

EPP

El Paso Plumbing, Inc.

140 W. 29th. St. #347 Pueblo CO 81008

(719) 391-1676 FAX 385-0267

**US AIR FORCE ACADEMY
GOLF COURSE CLUB HOUSE
PLUMBING PIPING SYSTEMS**

23 21 **13** ↗ 16

HYDRONIC PIPING SPECIALITIES

PARSONS	
	A APPROVED
X	AN APPROVED / SUBJECT TO CORRECTION MARKED
	R EXAMINED AND RETURNED FOR CORRECTIONS
By <u>Joseph C. Nelson</u>	
Date <u>03/16/17</u>	
As Noted and Subject to Contract Requirements THIS REVIEW DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR CONFORMANCE TO THE CONTRACT REQUIREMENTS	

NOTES:

1. 23 21 16 - 2 2.2 A VALVES HAVE BEEN SUBMITTED IN SPEC SECTION 23 05 23
2. 23 21 16 - 2 2.2 B N/A
3. 23 21 16 - 2.2 2 D N/A
4. 23 21 16 - 2.2 2 E SAFETY VALVES COME PRE INSTALLED ON BOILERS
5. 23 21 16 - 3 B 1 THE SPECS CALL FOR A 375 DEGREE MAXIMUM WORKING TEMPERATURE ALL OTHER COMPONENTS IN THE SYSTEM CALL FOR A MAXIMUM OF 225 DEGREE MAXIMUM WORKING TEMPERATURE. THE SUBMITTED EXPANSION TANK HAS A MAXIMUM WORKING TEMPERATURE OF 240 DEGREES. THIS EXCEEDS ALL OTHER DESIGN TEMPERATURES AND WE ARE REQUESTING AN EXCEPTION ON THE 375 DEGREE MAXIMUM WORKING TEMPERATURE. AFTER AN EXHAUSTIVE SEARCH NO VERTICAL EXPANSION TANK WITH A 375 DEGREE MAXIMUM WORKING TEMPERATURE COULD BE FOUND.

The 240 Degree F maximum working temperature for the expansion tank is acceptable. Section 2.1,A,1 in the specification lists the hot water heating piping at 200 degrees F. The boiler should not heat the heating water above that point.

JCN 03-16-17



CFM COMPANY

AIR CONDITIONING / HEATING / VENTILATING EQUIPMENT

1440 South Lipan Street • Denver, CO 80223-3411

Phone: (303) 761-2291 • Fax: (303) 761-0325

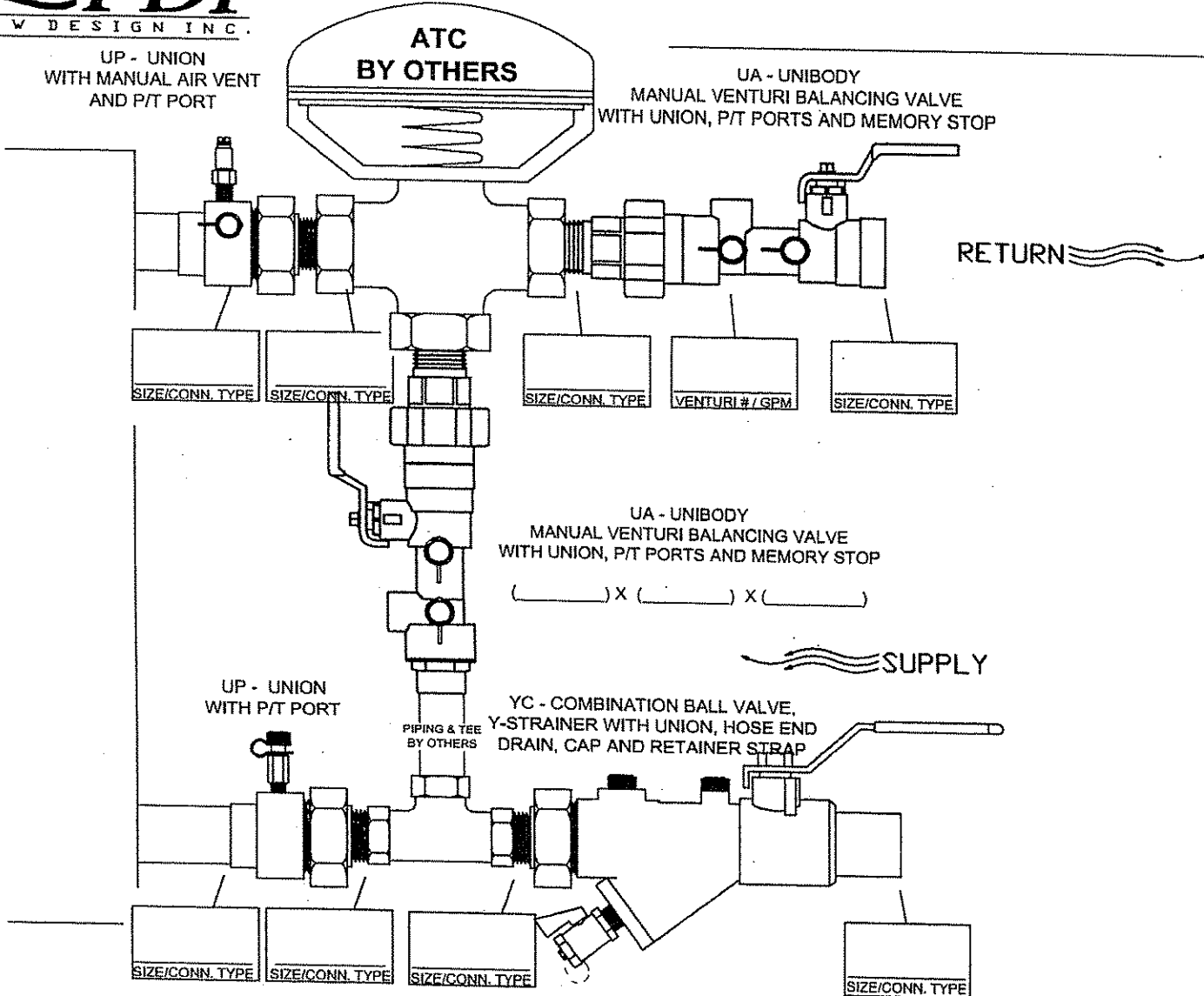
SUBMITTAL

PROJECT: USAF Academy Golf Course Clubhouse
LOCATION: Colorado Springs
ENGINEER: URS
CONTRACTOR: El Paso Plumbing
DATE: July 14, 2016
SUBMITTED BY: Jeff Gaither

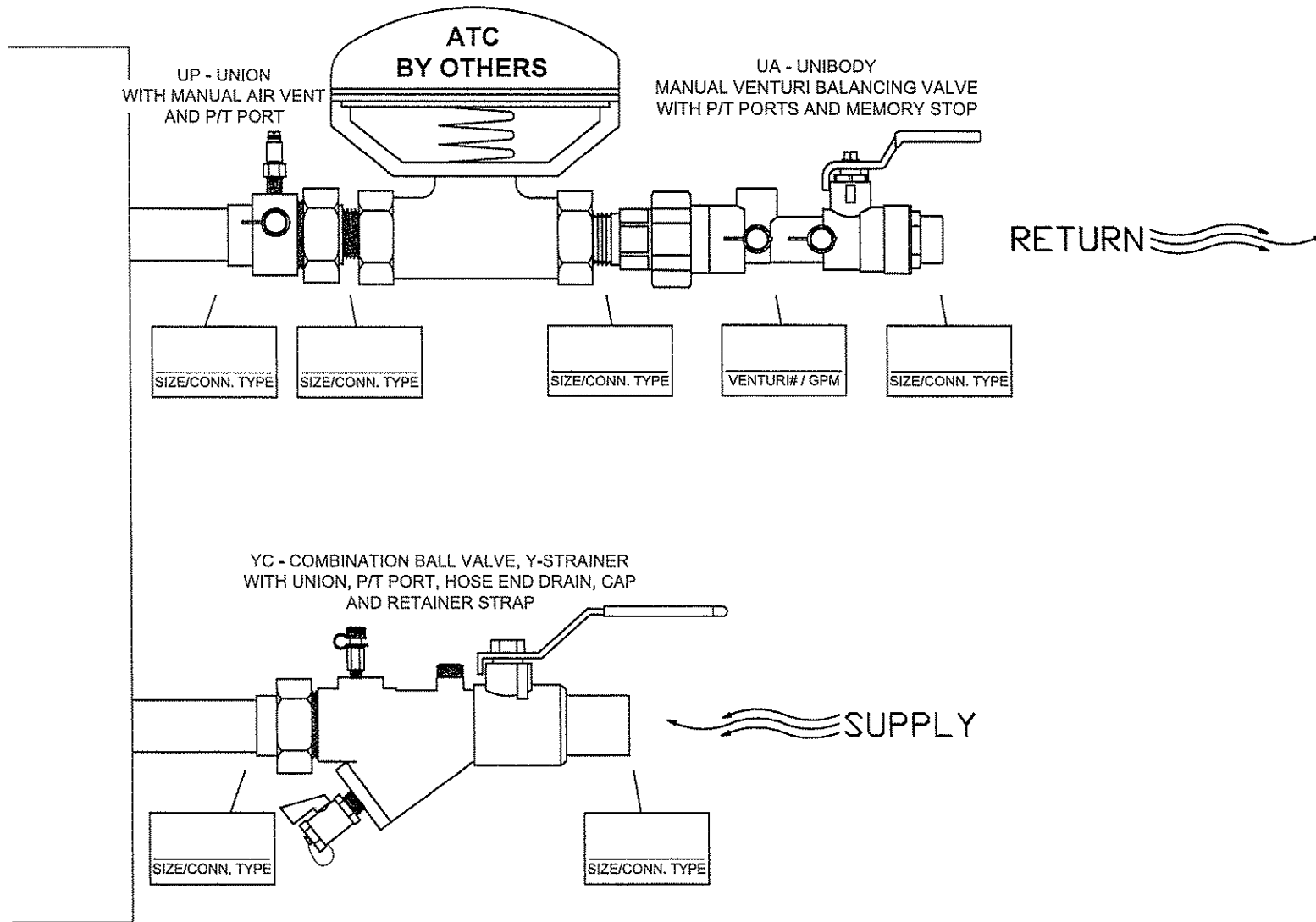
EQUIPMENT: Balancing Valves
SPEC SECTION: 23 05 23-5
MANUFACTURER: Flow Design, Inc.

Flow Design, Inc. "FlowSet" flow measurement/balancing valves, Model UA, complete with the following:

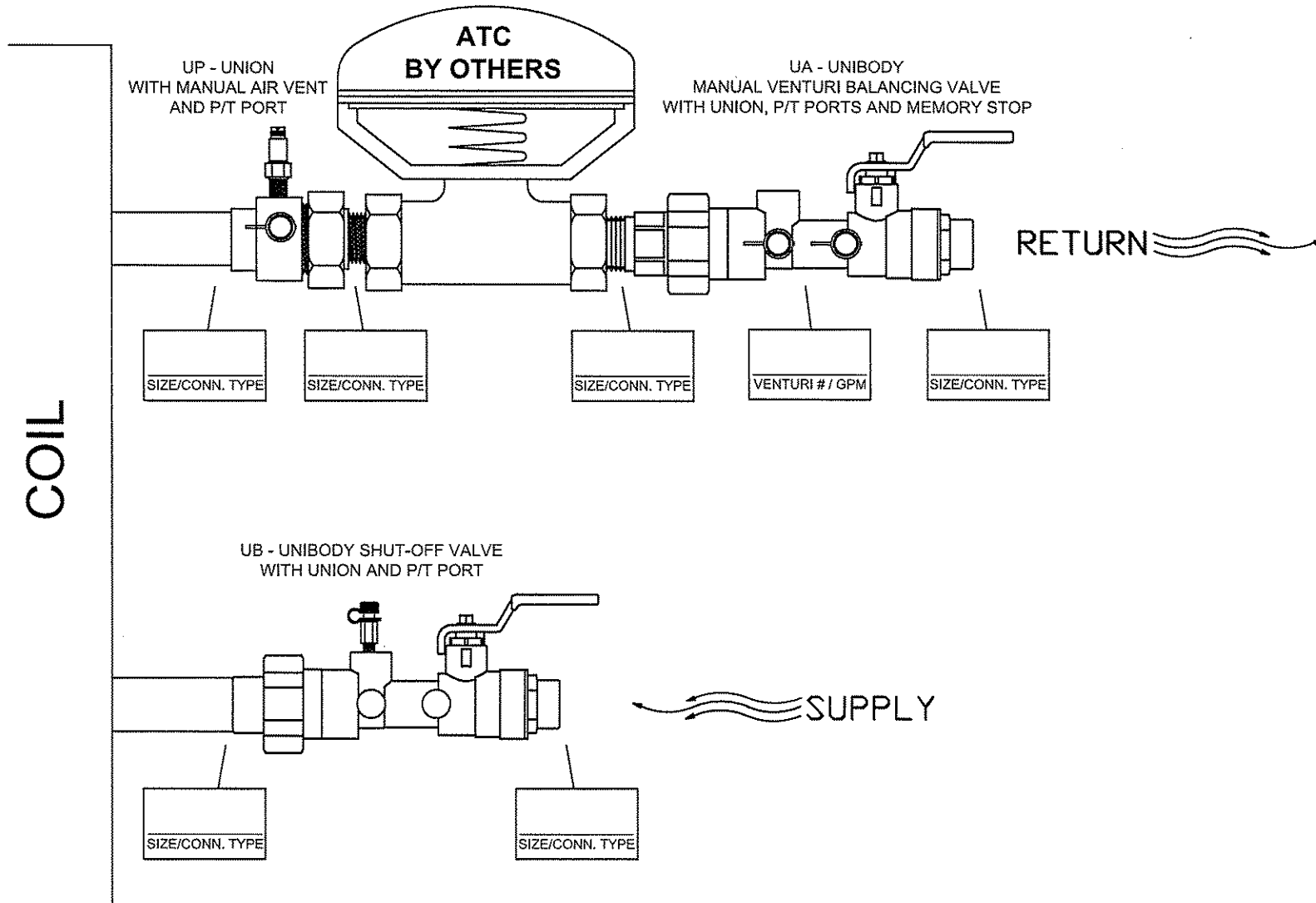
- DZR brass body
- Teflon ball valve seals
- Integral union with tailpiece
- Low loss venturi
- Integral large diameter plated ball valve
- Pressure/temperature taps
- 100% shut-off capability
- Tamper-proof memory stop
- 600 PSIG / 250° F. ratings
- I.D. tag



Note: Coil hook-up drawings are provided as a service by Flow Design Inc. These Drawings are a visual representation of our interpretation of possible coil configurations. They are not based on specific engineering requirements and Flow Design Inc. is not responsible for orders placed using unverified drawings. The purpose of Flow Design Inc.'s hook-up drawings is to show a "plan view" of the components comprising the coil hook-up rather than an exact "as-built" layout.

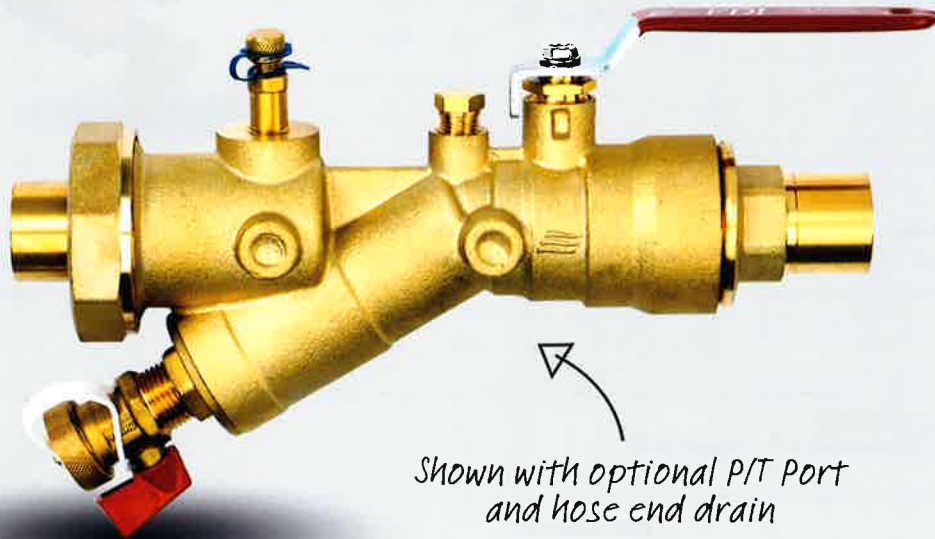


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YC



Hook-up Components
Y-strainer, ball valve and union

Engineering
GREAT Solutions

Weight / Cv

Model	Weight		Cv / (Kv)	
		lb./ (kg)		
YC0050	2.3	(1.05)	7.9	(6.8)
YC0075	2.3	(1.06)	8.8	(7.6)
YC0100R*	2.3	(1.06)	8.8	(7.6)
YC0100	5.9	(2.66)	19.7	(17.0)
YC0125	5.8	(2.64)	20.4	(17.6)
YC0150R*	6.4	(2.93)	20.4	(17.6)
YC0150	14.8	(6.72)	52.7	(45.6)
YC0200	14.8	(6.63)	55.1	(47.7)

Notes

Weights based on F X F connections and will vary with mixed options/connections

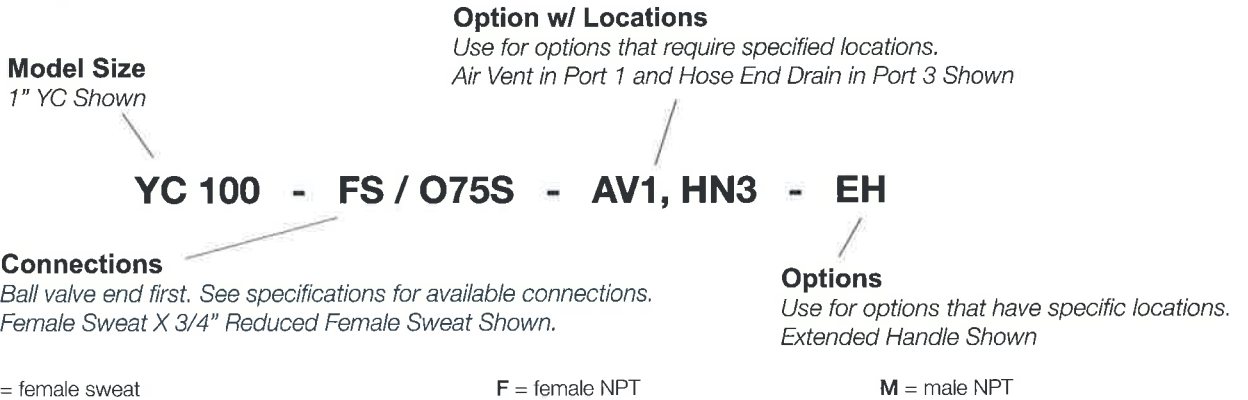
Weights and dimensions are subject to minor changes

