CONTRACTOR SUBMITTAL FORM

Project Name: Navajo Gallup Water Supply Project Reach 26.3	☒ **M** (Materials) ☐ **T** (Testing) ☐ **A** (Administrative)	**Submittal No.** M011B
SMA Project No: 6921307		
Date: 02-17-2020		
Contractor: Navajo Engineering and Construction Authority	**No. of Copies**: 1	

Supplier: Core & Main	**Manufacturer:** Pipestone
Specification No.: 33 12 18	**Drawing No.:** DT-10
Bid Item No(s).: 33, 34	
Submittal Checklist No(s).: M266-284	
Product Description: Control Valve Vault Resubmittal #2	
Are there any deviations from the Contract Documents? ☒ **No** ☐ **Yes** **Explain**:	
Contractor's certification that product meets requirements of Contract Documents: ☒ Certified ☐ Certified with variations as noted on shop drawings and/or attached sheets.	
Signed: Aaron Barton, NECA	**Date**: 02-17-2019

Engineer's Comments: ☒ No Exception Taken ☐ Approved as Corrected ☐ Exceptions as Noted ☐ Submittal Rejected ☐ Revise and Resubmit to Engineer ☐ Contractor to Submit Specified Information	Review is limited to check for compliance with design concept. No changes from provisions of Contract Documents are intended and Contractor remains responsible for compliance with revisions therein. The Contractor is solely responsible for quantities; correctness of dimensions; verification of physical interrelation of elements of the work as required by the drawings and specifications and by field determination; fabrication procedures, construction methods, techniques and sequences. This review does not relieve the Contractor from these responsibilities. Non-conformities and errors detected have been noted but such markings, or lack thereof, shall not relieve the Contractor from compliance with all requirements of the contract drawings and specifications.
Signed:	**Date**: 2/18/20

PIPESTONE EQUIPMENT

February 13, 2020

Core & Main
6135 Second Street, NE
Albuquerque, NM 87107

Attention: Cindy Mathews

Reference: Navajo Gallup Reach 26.3 Revised Submittal 20200213 for Approval

Dear Ms. Mathews:

Thank you for sending me the engineer's review comments for DT-10. I have attached revised submittals and hope to have addressed the following concerns:

SMA Project No. 6921307, Submittal No. M011A:

1. Use saddle type pipe supports. Understood. We will not have any flanged type supports. Page removed.
2. Piping shall be FBE coated. Confirmed. AkzoNobel Resicoat R4-ES is our standard. See pages 97-99. We also added information on the fittings. Pages 95-96.
3. Move frost safe damper up 15" to avoid conflict with relief valve operation. Based on an email I received 2/6/2020, I believe the Air Vent (therefore: FrostSafe, VentSafe and wall penetration) is not required. I have removed these items from the drawings and submittal.
4. Provide hole in sump to allow water to drain into gravel below vault. Confirmed. Please see page 111.
5. (Email 1/23/2020) Please explain what Pipestone plans to provide for the 2" GI pipe. Please provide submittal/shop drawings on this pipe. We would like to supply 304SS pipe and fittings for the 2" threaded items. Please see pages 100-103.
6. (Email 2/6/2020) Ductile Iron Spools – Engineer wants the spools to be 5' from the exterior wall of the vaults. Based on my understanding of the detail drawing in the plans and the buried gate valves that you are supplying for this project, 57.5" sticking outside the walls will meet the requirement from the plans. We will provide fusion bonded coated ductile iron Plain End pipe out both ends. The 6" Relief Valve line coming out the side of the vault should only be 24" sticking out for safe transit. Also the 2" pipe will have 12" sticking out. Please review pages 3-9.

We look forward to working with you on a successful project! Feel free to call my cell (720-301-8035) if you have any questions or concerns.

Best Regards,

Kira Witwer
Mechanical Engineer/Inside Sales

Engineers Comments to Submittal M011A

CONTRACTOR SUBMITTAL FORM

Project Name: Navajo Gallup Water Supply Project Reach 26.3	☒ **M** (Materials) ☐ **T** (Testing) ☐ **A** (Administrative)	**Submittal No.** M011A
SMA Project No: 6921307		
Date: 10-14-2019		
Contractor: Navajo Engineering and Construction Authority	**No. of Copies**: 1	

Supplier: Core & Main	**Manufacturer:** Pipestone
Specification No.: 33 12 18	**Drawing No.:** DT-10
Bid Item No(s).: 33, 34	
Submittal Checklist No(s).: M266-284	
Product Description: Control Valve Vault Revised Submittal. Original Engineer's Comments attached.	
Are there any deviations from the Contract Documents? ☒ **No** ☐ **Yes** **Explain**:	
Contractor's certification that product meets requirements of Contract Documents: ☒ Certified ☐ Certified with variations as noted on shop drawings and/or attached sheets.	
Signed: Quentin Benally, NECA	**Date**: 10-14-2019

Engineer's Comments:

☐ No Exception Taken
☒ Approved as Corrected
☐ Exceptions as Noted
☐ Submittal Rejected
☐ Revise and Resubmit to Engineer
☐ Contractor to Submit Specified Information

- Use saddle type pipe supports
- Piping shall be FBE coated
- Move frost safe damper up to avoid conflict with relief valve operation 15"
- Provide hole in sump to allow water to drain into gravel below vault

Review is limited to check for compliance with design concept. No changes from provisions of Contract Documents are intended and Contractor remains responsible for compliance with revisions therein.

The Contractor is solely responsible for quantities; correctness of dimensions; verification of physical interrelation of elements of the work as required by the drawings and specifications and by field determination; fabrication procedures, construction methods, techniques and sequences. This review does not relieve the Contractor from these responsibilities.

Non-conformities and errors detected have been noted but such markings, or lack thereof, shall not relieve the Contractor from compliance with all requirements of the contract drawings and specifications.

Signed:

