valve packages are piped normally closed to the water coil. The floating point control valve is compatible with any 24VAC three-wire signal when three minute time-out logic resides in the valve actuator or system controller.

| Nominal Size | 1/2" 2-Way | 3/4" 2-Way | 1" 2-Way |
|---|---|---|---|
| Body Material: | Brass | Brass | Brass |
| Connection: | Sweat | Sweat | Sweat |
| Pressure Rating (psig): | 300 | 300 | 300 |
| Temperature Rating, °F: | 200 | 200 | 200 |
| Cv: | 2.0 | 4.0 | 8.0 |
| Maximum Close-off Pressure Operating Mode: | 50 | 35 | 35 |
| Power Consumption: | 1VA | 1VA | 1VA |

Contact factory for 3-wire floating, spring return applications.

## Typical 3-Way Modulating Control Valve

A 3-wire floating point, fail-in-place (non-spring return) modulating water control valve, driven open or closed (bypass) upon a call for heating or cooling to maintain space temperature. In the "open" position, the bypass port is closed and water is directed through the unit's water coil to heat or cool the space depending on supply water temperature. In the "closed" position, the service (water coil) port is closed and water is directed through the bypass port. Factory furnished 3-way valve packages are piped as "mixing" valves. The floating point control valve is compatible with any 24VAC three-wire signal when three minute time-out logic resides in the valve actuator or system controller.

| Nominal Size | 1/2" 2-Way | 3/4" 2-Way | 1" 2-Way |
|---|---|---|---|
| Body Material: | Brass | Brass | Brass |
| Connection: | Sweat | Sweat | Sweat |
| Pressure Rating (psig): | 300 | 300 | 300 |
| Temperature Rating, °F: | 200 | 200 | 200 |
| Cv: | 2.0 | 4.0 | 8.0 |
| Maximum Close-off Pressure Operating Mode: | N/A | N/A | N/A |
| Power Consumption: | 1VA | 1VA | 1VA |

Contact factory for 3-wire floating, spring return applications.

NOTE: Photos are for representation purposes only. Vendors and models subject to change without notice.

## Automatic Fixed Flow Control (FC)

A pressure compensated automatic fixed flow control device designed to limit the flow GPM (gallons per minute) through the unit coil. Desired GPM must be specified when ordering. 1/2" size shown.

| | |
|---|---|
| Nominal Size: | 1/2", 3/4", and 1" |
| Body Material: | Copper |
| Connection: | Sweat |
| Pressure Rating (psig): | 500 |
| Temp. Rating, °F: | 225 |
| Cv: | Variable With Inlet Pressure |

## Automatic Cartridge Flow Control (FCN, FCS)

An automatic fixed flow control device with a replaceable stainless steel cartridge, and two pressure/temperature ports, designed to limit the flow GPM through the unit coil to ±5% of rated GPM. Desired GPM must be specified when ordering. Available with 20 mesh stainless steel screen. 1/2" size shown.

| | |
|---|---|
| Nominal Size: | 1/2", 3/4", and 1" |
| Body Material: | Forged brass |
| Connection: | Sweat |
| Seals: | EPDM O-Rings |
| Pressure Rating (psig): | 230 |
| Temp. Rating, °F: | 250 |
| PSIG Range: | 2 - 32 |

**Optional Strainer:**

| | |
|---|---|
| Body Material: | 20 mesh stainless steel* |

* The optional strainer is internal and does not affect the dimensions.

## Adjustable Flow Circuit Setter (AFS)

A control device designed to allow maximum water flow through the unit coil in the Open (0%) position, and as little as 10% of flow through the unit coil in the Closed (90%) position. The device has a calibrated nameplate, built in test ports and adjustable mechanical stops, and is suitable for positive shutoff.

| | |
|---|---|
| Nominal Size: | 1/2", 3/4", and 1" |
| Body Material: | Bronze |
| Connection: | Sweat |
| Pressure Rating (psig): | 300 |
| Temp. Rating, °F: | 250 |
| Cv: | Variable |

NOTE: Photos are for representation purposes only. Vendors and models subject to change without notice.