Cv's based on the body only

* Denotes female thread not available on union end

See operation manual for Installation and Maintenance F033

Model Order Designation



Options Available

AA Automatic Air Vent	MI Metal ID Tag	SE Stem Extender
AV Manual Air Vent	PI Plastic ID Tag	T2 1/2" F Tap
EH Extended Handle	PL Plug	T4 1/4" F Tap
HN Hose End Drain Valve with Cap	PP Propress®	XL Ext. P/T Port



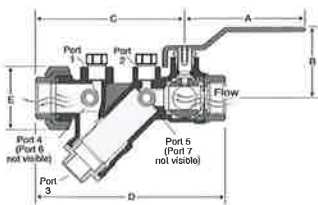
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Connections

Model	Size		Fixed Conn. (Inlet)			Union Conn. (Outlet)		
	in./	(mm)	in./	(mm)		in./	(mm)	
YC0050	1/2	(15)	1/2	(15)	S, F	3/8	(10)	S
						1/2	(15)	FMS
						3/4	(20)	FMS
YC0075	3/4	(20)	3/4	(20)	S, F	3/8	(10)	S
						1/2	(15)	FMS
YC0100R*	1	(25)	1	(25)	S, F	3/4	(20)	FMS
						1	(25)	MS
YC0100	1	(25)	1	(25)	S, F	1/2	(15)	FMS
						3/4	(20)	FMS
						1	(25)	FMS
						1 1/4	(32)	FMS
YC0125	1 1/4	(32)	1 1/4	(32)	S, F	1/2	(15)	MS
						3/4	(20)	FMS
						1	(25)	FMS
YC0150R*	1 1/2	(40)	1 1/2	(40)	S, F	1 1/4	(32)	FMS
						1 1/2	(40)	MS
YC0150	1 1/2	(40)	1 1/2	(40)	S, F	1	(25)	FMS
						1 1/4	(32)	FMS
						1 1/2	(40)	FMS
						2	(50)	FMS
YC0200	2	(50)	2	(50)	S, F	1 1/4	(32)	FMS
						1 1/2	(40)	FMS
						2	(50)	FMS

S = sweat F = female NPT M = male NPT

Articles

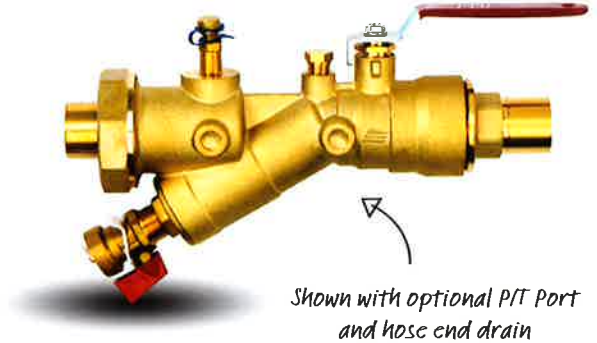


Dimensions

Model	Size		A		B		C		D		E	
	in./	(mm)	in./	(mm)	in./	(mm)	in./	(mm)	in./	(mm)	in./	(mm)
YC0050	1/2	(15)	4.1	(103)	2.0	(52)	4.8	(122)	6.7	(169)	2.1	(53)
YC0075	3/4	(20)	4.1	(103)	2.0	(52)	4.9	(124)	6.7	(170)	2.1	(53)
YC0100R*	1	(25)	4.1	(103)	2.0	(52)	5.5	(140)	7.6	(192)	2.1	(53)
YC0100	1	(25)	4.7	(119)	2.7	(68)	6.6	(169)	9.5	(241)	2.8	(71)
YC0125	1 1/4	(32)	4.7	(119)	2.7	(68)	6.6	(169)	9.6	(245)	2.8	(71)
YC0150R*	1 1/2	(40)	4.7	(119)	2.7	(68)	7.9	(200)	10.7	(273)	2.8	(71)
YC0150	1 1/2	(40)	5.6	(141)	3.6	(93)	8.4	(212)	11.7	(297)	3.8	(97)
YC0200	2	(50)	5.6	(141)	3.6	(93)	8.5	(217)	12.0	(305)	3.8	(97)

YC

Combination ball valve, y-strainer and union with up to five (5) accessory port locations. 20 mesh stainless steel strainer is removable from the valve body for inspection and cleaning without breaking the main piping. The ball valve has PTFE packing, brass packing nut and blowout-proof stem, large diameter plated ball and a full size steel handle with vinyl grip. The union has a EPDM "o"-ring and tailpiece available in M, F, and S connections. Ball valve end only available in FPT or SWT. One size reduction available for union section. Port 1 available with maximum 1/2" tap for bypass line (option T2).



Key features

- > **Combination Valve**
Add description of feature
- > **Removable Strainer**
Ease of inspection/cleaning
- > **Multiple Ports**
Configure exactly what you need

Technical description

Application:
Coil Isolation and Protection

Dimensions:
1/2" - 2"

Material:
Body: DZR Brass
Strainer: 20 mesh stainless steel


Functions:
Union, strainer, ball valve

Pressure class:
400 psig at 250° F (25 Bar at 120° C)

UA



Manual Venturi Balancing
Venturi ball valve


Engineering
GREAT Solutions

Options Available

***AA** Automatic Air Vent

***AV** Manual Air Vent

***DX** Two Extended P/T Ports

***EH** Extended Handle

***MH** Micro Handle (optional on B Body)

***MI** Metal ID Tag

***PI** Plastic ID Tag

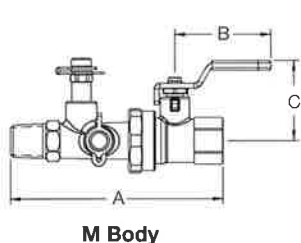
***PL** Plug

***SE** Stem Extender

Notes

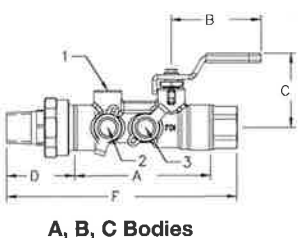
* Only available on A, B, C bodies

Articles



Body Dimensions

Body Size	A		B		C		Weight	
	in.	(mm)	in.	(mm)	in.	(mm)	lb.	(kg)
M	5.3	(132)	2.3	(59)	1.9	(48)	1.1	(0.5)
A	3.5	(90)	2.3	(58)	2.1	(53)	0.8	(0.4)
B	3.8	(97)	2.3	(58)	2.2	(56)	1.2	(0.5)
C	5.4	(137)	5.5	(140)	3.5	(89)	3.6	(1.6)



Connection Dimensions

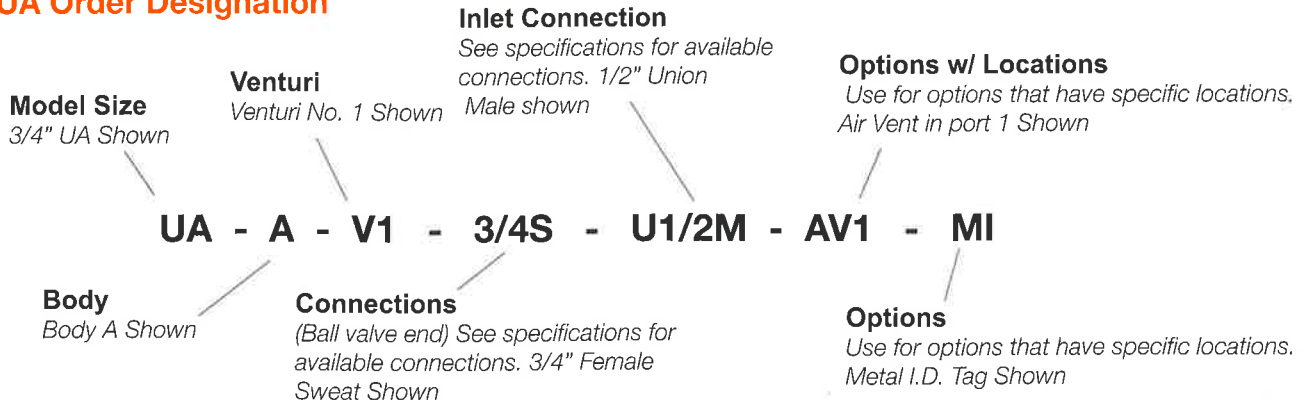
Body Size	Connection Type	D				E			
		in./ (mm)				in./ (mm)			
		3/8 (10)	1/2 (15)	3/4 (20)	1 (25)	3/8 (10)	1/2 (15)	3/4 (20)	1 (25)
	S	—	0.5 (14)	0.8 (20)	1.2 (29)	—	1.1 (28)	1.2 (29)	1.5 (29)
	F	—	0.7 (17)	0.8 (20)	1.1 (29)	—	1.1 (28)	1.3 (33)	1.6 (29)
A	Union S	1.4 (35)	1.5 (37)	1.6 (40)	—	1.6 (39)	1.6 (39)	1.6 (39)	—
	Union F	—	1.5 (37)	—	—	—	1.6 (39)	—	—
	Union M	—	2.4 (61)	2.2 (57)	—	—	1.6 (39)	1.6 (39)	—
		1/2 (15)	3/4 (20)	1 (25)	1 1/4 (32)	1/2 (15)	3/4 (20)	1 (25)	1 1/4 (32)
	S	0.5 (14)	0.8 (19)	1.0 (25)	1.2 (28)	1.3 (34)	1.3 (34)	1.5 (37)	1.8 (51)
	F	0.7 (18)	0.7 (19)	0.9 (24)	1.1 (32)	1.3 (34)	1.3 (34)	1.6 (41)	2.0 (45)
B	Union S	1.5 (37)	1.7 (43)	1.7 (42)	1.8 (45)	2.1 (53)	2.1 (53)	2.4 (60)	2.8 (72)
	Union F	1.5 (39)	1.6 (40)	1.7 (43)	1.7 (43)	2.1 (53)	2.1 (53)	2.4 (60)	2.8 (72)
	Union M	2.4 (60)	2.2 (56)	2.5 (63)	2.5 (64)	2.1 (53)	2.1 (53)	2.4 (60)	2.8 (72)
		1 1/4 (32)	1 1/2 (40)	2 (50)	—	1 1/4 (32)	1 1/2 (40)	2 (50)	—
	S	—	1.2 (29)	1.2 (31)	1.7 (42)	—	2.4 (62)	2.4 (62)	2.7 (69)
	F	—	0.9 (23)	0.9 (23)	1.2 (29)	—	2.4 (62)	2.4 (62)	2.9 (72)
C	Union S	—	2.0 (51)	2.1 (54)	2.4 (61)	—	3.5 (88)	3.5 (88)	3.8 (97)
	Union F	—	1.9 (49)	1.9 (49)	2.0 (50)	—	3.5 (88)	3.5 (88)	3.8 (97)
	Union M	—	3.0 (75)	3.0 (76)	2.8 (72)	—	3.5 (88)	3.5 (88)	3.8 (97)

Notes

All weights and dimensions are subject to minor changes.

*The F dimension may be calculated by using two D dimensions and adding them to the A dimension of the valve body.

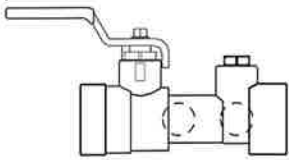
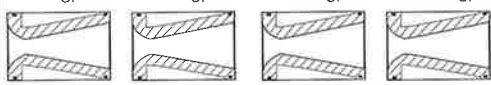
Model UA Order Designation

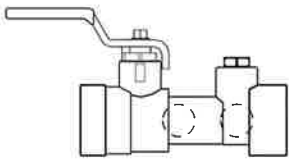



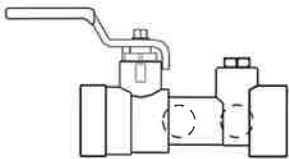

S = female sweat

F = female NPT

M = male NPT

<p>Connections (Ball Valve End)</p> <table style="width: 100%;"> <tr> <th style="width: 50%;">Fixed</th> <th style="width: 50%;">Union</th> </tr> <tr> <td> 1/2" S 3/4" S 1" S </td> <td> U1/2" S U3/4" S </td> </tr> <tr> <td> 1/2" F 3/4" F 1" F </td> <td> U1/2" F </td> </tr> <tr> <td> 1/2" M 3/4" M 1" M </td> <td> U1/2" M U3/4" M </td> </tr> </table>	Fixed	Union	1/2" S 3/4" S 1" S	U1/2" S U3/4" S	1/2" F 3/4" F 1" F	U1/2" F	1/2" M 3/4" M 1" M	U1/2" M U3/4" M	<p>Body A 1/2" - 3/4"</p>  <p>Includes Venturi, two P/T ports & Memory Stop</p> <p>Venturis (Choose One)</p> <table style="width: 100%; text-align: center;"> <tr> <td>Venturi #1 .2-.9 gpm</td> <td>Venturi #2 .4-2.0 gpm</td> <td>Venturi #3 1.0-4.6 gpm</td> <td>Venturi #4 2.3-10.1 gpm</td> </tr> </table> 	Venturi #1 .2-.9 gpm	Venturi #2 .4-2.0 gpm	Venturi #3 1.0-4.6 gpm	Venturi #4 2.3-10.1 gpm	<p>Connections (Ball Valve End)</p> <table style="width: 100%;"> <tr> <th style="width: 50%;">Union</th> <th style="width: 50%;">Fixed</th> </tr> <tr> <td> U1/2" S U3/4" S </td> <td> 1/2" S 3/4" S </td> </tr> <tr> <td> U1/2" F </td> <td> 1/2" F 3/4" F </td> </tr> <tr> <td> U1/2" M U3/4" M </td> <td> 1/2" M 3/4" M </td> </tr> </table> <p style="text-align: right; font-size: small;">1" inlet connection not available</p>	Union	Fixed	U1/2" S U3/4" S	1/2" S 3/4" S	U1/2" F	1/2" F 3/4" F	U1/2" M U3/4" M	1/2" M 3/4" M
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U1/2" F U3/4" F U1" F U1 1/4" F	1/2" F 3/4" F 1" F 1 1/4" F																			
U1/2" M U3/4" M U1" M U1 1/4" M	1/2" M 3/4" M 1" M 1 1/4" M																			

<p>Connections (Ball Valve End)</p> <table style="width: 100%;"> <tr> <th style="width: 50%;">Fixed</th> <th style="width: 50%;">Union</th> </tr> <tr> <td> 1 1/4" S 1 1/2" S 2" S </td> <td> U1 1/4" S U1 1/2" S U2" S </td> </tr> <tr> <td> 1 1/4" F 1 1/2" F 2" F </td> <td> U1 1/4" F U1 1/2" F U2" F </td> </tr> <tr> <td> 1 1/4" M 1 1/2" M 2" M </td> <td> U1 1/4" M U1 1/2" M U2" M </td> </tr> </table>	Fixed	Union	1 1/4" S 1 1/2" S 2" S	U1 1/4" S U1 1/2" S U2" S	1 1/4" F 1 1/2" F 2" F	U1 1/4" F U1 1/2" F U2" F	1 1/4" M 1 1/2" M 2" M	U1 1/4" M U1 1/2" M U2" M	<p>Body C 1 1/2" - 2"</p>  <p>Includes Venturi, two P/T ports & Memory Stop</p> <p>Venturis (Choose One)</p> <table style="width: 100%; text-align: center;"> <tr> <td>Venturi #7 9.5-48.0 gpm</td> <td>Venturi #8 22.0-103.3 gpm</td> </tr> </table> 	Venturi #7 9.5-48.0 gpm	Venturi #8 22.0-103.3 gpm	<p>Connections (Ball Valve End)</p> <table style="width: 100%;"> <tr> <th style="width: 50%;">Union</th> <th style="width: 50%;">Fixed</th> </tr> <tr> <td> U1 1/4" S U1 1/2" S U2" S </td> <td> U1 1/4" S U1 1/2" S U2" S </td> </tr> <tr> <td> U1 1/4" F U1 1/2" F U2" F </td> <td> U1 1/4" F U1 1/2" F U2" F </td> </tr> <tr> <td> U1 1/4" M U1 1/2" M U2" M </td> <td> U1 1/4" M U1 1/2" M U2" M </td> </tr> </table>	Union	Fixed	U1 1/4" S U1 1/2" S U2" S	U1 1/4" S U1 1/2" S U2" S	U1 1/4" F U1 1/2" F U2" F	U1 1/4" F U1 1/2" F U2" F	U1 1/4" M U1 1/2" M U2" M	U1 1/4" M U1 1/2" M U2" M
Fixed	Union																			
1 1/4" S 1 1/2" S 2" S	U1 1/4" S U1 1/2" S U2" S																			
1 1/4" F 1 1/2" F 2" F	U1 1/4" F U1 1/2" F U2" F																			
1 1/4" M 1 1/2" M 2" M	U1 1/4" M U1 1/2" M U2" M																			
Venturi #7 9.5-48.0 gpm	Venturi #8 22.0-103.3 gpm																			
Union	Fixed																			
U1 1/4" S U1 1/2" S U2" S	U1 1/4" S U1 1/2" S U2" S																			
U1 1/4" F U1 1/2" F U2" F	U1 1/4" F U1 1/2" F U2" F																			
U1 1/4" M U1 1/2" M U2" M	U1 1/4" M U1 1/2" M U2" M																			

Configuration Information

Body Size	Venturi No.	Venturi Flow Ranges* gpm (lps)	CV Rating	Inlet Connections in (mm)			Outlet Connections in (mm)		
M	1	0.2 - 0.9 (0.01 - 0.06)	.28	1/2	(15)	M	1/2	(15)	S, F
	2	0.5 - 2.0 (0.03 - 0.12)	.77						
	3	1.0 - 4.6 (0.06 - 0.29)	2.2						
	4	2.2 - 10.0 (0.14 - 0.63)	4.8						
A	1	0.2 - 0.9 (0.01 - 0.06)	.28	1/2	(15)	S, F, M	-	-	-
	2	0.4 - 2.0 (0.03 - 0.13)	.77	3/4	(20)	S, F, M	1/2	(15)	S, F, M
	3	1.0 - 4.6 (0.06 - 0.29)	2.2	1	(25)	S, F, M	3/4	(20)	S, M
	4	2.3 - 10.1 (0.14 - 0.64)	4.8						
B	5	2.7 - 12.6 (0.17 - 0.80)	6.0	1/2	(15)	S, F, M	1/2	(15)	S, F, M
	6	5.8 - 27.5 (0.37 - 1.73)	18.0	3/4	(20)	S, F, M	3/4	(20)	S, M
				1	(25)	S, F, M	1	(25)	S, F, M
				1 1/4	(15)	S, F, M	1 1/4	(15)	S, F, M
C	7	9.5 - 48.8 (0.60 - 3.08)	18.0	1 1/4	(32)	S, F, M	1 1/4	(32)	S, F, M
	8	22.0 - 103.3 (1.39 - 6.52)	68.0	1 1/2	(40)	S, F, M	1 1/2	(40)	S, F, M
				2	(50)	S, F, M	2	(50)	S, F, M

S = female sweat

F - female NPT

M = male NPT

Notes

* Flow range is from the minimum recommended differential pressure 24" to 500" W.C. (5.97 to 124.42 kPa)
See installation and operation manual (Flowset)

Connection Weights

Body Size	Connection Type	Weight (in./mm)			
		1/2 (15)	3/4 (20)	1 (25)	1 1/4 (32)
A	S	0.1 (.05)	0.1 (.05)	0.2 (.08)	-
	F	0.1 (.06)	0.2 (.08)	0.4 (.16)	-
	Union S	0.4 (.20)	0.4 (.20)	-	-
	Union F	-	0.5 (.21)	-	-
	Union M	0.5 (.24)	0.5 (.20)	-	-
B		1/2 (15)	3/4 (20)	1 (25)	1 1/4 (32)
	S	0.2 (.07)	0.2 (.08)	0.1 (.05)	0.3 (.20)
	F	0.2 (.08)	0.2 (.09)	0.3 (.13)	0.4 (.12)
	Union S	0.4 (.20)	0.5 (.20)	2.7 (1.21)	1.2 (.54)
	Union F	0.5 (.22)	0.5 (.22)	2.8 (1.25)	1.3 (.57)
C		1 1/4 (32)	1 1/2 (40)	2 (50)	-
	S	0.7 (.31)	0.6 (.28)	0.7 (.29)	-
	F	0.8 (.34)	0.6 (.29)	0.6 (.29)	-
	Union S	2.4 (1.10)	2.4 (1.10)	2.8 (1.27)	-
	Union F	2.7 (1.24)	2.7 (1.24)	3.1 (1.38)	-
	Union M	2.8 (1.28)	3.0 (1.37)	2.8 (1.29)	-

UA

Model UA is a shutoff and manual throttling venturi valve with large diameter plated ball and PTFE seats. Stem is blowout proof with EPDM O-ring and PTFE packing with packing nut. Micro handle customary on the A and M body, and standard handle customary on the B and C bodies both utilize a standard adjustable memory stop for shutoff and resetting and vinyl coated grip. Dual Pressure / Temperature ports are standard on all UA bodies. Models A, B and C are available with union connection or fixed threaded or sweat connections each with a metal to metal and EPDM O-ring seal.