Date: 11/5/19

676 Moss Street, Unit A
Golden, CO 80401
Phone: 303-579-9658
Fax: 303-567-2861

Navajo Gallup Reaches 26.3

Reach 26.3 to Torreon, NM

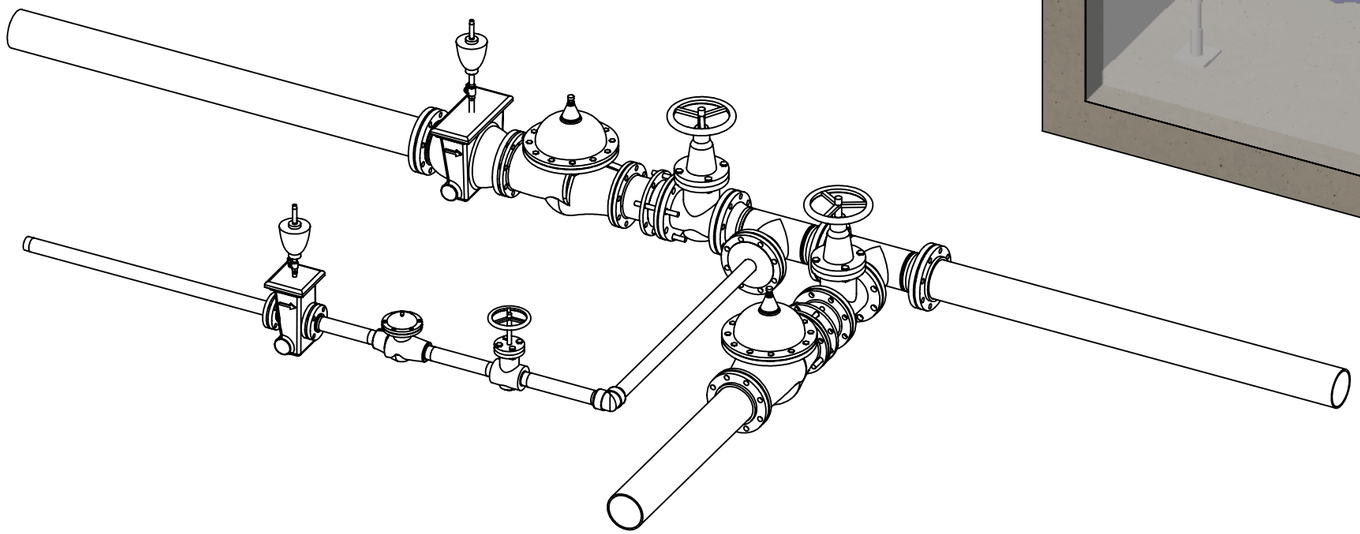
DT10 Vault

Qty	Product Description
1	6" Cla-Val 92G-01BCPSVYKCKD D/S CL150 FL Combination Pressure Sustaining and Pressure Reducing Valve. Full Port, Globe Style, Straight Pattern, Epoxy Coated, Ductile Iron Main Valve with Class 150 Flanged Ends, Dura-Kleen Stem, BunaN Elastomers, 316SS Trim, SST Fasteners and Position Indicator. Valve Body to be installed in reverse orientation to Fail Close on Loss of Diaphragm. All 316 Stainless Steel Pilot System consisting of: Isolation Ball Valves, Wye Strainer with Manual Blowdown, Fixed Restriction, Opening/Closing Speed Controls (Locking Caps), CRD Reducing Pilot (30-300psi, Set at 60psi), CRL Sustaining Pilot (20-200psi, set at 60psi), Upstream and Downstream Pressure Gauges (0-200psi) with Bleed, PTFE Lined SST Braided Hose with SST Ends and Fittings.
1	6" Cla-Val 50G-13BCPYKCKDKO D/S CL150 FL Pressure Relief Valve with Cavitation Control Cage. Globe Style, Straight Pattern, Epoxy Coated, Ductile Iron Main Valve with Class 150 Flanged Ends, Dura-Kleen Stem, BunaN Elastomers, 316SS Trim, SST Fasteners and Visual Position Indicator. All Stainless Steel Pilot System consisting of: Isolation Ball Valves, Wye Strainer with Manual Blowdown, Fixed Restriction, Closing Speed Control (Locking Cap), CRL-60 Pressure Relief Pilot (20-200psi, set at 60psi), Upstream Pressure Gauge (0-200psi) with Bleed, PTFE Lined SST Braided Hose with SST Ends and Fittings.
1	6" Cla-Val X43H Style Strainer, Ductile Iron Body and Cover, 316SST Strainer, 250psi Rated, 150# RF Flanges, Fusion Bonded Epoxy Coating, Air Bleed and Drain Blowoff
1	2" Cla-Val 92G-01BCPSVYKCKD D/S NPT Combination Pressure Sustaining and Pressure Reducing Valve. full Port, Globe Style, Straight Pattern, Epoxy Coated, Ductile Iron Main Valve with NPT Ends, Dura-Kleen Stem, BunaN Elastomers, 316SS Trim, SST Fasteners and Position Indicator. Valve Body to be installed in reverse orientation to Fail Close on Loss of Diaphragm. All 316 Stainless Steel Pilot System consisting of: Isolation Ball Valves, Wye Strainer with Manual Blowdown, Fixed Restriction, Opening/Closing Speed Controls (Locking Caps), CRD Reducing Pilot (30-300psi, Set at 60psi), CRL Sustaining Pilot (20-200psi, set at 60psi), Upstream and Downstream Pressure Gauges (0-200psi) with Bleed, PTFE Lined SST Braided Hose with SST Ends and Fittings.
1	2" Cla-Val X43H Style Strainer, Ductile Iron Body and Cover, 316SST Strainer, 250psi Rated, 150# RF Flanges, Fusion Bonded Epoxy Coating, Air Bleed and Drain Blowoff
2	6" Mueller A2361 Resilient Wedge Gate Valve, 350psi, AWWA C515 Ductile Iron, SBR Encapsulated Disc, Non Rising Stem, Handwheel, Class 125# Flanged Ends, Fusion Bonded Epoxy Coating, SST Fasteners
1	2" Mueller A2362 Resilient Wedge Gate Valve, 250psi,, AWWA C509, SBR Encapsulated Disc, Non-Rising Stem, Handwheel, Threaded Ends, Fusion Bonded Epoxy Coating, SST Fasteners

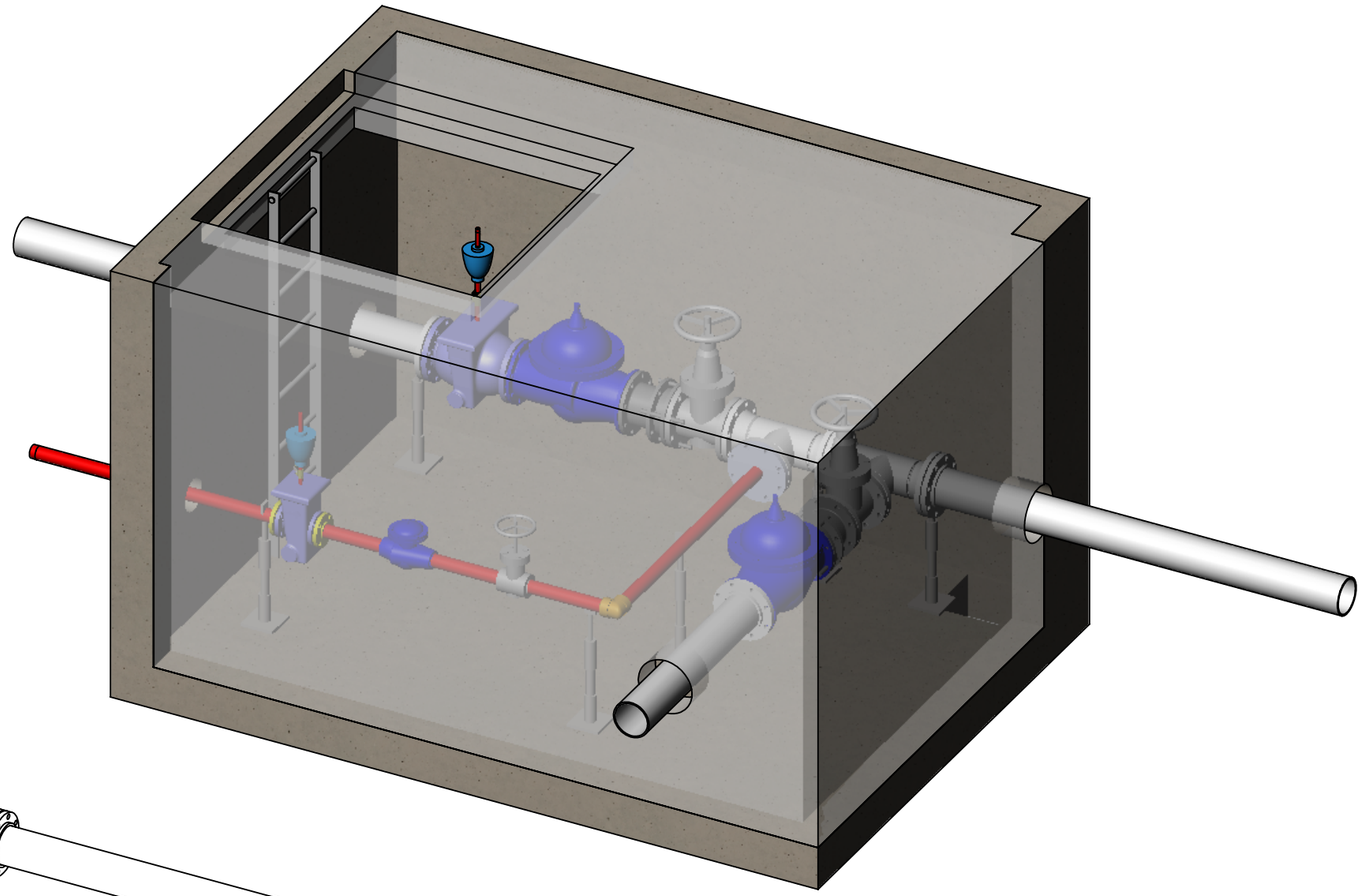
2	6" ROMAC DJ 400 Dismantling Joint with Class E Flanges, Ductile Iron End Ring and Body, Fusion Bonded Epoxy Coating, Stainless Bolts and Tie Rods
2	1/2" ValMatic 22.7DISV Water Air Release Valve, Ductile Iron Body, 316SST Trim, EPDM Seating, Fusion Bonded Epoxy Coating, SST Bolts and Pipe Plugs, Rated 300psi
2	1/2" Apollo 76F10301A Stainless Steel, Full Port, NPT, Ball Valve
2	3/4" Apollo 76F10401A Stainless Steel, Full Port, NPT, Ball Valve
3	PS410ES Pen Seal for 6" Ductile Iron Pipe in 10" ID Core Drilled Hole, 10 links
1	PS300ES Pen Seal for 2" Steel Pipe in 4" ID Core Drilled Hole, 6 links

PE-18-0824-DWB
2/13/2020

NAVAJO GALLUP WATER SUPPLY
REACH 26.3 DT10-VAULT
GENERAL ARRANGEMENT



ISO VIEW



ISO VIEW WITH VAULT

STANDARD TOLERANCE
UNLESS OTHERWISE SPECIFIED
FRACTIONAL: DECIMAL:
FRACTION ±3/8" 1 PLACE ±.1
2 PLACE ±.06
3 PLACE ±.031
BREAK ALL SHARP EDGES

CUSTOMER CONN TOLERANCE
UNLESS OTHERWISE SPECIFIED
FRACTIONAL: DECIMAL:
FRACTION ±1" 1 PLACE ±.1
2 PLACE ±.06
3 PLACE ±.031
BREAK ALL SHARP EDGES

REFERENCE DRAWINGS

DWG. NO.	TITLE

REVISIONS

REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE
2	REVISED PER ENGINEERS COMMENTS	CAL 2/10/20		
1	REVISED PER ENGINEERS COMMENTS	CAL 9/13/19		