## Balance Bypass Valve (BPV)

A plug type valve designed to balance the water flow through the bypass circuit of a 3-way control valve. Manual adjustment is required. No calibration is provided at the valve.

| | |
|---|---|
| Nominal Size: | 1/2", 3/4", and 1" |
| Body Material: | Bronze |
| Connection: | Sweat |
| Pressure Rating (psig): | 400 |
| Temp. Rating, °F: | 200 |
| Cv: | Adjustable |

## Unions

A fitting used to provide a mechanical connection between the coil and valve package that can be connected, disconnected, and re-connected without the need to cut tubing or unsolder a joint. Unions are installed at the coil on HL, HP, and VF fan coil units. Unions are not available on VH fan coil units.

| | |
|---|---|
| Nominal Size: | 1/2", 3/4", and 1" |
| Body Material: | Bronze/Copper |
| Connection: | Sweat |
| Pressure Rating (psig): | 125* |
| Temp. Rating, °F: | 200* |

*Contact factory for unions rated at 600 PSIG and 325°F.

## Y-Strainer (Y-STR)

Designed to allow water to flow through a built in screen to filter debris or contaminates from the water system. With the water system isolated, the plug can be removed from the blowdown leg of the strainer and the captured debris removed from the screen. After the plug is replaced, the system can be put back in operation and the strainer will continue to filter the unit's water.

| | |
|---|---|
| Nominal Size: | 1/2", 3/4", and 1" |
| Body Material: | Bronze |
| Connection: | Sweat |
| Pressure Rating (psig): | 400 |
| Temp. Rating, °F: | 150 |
| Screen: | 20 Mesh Stainless Steel |

NOTE: Photos are for representation purposes only. Vendors and models subject to change without notice.


## Cleanout Valve for Y-Strainer (Y-CO)

A standard ball valve installed on the strainer blowdown leg to allow flushing the strainer screen without removing the plug in the blowdown leg. This valve has a standard ½" garden hose connection to allow fluid to be piped to a container or remote location during cleaning. Not available separately.

| | |
|---|---|
| Nominal Size: | 1/4" |
| Body Material: | Bronze |
| Connection: | MPT |
| Pressure Rating (psig): | 600 |
| Temp. Rating, °F: | 200 |

## Optional Pressure/Temperature Test Port Locations (P/T)

Designed to allow testing of water pressure, differential pressure or water temperature without interrupting the waterside operation of the Fan Coil Unit. Sensor probes (⅛") are not included.

| | |
|---|---|
| Nominal Size: | 1/4" |
| Body Material: | Brass |
| Connection: | MPT |
| Pressure Rating (psig): | 400 |
| Temp. Rating, °F: | 250 |

## Aqua Thermostat

The aqua thermostat, also called an automatic seasonal changeover switch or aquastat, is a switch designed to change a room thermostat from heating to cooling and back, based on the temperature of the water supplied to a 2-pipe unit to be used for both heating and cooling. The switch is shipped loose and is mounted in the field on the water tubing using the integral clip or spring.

| | |
|---|---|
| Nominal Size: | 1/2", 3/4" and 1" |
| Switch Action: | SPDT<br>Switch on temperature rise, 85°F (± 6°F)<br>Switch on temperature fall, 70°F (± 6°F) |
| Current Rating: | 120VAC = 5.8 FLA/34.8 LRA (Inductive), 10.0 Amps (Resistive)<br>208/240VAC = 2.9 FLA/17.4 LRA (Inductive), 2.0 Amps (Resistive)<br>277VAC = 3.6 FLA/21.6 LRA (Inductive), 1.0 Amp (Resistive) |
| Agency Approval: | UL Listed, CSA Approved |

Ratings may vary with vendor and size.