Key features

- > **Fixed Measures Element**
Reading depends on flow only
- > **Optional Connections**
Unions, fixed and sweat

Technical description

Application:
Hydronic Balancing

Functions:
Balancing, shut-off and optional unions

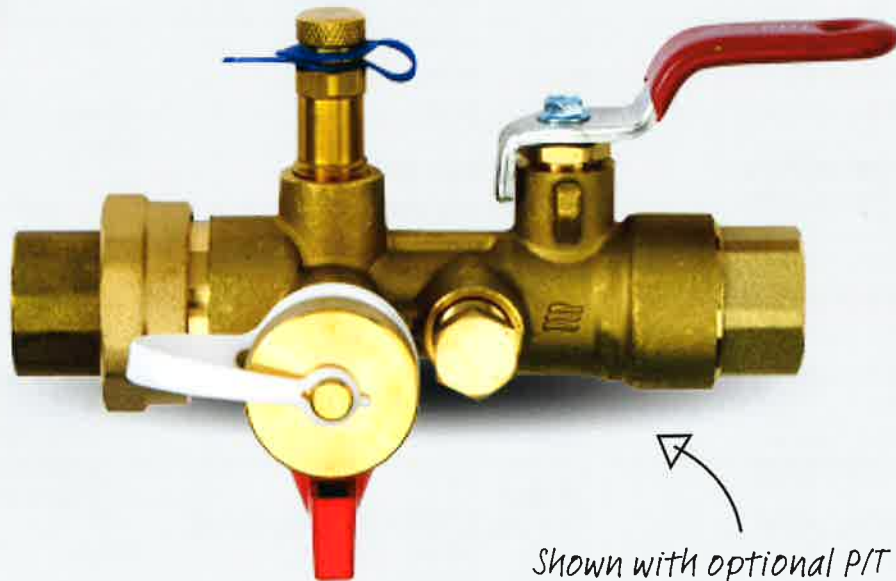
Dimensions:
1/2" - 2"

Rating:
Body M: 400 psig at 250° F (25 Bar at 120° C)
Bodies A, B & C: 600 psig at 250° F (40 Bar at 120° C)

Accuracy:
±3%

Material:
Body: DZR Brass
Union (Optional): Brass with EPDM O-ring
Fixed Connection: DZR Brass

UB

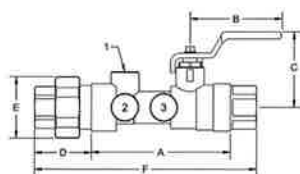


*Shown with optional P/T Port
and hose end drain*

Hook-Up Components
Shut-off valve with union

*Engineering
GREAT Solutions*

Articles



Body Dimensions

Body Size	A		B		C		Weight	
	in.	(mm)	in.	(mm)	in.	(mm)	lb.	(kg)
A	3.5	(90)	2.3	(58)	2.1	(53)	0.8	(0.4)
B	3.8	(97)	2.3	(58)	2.2	(56)	1.2	(0.5)
C	5.4	(137)	5.5	(140)	3.5	(89)	3.6	(1.6)

Connection Dimensions

Body Size	Connection Type	D			E				
		in./ (mm)			in./ (mm)				
		—	1/2 (15)	3/4 (20)	1 (25)	—	1/2 (15)	3/4 (20)	1 (25)
	S	—	0.5 (14)	0.8 (20)	1.2 (29)	—	1.1 (28)	1.2 (29)	1.5 (29)
	F	—	0.7 (17)	0.8 (20)	1.1 (29)	—	1.1 (28)	1.3 (33)	1.6 (29)
A	Union S	—	1.5 (37)	1.6 (40)	—	—	1.6 (39)	1.6 (39)	—
	Union F	—	1.5 (37)	—	—	—	1.6 (39)	—	—
	Union M	—	2.4 (61)	2.2 (57)	—	—	1.6 (39)	1.6 (39)	—
		1/2 (15)	3/4 (20)	1 (25)	1 1/4 (32)	1/2 (15)	3/4 (20)	1 (25)	1 1/4 (32)
	S	0.5 (14)	0.8 (19)	1.0 (25)	1.2 (28)	1.3 (34)	1.3 (34)	1.5 (37)	1.8 (51)
	F	0.7 (18)	0.7 (19)	0.9 (24)	1.1 (32)	1.3 (34)	1.3 (34)	1.6 (41)	2.0 (45)
B	Union S	1.5 (37)	1.7 (43)	1.7 (42)	1.8 (45)	2.1 (53)	2.1 (53)	2.4 (60)	2.8 (72)
	Union F	1.5 (39)	1.6 (40)	1.7 (43)	1.7 (43)	2.1 (53)	2.1 (53)	2.4 (60)	2.8 (72)
	Union M	2.4 (60)	2.2 (56)	2.5 (63)	2.5 (64)	2.1 (53)	2.1 (53)	2.4 (60)	2.8 (72)
		1 1/4 (32)	1 1/2 (40)	2 (50)	—	—	1 1/4 (32)	1 1/2 (40)	2 (50)
	S	—	1.2 (29)	1.2 (31)	1.7 (42)	—	2.4 (62)	2.4 (62)	2.7 (69)
	F	—	0.9 (23)	0.9 (23)	1.2 (29)	—	2.4 (62)	2.4 (62)	2.9 (72)
C	Union S	—	2.0 (51)	2.1 (54)	2.4 (61)	—	3.5 (88)	3.5 (88)	3.8 (97)
	Union F	—	1.9 (49)	1.9 (49)	2.0 (50)	—	3.5 (88)	3.5 (88)	3.8 (97)
	Union M	—	3.0 (75)	3.0 (76)	2.8 (72)	—	3.5 (88)	3.5 (88)	3.8 (97)

Notes

All weights and dimensions are subject to minor changes.

*The F dimension may be calculated by using two D dimensions and adding them to the A dimension of the valve body.

Model UA Order Designation

Model Size
3/4" UB Shown

Inlet Connection

See specifications for available connections.
1/2" Union Male shown

Options w/ Locations

Use for options that have specific locations.
Air Vent in Port 1 Shown

UB - A - 3/4S - U1/2M - AV1 - MI

Body
Body A Shown

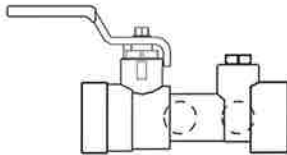
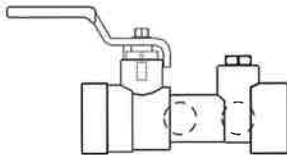
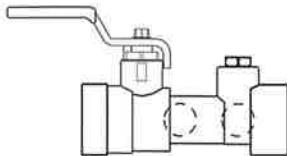
Connections
(Ball valve end) See specifications for available connections. 3/4" Female Sweat Shown

Options
Use for options that have specific locations. Metal I.D. Tag Shown

S = female sweat

F = female NPT

M = male NPT

Connections (Ball Valve End)		Body A	Connections (Ball Valve End)		
Fixed	Union	 1/2" - 3/4"	Union	Fixed	
1/2" S 3/4" S 1" S 1/2" F 3/4" F 1" F 1/2" M 3/4" M 1" M	U1/2" S U3/4" S U1/2" F U1/2" M U3/4" M		U1/2" S U3/4" S U1/2" F U1/2" M U3/4" M	1/2" S 3/4" S 1/2" F 3/4" F 1/2" M 3/4" M	1" S 3/4" S 1" F 3/4" F 1" M 3/4" M
			1" inlet connection not available		
Connections (Ball Valve End)		Body B	Connections (Ball Valve End)		
Fixed	Union	 1" - 1 1/4"	Union	Fixed	
1/2" S 3/4" S 1" S 1 1/4" S 1/2" F 3/4" F 1" F 1 1/4" F 1/2" M 3/4" M 1" M 1 1/4" M	U1/2" S U3/4" S U1" S U1 1/4" S U1/2" F U3/4" F U1" F U1 1/4" F U1/2" M U3/4" M U1" M U1 1/4" M		U1/2" S U3/4" S U1" S U1 1/4" S U1/2" F U3/4" F U1" F U1 1/4" F U1/2" M U3/4" M U1" M U1 1/4" M	1/2" S 3/4" S 1" S 1 1/4" S 1/2" F 3/4" F 1" F 1 1/4" F 1/2" M 3/4" M 1" M 1 1/4" M	1" S 3/4" S 1" S 1 1/4" S 1" F 3/4" F 1" F 1 1/4" F 1" M 3/4" M 1" M 1 1/4" M
Connections (Ball Valve End)		Body C	Connections (Ball Valve End)		
Fixed	Union	 1 1/2" - 2"	Union	Fixed	
1 1/4" S 1 1/2" S 2" S 1 1/4" F 1 1/2" F 2" F 1 1/4" M 1 1/2" M 2" M	U1 1/4" S U1 1/2" S U2" S U1 1/4" F U1 1/2" F U2" F U1 1/4" M U1 1/2" M U2" M		U1 1/4" S U1 1/2" S U2" S U1 1/4" F U1 1/2" F U2" F U1 1/4" M U1 1/2" M U2" M	U1 1/4" S U1 1/2" S U2" S U1 1/4" F U1 1/2" F U2" F U1 1/4" M U1 1/2" M U2" M	U1 1/4" S U1 1/2" S U2" S U1 1/4" F U1 1/2" F U2" F U1 1/4" M U1 1/2" M U2" M

Configuration Information

Body Size	Cv (Kv)	Fixed Connections in. (mm)	Union Connections in. (mm)
A	6 (6.94)	1/2 (15) S, F, M	-
		3/4 (20) S, F, M	1/2 (15) S, F, M
		1 (25) S, F, M	3/4 (20) S, M
B	6 (6.94)	1/2 (15) S, F, M	1/2 (15) S, F, M
		3/4 (20) S, F, M	3/4 (20) S, M
		1 (25) S, F, M	1 (25) S, F, M
		1 1/4 (32) S, F, M	1 1/4 (32) S, F, M
C	66 (76.36)	1 1/4 (32) S, F, M	1 1/4 (32) S, F, M
		1 1/2 (40) S, F, M	1 1/2 (40) S, F, M
		2 (50) S, F, M	2 (50) S, F, M

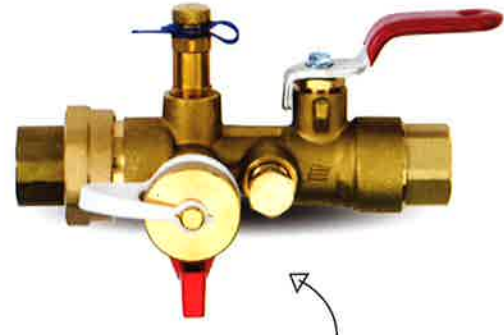
S = female sweat F - female NPT M = male NPT

Connection Weights

Body Size	Connection Type	Weight (in./mm)			
		1/2 (15)	3/4 (20)	1 (25)	1 1/4 (32)
A	S	-	0.1 (.05)	0.1 (.05)	0.2 (.08)
	F	-	0.1 (.06)	0.2 (.08)	0.4 (.16)
	Union S	-	0.4 (.20)	0.4 (.20)	-
	Union F	-	-	0.5 (.21)	-
	Union M	-	0.5 (.24)	0.5 (.20)	-
B		1/2 (15)	3/4 (20)	1 (25)	1 1/4 (32)
	S	0.2 (.07)	0.2 (.08)	0.1 (.05)	0.3 (.20)
	F	0.2 (.08)	0.2 (.09)	0.3 (.13)	0.4 (.12)
	Union S	0.4 (.20)	0.5 (.20)	2.7 (1.21)	1.2 (.54)
	Union F	0.5 (.22)	0.5 (.22)	2.8 (1.25)	1.3 (.57)
C		1 1/4 (32)	1 1/2 (40)	2 (50)	-
	S	0.7 (.31)	0.6 (.28)	0.7 (.29)	-
	F	0.8 (.34)	0.6 (.29)	0.6 (.29)	-
	Union S	2.4 (1.10)	2.4 (1.10)	2.8 (1.27)	-
	Union F	2.7 (1.24)	2.7 (1.24)	3.1 (1.38)	-
	Union M	2.8 (1.28)	3.0 (1.37)	2.8 (1.29)	-

UB

Model UB is a shut-off valve with large diameter plated ball and PTFE seats. Stem is blowout proof with EPDM O-ring and PTFE packing with packing nut. Micro handle customary on the A body, and standard handle customary on the B and C bodies; all available with optional adjustable memory stop for shut-off and resetting and vinyl coated grip. Available with union connection or fixed threaded or sweat connections each with a metal-to-metal and EPDM O-ring seal.



Key features

- > **Multiple Accessory Ports**
P/T port, air vent and drains
- > **Selectable Ends**
Avoid adapters

Technical description

Application:
Hydronic Balancing

Functions:
Shut-off and optional unions

Dimensions:
1/2" - 2"

Rating:
600 psig at 250° F (40 Bar at 120° C)

Material:
Body: DZR Brass
Union (Optional): Brass with EPDM O-ring
Fixed Connection: DZR Brass

HS-1 HydroCal™ combination hydraulic, air and dirt separator

549 and NA549 series



01178/14 NA
Replaces 01178/13 NA



Function

The Caleffi HydroCal™ combination hydraulic, air and dirt separator is a device that combines high performance air and dirt removal with hydraulic separation. Primary and secondary circuits connected to it become hydraulically decoupled thus eliminating pump conflict.

A proven, time tested stainless steel internal coalescing element continuously and automatically eliminates all entrained air, including microbubbles, in the system. Air discharge capacity is very high. Over time, dirt particles as tiny as 5 microns are captured and collected away from the flow stream.

The 3-in-1 high performance functionality of the HydroCal™ saves system installation and maintenance cost as there is no need to include separate air and dirt separators. It can be used on either hot or chilled water systems.

Product range

- 549 series HydroCal™ hydraulic, air and dirt separator in steel with flanged connections, drain and insulation connections 2–4" ANSI
- NA549 series HydroCal™ hydraulic, air and dirt separator in steel with flanged connections, drain and insulation, ASME and CRN connections 2–4" ANSI
- NA549 series HydroCal™ hydraulic, air and dirt separator in steel with flanged connections and drain, ASME and CRN connections 6–12" ANSI

Technical specifications

- Connections** - flanged: 2–12" ANSI B16.5 150 CLASS RF
 - drain valve: 2–6": 1-1/4" NPT female
 8–12": 2" NPT female
 - thermometer pockets: 1/2" (8–12" only)
 front center: 3/4" NPT female
 inlet/outlet flanges: 1/2" NPT female
- Materials** - separator body: epoxy resin painted steel body
 - air vent body: brass
 - shut-off and drain valve body: brass
 - internal element: 300 series stainless steel
 - air vent seal: VITON
 - air vent float: stainless steel

Performance

- Suitable fluids: water and non-hazardous glycol solutions up to 50%
 Max. operating pressure: 150 psi (10 bar)
 Max. connection velocity: 4 feet per second (1.2 m/s)
 Temperature range: - with insulation 32–220°F (0–105°C)
 - without insulation (vessel) 32–270°F (0–132°C)
 Particle separation capacity: to 5 µm (0.2 mil)
 Air separation capacity: 100% removal to micro-bubble level

Agency approval

Series NA549 is designed and built in accordance with Section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code and tagged and registered with the National Board of Boiler and Pressure Vessel Inspector, and CRN registered, and stamped for 150 psi (10 bar) working pressure, with ASME U stamp.

Technical specifications of insulation

Inner part

- Material: rigid closed cell expanded polyurethane foam
 Thickness: 2-3/8" (60 mm)
 Density: 3 lb/ft³ (45 kg/m³)
 Conductivity (ISO 2581): 0.16 BTU-in/hr-ft²·°F (0.023 W/(m·K))
 Temperature range: 32–220°F (0–105°C)

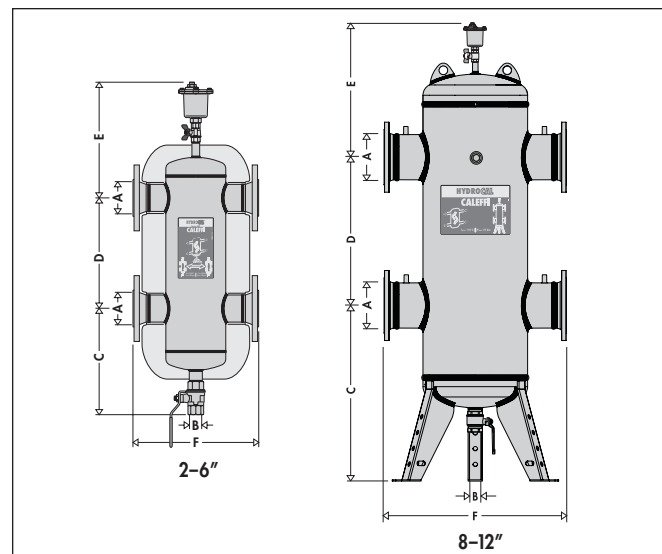
Outer part

- Material: embossed aluminium
 Thickness: 7-mil (0.70 mm)
 Fire resistance (DIN 4102): class 1

Head covers

- Heat formed material: PS

Dimensions



Code	A	B	C	D	E	F	Wt. (lbs.)	Flow (gpm)	Vol (gal.)
549052A	2"	1 1/4"	13"	13"	15"	14"	73	37.3	4.0
549062A	2 1/2"	1 1/4"	13"	13"	15"	14"	79	63	4.0
549082A	3"	1 1/4"	15"	17 3/4"	17"	18"	108	95.5	8.0
549102A	4"	1 1/4"	15"	17 3/4"	17"	18"	117	149	8.0
NA549150A*	6"	1 1/4"	15"	22"	19"	25"	231	380	23.2
NA549200A*	8"	2"	33 3/8"	39 3/8"	27 1/2"	35 1/2"	520	625	95.0
NA549250A*	10"	2"	33 3/8"	43 3/8"	30"	41 3/4"	725	1,030	175
NA549300A*	12"	2"	33 3/8"	47 1/4"	31 1/2"	47 3/4"	1100	1,650	255

*Without insulation

NA prefix indicates ASME tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors and CRN registered, with ASME U stamp.