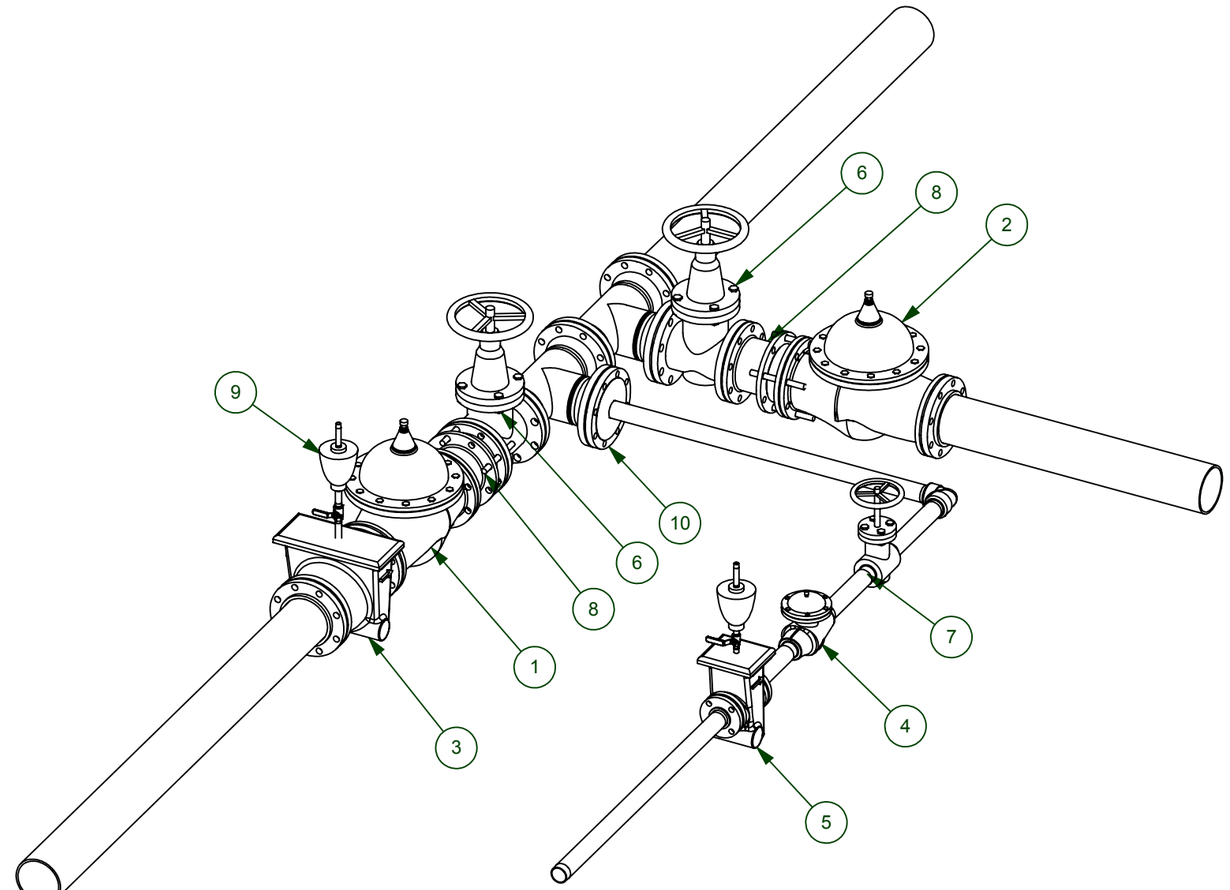
DRAWN BY: CAL	CHECKED BY: KCW
DATE DRAWN: 6/17/2019	DATE CHECKED: -

PIPESTONE EQUIPMENT

NAVAJO GALLUP WATER SUPPLY
GENERAL ARRANGEMENT DRAWING

SCALE:	PROJECT NO:	DWG NO:	REV.
1:25		PE-18-0824-DWB SHEET 1 OF 7	2

Item	Qty	Product Description
1	1	6" Cla-Val Pressure Sustaining and Reducing Valve
2	1	6" Cla-Val Pressure Relief Valve
3	1	6" Cla-Val X43H Strainer
4	1	2" Cla-Val Pressure Sustaining and Reducing Valve
5	1	2" Cla-Val X43H Strainer
6	2	6" Kennedy Gate Valve
7	1	2" Kennedy Gate Valve
8	2	6" Romac DJ400 Dismantling Joint
9	2	1" ValMatic Air Release Valve



ISO VIEW

STANDARD TOLERANCE
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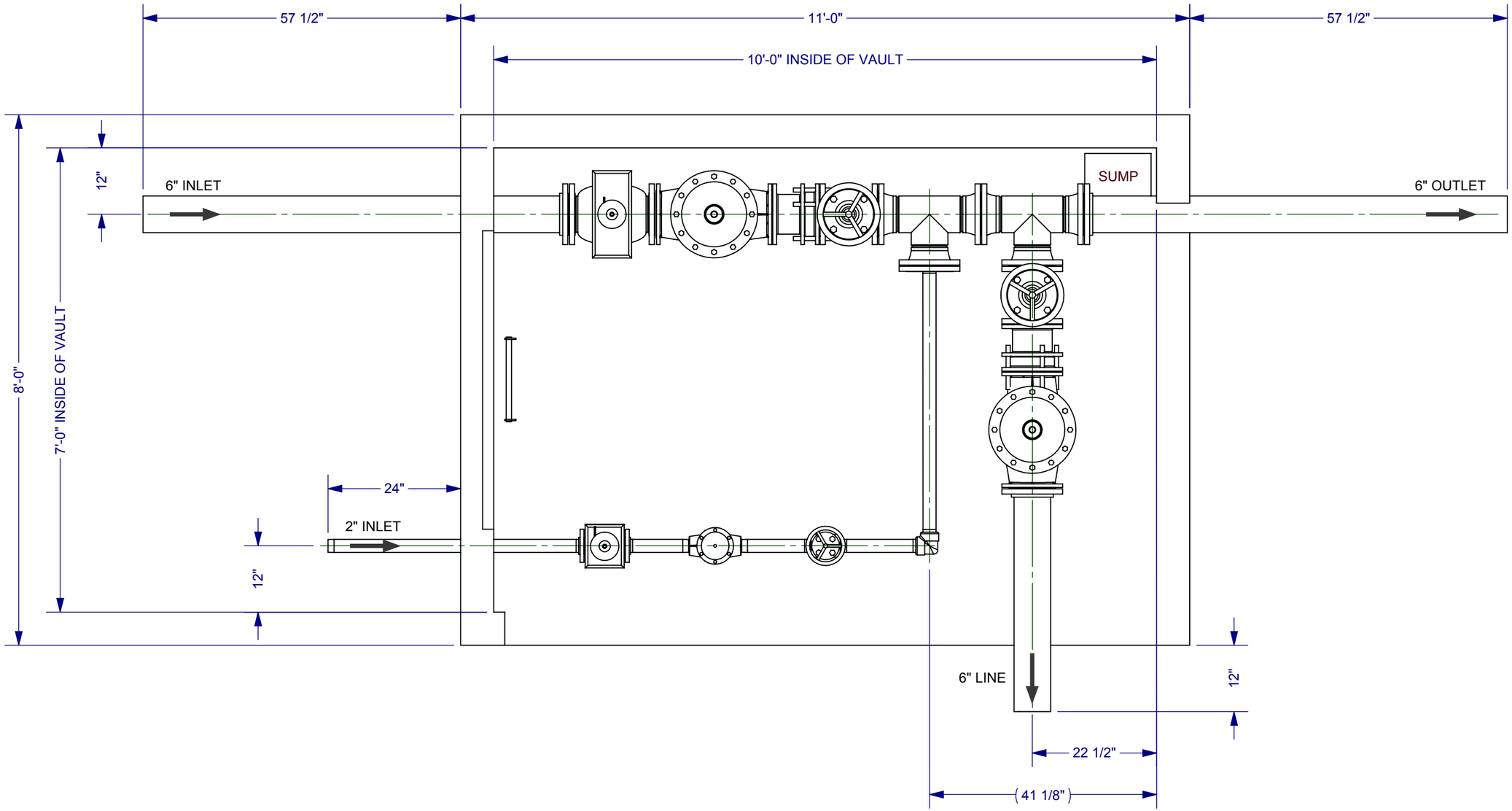
2	REVISED PER ENGINEERS COMMENTS	CAL 2/10/20		
1	REVISED PER ENGINEERS COMMENTS	CAL 9/13/19		

DRAWN BY: CAL
CHECKED BY: KCW
DATE DRAWN: 6/17/2019
DATE CHECKED: -

PIPESTONE EQUIPMENT

NAVAJO GALLUP WATER SUPPLY
GENERAL ARRANGEMENT DRAWING

SCALE: 1:20
PROJECT NO:
DWG NO: PE-18-0824-DWB
REV. 2



PLAN VIEW

STANDARD TOLERANCE
UNLESS OTHERWISE SPECIFIED
FRACTIONAL: DECIMAL:
FRACTION ±3/8" 1 PLACE ±.1
2 PLACE ±.06
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BREAK ALL SHARP EDGES

CUSTOMER CONN TOLERANCE
UNLESS OTHERWISE SPECIFIED
FRACTIONAL: DECIMAL:
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2 PLACE ±.06
3 PLACE ±.031
BREAK ALL SHARP EDGES