# Copper Tube Dimensional & Physical Data

| Nominal Diameter (in.) | Wall Thickness (t, in.) | Diameter | | Surface Area | | Cross Section | | Weight | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Outside (d, in.) | Inside (d, in.) | Outside ($ft^2/ft$) | Inside ($ft^2/ft$) | Metal Area ( $in^2$) | Flow Area ($in^2$) | Tube (lb/ft) | Water (lb/ft) | 1/2" Ins. (lb/ft) | 3/4" Ins. (lb/ft) |
| **Type - K (color code: green)** | | | | | | | | | | | |
| 3/4 | 0.065 | 0.875 | 0.745 | 0.229 | 0.195 | 0.165 | 0.436 | 0.641 | 0.189 | 0.04 | 0.06 |
| 1 | 0.065 | 1.125 | 0.995 | 0.295 | 0.260 | 0.216 | 0.778 | 0.839 | 0.336 | 0.05 | 0.07 |
| 1 1/4 | 0.065 | 1.375 | 1.245 | 0.360 | 0.326 | 0.268 | 1.217 | 1.037 | 0.527 | 0.06 | 0.09 |
| 1 1/2 | 0.072 | 1.625 | 1.481 | 0.425 | 0.388 | 0.351 | 1.723 | 1.361 | 0.745 | 0.07 | 0.11 |
| 2 | 0.083 | 2.125 | 1.959 | 0.556 | 0.513 | 0.532 | 3.014 | 2.063 | 1.304 | 0.09 | 0.14 |
| 2 1/2 | 0.095 | 2.625 | 2.435 | 0.687 | 0.637 | 0.755 | 4.657 | 2.926 | 2.015 | 0.11 | 0.17 |
| 3 | 0.109 | 3.125 | 2.907 | 0.818 | 0.761 | 1.033 | 6.637 | 4.002 | 2.872 | 0.14 | 0.20 |
| **Type - L (color code: blue)** | | | | | | | | | | | |
| 3/4 | 0.045 | 0.875 | 0.785 | 0.229 | 0.206 | 0.117 | 0.484 | 0.455 | 0.209 | 0.04 | 0.06 |
| 1 | 0.050 | 1.125 | 1.025 | 0.295 | 0.268 | 0.169 | 0.825 | 0.654 | 0.357 | 0.05 | 0.07 |
| 1 1/4 | 0.055 | 1.375 | 1.265 | 0.360 | 0.331 | 0.228 | 1.257 | 0.884 | 0.544 | 0.06 | 0.09 |
| 1 1/2 | 0.060 | 1.625 | 1.505 | 0.425 | 0.394 | 0.295 | 1.779 | 1.143 | 0.770 | 0.07 | 0.11 |
| 2 | 0.070 | 2.125 | 1.985 | 0.556 | 0.520 | 0.452 | 3.095 | 1.751 | 1.339 | 0.09 | 0.14 |
| 2 1/2 | 0.080 | 2.625 | 2.465 | 6.87 | 0.645 | 0.64 | 4.772 | 2.479 | 2.065 | 0.11 | 0.17 |
| 3 | 0.090 | 3.125 | 2.945 | 0.818 | 0.771 | 0.858 | 6.812 | 3.325 | 2.947 | 0.14 | 0.20 |
| **Type - M (color code: red)** | | | | | | | | | | | |
| 3/4 | 0.032 | 0.875 | 0.811 | 0.229 | 0.212 | 0.085 | 0.517 | 0.328 | 0.224 | 0.04 | 0.06 |
| 1 | 0.035 | 1.125 | 1.055 | 0.295 | 0.276 | 0.120 | 0.874 | 0.464 | 0.378 | 0.05 | 0.07 |
| 1 1/4 | 0.042 | 1.375 | 1.291 | 0.360 | 0.388 | 0.176 | 1.309 | 0.682 | 0.566 | 0.06 | 0.09 |
| 1 1/2 | 0.049 | 1.625 | 1.527 | 0.425 | 0.400 | 0.243 | 1.831 | 0.94 | 0.792 | 0.07 | 0.11 |
| 2 | 0.058 | 2.125 | 2.009 | 0.556 | 0.526 | 0.377 | 3.170 | 1.459 | 1.372 | 0.09 | 0.14 |
| 2 1/2 | 0.065 | 2.625 | 2.495 | 0.687 | 0.653 | 0.523 | 4.889 | 2.026 | 2.116 | 0.11 | 0.17 |
| 3 | 0.072 | 3.125 | 2.981 | 0.818 | 0.780 | 0.691 | 6.979 | 2.676 | 3.020 | 0.14 | 0.20 |