Add NA prefix to 2" to 4" flanged connection for ASME approved, CRN registered.

Larger sizes available, consult with factory.

Operating principle

Hydraulic separation

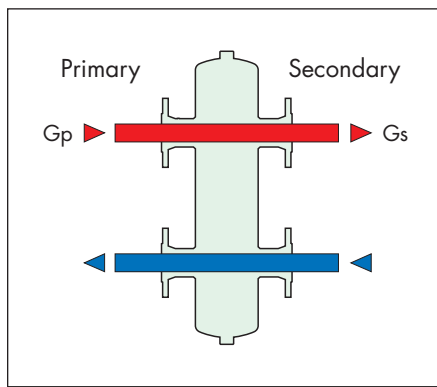
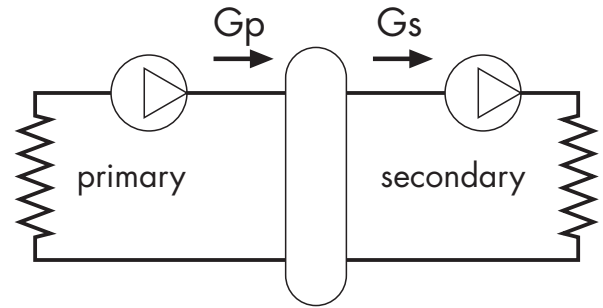
When a single system contains a primary production circuit, with its own pump, and a secondary user circuit, with one or more distribution pumps, operating conditions may arise in the system whereby the pumps interact, creating abnormal variations in circuit flow rates and pressures. The hydraulic separator creates a zone with a low pressure loss, which enables the primary and secondary circuits connected to it to be hydraulically independent of each other; **the flow in one circuit does not affect flow in the other.**

In this case, the flow rate in the respective circuits depends exclusively on the flow rate characteristics of the circuit pumps, preventing reciprocal influence caused by connection in series. Therefore, using a device with these characteristics means that the flow in the secondary circuit only circulates when the relevant pump is on, permitting the system to meet the specific load requirements at that time.

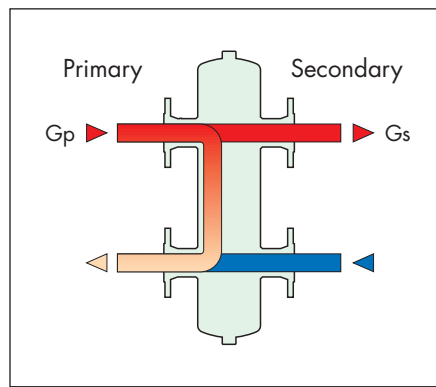
When the secondary pump is off, there is no circulation in the secondary circuit; the whole flow rate produced by the primary pump is by-passed

through the separator. With the hydraulic separator, it is therefore possible to have a primary production circuit with a constant flow rate and a secondary distribution circuit with a variable flow rate; these operating conditions are typical of modern heating and cooling systems.

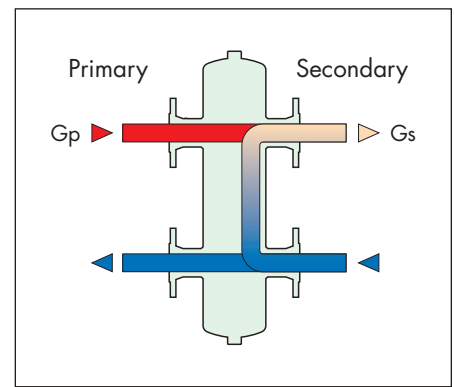
Three possible hydraulic balance situations are shown below.



$G_{primary} = G_{secondary}$



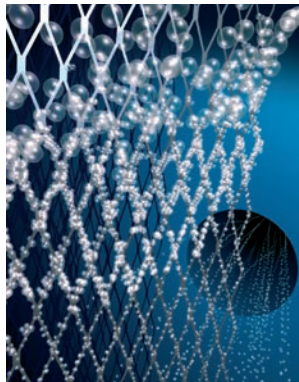
$G_{primary} > G_{secondary}$



$G_{primary} < G_{secondary}$

Microbubble air separation

The HydroCal's internal element (1) creates the whirling movement required to facilitate the release of microbubbles and their adhesion to the internal element surfaces. The bubbles, fusing with each other, increase in size until the hydrostatic thrust overcomes the adhesion force to the mesh. They rise towards the top of the unit from which they are released through a float-operated automatic air vent.

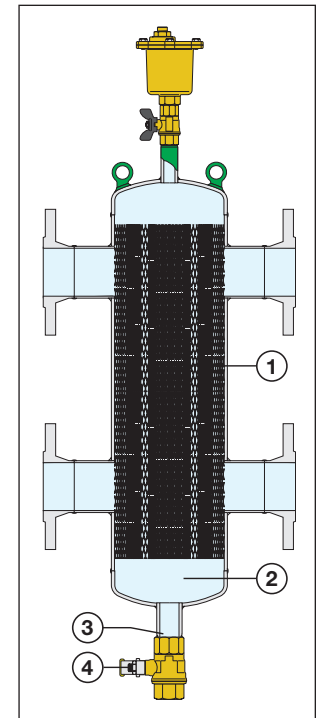


Microparticle dirt separation

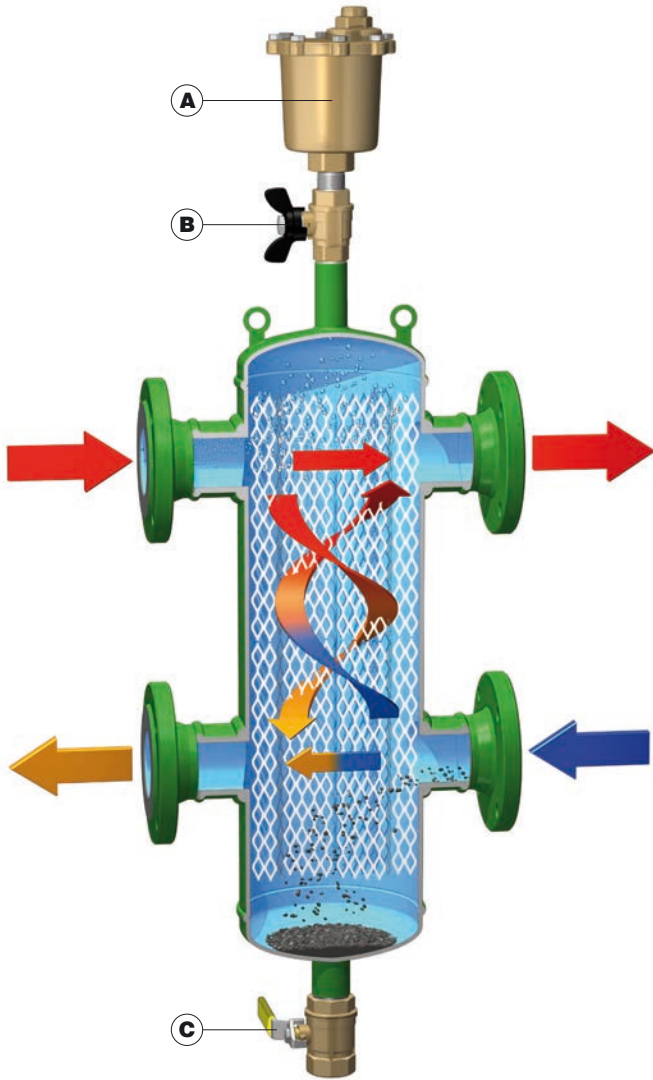
Impurities in the fluid upon striking the surfaces of the HydroCal's internal element (1), get separated and drop to the bottom of the body (2) where they collect.

In addition, the large internal volume of HydroCal™ slows down the flow speed of the fluid thus helping, by gravity, to separate the particles it contains.

The collected impurities are discharged, by opening the drain valve (3) with the handle (4), even with the system operating.



Construction details



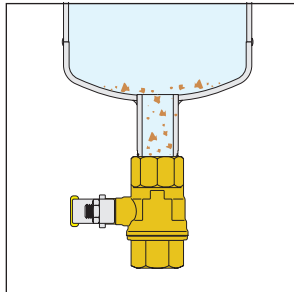
Isolating the air vent valve

The air vent (A), replacement part number 501502A, is isolated manually, using a shut-off ball valve (B), replacement part number NA39589.

Dirt removing element

The HydroCal™ dirt removing element separates and collects any impurities present in the system.

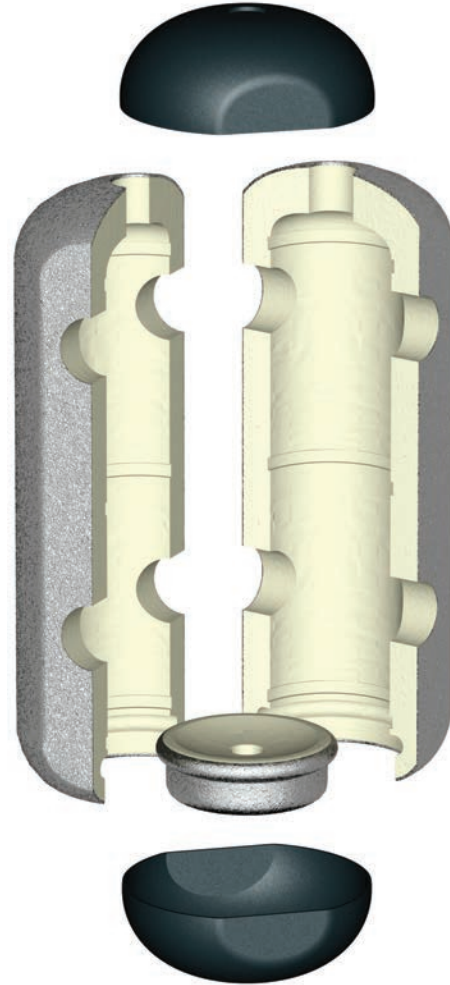
These impurities are removed by the drain valve (C) replacement part number NA39588 for connection sizes 2–6"; NA59600 for connection size 8–12", which can be connected to a discharge pipe, at the bottom of the separator.



Insulation

The HydroCal™ is available complete with a hot preformed insulation shell. In the flanged series, sizes 2" to 4", the insulation is made of a shell in expanded polyurethane foam covered with an aluminium layer. This insulation ensures not only perfect heat insulation but also the tightness required to prevent atmospheric water vapors from entering the unit. For these reasons, this type of insulation can also be used in cooling water circuits, as it prevents the formation of condensate on the surface of the separator body.

NOTE: Insulation shells are not available for sizes 6" through 12".

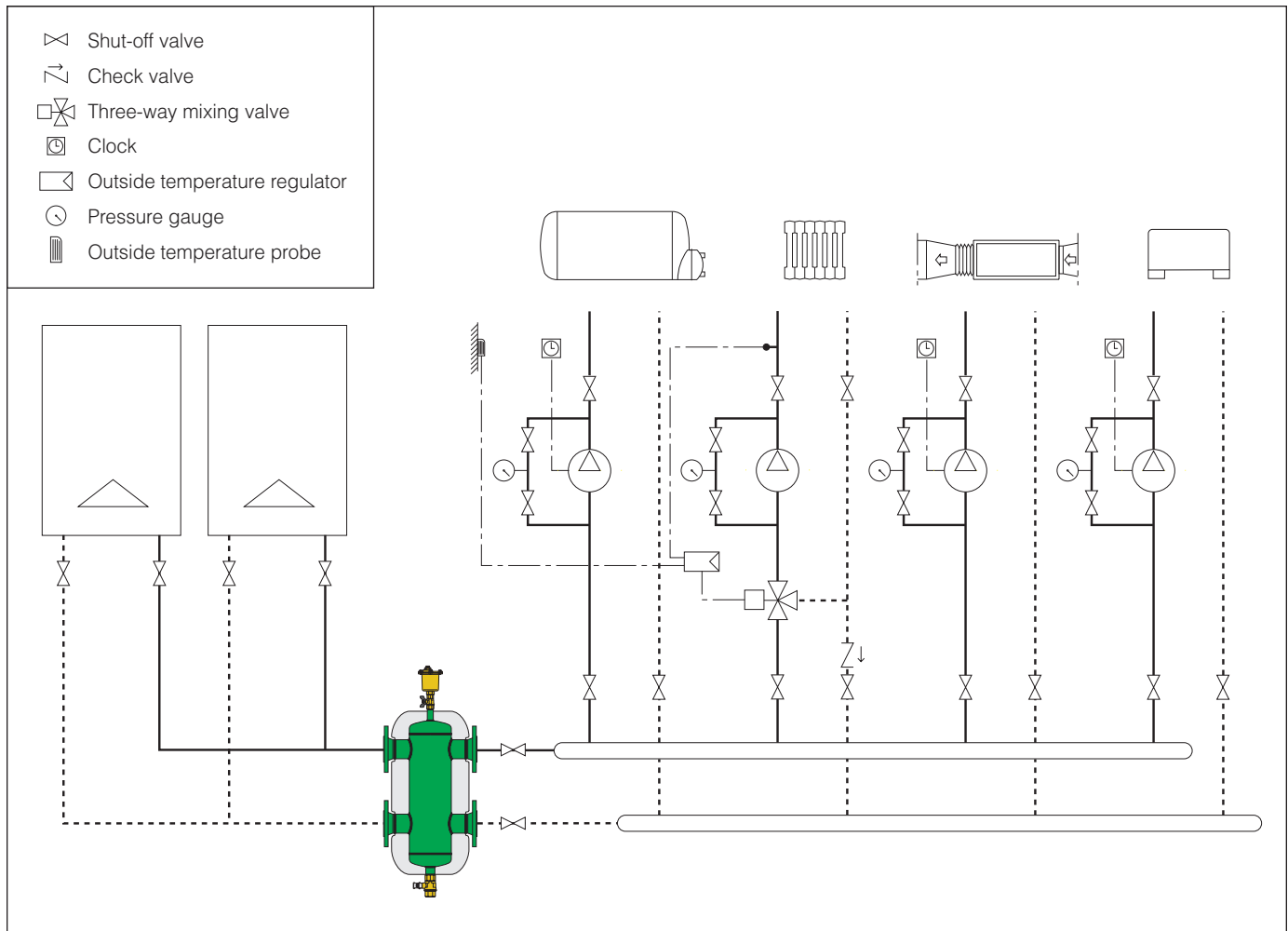


Hydraulic characteristics

The HydroCal™ should be sized according to the maximum flow rate value at the inlet. The selected design value must be the greatest required flow rate of either the primary circuit or the secondary circuit.

Size	2"	2½"	3"	4"	6"	8"	10"	12"
gpm	37.3	63	95.5	149	380	625	1030	1650
m³/h	8.5	14	22	34	86	142	302	420
l/s	2.3	4.0	6.0	9.4	24	40	83	104

Application diagram



SPECIFICATION SUMMARIES

HydroCal™ 549 series

Combination hydraulic, air and dirt separator. ANSI B16.5 CLASS 150 RF flanged connections 2", 2-1/2", 3" and 4". Epoxy resin painted steel body. 300 series stainless steel internal coalescing mesh. Vessel working temperature range of 32–220°F (0–105°C) with insulation, 32–270°F (0–132°C) without insulation. Glycol maximum 50%. 100% air removal to microbubble level. Particle separation rating to 5 micron (0.2 mil). Max. connection velocity 4 feet per second (1.2 m/s). Max. working pressure 150 psi (10 bar). Supplied with: automatic air vent with 3/4" NPT female outlet connection and brass body. Brass body 3/4" NPT female shut-off ball valve for air vent. Drain ball valve brass body with 1-1/4" NPT female connection. Rigid closed cell expanded polyurethane foam shell insulation with external embossed aluminium cover for 2, 2-1/2, 3 and 4 inch sizes.

HydroCal™ NA549 series

Combination hydraulic, air and dirt separator. ANSI B16.5 CLASS 150 RF flanged connections 2", 2-1/2", 3", 4", 6", 8", 10" and 12". Epoxy resin painted steel body. 300 series stainless steel internal coalescing mesh. Vessel working temperature range of 32–220°F (0–105°C) with insulation, 32–270°F (0–132°C) without insulation. Glycol maximum 50%. 100% air removal to microbubble level. Particle separation rating to 5 micron (0.2 mil). Max. connection velocity 4 feet per second (1.2 m/s). Max. working pressure 150 psi (10 bar). Supplied with: automatic air vent with 3/4" NPT female outlet connection and brass body. Brass body 3/4" NPT female shut-off ball valve for air vent. Drain ball valve brass body with 1-1/4" NPT female connection for separator sizes 2–6"; 2" NPT female connections for separator size 8–12". For separator size 8–12" only thermometer pocket well on front center 3/4" NPT female; and on inlet/outlet flanges 1/2" NPT female. Rigid closed cell expanded polyurethane foam shell insulation with external embossed aluminium cover for 2, 2-1/2, 3 and 4 inch sizes. The separator is designed and built in accordance Section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code and tagged and registered with the National Board of Boiler and Pressure Vessel Inspector, and CRN registered, and stamped for 150 psi (10 bar) working pressure, with ASME U stamp.

We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.



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ET-1

EXTROL®

Hydronic Expansion Tanks: Vertical AX Series ASME

150 PSIG Working Pressure

Construction

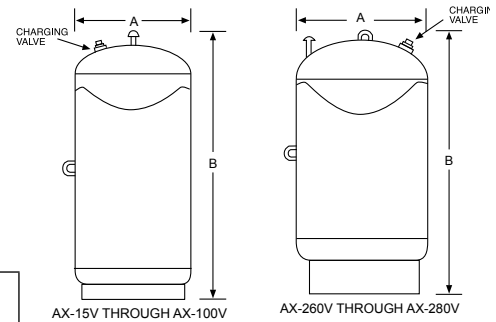
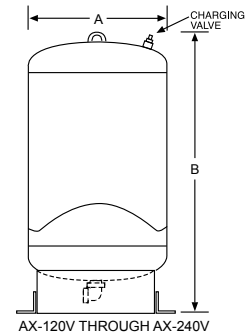
Shell	ASME Approved Steel
Diaphragm	Heavy Duty Butyl/EPDM
System Connection	NPTF ¹ Malleable Iron Center NPTF ² Malleable Iron Bottom NPTM ³ Malleable Iron Top Offset
Finish	Red Oxide Primer
Air Valve	Schrader Valve w/EPDM Seats
Factory Precharge	12 PSIG (.8 bar)

Performance

Maximum Operating Temperature	240°F (115°C)
Maximum Working Pressure	150 PSIG (10.3 bar)
Warranty	1 Year

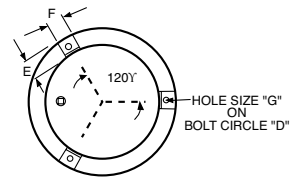
Application

- For use in closed, non-potable hydronic heating and chilled water systems.
- Diaphragm design meets all ASME Code Section VIII, Division 1 standards.
- Available with optional sight glass and seismic restraints.