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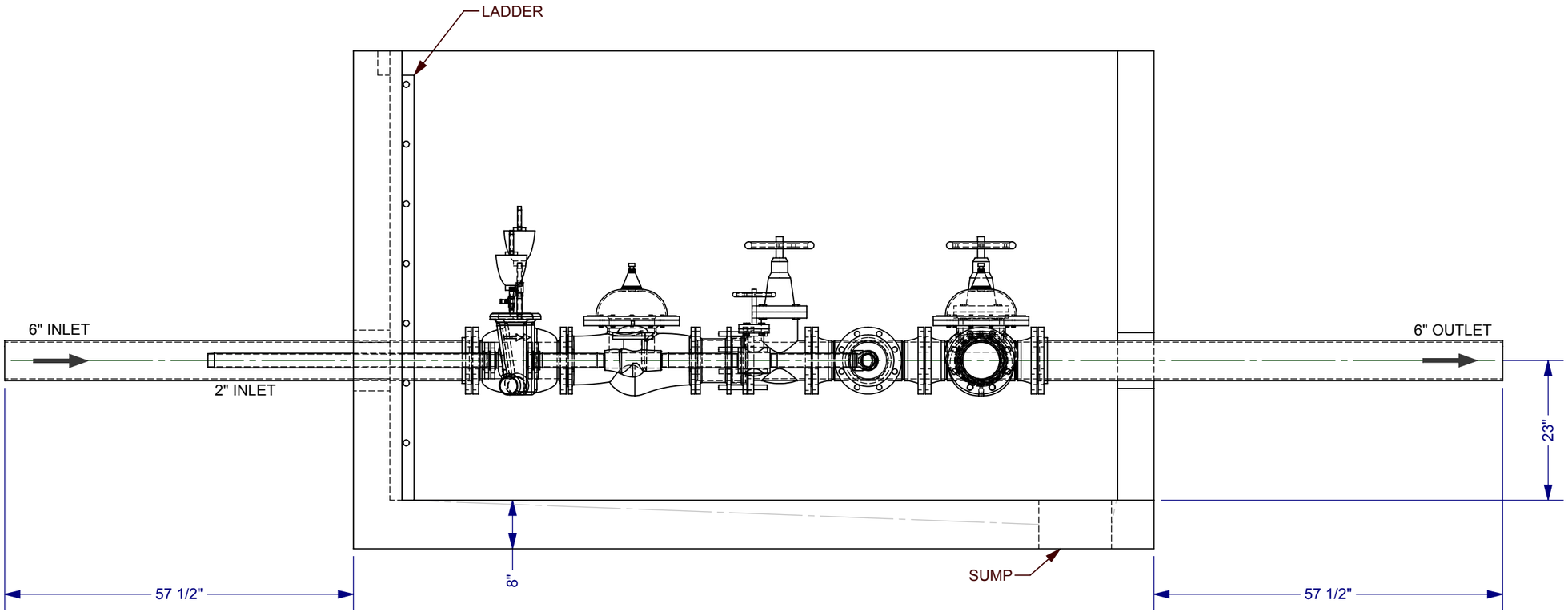
1	REVISED PER ENGINEERS COMMENTS	CAL 9/13/19		

DRAWN BY: CAL
CHECKED BY: KCW
DATE DRAWN: 6/17/2019
DATE CHECKED: -

PIPESTONE EQUIPMENT

NAVAJO GALLUP WATER SUPPLY
GENERAL ARRANGEMENT DRAWING

SCALE: 1:20
PROJECT NO:
DWG NO: PE-18-0824-DWB
REV. 2
SHEET 3 OF 7



ELEVATION VIEW

STANDARD TOLERANCE		CUSTOMER CONN TOLERANCE	
UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED	
FRACTIONAL:	DECIMAL:	FRACTIONAL:	DECIMAL:
FRACTION ±3/8"	1 PLACE ±.1	FRACTION ±1"	1 PLACE ±.1
	2 PLACE ±.06		2 PLACE ±.06
	3 PLACE ±.031		3 PLACE ±.031
BREAK ALL SHARP EDGES		BREAK ALL SHARP EDGES	

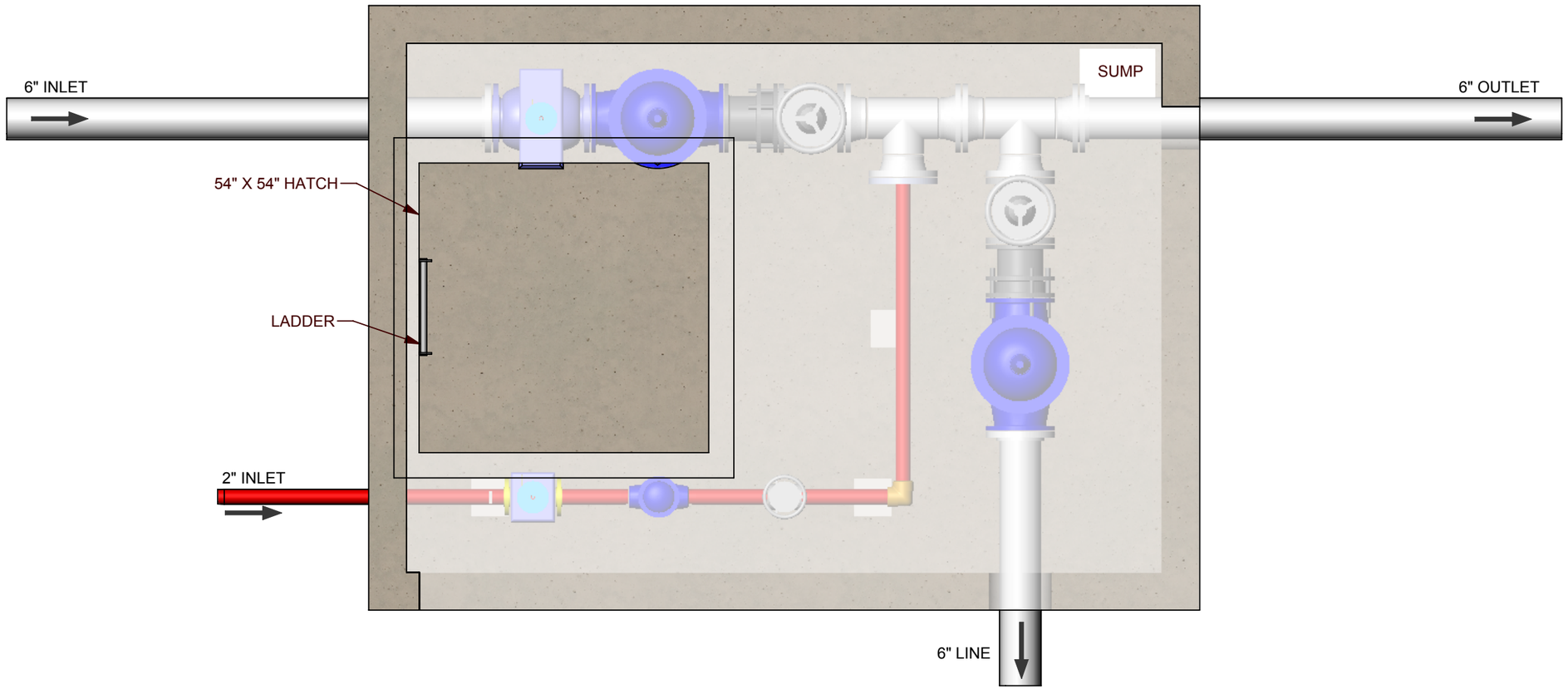
REFERENCE DRAWINGS

DWG. NO.	TITLE

REVISIONS

REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE
2	REVISED PER ENGINEERS COMMENTS	CAL 2/10/20		
1	REVISED PER ENGINEERS COMMENTS	CAL 9/13/19		

DRAWN BY: CAL	CHECKED BY: KCW	PIPESTONE EQUIPMENT	
DATE DRAWN: 6/17/2019	DATE CHECKED: -		
NAVAJO GALLUP WATER SUPPLY GENERAL ARRANGEMENT DRAWING			
SCALE: 1:20	PROJECT NO:	DWG NO: PE-18-0824-DWB	REV. 2



COLOR PLAN VIEW

STANDARD TOLERANCE
UNLESS OTHERWISE SPECIFIED
FRACTIONAL: ±3/8" DECIMAL: 1 PLACE ±.1, 2 PLACE ±.06, 3 PLACE ±.031
BREAK ALL SHARP EDGES

CUSTOMER CONN TOLERANCE
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FRACTIONAL: ±1" DECIMAL: 1 PLACE ±.1, 2 PLACE ±.06, 3 PLACE ±.031
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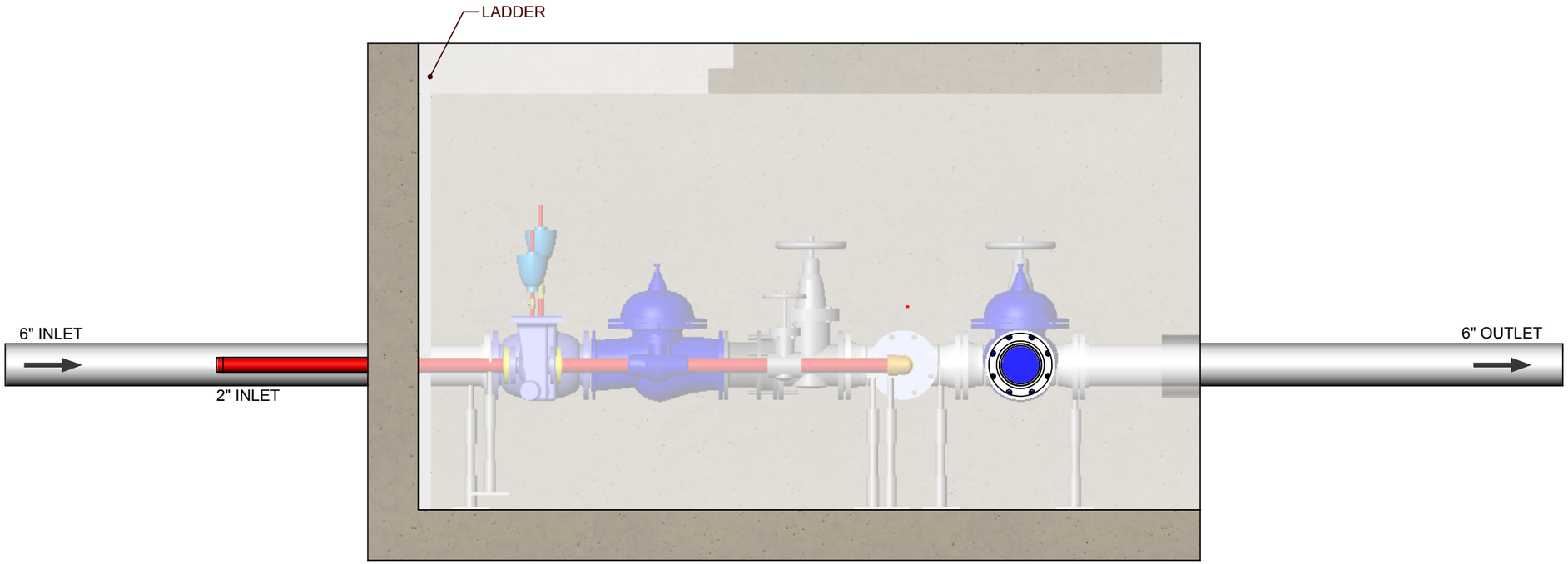
1	REVISED PER ENGINEERS COMMENTS	CAL 9/13/19		