*Source* : CDA Copper Development Association - *The Copper Tube Handbook*

# Soldered and Brazed Joint Rated Working Pressure

| Alloy Used for Joints | Water and Noncorrosive Liquids and Gases[a] | | | |
|---|---|---|---|---|
| | Service Temperature (°F) | Nominal Tube Size (Types K, L, M) | | |
| | | 3/4" to 1" | 1 1/4" to 2" | 2 1/2" to 3" |
| **50-50 Tin-Lead[b] Solder (ASTM B32 Gr 50A)** | 100 | 200 | 175 | 150 |
| | 150 | 150 | 125 | 100 |
| | 200 | 100 | 90 | 75 |
| | 250 | 85 | 75 | 50 |
| **95-5 Tin-Antimony[c] Solder (ASTM B32 Gr 50TA)** | 100 | 500 | 400 | 300 |
| | 150 | 400 | 350 | 275 |
| | 200 | 300 | 250 | 200 |
| | 250 | 200 | 175 | 150 |
| **Brazing Alloys – Melt Temperature >= 1000° F** | 100 to 200 | Note d | Note d | Note d |
| | 250 | 300 | 270 | 170 |
| | 350 | 270 | 190 | 150 |

*Source* : Based on ASME *Standard B31.9 - Building Services Piping*

**Notes:**

[a] Solder Joints shall not be used for:
- Flammable or toxic gases or liquids
- Gas, vapor or compressed air in tubing over 4 inch, unless maximum pressure is limited to 20 psig.

[b] Lead based solders must not be used on potable water systems

[c] Tin-Antimony solder is allowed for potable water supplies in some jurisdictions

[d] Rated pressure for up to 200° F. applies to the tube being joined - see pipe internal presure chart.

- Tin-Lead solder shall not be used in ENVIRO-TEC products.
- Tin-Antimony solder is used on valve packages and "packed" or "gasketed" parts at ENVIRO-TEC.
- Brazing alloy is used for all ENVIRO-TEC coils, risers and piping runs.

ENVIRO-TEC® BY JOHNSON CONTROLS

# Copper Tube Rated Internal Working Pressure (PSIG)

| Nominal Size (in) | Annealed (Soft) | | | | Drawn (Hard) | | | |
|---|---|---|---|---|---|---|---|---|
| | S=6000 psi **100° F** | S=5100 psi **150° F** | S=4800 psi **200° F** | S=4800 psi **250° F** | S=9000 psi **100° F** | S=9000 psi **150° F** | S=9000 psi **200° F** | S=9000 psi **250° F** |
| **Type K (green color code)** | | | | | | | | |
| 3/4 | 852 | 724 | 682 | 682 | 1278 | 1278 | 1278 | 1278 |
| 1 | 655 | 557 | 524 | 524 | 982 | 982 | 982 | 982 |
| 1 1/4 | 532 | 452 | 425 | 425 | 797 | 797 | 797 | 797 |
| 1 1/2 | 494 | 420 | 396 | 396 | 742 | 742 | 742 | 742 |
| 2 | 435 | 370 | 348 | 348 | 652 | 652 | 652 | 652 |
| 2 1/2 | 398 | 338 | 319 | 319 | 597 | 597 | 597 | 597 |
| 3 | 385 | 328 | 308 | 308 | 578 | 578 | 578 | 578 |
| **Type L (blue color code)** | | | | | | | | |
| 3/4 | 582 | 495 | 466 | 466 | 873 | 873 | 873 | 873 |
| 1 | 494 | 420 | 395 | 395 | 741 | 741 | 741 | 741 |
| 1 1/4 | 439 | 373 | 351 | 351 | 658 | 658 | 658 | 658 |
| 1 1/2 | 408 | 347 | 327 | 327 | 613 | 613 | 613 | 613 |
| 2 | 364 | 309 | 291 | 291 | 545 | 545 | 545 | 545 |
| 2 1/2 | 336 | 285 | 269 | 269 | 504 | 504 | 504 | 504 |
| 3 | 317 | 270 | 254 | 254 | 476 | 476 | 476 | 476 |
| **Type M (red color code)** | | | | | | | | |
| 3/4 | 407 | 346 | 326 | 326 | 611 | 611 | 611 | 611 |
| 1 | 337 | 286 | 270 | 270 | 506 | 506 | 506 | 506 |
| 1 1/4 | 338 | 285 | 270 | 270 | 507 | 507 | 507 | 507 |
| 1 1/2 | 331 | 282 | 265 | 265 | 497 | 497 | 497 | 497 |
| 2 | 299 | 254 | 239 | 239 | 448 | 448 | 448 | 448 |
| 2 1/2 | 274 | 233 | 219 | 219 | 411 | 411 | 411 | 411 |
| 3 | 253 | 215 | 203 | 203 | 380 | 380 | 380 | 380 |