Vertical ASME Models

Model Number	Tank Volume		Max. Accept. Volume		A Tank Diameter		B Tank Height		Sys. Conn	Shipping Weight	
	Gal	Lit	Gal	Lit	In	mm	In	mm		In	Lbs
AX-15V	8.0	30.3	2.4	9.1	12	305	20	508	1/2 ¹	41	19
AX-20V	10.9	41.3	2.4	9.1	12	305	27	686	1/2 ¹	49	22
AX-40V	21.7	82.2	11.3	42.8	16	356	30	762	1/2 ¹	80	36
AX-60V	33.6	127.2	11.3	42.8	16	356	45	1143	1/2 ¹	103	47
AX-80V	44.4	168.1	22.6	85.5	24	610	29	737	1 ¹	167	76
AX-100V	55.7	211.8	22.6	85.5	24	610	34	864	1 ¹	187	85
AX-120V	68.0	257.4	34.0	128.7	24	610	47	1194	1 ²	255	116
AX-144V	77.0	291.5	34.0	128.7	24	610	52	1321	1 ²	267	121
AX-180V	90.0	340.7	34.0	128.7	24	610	60	1524	1 ²	275	125
AX-200V	110.0	416.4	34.0	128.7	24	610	66	1676	1 ²	358	162
AX-240V	132.0	500.0	46.0	174.0	30	762	58	1473	1 ²	403	183
AX-260V	159.0	600.0	56.0	212.0	30	762	65	1651	1 1/4 ³	467	212
AX-280V	211.0	800.0	84.0	318.0	30	762	82	2083	1 1/4 ³	605	274



BOTTOM VIEW

Optional Seismic Restraints

Tank Diameter	Bolt Circle	Dim. E	Dim. F	Hole Size G
12	12 3/4	2	2	9/16
16 1/4	14 3/4	2	2	9/16
24	18	2	2	9/16
30	27	3	3	3/4

All dimensions and weights are approximate.

Job Name _____	Notes _____
Engineer _____	_____
Contractor _____	_____
P.O. No. _____	_____
Sales Rep. _____	_____
Model No. _____	_____



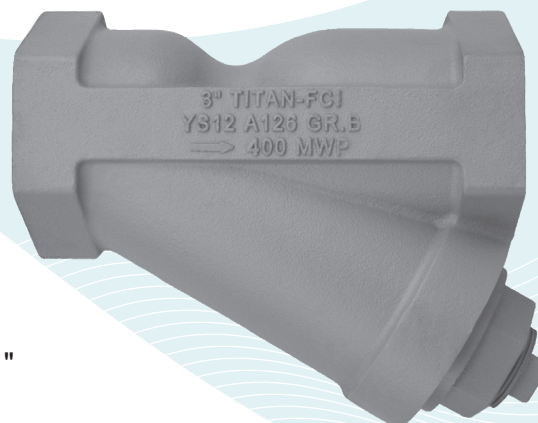


"Y" (WYE) STRAINER ❖ ANSI CLASS 250

CAST IRON ❖ THREADED ENDS

MODEL: YS 12-CI

(CAST IRON)



3" YS 12-CI

FEATURES

SIZE RANGE : 1/4" ~ 3"

- ❖ **LARGE STRAINING CAPACITY**
WITH ITS LARGE BODY AND SIZABLE STRAINING ELEMENT, THE YS12 PROVIDES EXCELLENT OPEN AREA RATIOS THAT ARE TYPICALLY TWO-AND-A-HALF TIMES LARGER THAN THE CORRESPONDING PIPELINE.
- ❖ **PRECISION MACHINED SEATS**
PRECISION MACHINED SCREEN SEATS IN BOTH THE BODY AND CAP HELP TO ENSURE ACCURATE POSITIONING OF THE SCREEN DURING REASSEMBLY AFTER CLEANING. ALSO, THE MACHINED BODY SEATS ENABLE FINER FILTRATION BY PREVENTING DEBRIS BYPASS.
- ❖ **SELF-CLEANING CAPABILITY**
WITH A TAPPED NPT BLOW-OFF CONNECTION, THIS UNIT CAN BE FITTED WITH A BLOW-DOWN VALVE WHICH FACILITATES CLEANING OF THE STRAINING ELEMENT. PLEASE CONTACT FACTORY FOR MORE INFORMATION.
- ❖ **EPOXY PAINTED**
ALL UNITS ARE EPOXY PAINTED TO HELP RESIST RUST AND CORROSION. TITAN FCI ALSO OFFERS EPOXY COATING AS AN OPTION FOR THE YS12.
- ❖ **POTABLE WATER/FDA APPROVED COATINGS AVAILABLE**
IN ADDITION TO ITS LEAD FREE, CAST IRON BODY, TITAN CAN PROVIDE NSF/ANSI AND FDA APPROVED EPOXY COATINGS WHICH MAKE THIS PRODUCT SUITABLE FOR POTABLE WATER AND FOOD CONTACT APPLICATIONS. NUMEROUS OPTIONS ARE AVAILABLE. PLEASE CONTACT US FOR MORE DETAILS.
- ❖ **THREADED CAP**
TITAN'S YS12 HAS STRAIGHT THREADS TO PERMIT EASY CAP REMOVAL FOR CLEANING AND PROPER ALIGNMENT WHEN REASSEMBLING STRAINER.
- ❖ **NATURAL GAS AND OTHER SPECIAL APPLICATIONS**
TITAN HAS EXTENSIVELY TESTED THE YS12 IN GAS APPLICATIONS AND DETERMINED THAT BUNA-N GASKETS PROVIDE SUPERB SEALING CAPABILITIES FOR THE SERVICE. ALWAYS SPECIFY IF A SPECIAL GASKET OR SCREEN IS REQUIRED FOR A SPECIFIC APPLICATION.



TECHNICAL

PRESSURE/TEMPERATURE RATING
CI- ASTM A126 GR. B - CLASS 250
YS 12-CI (THREADED)

WOG (Non-shock): 400 PSI @ 150 °F

- The above listed temperatures are theoretical and may vary during actual operating conditions.

APPLICATIONS

GENERAL APPLICATION: Y-STRAINERS ARE INSTALLED IN A PIPING SYSTEM TO REMOVE UNWANTED DEBRIS FROM THE PIPELINE, PROTECTING EXPENSIVE EQUIPMENT DOWNSTREAM SUCH AS PUMPS, METERS, SPRAY NOZZLES, COMPRESSORS, AND TURBINES. THEY CAN BE PLACED IN A HORIZONTAL OR VERTICAL PIPELINE AS LONG AS THE SCREEN IS IN A DOWNWARD POSITION. STRAINING IS ACCOMPLISHED VIA AN INTERNAL PERFORATED OR MESH LINED STRAINING ELEMENT, THE SIZE OF WHICH SHOULD BE DETERMINED BASED ON THE SIZE OF THE SMALLEST PARTICLE TO BE REMOVED.

SERVICING: THE STRAINING ELEMENT NEEDS REGULAR CLEANING TO PREVENT DEBRIS BUILD UP. IT IS NOT ADVISABLE TO ALLOW THE DIFFERENTIAL PRESSURE TO INCREASE BY 20 PSI. ALTHOUGH CLEANING NORMALLY REQUIRES THE REMOVAL OF THE STRAINING ELEMENT, INSTALLING AND USING A TITAN BLOW-OFF DRAIN VALVE CAN INCREASE THE TIME BETWEEN CLEANINGS.

The above data represents common market and service applications. No representation or guarantee, expressed or implied, is given due to the numerous variations of concentrations, temperatures and flow conditions that may occur during actual service.

TITAN FLOW CONTROL, INC.
YOUR PIPELINE TO THE FUTURE!

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Fax: 910.738.3848

"Y" (WYE) STRAINER
YS 12-CI - (Cast Iron)
Threaded Ends • Cast Iron • ANSI Class 250

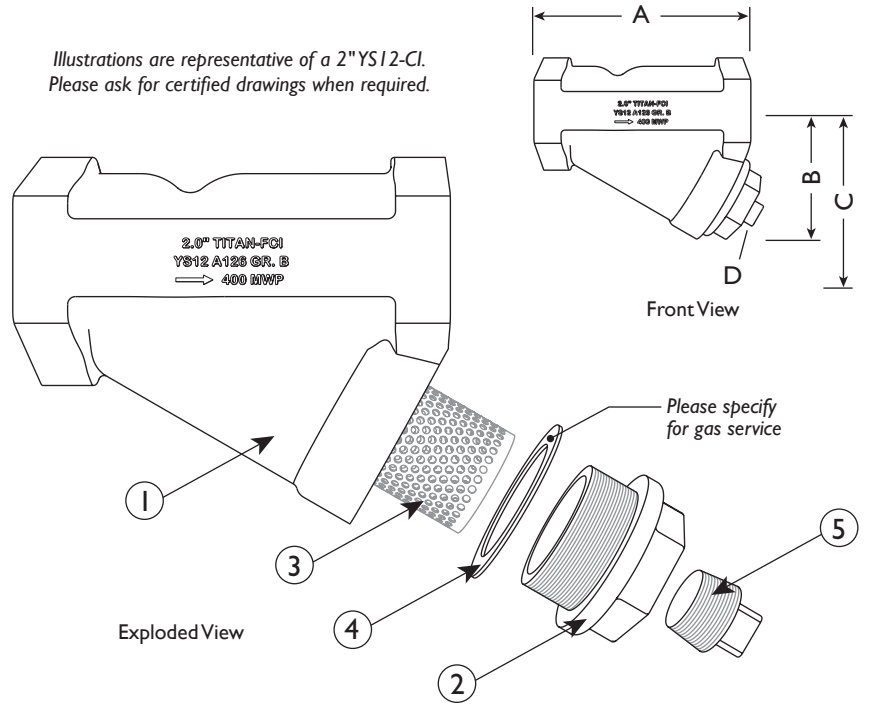
ANSI Class
250

BILL OF MATERIALS (1)

No.	PART	YS 12-CI
1	Body (2)	Cast Iron A126 Gr. B
2	Cap	Cast Iron A126 Gr. B
3	Straining Element (3)	Stainless Steel (6)
4	Gasket (3) (4)	Grafoil
5	NPT Plug (Blow-off) (5)	Steel

- Bill of Materials represents standard materials. Equivalent or better materials may be substituted at the manufacturer's discretion.
- All units are epoxy painted.
- Denotes recommended spare parts.
- Contact Titan for special gaskets materials, including Buna-N or Viton, for natural gas, hot air, or other applications.
- The YS12 can be furnished with bronze blow-off plug to meet Military Specification WW-S-2739. Contact factory.
- Stainless Steel Straining Element is available in Type 304 and Type 316 Stainless Steel. A wide range of wire mesh and perforated screens are available. See "Standard Screen Selections" chart below for standard perforations and meshes. Please specify if a non-standard screen is required.

Illustrations are representative of a 2" YS12-CI.
Please ask for certified drawings when required.

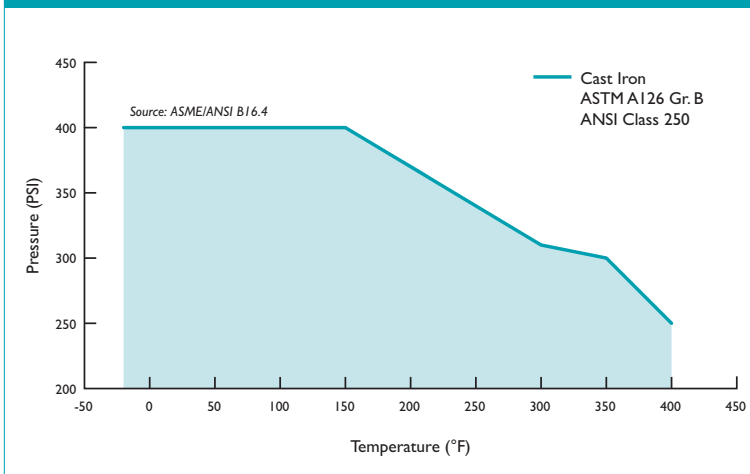


DIMENSIONS AND PERFORMANCE DATA (1)

SIZE	in	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
	mm	8	10	15	20	25	32	40	50	65	80
A DIMENSION FACE TO FACE (2)	in	3.188	3.188	3.188	3.75	4.2	5.0	5.75	7.0	9.25	10.0
	mm	81	81	81	95	107	127	146	178	235	254
B DIMENSION CENTER LINE TO BOTTOM	in	2.063	2.063	2.063	2.438	2.625	3.375	3.875	4.75	5.875	6.0
	mm	52	52	52	62	67	86	98	121	149	152
C DIMENSION SCREEN REMOVAL	in	2.375	2.375	2.375	3.0	3.25	4.25	5.0	6.125	7.875	8.0
	mm	60	60	60	76	83	108	127	156	200	203
D NPT Plug BLOW-OFF	in	1/4	1/4	1/4	3/8	3/8	3/4	3/4	1	1 1/2	1 1/2
	mm	8	8	8	10	10	20	20	25	40	40
APPROXIMATE ASSEMBLED WEIGHT	lb	1.5	1.5	1.5	2.5	3.5	6.0	9.0	14.0	25.5	32.0
	kg	0.7	0.7	0.7	1.1	1.6	2.7	4.1	6.3	11.6	14.5
Flow Coefficient	Cv	0.7	2	8	15	22	38	42	70	110	160

- Dimensions and weights are for reference only. When required, request certified drawings.
- Face to face values have a tolerance of ±0.06 in (±2.0 mm).

PRESSURE - TEMPERATURE RATINGS



PRESSURE - TEMPERATURE RATING

ANSI Class 250	A126 Gr. B
WOG (Non-shock):	400 PSI @ 150 °F

STANDARD SCREEN SELECTIONS

Size	Liquid	Open Area	Steam	Open Area
1/4" ~ 2"	20 Mesh	51.8%	30 Mesh	44.8%
2 1/2" ~ 3"	1/16 (.0625)	41%	3/64 (.045)	36%

REFERENCED STANDARDS & CODES

CODE	DESCRIPTION
ASME/ANSI B16.4	Cast Iron Threaded Fittings

Titan FCI makes every effort to ensure the information presented on our literature accurately reflects exact product specifications. However, as product changes occur, there may be short-term differences between actual product specifications and the information contained within our literature. Titan FCI reserves the right to make design and specification changes to improve our products without prior notification. When required, request certified drawings.



TITAN FLOW CONTROL, INC.

"Y" (WYE) STRAINER ♦ ANSI CLASS 125

CAST IRON ♦ FLANGED ENDS, FLAT FACE

NEWLY DESIGNED...
Gauge Taps

STANDARD ON ALL
YS 58-CI MODELS IN
SIZES 2" ~ 20"



MODELS: **YS 58-CI**
(CAST IRON)

FEATURES

SIZE RANGE : 2" ~ 24"

♦ NEW DESIGN WITH GAUGE TAPS

TITAN'S YS58 HAS CONVENIENT GAUGE TAPS FURNISHED WITH A PLUG ON BOTH THE INLET AND OUTLET SIDES OF SIZES 2" THROUGH 20". THESE TAPS ALLOW FOR EASY INSTALLATION OF PRESSURE GAUGES TO MONITOR DIFFERENTIAL PRESSURE AND DETERMINE WHEN SCREEN CLEANING IS NECESSARY. ADDITIONALLY, SIZES 2" THROUGH 6" HAVE AN EXTRA BOSS FOR CUSTOM GAUGE TAPPING.

♦ LARGE STRAINING CAPACITY

WITH ITS LARGE BODY AND SIZABLE STRAINING ELEMENT, THE YS58 PROVIDES EXCELLENT OPEN AREA RATIOS THAT ARE TYPICALLY TWO-AND-A-HALF TIMES LARGER THAN THE CORRESPONDING PIPELINE.

♦ PRECISION MACHINED SEATS

PRECISION MACHINED SCREEN SEATS IN BOTH THE BODY AND CAP HELP TO ENSURE ACCURATE POSITIONING OF THE SCREEN DURING REASSEMBLY AFTER CLEANING. ALSO, THE MACHINED BODY SEATS ENABLE FINER FILTRATION BY PREVENTING DEBRIS BYPASS.

♦ SELF-CLEANING CAPABILITY

WITH A TAPPED NPT BLOW-OFF CONNECTION, THIS UNIT CAN BE FITTED WITH A BLOW-DOWN VALVE WHICH FACILITATES CLEANING OF THE STRAINING ELEMENT. PLEASE CONTACT FACTORY FOR MORE INFORMATION.

♦ EPOXY PAINTED

ALL UNITS ARE EPOXY PAINTED TO HELP RESIST RUST AND CORROSION. TITAN FCI ALSO OFFERS EPOXY COATING AS AN OPTION FOR THE YS58.

♦ POTABLE WATER/FDA APPROVED COATINGS AVAILABLE



IN ADDITION TO ITS LEAD FREE, CAST IRON BODY, TITAN CAN PROVIDE NSF/ANSI AND FDA APPROVED EPOXY COATINGS WHICH MAKE THIS PRODUCT SUITABLE FOR POTABLE WATER AND FOOD CONTACT APPLICATIONS. NUMEROUS OPTIONS ARE AVAILABLE. PLEASE CONTACT US FOR MORE DETAILS.

♦ OPTIONAL COVER DESIGNS

TITAN'S YS58 IS AVAILABLE WITH DIFFERENT COVER OPTIONS INCLUDING SWING, CLAMP, AND HINGE TYPE COVERS. PLEASE CONSULT FACTORY FOR MORE INFORMATION ON THESE OPTIONS.

TECHNICAL

PRESSURE/TEMPERATURE RATING
CI-ASTM A126 GR. B - CLASS 125
SIZES 2" ~ 12"

WOG (Non-shock): 200 PSI @ 150 °F

PRESSURE/TEMPERATURE RATING
CI-ASTM A126 GR. B - CLASS 125
SIZES 14" ~ 24"

WOG (Non-shock): 150 PSI @ 150 °F

• The above listed temperatures are theoretical and may vary during actual operating conditions.