DRAWN BY: CAL
CHECKED BY: KCW
DATE DRAWN: 6/17/2019
DATE CHECKED: -

PIPESTONE EQUIPMENT

NAVAJO GALLUP WATER SUPPLY
GENERAL ARRANGEMENT DRAWING

SCALE: 1:20
PROJECT NO:
DWG NO: PE-18-0824-DWB
SHEET 5 OF 7
REV. 2



COLOR ELEVATION VIEW

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DATE DRAWN: 6/17/2019
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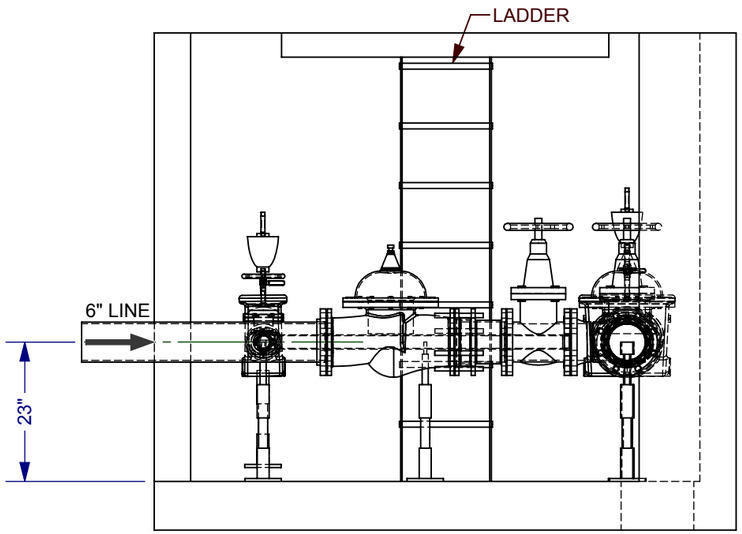
DATE CHECKED: -

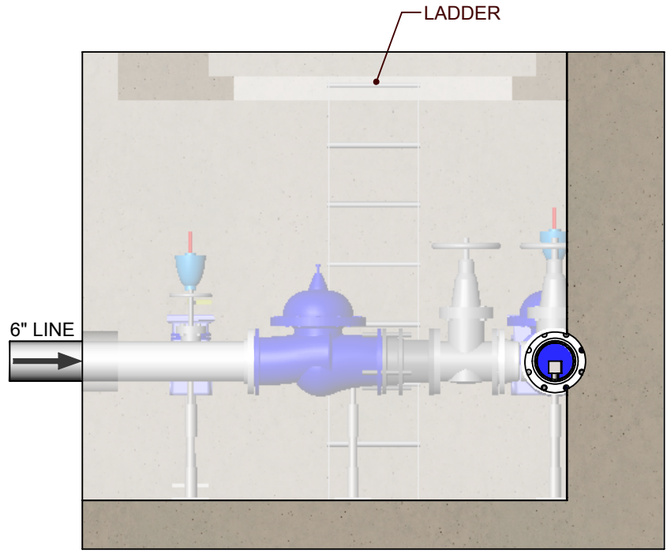
PIPESTONE EQUIPMENT

NAVAJO GALLUP WATER SUPPLY
GENERAL ARRANGEMENT DRAWING

SCALE: 1:20
PROJECT NO:
DWG NO: PE-18-0824-DWB
REV. 2
SHEET 6 OF 7



SIDE ELEVATION VIEW



COLOR SIDE ELEVATION VIEW

STANDARD TOLERANCE
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BREAK ALL SHARP EDGES

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REFERENCE DRAWINGS

DWG. NO.	TITLE

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CHECKED BY: KCW
DATE DRAWN: 6/17/2019
DATE CHECKED: -

PIPESTONE EQUIPMENT

NAVAJO GALLUP WATER SUPPLY
GENERAL ARRANGEMENT DRAWING

SCALE: 1:25
PROJECT NO:
DWG NO: PE-18-0824-DWB
SHEET 7 OF 7
REV. **2**

Submittal Data Cover Sheet

Date:

Model No.: 92G-01BCPSVYKCKD

Description: Combination Pressure Sustaining, Pressure Reducing Valve

Job/Project Name: Navajo Gallup Reach 26.3 PRV Vault

Engineering Firm: Souder, Miller and Associates

Project Engineer: Andrew Robertson

Company: Pipestone Equipment

Contact: Kira Witwer

Address: 676 Moss Street

City: Golden **State:** CO **Zip:** 80401

Fluid To Be Handled: Water

Specific Gravity: 1

Temperature: Ambient

Max. Flow Rate: 841 **GPM**

Min. Flow Rate: 300 **GPM**

Main Valve

Valve Size:
6"

Base Valve:
100-01 Hytrol

Quantity:
1

Main Valve Body & Cover:
Ductile Iron ASTM A-536

Main Valve Trim:
(Disc Guide, Seat & Cover Bearings)
316 Stainless Steel

Valve Pattern:
Globe

End Details:
Flanged Ductile Iron ANSI B16.42 Class 150

Pressure Rating:
150 Class @ 250 psi Max.

Elastomers: *(Max Temperature 180°F)*
Buna-N® Synthetic Rubber

Pilot System

Tubing & Fittings
Stainless Steel Braided Flex Hose

Pilot System Configuration
316 SST with 316 SST Trim

R.H. Pilot System Mount (standard)

Hydraulic Pilot System Adjustment Range(s)

CRL 20-200 PSI	60psi
CRD 30-300 PSI	60psi

Electronic Pilot Spring Ranges

Electrical

Electrical - Voltages & Accessories

VC-22D Electronic Valve Controller

VC-22D Power Converter

Features & Options

- [x] **Strainer:** Y-Pattern
- [x] Pilot System Isolation Valves
- [x] Closing Speed Control
- [x] Opening Speed Control
- [ ] Pilot System Check Feature
- [ ] Independent Operating Pressure
- [ ] Atmospheric Drain
- [x] Fusion Bonded Epoxy Coating 12 mil
- [ ] X144D e-FlowMeter
- [ ] Reservoir Gauge with Tester
- [ ] X145 External Display

Pressure Gauges:
Inlet: 2-1/2" 0 - 200 psi
Outlet: 2-1/2" 0 - 200 psi
Cover:

Valve Position Transmitter:
N/A

Valve Position Indicator:
X101

Stem Option:
Dura-Kleen® Stem

Limit Switch (SPDT):
N/A

Differential Pressure Transmitter:
N/A

Pressure Transmitter:
Inlet: N/A
Outlet: N/A

Orifice Plate:
N/A Bore: _____

Power Generator:
N/A

X43 H-Style Strainer:
Supplied Seperately

X43 H-Style Strainer Flange:
(Ductile Iron ASME B16.42)

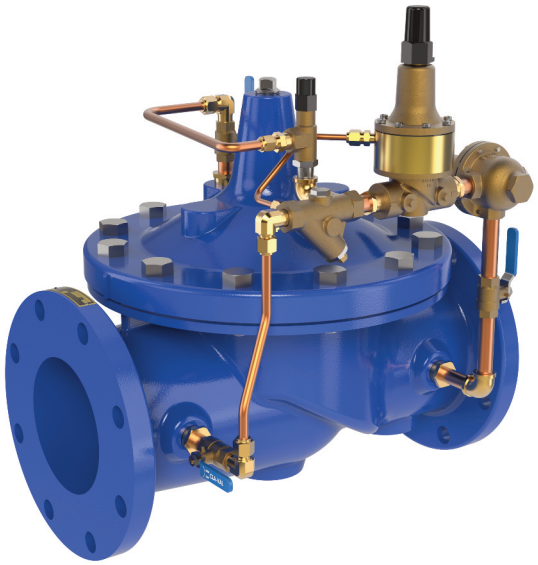
Notes:

Cla-Val Contact: **Phone:** **E-Mail:**

CLA-VAL®

MODEL 92-01

Combination Pressure Reducing & Pressure Sustaining Valve



- **Accurate Response to Slight Pressure Changes**
- **Check Feature Available**
- **Completely Automatic Operation**
- **Drip-Tight, Positive Seating Action**
- **Operation is Fully Hydraulic**

The Cla-Val Model 92-01 Combination Pressure Reducing and Pressure Sustaining Valve automatically performs two independent functions. It maintains a constant downstream pressure, regardless of fluctuating demand and sustains the upstream pressure to a pre-determined minimum.