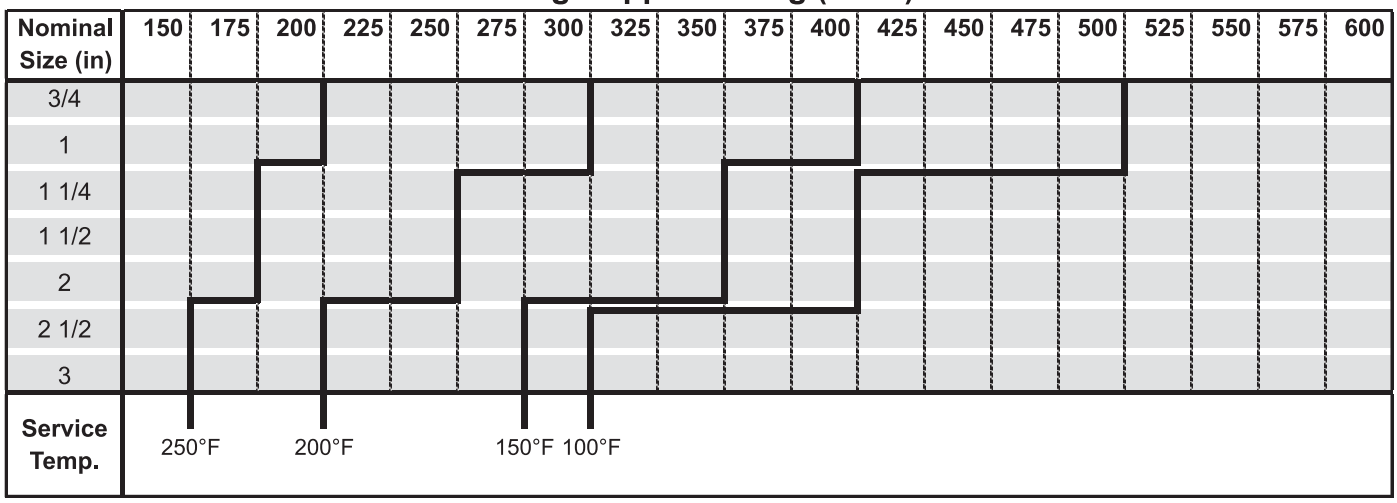
*Source* : CDA Copper Development Association - *The Copper Tube Handbook*

**Notes:**

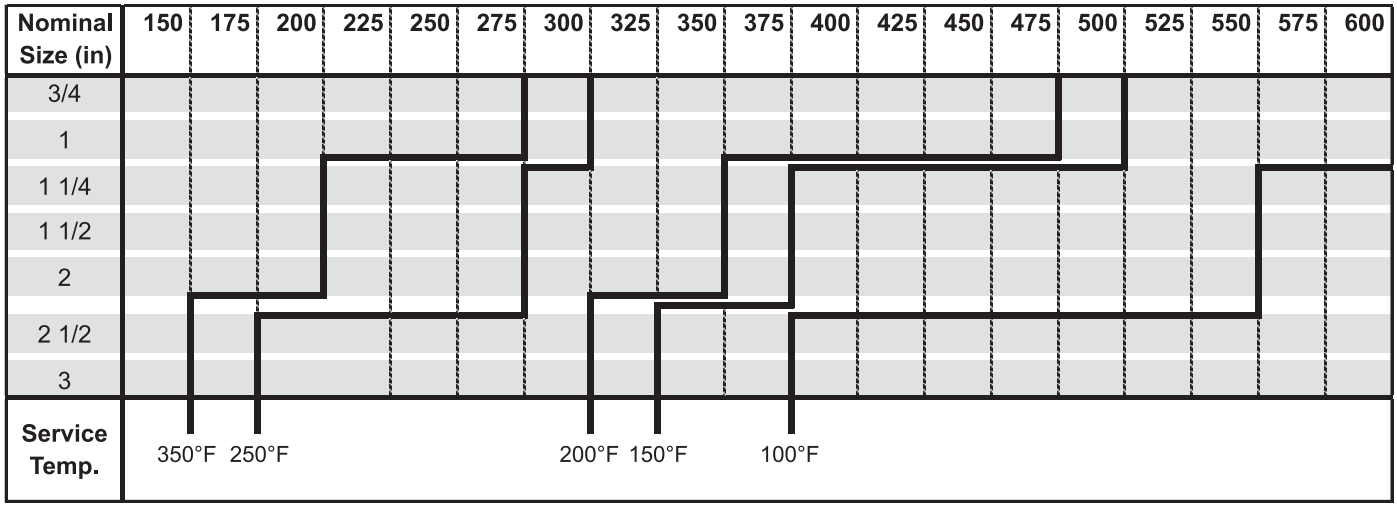
1. Table values based on the maximum allowable stress in tension (psi) for the indicated service temperature (° F.)
2. When brazing or soldering is used to join drawn (hard) tubing, the corresponding annealed rating shall be used.
3. Type-M Annealed temper is not readily availble. Annealed values indicated for use when heating or forming drawn tube.