APPLICATIONS

GENERAL APPLICATION: Y-STRAINERS ARE INSTALLED IN A PIPING SYSTEM TO REMOVE UNWANTED DEBRIS FROM THE PIPELINE, PROTECTING EXPENSIVE EQUIPMENT DOWNSTREAM SUCH AS PUMPS, METERS, SPRAY NOZZLES, COMPRESSORS, AND TURBINES. THEY CAN BE PLACED IN A HORIZONTAL OR VERTICAL PIPELINE AS LONG AS THE SCREEN IS IN A DOWNWARD POSITION. STRAINING IS ACCOMPLISHED VIA AN INTERNAL PERFORATED OR MESH LINED STRAINING ELEMENT, THE SIZE OF WHICH SHOULD BE DETERMINED BASED ON THE SIZE OF THE SMALLEST PARTICLE TO BE REMOVED.

SERVICING: THE STRAINING ELEMENT NEEDS REGULAR CLEANING TO PREVENT DEBRIS BUILD UP. IT IS NOT ADVISABLE TO ALLOW THE DIFFERENTIAL PRESSURE TO INCREASE BY 20 PSI. ALTHOUGH CLEANING NORMALLY REQUIRES THE REMOVAL OF THE STRAINING ELEMENT, INSTALLING AND USING A TITAN BLOW-OFF DRAIN VALVE CAN INCREASE THE TIME BETWEEN CLEANINGS.

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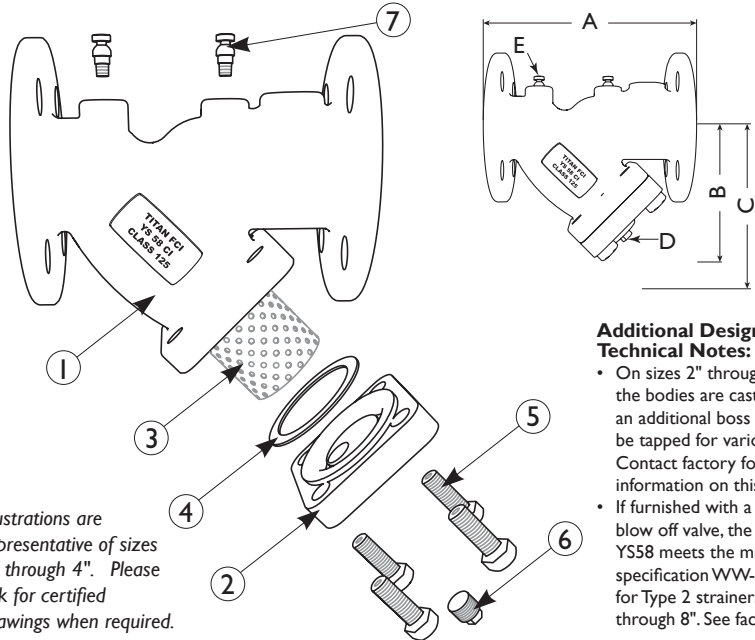
"Y" (WYE) STRAINER
YS 58-CI - (Cast Iron)
Flanged Ends • Flat Face • Cast Iron

ANSI Class
125

BILL OF MATERIALS ⁽¹⁾

No.	PART	YS 58-CI
1	Body	Cast Iron A126 Gr. B
2	Cover	Cast Iron A126 Gr. B
3	Straining Element ⁽²⁾	Stainless Steel
4	Gasket ⁽²⁾	Non-Asbestos Gasket, Garlock 3000 or Equal
5	Cap Screws	Steel
6	NPT Plug (Blow-off)	Carbon Steel
7	NPT Plugs (Gauge Taps) ⁽³⁾	Carbon Steel

1. Bill of Materials represents standard materials. Equivalent or better materials may be substituted at the manufacturer's discretion.
2. Denotes recommended spare parts.
3. Gauge taps and NPT Plugs (Part #7) are standard only on sizes 2" through 20". See Dimensions and Performance Data for the standard NPT sizes.



Illustrations are representative of sizes 2" through 4". Please ask for certified drawings when required.

Additional Design and Technical Notes:

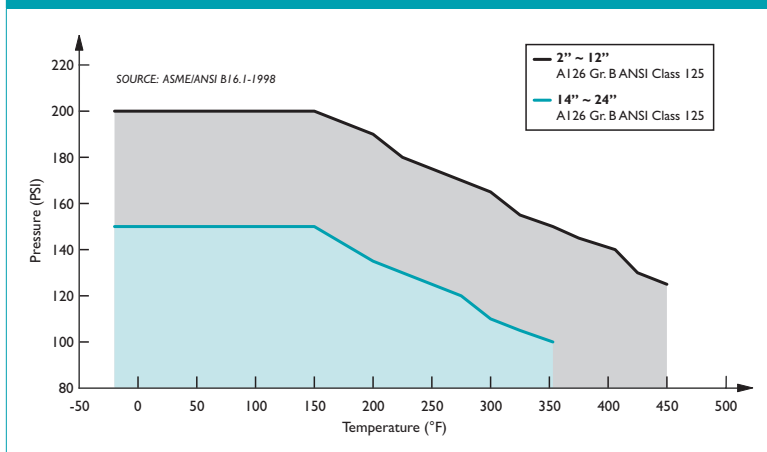
- On sizes 2" through 6", the bodies are cast with an additional boss that can be tapped for various sizes. Contact factory for more information on this option.
- If furnished with a bronze blow off valve, the YS58 meets the military specification WW-S-2739 for Type 2 strainers, sizes 2" through 8". See factory.

DIMENSIONS AND PERFORMANCE DATA ⁽¹⁾

SIZE	in	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
	mm	50	65	80	100	125	150	200	250	300	350	400	450	500	600
A DIMENSION FACE TO FACE (FLAT FACE) ⁽²⁾	in	7.875	10.0	10.125	12.12	15.62	18.5	21.625	25.75	29.87	33.25	38.75	43.125	49.5	58.375
	mm	200	254	256	308	397	470	550	655	759	845	984	1095	1257	1483
B DIMENSION CENTER LINE TO BOTTOM	in	5.25	6.50	7.0	8.25	11.25	13.5	15.5	18.5	21.75	25.0	26.5	31.0	39.0	45.0
	mm	133	166	178	210	286	343	394	470	553	625	673	787	991	1143
C DIMENSION SCREEN REMOVAL	in	7.0	9.75	10.0	12.0	20.0	20.0	22.75	28.0	30.0	36.5	42.0	45.5	56.0	68.0
	mm	178	248	254	305	508	508	578	712	762	927	1067	1156	1422	1727
D NPT Plug BLOW-OFF	in	1/2	1	1	1 1/2	2	2	2	2	2	2	2	2	2	2
	mm	15	25	25	40	50	50	50	50	50	50	50	50	50	50
E NPT Plug GAUGETAPS	in	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	n/a
	mm	8	8	8	8	8	8	8	8	8	8	8	8	8	n/a
APPROXIMATE ASSEMBLED WEIGHT	lb	20.0	33.0	34.0	60.0	105.0	130.0	236.0	358.0	560.0	818.0	1145.0	1740.0	1888.0	3000.0
	kg	9.1	15.0	15.4	27.2	47.6	59.0	107.1	162.4	254.0	371.0	519.4	789.3	856.4	1360.8
Flow Coefficient	C _v	70	110	160	260	400	570	950	1600	2200	3300	4900	6100	8000	11000

1. Dimensions and weights are for reference only. When required, request certified drawings.
2. Face to face values have a tolerance of ±0.06 in (±2.0 mm) for sizes 10" and lower and a tolerance of ±0.12 in (±3.0 mm) for sizes 12" and larger.

PRESSURE - TEMPERATURE RATINGS ⁽¹⁾



1. This chart displays the pressure-temperature ratings for the valve's body per ASME B16.1-1998.

Titan FCI makes every effort to ensure the information presented on our literature accurately reflects exact product specifications. However, as product changes occur, there may be short-term differences between actual product specifications and the information contained within our literature. Titan FCI reserves the right to make design and specification changes to improve our products without prior notification. When required, request certified drawings.

PRESSURE - TEMPERATURE RATING

A126 Gr. B	2" ~ 12"	14" ~ 24"
WOG (Non-shock):	200 PSI @ 150 °F	150 PSI @ 150 °F
Saturated Steam:	125 PSI @ 353°F	100 PSI @ 353°F
Max Liquid:	125 PSI @ 450 °F	100 PSI @ 353 °F

STANDARD SCREEN SELECTIONS

Size	Liquid	Open Area	Steam	Open Area
2" ~ 4"	1/16 (.0625)	41%	3/64 (.045)	36%
5" ~ 8"	1/8 (.125)	40%	3/64 (.045)	36%
10" ~ 16" ⁽¹⁾	1/8 (.125)	40%	30 Mesh Lined	44.8%

1. Please consult factory for screen selections on 18" and larger YS 58-CI models.

REFERENCED STANDARDS & CODES

CODE	DESCRIPTION
ASME/ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings



MASON INDUSTRIES, Inc.

MERCER RUBBER Co.

350 Rabro Drive, Hauppauge, NY 11788
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 Mercer- 631/582-1524 • Info@Mercer-Rubber.com
 FAX 631/348-0279

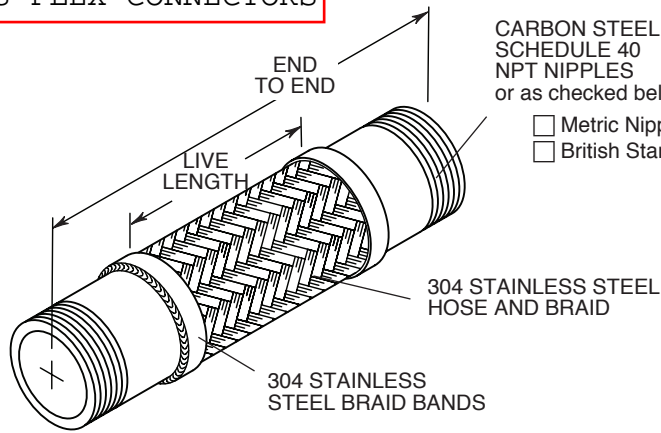


JOB NAME _____
 CUSTOMER _____
 CUSTOMER P.O. _____
 MASON M. _____
 DWG No. _____

MN

**SS BRAIDED
 HOSE with CARBON
 STEEL THREADED
 NIPPLES**

SS FLEX CONNECTORS



CARBON STEEL
 SCHEDULE 40
 NPT NIPPLES
 or as checked below
 Metric Nipples
 British Standard Nipples

**Industry Standard
 Pump Connectors**

**Short lengths conserve
 space but allow minimum
 motion and attenuation.
 Offset Ratings are
 industry standard.**

**Vacuum rating varies with size and application.
 Consult factory on all vacuum applications.**

**RATED PRESSURES @
 ELEVATED TEMPERATURES (psi) (kg/cm²)**

Hose Size (in) (mm)	250°F 121°C Factor 0.92	350°F 176°C Factor 0.86	450°F 232°C Factor 0.81
1/2 15	1010 69	950 59	890 61
3/4 20	640 44	600 41	570 39
1 25	530 36	500 34	470 32
1 1/4 32	460 32	430 30	400 28
1 1/2 40	400 28	370 26	350 24
2 50	330 23	310 21	290 20
2 1/2 65	270 19	250 17	235 16
3 80	260 18	240 16	230 16
4 100	210 15	200 14	190 13

**SATURATED STEAM
 RECOMMENDED PRESSURE LIMITS**

Size (in) (mm)	Max Gauge (psi)(kg/cm ²)	Temp Reference (°F) (°C)
1/2 15	200 14	387 197
3/4 20	200 14	387 197
1 25	150 11	362 183
1 1/4 32	150 11	362 183
1 1/2 40	150 11	362 183
2 50	150 11	362 183
2 1/2 65	125 9	355 179
3 80	125 9	355 179
4 100	125 9	355 179

Our steam service ratings are very low in the interest of safety although our 70°F (21°C) pressure ratings are as high or higher than our competitors. All locations where failure could lead to personal injury or suffocation must be avoided. In dangerous locations we suggest housed expansion joints, solid loops, ball joints, packed devices etc. rather than thin walled flexible products regardless of manufacturer.

Consult factory with full location description as well as service conditions for higher pressure or temperature applications.

304 SS can be used up to 850°F (454°C) in applications such as engine exhaust.

When using MN products in copper or brass water or steam systems, dielectric unions must be used on each end to prevent leakage from galvanic action.

MN DIMENSIONS AND PRESSURE RATINGS (American Units)

Type	Pipe Size & End to End (in)	Live Length (in)	Corrugations per foot	Maximum Permanent Lateral Offset (in)	Rated Pressure @70°F (psi)
MN	1/2 x 6 1/2	25/8	92	1/8	1100
MN	3/4 x 7	3 1/8	80	1/8	700
MN	1 x 8	35/8	72	1/8	580
MN	1 1/4 x 8 1/2	35/8	67	1/8	480
MN	1 1/2 x 9	4 1/8	63	1/8	450
MN	2 x 10 1/2	5 1/4	58	1/8	360
MN	2 1/2 x 12	5	48	1/8	290
MN	3 x 12	5	46	1/8	280
MN	4 x 12	5	32	1/8	225

MN DIMENSIONS AND PRESSURE RATINGS (Metric Units)

Type	Pipe Size & End to End (mm)	Live Length (mm)	Corrugations per meter	Maximum Permanent Lateral Offset (mm)	Rated Pressure @21°C (kg/cm ²)
MN	15 x 165	67	302	3	77
MN	20 x 178	80	262	3	49
MN	25 x 203	93	236	3	40
MN	32 x 216	94	220	3	33
MN	40 x 229	107	207	3	31
MN	50 x 267	135	190	3	25
MN	65 x 305	127	157	3	20
MN	80 x 305	127	151	3	19
MN	100 x 305	127	105	3	15

End to End Tolerance: minus 1% plus 3%. Minimum Burst is four times the Rated Pressure. Safety factor of 4.
 Lateral Offset one side of centerline and normal machinery vibration. If intermittent in both directions, reduce by 50%.

QTY	SIZE	TAG

QTY	SIZE	TAG



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MASON M.
DWG No.

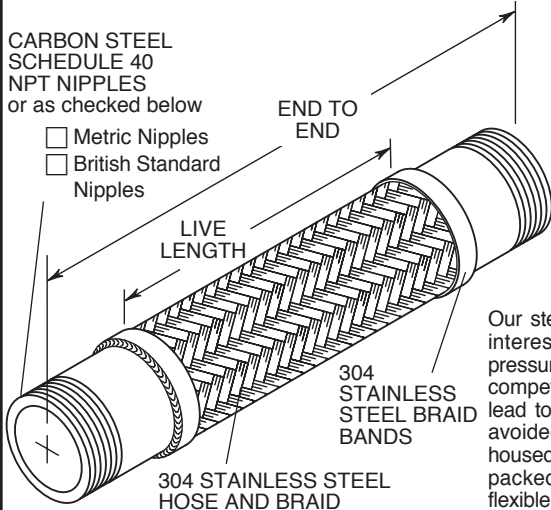
MN

SS BRAIDED HOSE with CARBON STEEL THREADED NIPPLES

Vacuum rating varies with size and application. Consult factory on all vacuum applications.

CARBON STEEL SCHEDULE 40 NPT NIPPLES or as checked below

- Metric Nipples
British Standard Nipples



RATED PRESSURES @ ELEVATED TEMPERATURES (psi) (kg/cm²)

Table with columns for Hose Size (in/mm), 250°F/121°C, 350°F/176°C, 450°F/232°C and rows for various sizes from 1/2 to 4 inches.

SATURATED STEAM RECOMMENDED PRESSURE LIMITS

Table with columns for Size (in/mm), Max Gauge (psi/kg/cm²), and Temp Reference (°F/°C) for sizes 1/2 to 4 inches.

Our steam service ratings are very low in the interest of safety although our 70°F (21°C) pressure ratings are as high or higher than our competitors. All locations where failure could lead to personal injury or suffocation must be avoided.

Consult factory with full location description as well as service conditions for higher pressure or temperature applications.

304 SS can be used up to 850°F (454°C) in applications such as engine exhaust.

When using MN products in copper or brass water or steam systems, dielectric unions must be used on each end to prevent leakage from galvanic action.

MN DIMENSIONS AND PRESSURE RATINGS (American Units)

Table with columns: Type, Pipe Size & End to End (in), Live Length (in), Corrugations per foot, Maximum Permanent Lateral Offset (in), and Rated Pressure @70°F (psi).

MN DIMENSIONS AND PRESSURE RATINGS (Metric Units)

Table with columns: Type, Pipe Size & End to End (mm), Live Length (mm), Corrugations per meter, Maximum Permanent Lateral Offset (mm), and Rated Pressure @21°C (kg/cm²).

End to End Tolerance: minus 1% plus 3%. Minimum Burst is four times the Rated Pressure. Safety factor of 4. Lateral Offset one side of centerline and normal machinery vibration. If intermittent in both directions, reduce by 50%.

Table with columns: QTY, SIZE, TAG

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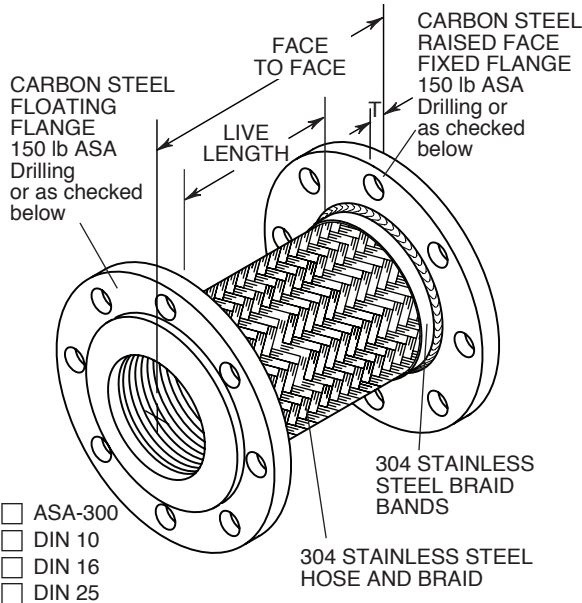


JOB NAME _____
 CUSTOMER _____
 CUSTOMER P.O. _____
 MASON M. _____
 DWG No. _____

FFL

SS BRAIDED
 HOSE with
 CARBON STEEL
 FIXED & FLOATING
 FLANGES

**Vacuum rating varies with size and application.
 Consult factory on all vacuum applications.**



**CARBON STEEL PLATE
 FLANGE THICKNESS**

Pipe Size (in)	(mm)	Flange Thickness T (in)	(mm)
1 1/2 thru 4	40 thru 100	5/8	16
5 thru 6	125 thru 150	3/4	19
8 thru 16	200 thru 400	1	25

**Industry Standard
 Pump Connectors**

Short lengths conserve space but allow minimum motion and attenuation. Offset Ratings are industry standard.