The pressure reducing control responds to slight variations in downstream pressure and immediately repositions the main valve to maintain the desired downstream pressure. The pressure sustaining control is normally held open by the upstream pressure, but modulates should the pressure drop to the control set point. This, in turn, modulates the main valve to sustain the desired upstream pressure.

If a check feature is added, and a pressure reversal occurs, the downstream pressure is admitted into the main valve cover chamber and the valve closes to prevent return flow.

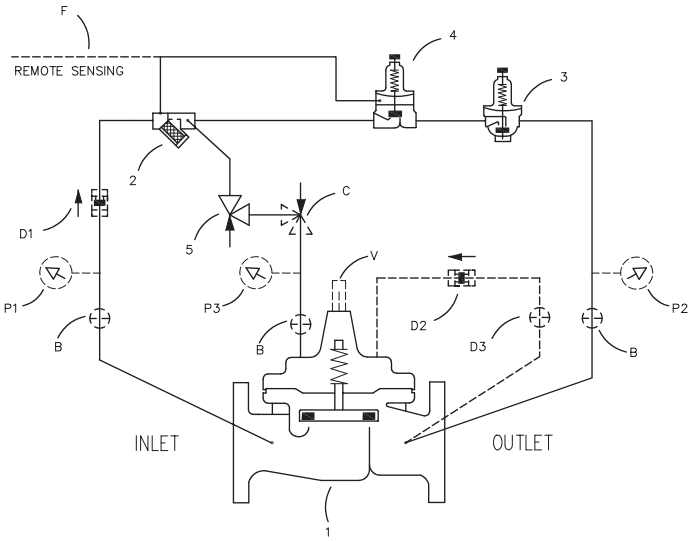
Schematic Diagram

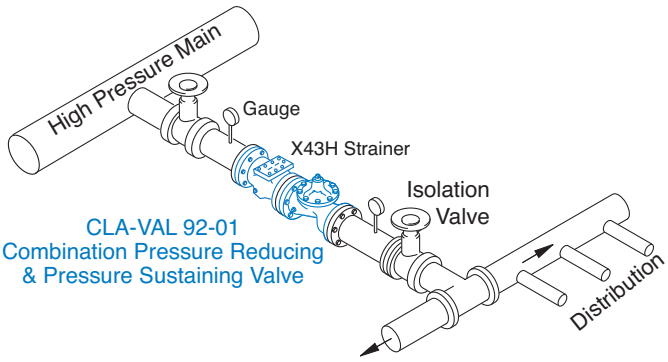
Item	Description
1	100-01 Hytrol Main Valve
2	X44A Strainer & Orifice
3	CRD Pressure Reducing Control
4	CRL-60 Pressure Relief Control
5	CV Flow Control (Opening)

Optional Features

Item	Description
B	CK2 Isolation Valve
C	CV Flow Control (Closing)*
D	Check Valves With Isolation Valve
F	Remote Pilot Sensing
P	X141 Pressure Gauge
V	X101 Valve Position Indicator

* The (optional) closing speed control on this valve should always be open at least three (3) turns off its seat.

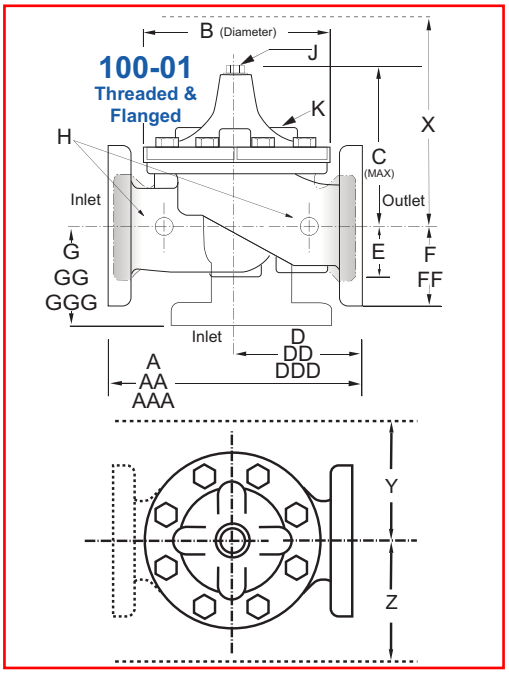




Typical Applications

A Combination Pressure Reducing and Pressure Sustaining Valve is typically used to automatically reduce pressure for the downstream distribution network and sustain a minimum pressure in the high pressure main regardless of distribution demand.

Model 92-01 (Uses 100-01 Hytrol Main Valve)



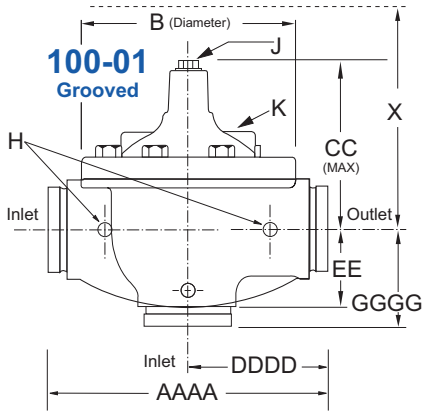
Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class				
		Flanged			Grooved	Threaded
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End‡ Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
UNS 87850	Bronze	B16.24	225	400	400	400

Note: * ANSI standards are for flange dimensions only.
Flanged valves are available faced but not drilled.
‡ End Details machined to ANSI B2.1 specifications.
Valves for higher pressure are available; consult factory for details

Materials

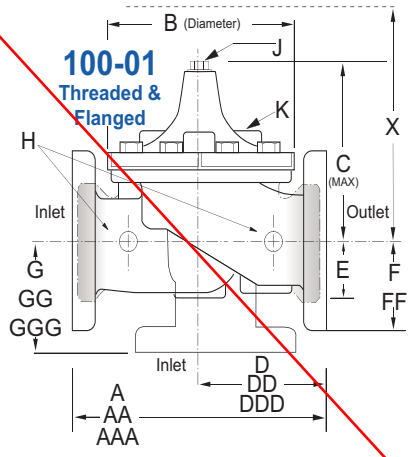
Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	1" - 36" 25 - 900mm	1" - 16" 25 - 400mm	1" - 16" 25 - 400mm
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is Optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		
For material options not listed, consult factory. Cla-Val manufactures valves in more than 50 different alloys.			

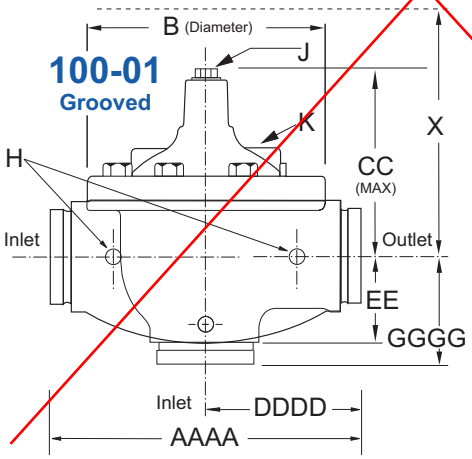


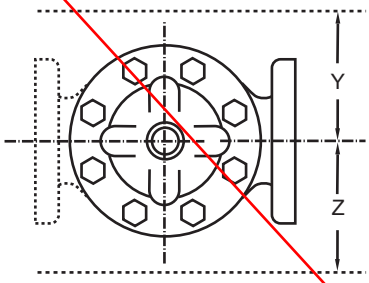
Model 92-01 Dimensions (In Inches)

Valve Size (Inches)	1	1¼	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
A Threaded	7.25	7.25	7.25	9.38	11.00	12.50	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	8.50	9.38	11.00	12.00	15.00	~~20.00~~	25.38	29.75	34.00	39.00	41.38	46.00	52.00	61.50	63.00	72.75
AAA 300 ANSI	—	—	9.00	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	47.64	53.62	63.24	64.50	74.75
AAAA Grooved End	—	—	8.50	9.00	11.00	12.50	15.00	~~20.00~~	25.38	—	—	—	—	—	—	—	—	—
B Diameter	5.62	5.62	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	41.50	45.00	53.16	56.00	66.00
C Maximum	5.50	5.50	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	39.06	41.90	43.93	54.60	59.00
CC Maximum Grooved End	—	—	4.75	5.75	6.88	7.25	9.31	~~12.12~~	14.62	—	—	—	—	—	—	—	—	—
D Threaded	3.25	3.25	3.25	4.75	5.50	6.25	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	4.00	4.75	5.50	6.00	7.50	~~10.00~~	12.69	14.88	17.00	19.50	20.81	—	—	30.75	—	—
DDD 300 ANSI	—	—	4.25	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	—	—	31.62	—	—
DDDD Grooved End	—	—	—	4.75	—	6.00	7.50	—	—	—	—	—	—	—	—	—	—	—
E	1.12	1.12	1.12	1.50	1.69	2.06	3.19	4.31	5.31	9.25	10.75	12.62	15.50	12.95	15.00	17.75	21.31	24.56
EE Grooved End	—	—	2.00	2.50	2.88	3.12	4.25	~~6.00~~	7.56	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	2.50	3.00	3.50	3.75	4.50	~~5.50~~	6.75	8.00	9.50	10.50	11.75	15.00	16.50	19.25	22.50	28.50
FF 300 ANSI	—	—	3.06	3.25	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.00	16.50	19.25	24.00	30.00
G Threaded	1.88	1.88	1.88	3.25	4.00	4.50	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	4.00	3.25	4.00	4.00	5.00	~~6.00~~	8.00	8.62	13.75	14.88	15.69	—	—	22.06	—	—
GGG 300 ANSI	—	—	4.25	3.50	4.31	4.38	5.31	~~6.50~~	8.50	9.31	14.50	15.62	16.50	—	—	22.90	—	—
GGGG Grooved End	—	—	—	3.25	—	4.25	5.00	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	0.40	0.40	0.40	0.60	0.70	0.80	1.10	1.70	2.30	2.80	3.40	4.00	4.50	5.10	5.63	6.75	7.50	8.50
Approx. Ship Weight (lbs)	15	15	15	35	50	70	140	285	500	780	1165	1600	2265	2982	3900	6200	7703	11720
Approx. **X** Pilot System	11	11	11	13	14	15	17	29	31	33	36	40	40	43	47	68	79	85
Approx. **Y** Pilot System	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	40	45
Approx. **Z** Pilot System	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	42	47