# Soldered and Brazed Joints Pressure - Temperature Ratings

## Maximum Pressure & Temperature Rating of 95-5 Tin-Antimony Solder Joints Using Copper Tubing (PSIG)




## Maximum Pressure & Temperature Rating for Brazing Alloy Joints Using Copper Tubing (PSIG)




**Notes:**

1. Pressure Ratings Based on *ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.*
2. Tubing Pressure Ratings may exceed those shown if joints are not present and tubing is not annealed. See Copper Tube Internal Pressure Ratings Chart for those cases.

# Piping System Component Maximum Working Pressure (PSIG)

| System Working Pressure (PSIG) | Water and Steam Coil | | | Ball Valves | Motorized Control Valves [a] | | | | | | Flow Control | | | | 1/4" Schraeder Valve | Pressure / Temp. Test Port | Flexible Hose Kit | Y-Strainer | | Unions [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Air Vent | | | 2 Position | | | Modulating [b] | | | Automatic | | Adjustable | | | | | | | |
| | Coil | Manual | Auto | | 1/2" | 3/4" | 1" | 1/2" | 3/4" | 1" | Fixed | Cartridge [c] | Circuit Setter | Balance Valve | | | | Body | Clean-out | |
| | | | | | (40) | (20) | (17) | (50) | (35) | (35) | | | | | | | | | | |
| 100 | 250 @ 200°F, 15 PSIG Steam | 400 @ 200°F | 150 @ 240°F | 600 @ 200°F | 300 @ 200°F | 300 @ 200°F | 300 @ 200°F | 300 @ 200°F | 300 @ 200°F | 300 @ 200°F | 500 @ 225°F | 230 @ 250°F | 300 @ 400°F | 400 @ 200°F | 400 @ 250°F | 400 @ 250°F | 375 @ 250°F | 400 @ 150°F | 400 @ 200°F | 125 @ 200°F |
| 200 | | | | | | | | | | | | | | | | | | | | |
| 300 | | | | | | | | | | | | | | | | | | | | |
| 400 | | | | | | | | | | | | | | | | | | | | |
| 500 | | | | | | | | | | | | | | | | | | | | |
| 600 | | | | | | | | | | | | | | | | | | | | |

**Notes:**

a. All valves use sweat connections. 2 position valves are N.C. spring return; modulating valves are floating point non-spring return fail in place.

b. Valve close off pressure is rated at powered operating mode.

c. Cartridge type flow control devices utilize a replaceable flow compensation cartridge to adjust desired flow rate.

d. Pressure ratings will be reduced as temperature exceeds those shown above.

e. Maximum allowable system pressure is limited to the components selected with the lowest working pressure.

f. ENVIRO-TEC assumes no responsibility for misapplication and selection of piping components.

g. Contact factory for unions rated at 600 PSIG and 325°F.

(xx) = Valve close off pressure

Stock ID: CAT-PIPING Part No. PX-00-0018

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