**RATED PRESSURES @
 ELEVATED TEMPERATURES (psi) (kg/cm²)**

Hose Size (in) (mm)	250°F 121°C Factor 0.92	350°F 176°C Factor 0.86	450°F 232°C Factor 0.81
1 1/2 40	400 28	370 26	350 24
2 50	330 23	310 21	290 20
2 1/2 65	270 19	250 17	235 16
3 80	260 18	240 16	230 16
4 100	210 15	200 14	190 13
5 125	190 13	180 12	170 11
6 150	190 13	180 12	170 11
8 200	190 13	180 12	170 11
10 250	160 11	150 10	140 9
12 300	160 11	150 10	140 9
14 350	160 11	150 10	140 9
16 400	160 11	150 10	140 9

**SATURATED STEAM
 RECOMMENDED PRESSURE LIMITS**

Size (in) (mm)	Max Gauge (psi) (kg/cm ²)	Temp Reference (F) (°C)
1 1/2 40	150 11	362 183
2 50	150 11	362 183
2 1/2 65	125 9	355 179
3 80	125 9	355 179
4 100	125 9	355 179
5 125	100 7	337 169
6 150	100 7	337 169
8 200	75 5	320 160
10 250	60 4	307 153
12 300	60 4	307 153
14 350	60 4	307 153
16 400	60 4	307 153

Our steam service ratings are very low in the interest of safety although our 70°F (21°C) pressure ratings are as high or higher than our competitors. All locations where failure could lead to personal injury or suffocation must be avoided. In dangerous locations we suggest housed expansion joints, solid loops, ball joints, packed devices etc. rather than thin walled flexible products regardless of manufacturer.

Consult factory with full location description as well as service conditions for higher pressure or temperature applications.

304 SS can be used up to 850°F (454°C) in applications such as engine exhaust.

When using FFL products in copper or brass water or steam systems, dielectric flanges must be used on each end to prevent leakage from galvanic action.

FFL DIMENSIONS AND PRESSURE RATINGS (American Units)

Type	Pipe Size & Face to Face (in)	Live Length (in)	Corrugations per foot	Maximum Permanent Lateral Offset (in)	Rated Pressure @70°F (psi)
FFL	11/2 X 9	63/4	63	1/8	450
FFL	2 X 9	63/4	58	1/8	360
FFL	2 1/2 X 9	6	48	1/8	290
FFL	3 X 9	6	46	1/8	280
FFL	4 X 9	6	32	1/8	225
FFL	5 X 12	83/4	29	1/8	200
FFL	6 X 12	83/4	25	1/8	200
FFL	8 X 12	81/2	23	1/8	200
FFL	10 X 13	91/2	21	1/8	170
FFL	12 X 14	101/2	20	1/8	170
FFL	14 X 14	101/2	18	1/8	170
FFL	16 X 16	121/2	16	1/8	170

FFL DIMENSIONS AND PRESSURE RATINGS (Metric Units)

Type	Pipe Size & Face to Face (mm)	Live Length (mm)	Corrugations per meter	Maximum Permanent Lateral Offset (mm)	Rated Pressure @21°C (kg/cm ²)
FFL	40 X 229	171	207	3	31
FFL	50 X 229	171	190	3	25
FFL	65 X 229	152	157	3	20
FFL	80 X 229	152	151	3	19
FFL	100 X 229	152	105	3	15
FFL	125 X 305	222	95	3	14
FFL	150 X 305	222	82	3	14
FFL	200 X 305	216	75	3	14
FFL	250 X 330	241	69	3	11
FFL	300 X 356	267	66	3	11
FFL	350 X 356	267	59	3	11
FFL	400 X 406	318	52	3	11

Face to Face Tolerance: minus 1% plus 3%. Minimum Burst is four times the Rated Pressure. Safety factor of 4.
 Lateral Offset one side of centerline and normal machinery vibration. If intermittent in both directions, reduce by 50%.
 Sizes 12" - 16" (300-400mm) have double braid.

QTY	SIZE	TAG

QTY	SIZE	TAG



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 CUSTOMER P.O. _____
 MASON M. _____
 DWG No. _____

FFL

**SS BRAIDED
 HOSE with
 CARBON STEEL
 FIXED & FLOATING
 FLANGES**

**Vacuum rating varies with size and application.
 Consult factory on all vacuum applications.**

CARBON STEEL
 FLOATING FLANGE
 150 lb ASA Drilling
 or as checked below

FACE
 TO FACE

LIVE
 LENGTH

CARBON STEEL
 RAISED FACE FIXED
 FLANGE 150 lb ASA
 Drilling or as checked

304 STAINLESS STEEL,
 BRAID BANDS, HOSE
 AND BRAID

- DIN 10
- DIN 16
- DIN 25
- ASA-300

**RATED PRESSURES @
 ELEVATED TEMPERATURES (psi) (kg/cm²)**

Hose Size (in) (mm)	250°F 121°C	350°F 176°C	450°F 232°C
	Factor 0.92	Factor 0.86	Factor 0.81
1 1/2 40	400 28	370 26	350 24
2 50	330 23	310 21	290 20
2 1/2 65	270 19	250 17	235 16
3 80	260 18	240 16	230 16
4 100	210 15	200 14	190 13
5 125	190 13	180 12	170 11
6 150	190 13	180 12	170 11
8 200	190 13	180 12	170 11
10 250	160 11	150 10	140 9
12 300	160 11	150 10	140 9
14 350	160 11	150 10	140 9
16 400	160 11	150 10	140 9

**SATURATED STEAM
 RECOMMENDED PRESSURE LIMITS**

Size (in) (mm)	Max Gauge (psi) (kg/cm ²)	Temp Reference (F) (°C)
1 1/2 40	150 11	362 183
2 50	150 11	362 183
2 1/2 65	125 9	355 179
3 80	125 9	355 179
4 100	125 9	355 179
5 125	100 7	337 169
6 150	100 7	337 169
8 200	75 5	320 160
10 250	60 4	307 153
12 300	60 4	307 153
14 350	60 4	307 153
16 400	60 4	307 153

**FFL DIMENSIONS AND
 PRESSURE RATINGS (American Units)**

Type	Pipe Size & Face to Face (in)	Live Length (in)	Corru- gations per foot	Maximum Permanent Lateral Offset (in)	Rated Pressure @70°F (psi)
FFL	1 1/2 X 12	93/4	63	1 1/4	450
FFL	1 1/2 X 18	153/4	63	3 1/2	450
FFL	1 1/2 X 24	213/4	63	6 1/2	450
FFL	2 X 12	93/4	58	1 1/8	360
FFL	2 X 18	153/4	58	2 1/2	360
FFL	2 X 24	213/4	58	5	360
FFL	2 1/2 X 12	9	48	1	290
FFL	2 1/2 X 18	15	48	2 1/4	290
FFL	2 1/2 X 24	21	48	4 3/4	290
FFL	3 X 12	93/4	46	7/8	280
FFL	3 X 18	153/4	46	2	280
FFL	3 X 24	213/4	46	4	280
FFL	3 X 36	333/4	46	8	280
FFL	4 X 12	93/4	32	3/4	225
FFL	4 X 18	153/4	32	1 1/2	225
FFL	4 X 24	213/4	32	3 1/2	225
FFL	4 X 36	333/4	32	7	225
FFL	5 X 18	143/4	29	1 1/4	200
FFL	5 X 24	203/4	29	2 1/4	200
FFL	5 X 36	323/4	29	5 1/2	200
FFL	6 X 18	143/4	25	1	200
FFL	6 X 24	203/4	25	2	200
FFL	6 X 36	323/4	25	5	200
FFL	8 X 18	141/2	23	7/8	200
FFL	8 X 24	201/2	23	1 1/2	200
FFL	8 X 36	321/2	23	4	200
FFL	10 X 18	141/2	21	3/4	170
FFL	10 X 24	201/2	21	1 1/4	170
FFL	10 X 36	321/2	21	3	170
FFL	12 X 24	201/2	20	1	170
FFL	12 X 36	321/2	20	2 1/2	170
FFL	14 X 36	321/2	18	1 1/4	170
FFL	16 X 36	321/2	16	1	170

**FFL DIMENSIONS AND
 PRESSURE RATINGS (Metric Units)**

Type	Pipe Size & Face to Face (mm)	Live Length (mm)	Corru- gations per meter	Maximum Permanent Lateral Offset (mm)	Rated Pressure @21°C (kg/cm ²)
FFL	40 X 305	248	207	32	31
FFL	40 X 457	400	207	89	31
FFL	40 X 610	552	207	165	31
FFL	50 X 305	248	190	29	25
FFL	50 X 457	400	190	64	25
FFL	50 X 610	552	190	127	25
FFL	65 X 305	248	157	25	20
FFL	65 X 457	400	157	57	20
FFL	65 X 610	552	157	121	20
FFL	80 X 305	248	151	22	19
FFL	80 X 457	400	151	51	19
FFL	80 X 610	552	151	102	19
FFL	80 X 914	857	151	203	19
FFL	100 X 305	248	105	19	15
FFL	100 X 457	400	105	38	15
FFL	100 X 610	552	105	89	15
FFL	100 X 914	857	105	178	15
FFL	125 X 457	375	95	32	14
FFL	125 X 610	527	95	57	14
FFL	125 X 914	832	95	140	14
FFL	150 X 457	375	82	25	14
FFL	150 X 610	527	82	51	14
FFL	150 X 914	832	82	127	14
FFL	200 X 457	368	75	22	14
FFL	200 X 610	521	75	32	14
FFL	200 X 914	826	75	102	14
FFL	250 X 457	368	69	19	11
FFL	250 X 610	521	69	32	11
FFL	250 X 914	826	69	76	11
FFL	300 X 610	521	66	25	11
FFL	300 X 914	826	66	64	11
FFL	350 X 914	826	59	32	11
FFL	400 X 914	826	52	25	11

Our steam service ratings are very low in the interest of safety although our 70°F (21°C) pressure ratings are as high or higher than our competitors. All locations where failure could lead to personal injury or suffocation must be avoided. In dangerous locations we suggest housed expansion joints, solid loops, ball joints, packed devices etc. rather than thin walled flexible products regardless of manufacturer.

Consult factory with full location description as well as service conditions for higher pressure or temperature applications.

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When using FFL products in copper or brass water or steam systems, dielectric flanges must be used on each end to prevent leakage from galvanic action.

CARBON STEEL PLATE FLANGE THICKNESS

Pipe Size (in)	Flange Thickness T (in) (mm)
1 1/2 thru 4	5/8 16
5 thru 6	3/4 19
8 thru 16	1 25

Face to Face Tolerance: minus 1% plus 3%. Minimum Burst is four times the Rated Pressure. Safety factor of 4.
 Lateral Offset one side of centerline and normal machinery vibration. If intermittent in both directions, reduce by 50%.
 Sizes 12" - 16" (300-400mm) have double braid.

QTY	SIZE	TAG

QTY	SIZE	TAG

MASON-MERCER

STAINLESS STEEL

INTRODUCING MASON STAINLESS STEEL FLEXIBLE HOSE AND EXPANSION JOINTS

Mason Industries was started in 1958. Our first effort went toward the creation of a totally new approach to Vibration Isolation using high deflection free standing springs as opposed to traditional inadequate methods.

Our more recent work includes new approaches to both seismic and bomb blast protection, architectural isolation for floating floors, walls and ceilings, and complete building isolation, always using our own designs or new methods.

In the molded spherical rubber expansion world we started with Masonflex and Superflex that have a 35 year history and culminated our development with Safeflex, the only Kevlar reinforced spherical joint molded in high temperature EPDM with escape proof flanges in 1996.

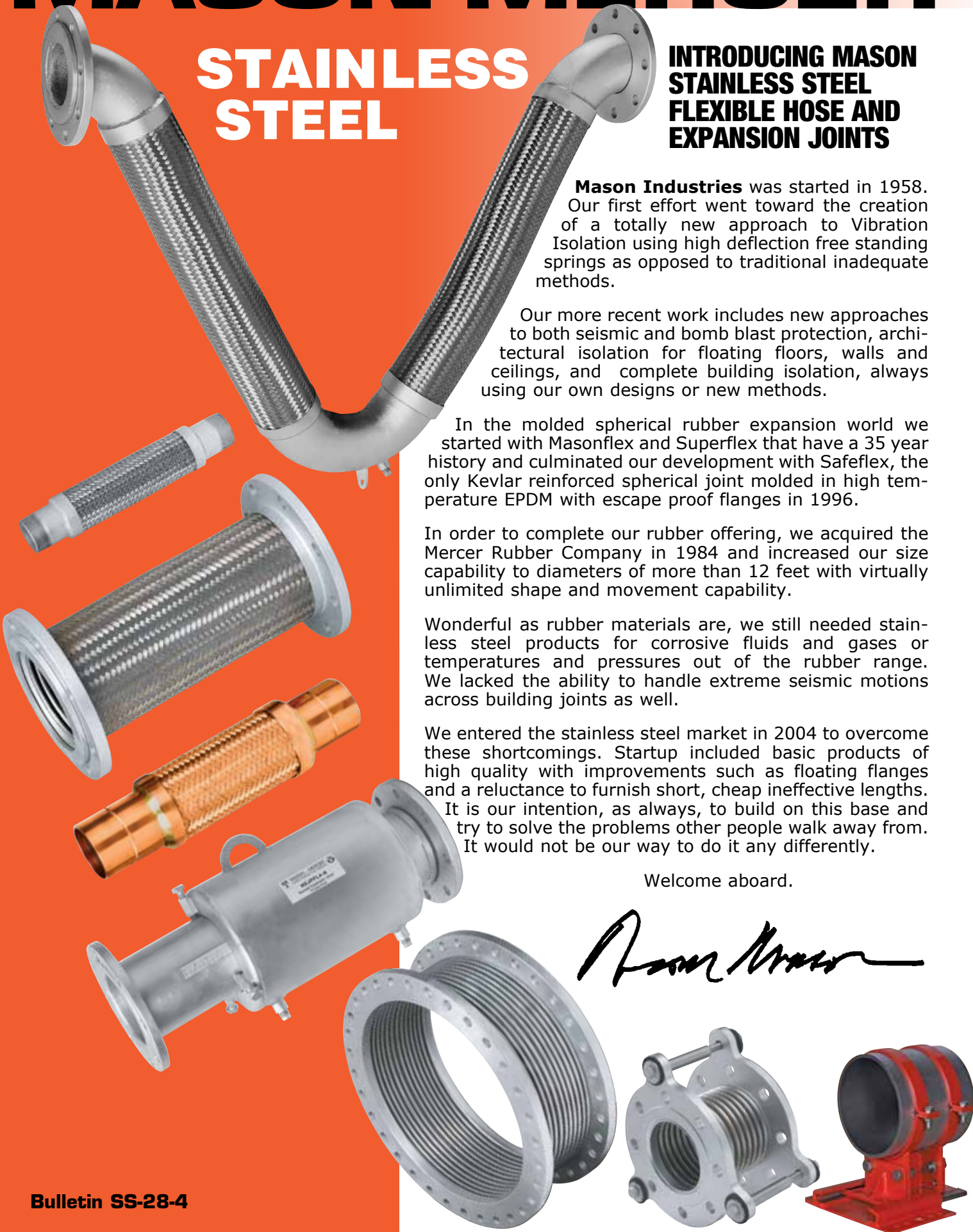
In order to complete our rubber offering, we acquired the Mercer Rubber Company in 1984 and increased our size capability to diameters of more than 12 feet with virtually unlimited shape and movement capability.

Wonderful as rubber materials are, we still needed stainless steel products for corrosive fluids and gases or temperatures and pressures out of the rubber range. We lacked the ability to handle extreme seismic motions across building joints as well.

We entered the stainless steel market in 2004 to overcome these shortcomings. Startup included basic products of high quality with improvements such as floating flanges and a reluctance to furnish short, cheap ineffective lengths.

It is our intention, as always, to build on this base and try to solve the problems other people walk away from. It would not be our way to do it any differently.

Welcome aboard.



STAINLESS STEEL BRAIDED ANNULAR FLEXIBLE HOSE

Stainless Steel Flexible Connectors contribute to the solution of vibration, noise, expansion and offset motion problems in piping systems. Assemblies are designed for both high and low temperatures, as well as high pressure and full vacuum.

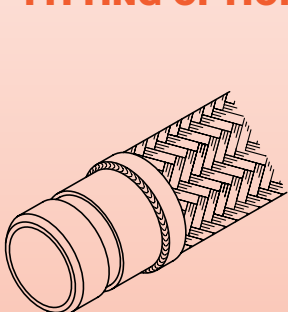
Stock sizes include 1/2" (13mm) through 16" (400mm) pipe diameter. Temperature ranges are from below 0°F (-18°C) to 850°F (454°C) when using our standard 304 stainless steel. On rare occasions, when temperatures as high as 1500°F (816°C) are needed, Type 316 or 321 are available too. Most standard construction is single braided, but we can provide double braid for higher pressures or omit the braid for low pressure venting or exhaust applications.

Standard end fittings include a fixed ASA 150, carbon steel raised face plate flange on one end and a floating flange on the other. A floating flange is very important as twisting full strength pipe to line up bolt holes is not an issue, but torquing a stainless hose to make up for poor alignment can cause immediate or early failure. Other fittings include NPT Carbon Steel Nipples or Grooved Ends, as well as any combination. Metric threads and drillings are available for export applications.

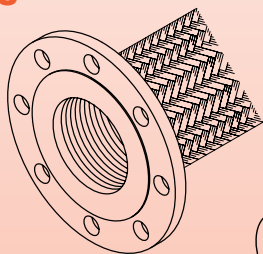
Stock lengths vary from the minimum "Pump Connectors" to as many as three additional stock lengths for greater movements. Special lengths take a little longer.

Commercial pricing pressure forces us to include the very short Nipped or Flanged Pump Connectors that range from 1/2" x 6 1/2" (13 x 165mm) thru 16" x 16" (400 x 400mm). These very short lengths are a travesty with a barely functional length of flexible hose connecting 2 long nipples. They have been shortened year after year from the old standards until no one dares make them shorter. We sell them when specified but recommend our longer lengths at a minor addition in cost, but a tremendous improvement in performance.