Model 92-01 Metric Dimensions (Uses the 100-01 Hytrol Main Valve)







Valve Options

X141 Pressure Gauge

X101AR Valve Position Indicator with Air Release

X101 Valve Position Indicator

X144 e-FlowMeter

X43H Strainer

Stainless Steel Pilot

92-01 Dimensions (In mm)

Valve Size (mm)	25	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900
A Threaded	184	184	184	238	279	318	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	216	238	279	305	381	508	645	756	864	991	1051	1168	1321	1562	1600	1848
AAA 300 ANSI	—	—	229	254	295	337	397	533	670	790	902	1029	1105	1210	1326	1606	1638	1899
AAAA Grooved End	—	—	216	228	279	318	381	508	645	—	—	—	—	—	—	—	—	—
B Diameter	143	143	143	168	203	232	292	400	508	600	711	832	902	1054	1143	1350	1422	1676
C Maximum	140	140	140	165	192	208	270	340	406	435	530	614	635	992	1064	1116	1387	1499
CC Maximum Grooved End	—	—	120	146	175	184	236	308	371	—	—	—	—	—	—	—	—	—
D Threaded	83	83	83	121	140	159	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	102	121	140	152	191	254	322	378	432	495	528	—	—	781	—	—
DDD 300 ANSI	—	—	108	127	149	162	200	267	337	395	451	514	549	—	—	803	—	—
DDDD Grooved End	—	—	—	121	—	152	191	—	—	—	—	—	—	—	—	—	—	—
E	29	29	29	38	43	52	81	110	135	235	273	321	394	329	381	451	541	624
EE Grooved End	—	—	52	64	73	79	108	152	192	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	64	76	89	95	114	140	171	203	241	267	298	381	419	489	572	724
FF 300 ANSI	—	—	78	83	95	105	127	159	191	222	260	292	324	381	419	489	610	762
G Threaded	48	48	48	83	102	114	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	102	83	102	102	127	152	203	219	349	378	399	—	—	560	—	—
GGG 300 ANSI	—	—	102	89	110	111	135	165	216	236	368	397	419	—	—	582	—	—
GGGG Grooved End	—	—	—	83	—	108	127	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	10	10	10	15	18	20	28	43	58	71	86	102	114	130	143	171	190	216
Approx. Ship Weight (kgs)	7	7	7	16	23	32	64	129	227	354	528	726	1027	1353	1769	2812	3494	5316
Approx. **X** Pilot System	280	280	280	331	356	381	432	737	788	839	915	1016	1016	1093	1194	1728	2007	2159
Approx. **Y** Pilot System	229	229	229	229	254	280	305	508	559	610	661	737	762	813	864	991	1016	1143
Approx. **Z** Pilot System	229	229	229	229	254	280	305	508	559	610	661	737	762	813	864	991	1067	1194

92-01 Valve Selection	100-01 Pattern: Globe (G), Angle (A), End Connections: Threaded (T), Grooved (GR), Flanged (F) Indicate Available Sizes																		
	Inches	1	1¼	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
	mm	25	32	40	50	65	80	100	~~150~~	200	250	300	350	400	450	500	600	750	900
Main Valve 100-01	Pattern	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G	G	G, A	G	G
	End Detail	T	T	T, F, Gr*	T, F, Gr	T, F, Gr*	T, F, Gr	F, Gr	F, Gr*	F, Gr*	F	F	F	F	F	F	F	F	F
Suggested Flow (gpm)	Maximum	55	93	125	210	300	460	800	1800	3100	4900	7000	8400	11000	14000	17000	25000	42000	50000
	Maximum Intermittent	68	120	160	260	370	580	990	2250	3900	6150	8720	10540	13700	17500	21700	31300	48000	62500
	Minimum	1	1	1	1	2	2	4	10	15	35	50	70	95	120	150	275	450	650
Suggested Flow (Liters/Sec)	Maximum	3.5	6	8	13	19	29	50	113	195	309	442	530	694	883	1073	1577	2650	3150
	Maximum Intermittent	4.3	7.6	10	16	23	37	62	142	246	387	549	664	863	1104	1369	1972	3028	3940
	Minimum	.03	.03	.03	.06	.09	0.13	0.25	0.63	0.95	2.2	3.2	4.4	6.0	7.6	9.5	17.4	28.4	41.0

100-01 Series is the full internal port Hytrol. **For Lower Flows Consult Factory** *Globe Grooved Only

Many factors should be considered in sizing pressure reducing valves including inlet pressure, outlet pressure and flow rates. For sizing questions or cavitation analysis, consult Cla-Val with system details.

CRD Pressure Reducing Pilot Control

The CRD Pilot is held open by the force of the compression spring above the diaphragm, and closes when the downstream pressure acting on the underside of the diaphragm exceeds the spring setting. The CRD senses downstream pressure directly.

Flow through the control responds to changes in downstream pressure. Turning the adjusting screw clockwise increases the delivery pressure. Turning it counterclockwise decreases the pressure. A resilient disc assures tight shut-off on dead-end service.

See the E-CRD E-Sheet for more details.

CRL-60 Pressure Relief Pilot Control

The Model CRL-60 is normally held closed by the force of the compression spring above the diaphragm. Control pressure is applied under the diaphragm. When the controlling pressure exceeds the spring setting, the disc is lifted off its seat, permitting flow through the control. When control pressure drops below the spring setting, the spring forces the control back to its normally closed position. The controlling pressure is applied to the chamber beneath the diaphragm through a sensing port on the CRL-60 body.

See the E-CRL-60 E-Sheet for more details.

Pilot System Specifications

Adjustment Ranges

CRD	CRL-60
2 to 30 psi	0 to 75 psi
15 to 75 psi	20 to 105 psi*
20 to 105 psi	20 to 200 psi
30 to 300 psi*	100 to 300 psi

*Supplied unless otherwise specified

Other ranges available, please consult factory.

Temperature Range

Water: to 180°F

Materials

Standard Pilot System Materials

Pilot Control: Low Lead Bronze

Trim: Brass & Stainless Steel Type 303

Rubber: Buna-N® Synthetic Rubber

Optional Pilot System Materials

Pilot Systems are available with optional Stainless Steel or Monel materials.

Note: Available with remote sensing control.

When Ordering, Specify:

1. Catalog No. 92-01
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded or Flanged
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed

CLA-VAL 1701 Placentia Ave • Costa Mesa CA 92627 • Phone: 949-722-4800 • Fax: 949-548-5441 • E-mail: info@cla-val.com • www.cla-val.com

CLA-VAL 100-01

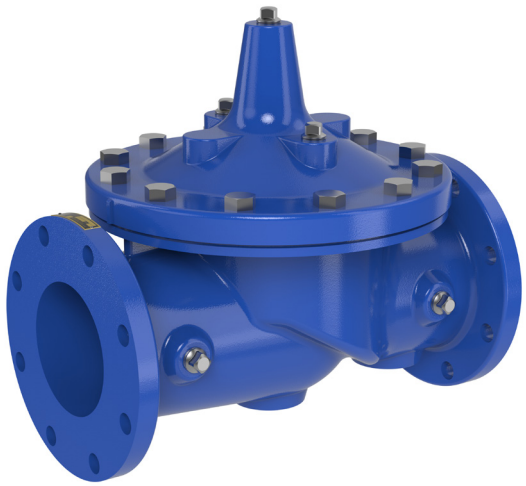
Main Valve

▶ PRODUCT FEATURES

Cla-Val Model 100-01 Hytrol Valve is a hydraulically operated, diaphragm actuated, valve. It consists of three major components: body, diaphragm assembly, and cover. The diaphragm assembly is the only moving part.

The diaphragm assembly is guided top and bottom by a precision machined stem. It utilizes a non-wicking diaphragm of nylon fabric bonded with synthetic rubber.

Model 100-01 is used in system applications, such as, remote control, pressure regulation, solenoid operation, rate of flow control, liquid level control or check valve operation. Applications are unlimited.



▶ SPECIFICATIONS

Available Sizes

Pattern	Threaded	Flanged	Grooved End
Globe	⅜" - 3"	1½" - 36"	1½"-2"- 2½"- 3"- 4"- 6"- 8"
Angle	1" - 3"	1½" - 16" & 24"	2" - 3" - 4"

Operating Temp. Range

Fluids
-40° to 180° F

Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class				
			Flanged		Grooved	Threaded
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End‡ Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
UNS 87850	Bronze	B16.24	225	400	400	400

Note: * ANSI standards are for flange dimensions only.
Flanged valves are available faced but not drilled.
‡ End Details machined to ANSI B2.1 specifications.
Valves for higher pressure are available; consult factory for details

Materials

Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	3/8" - 36"	1" - 16"	1" -16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		

For material options not listed, consult factory.
Cla-Val manufactures valves in more than 50 different alloys.