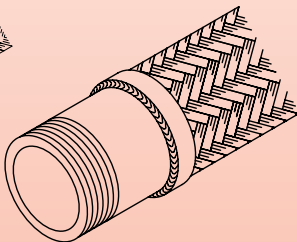
FITTING OPTIONS



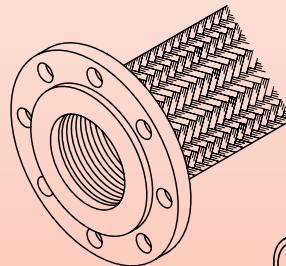
GROOVED NIPPLES



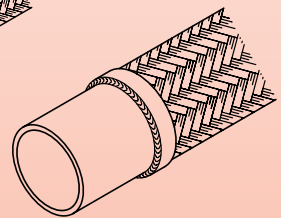
RAISED FACE FLANGES



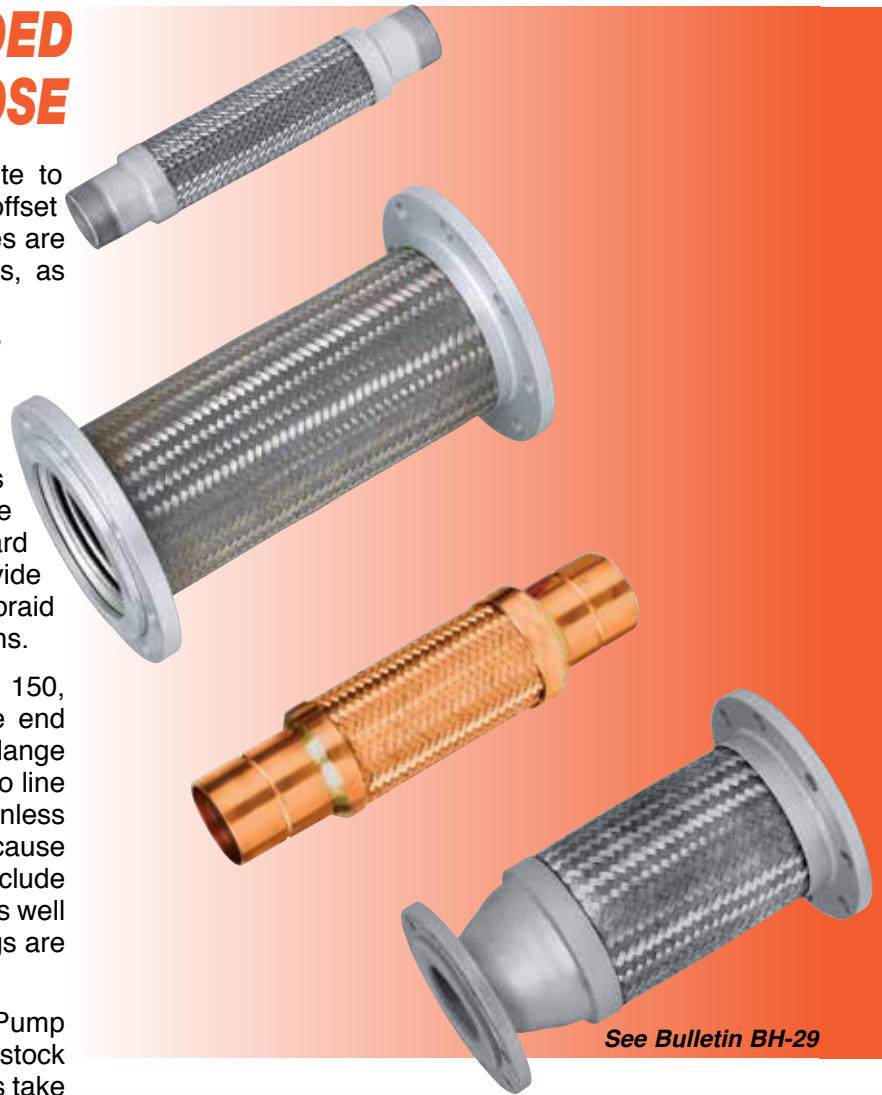
THREADED NIPPLES



FLOATING FLANGES



FEMALE COPPER SWEAT ENDS



See Bulletin BH-29

In addition to the equal ended flexible connectors, we also manufacture concentric reducers that act as a flexible transition piece between different sizes of piping, particularly at pump suction and discharge. They are usually used with an ASA 150 Carbon Raised Face Steel Plate Flange on one end and a Floating Flange on the other. Other configurations are available as well.

To complete this flexible connector offering, we stock bronze braided hoses with copper female ends for sweating into copper piping systems and the usual copper ended Freon connectors.

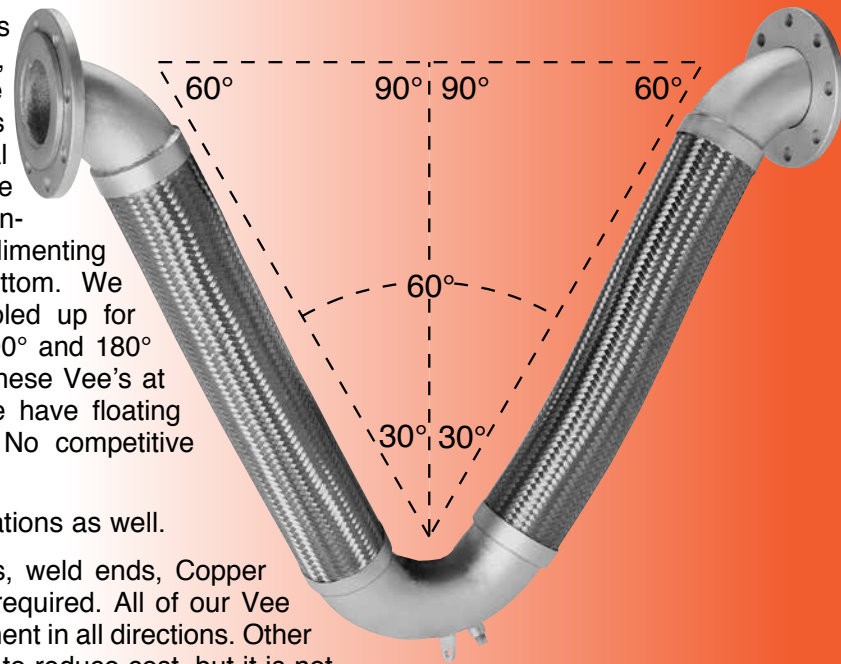
We have CSA, UL & NSF for most of these products.

SEISMIC "Vee" ASSEMBLIES

Many buildings are separated by expansion joints through the walls and floors. During an earthquake, the two adjacent parts resonate with relative motion of as much as $\pm 4"$ (100mm) in shear as well as toward and away from one another. Vertical motion is minimal. We have developed a unique product to handle this seismic motion. Our Vee construction is based on two 30, 60, 90 triangles complimenting one another to form a 60° "Vee" at the bottom. We thought the concept so interesting that we tooled up for these fittings rather than use the common 45°, 90° and 180° configurations. Since it may be necessary to fit these Vee's at odd angles, depending on space conditions, we have floating ASA 150 carbon steel flanges on both ends. No competitive product can be rotated this way.

Vee's are often used in simple expansion applications as well.

Other fittings include Carbon Steel NPT Nipples, weld ends, Copper Female Sweat Couplings or Grooved Ends, as required. All of our Vee assemblies are designed for $\pm 4"$ (100mm) movement in all directions. Other manufacturers offer $\pm 2"$ (50mm) designs as well to reduce cost, but it is not worth the risk of misapplication.



See Bulletin VH-30

See Bulletin EJ-34



LARGE SPECIAL ORDER and STOCK EXPANSION JOINTS

Many expansion joints are custom manufactured to diameters as large as 8 feet (2.4m). The construction varies, depending on the operating pressure and the required movements. We can provide these unusual constructions in virtually every configuration. We can build to your specific product description or complete our own recommendations based on your movement and pressure requirements.

Please let us have your inquiries.

We also stock expansion joints in 2" to 16" diameters with 2" axial and 1/4" transverse capability.

BELLOWS PUMP CONNECTORS

All bellows differ from Stainless Steel Hose in the corrugation configurations. Bellows are deeper and wider, and they are made of heavier material, to handle the pressures without braid. A very common location for our 2 ply Bellows is at the pumps. The face to face dimension is equal to the length of most Single Sphere Rubber Molded Expansion Joints. This product should be used when a combination of short length with greater movement capabilities along with the other benefits of stainless steel (high temperature and pressure) are required. If the equipment is solidly mounted, and there is an anchor somewhere in the line on the other side of the bellows, they will accept 1" (25mm) of compression and 3/8" (9mm) of elongation. Transverse movement varies between 1/8" (3mm) and 3/8" (9mm), depending on diameter.

If no anchors are provided, the joint will always remain in the full open position against the rubber isolated control rods and only serve to reduce transverse misalignment.



See Data Sheet DS-520

EXPANSION COMPENSATORS & HOUSED EXPANSION JOINTS

Expansion Compensators and Housed Expansion Joints are basically a bellows that is protected by and guided within a pipe housing. While the industry offers two styles, one of which is referred to as "internally" and the other "externally pressurized", they both serve the same function but we prefer the "externally pressurized" for improved bellows stability. They are furnished with a Fixed ASA150 Drilling Raised Face Carbon Steel Flange on the one end and a Floating Flange on the other. The alternates are Carbon Steel Threaded Nipples, Weld or Grooved Ends or Copper Female Sweat Ends as needed.

There are three movement choices: 2" (50mm) compression and 1/2" (13mm) extension, 4" (100mm) compression and 3/4" (19mm) extension or 8" (200mm) compression and 1 1/2" (38mm) extension. They are all designed for systems that will run hot and the slight extension is only there for those occasions when ambient temperatures are fairly high during installation, and the installation drops to some very low temperatures before they are put into hot water or steam service.



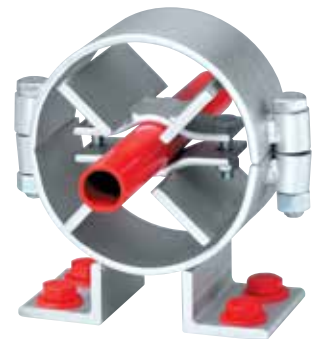
See Bulletin
HEJ-31

PIPE ALIGNMENT GUIDES

Our newly developed Adjustable Sliding Guides offer many improvements over other guides: one size guide for all thicknesses of insulation, less friction with our Stainless Steel Slides, sturdier construction and they can be used as load supports as well.

We still carry spider guides as well.

Anchors are manufactured to order.

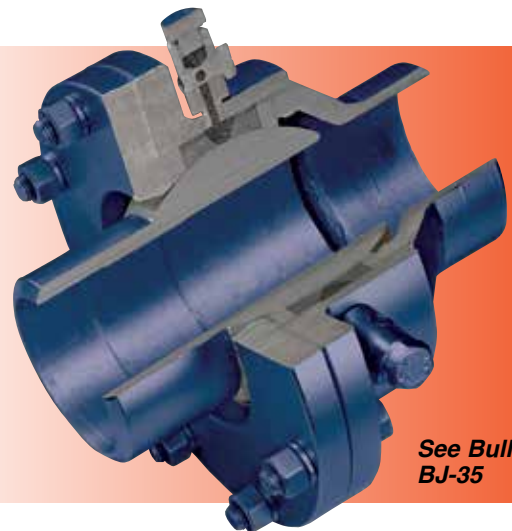


See Bulletin
ASG-33

BALL JOINTS

When ball joints are installed at each end of a pipe offset, the system can accommodate much larger movements with much lower anchorage requirements than solid pipe in the same configuration.

We not only sell our flanged and weld end ball joints, but we engineer the systems should there be no specifications or if specifications call for design by vendor.



See Bulletin
BJ-35



MASON - MERCER



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 MASON - 631/348-0282 • Email info@Mason-Ind.com • Website www.Mason-Ind.com
 MERCER - 631/582-1524 • Email info@Mercer-Rubber.com • Website www.Mercer-Rubber.com

Wu1403
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Glycol Feed Systems

Purpose

Neptune Glycol Feeders are designed for the addition of glycol solution to closed loop chilled or hot water systems. The system automatically maintains pressure in the loop by adding glycol solution to make up for losses which occur due to leakage.

Glycol addition is controlled by a pressure switch with adjustable low and high set points.

Standard Pressure Switch:

Cut-In Range: 10-45 PSI Cut-Out Range: 20-60 PSI

Adjustable Differential: 10-30 PSI

Other pressure switches available.

When the pressure in the loop reaches the low set point, the pump begins to feed glycol into the system until the high pressure set point is achieved and stops the pump.

Features

- 50 gallon polyethylene tank mounted in a steel frame
- Bronze rotary gear pump (1.5 gpm @ 100 psi)
- Float switch for low level pump shutoff and alarm
- NEMA 4X control panel

Panel includes:

- Hand-off-auto selector switch for pump motor
- Pump "on" indicator light
- "Low" tank level indicator light
- Dry contact for remote low level indication
- Power cord with plug, 115V 60C

Optional audible alarm and push button silence available.

(Audible alarm is not watertight.)

Neptune
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**MODEL
G-50-1**

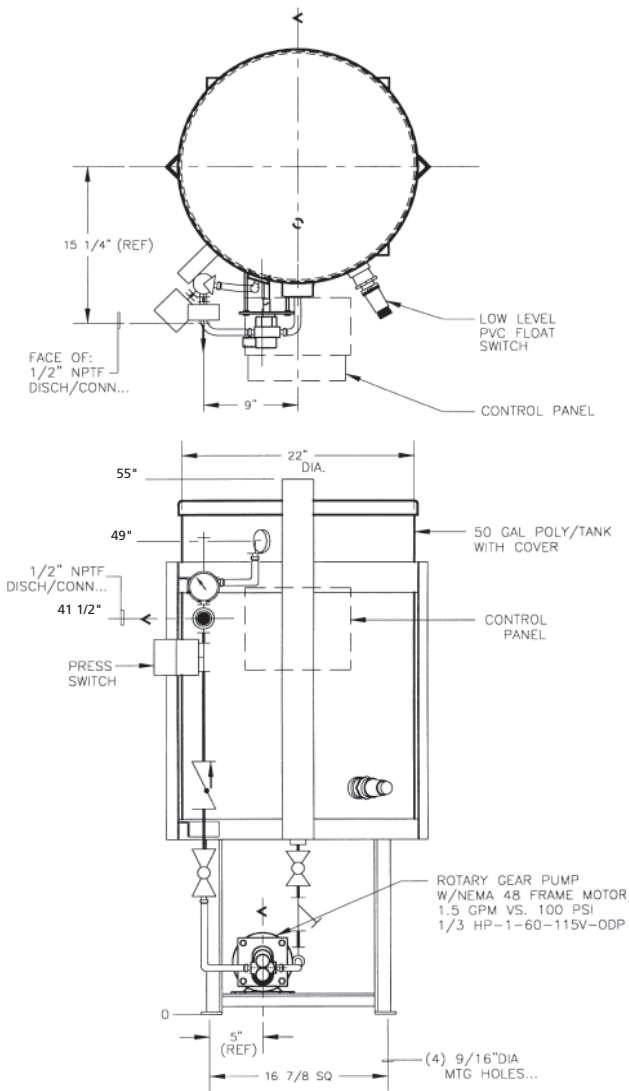
Each Neptune Glycol Feeder is fully piped and wired with the following components:

Suction assembly includes:

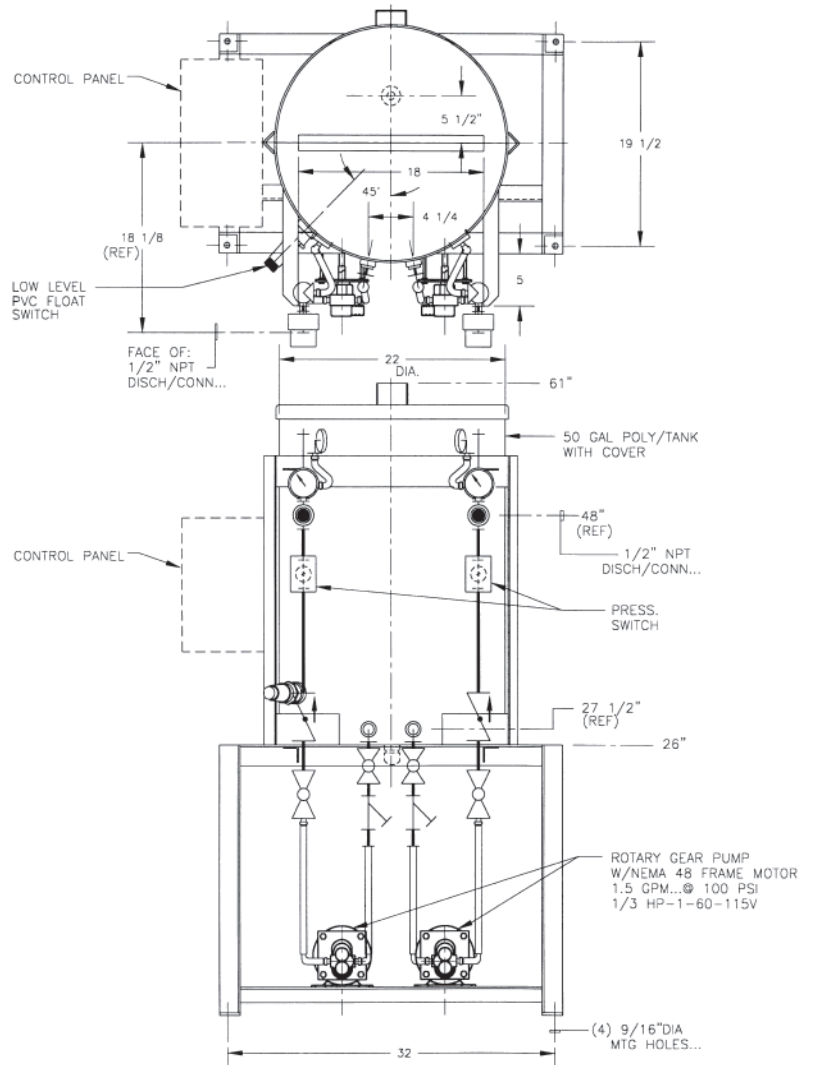
- PVC tubing and fittings
- PVC ball valve
- Cast iron "Y" strainer

Discharge assembly includes:

- Schedule 40 brass pipe and fittings
- PVC ball valve
- Brass check valve
- Pressure gauge
- Brass relief valve with return to tank tubing



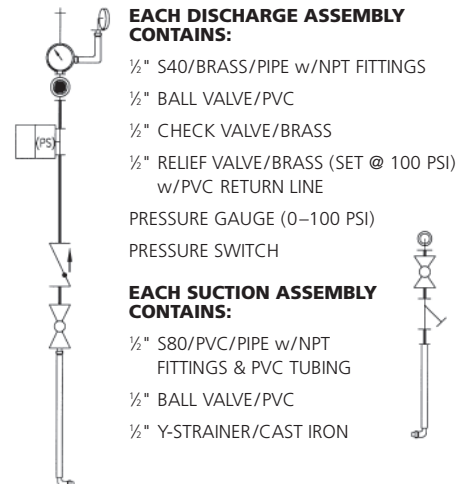
MODEL G-50-1 & G-50-1A



MODEL G-50-2A

SELECTION CHART

MODEL	DESCRIPTION
G-50-1	Complete system including 1.5 gpm (@ 100 psi) pump and low level light.
G-50-1A	Complete system including 1.5 gpm (@ 100 psi) pump, low level light and audible alarm.
G-50-2A	Complete system including two 1.5 gpm (@ 100 psi) pumps, low level light and audible alarm. Separate discharges and pressure switches allow feeding two separate closed loop systems independently from a single tank.
LP	Option to furnish larger pump rated 3.75 gpm (@ 100 psi). Add "LP" to Model Number to specify larger pump; Example G-50-1-LP.



Neptune
A DOVER COMPANY

SOLD BY:

P.O. Box 247 • Lansdale, PA 19446-0247
Tel: 215-699-8700 • Fax: 215-699-0370
Toll-Free Tel: 1-888-3NEPTUNE (1-888-363-7886)
Toll-Free Fax: 1-800-255-4017
Web Site: <http://www.neptune1.com>
E-mail: pump@neptune1.com

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