CLA-VAL 100-01

Main Valve

▶ FUNCTIONAL DATA

† Non Guided Stem

Valve Size		Inches	⅜†	½†	¾†	1†	1	1¼	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
		mm	10	15	20	25	25	32	40	50	65	80	100	~~150~~	200	250	300	350	400	450	500	600	750	900
C_V Factor	Globe Pattern	Gal./Min.(gpm)	1.8	6	8.5	13.3	20	30	32	54	85	115	200	440	770	1245	1725	2300	3130	4463	5345	7655	10150	14020
		Litres/Sec. (l/s)	.11	.38	.54	.84	1.26	1.89	2	3.4	5.4	7.3	13	~~28~~	49	79	109	145	198	282	337	483	640	885
	Angle Pattern	Gal./Min.(gpm)	—	—	—	—	21	27	29	61	101	139	240	~~541~~	990	1575	2500*	3060*	4200*	—	—	9950*	—	—
		Litres/Sec. (l/s)	—	—	—	—	1.32	1.70	1.83	3.8	6.4	8.8	15	~~34~~	62	99	158	193	265	—	—	628	—	—
Equivalent Length of Pipe	Globe Pattern	Feet (ft)	25	7	16	23	10	19	37	51	53	85	116	211	291	347	467	422	503	612	595	628	1181	2285
		Meters (m)	7.6	2.2	4.8	7.1	3.1	5.7	12	15.5	16	26	35	~~64~~	89	106	142	129	154	187	181	192	360	696
	Angle Pattern	Feet (ft)	—	—	—	—	9.0	28	46	40	37	58	80	~~139~~	176	217	222*	238*	247*	—	—	372*	—	—
		Meters (m)	—	—	—	—	2.8	8.7	14	12	11	18	25	~~43~~	54	66	68	73	75	—	—	113	—	—
K Factor	Globe Pattern		16.3	3.7	5.7	6.1	2.7	3.6	5.9	5.6	4.6	6.0	5.9	6.2	6.1	5.8	6.1	5.0	4.6	5.2	3.9	4.0	6.4	6.4
	Angle Pattern		—	—	—	—	2.5	4.4	7.1	4.4	3.3	4.1	4.1	~~4.1~~	3.7	3.6	2.9	2.8	2.6	—	—	2.4	—	—
Suggested Flow (gpm)		Minimum		0.3	0.5	1	1	1	1	1	2	2	4	10	15	35	50	70	95	120	150	275	450	650
		Maximum		19.0	33.0	55	55	93	125	210	300	460	800	1800	3100	4500	7000	8400	11000	14000	17000	25000	42000	50000
		Max. Surge		42.0	75.0	120	120	210	280	470	670	1000	1800	4000	7000	11000	16000	19000	25000	31000	35000	56500	63000	85000
Suggested Flow (l/s)		Minimum		0.02	0.03	0.03	0.03	0.03	0.03	0.06	0.09	0.13	0.25	~~0.63~~	0.95	2.2	3.2	4.4	6.0	7.6	9.5	17.4	28.4	41.0
		Maximum		1.2	2.1	3.5	3.5	6	8	13	19	29	50	~~113~~	195	309	442	530	694	883	1073	1577	2650	3150
		Max. Surge		2.7	4.7	7.6	7.6	13	18	30	42	63	113	~~252~~	441	693	1008	1199	1577	1956	2461	3560	3975	5360
Liquid Displaced from Cover Chamber When Valve Opens		Fl. Oz	.12	.34	.34	.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		U.S. Gal.	—	—	—	—	.02	.02	.02	.03	.04	.08	.17	.53	1.26	2.51	4.0	6.5	9.6	11	12	29	42	90
		ml	3.5	10.1	10.1	20.7	75.7	75.7	75.7	121	163	303	643	—	—	—	—	—	—	—	—	—	—	—
		Litres	—	—	—	—	—	—	—	—	—	—	—	~~2.0~~	4.8	9.5	15.1	24.6	36.2	41.6	45.4	109.8	159	340

*Estimated

C_V Factor

Formulas for computing C_V Factor, Flow (Q) and Pressure Drop (▲P):

$$C_V = \frac{Q}{\sqrt{\triangle P}} \qquad Q = C_V \sqrt{\triangle P} \qquad \triangle P = \left(\frac{Q}{C_V}\right)^2$$

K Factor (Resistance Coefficient)
The Value of K is calculated from the formula: $K = \frac{894 d^4}{C_V^2}$
(U.S. system units)

Equivalent Length of Pipe
Equivalent lengths of pipe (L) are determined from the formula: $L = \frac{K d}{12 f}$
(U.S. system units)

Fluid Velocity
Fluid velocity can be calculated from the following formula: $V = \frac{.4085\ Q}{d^2}$
(U.S. system units)

Where:

C_V = U.S. (gpm) @ 1 psi differential at 60° F water
or
= (l/s) @ 1 bar (14.5 PSIG) differential at 15° C water

d = inside pipe diameter of Schedule 40 Steel Pipe (inches)

f = friction factor for clean, new Schedule 40 pipe (dimensionless) (from Cameron Hydraulic Data, 18th Edition, P 3-119)

K = Resistance Coefficient (calculated)

L = Equivalent Length of Pipe (feet)

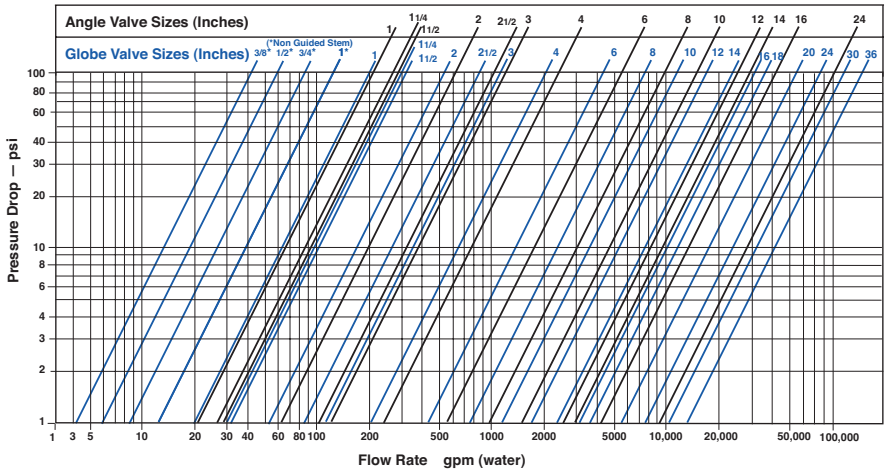
Q = Flow Rate in U.S. (gpm) or (l/s)

V = Fluid Velocity (feet per second) or (meters per second)

△ **P** = Pressure Drop in (psi) or (bar)

▶ FLOW CHART

(Based on normal flow through a wide open valve)

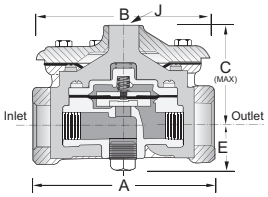


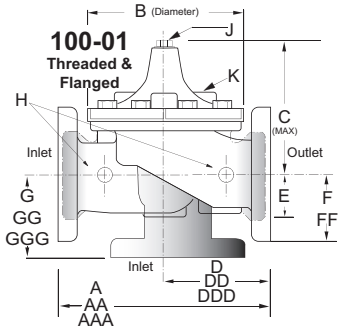
CLA-VAL 100-01

Main Valve

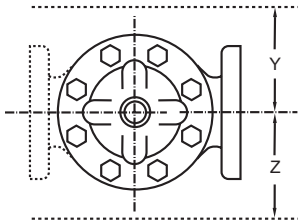
▶ DIMENSIONS (inches)

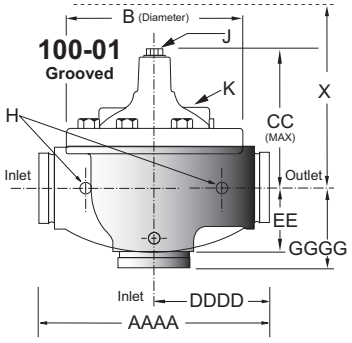
100-01
3/8", 1/2", 3/4", 1"
Auxillary Hytrol Valves with non Guided Stems





Model 100-01





Valve Size (Inches)	3/8*	1/2*	3/4*	1*	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18†	20†	24†	30†	36†
A Threaded	2.75	3.50	3.50	5.12	7.25	7.25	7.25	9.38	11.00	12.50	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	—	—	—	—	8.50	9.38	11.00	12.00	15.00	~~20.00~~	25.38	29.75	34.00	39.00	41.38	46.00	52.00	61.50	63.00	72.75
AAA 300 ANSI	—	—	—	—	—	—	9.00	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	47.64	53.62	63.24	64.50	74.75
AAAA Grooved End	—	—	—	—	—	—	8.50	9.00	11.00	12.50	15.00	~~20.00~~	25.38	—	—	—	—	—	—	—	—	—
B Diameter	2.50	3.12	3.12	4.38	5.62	5.62	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	41.50	45.00	53.16	56.00	66.00
C Maximum	2.33	5.88	5.88	6.25	5.50	5.50	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	39.06	41.90	43.93	54.60	59.00
CC Maximum Grooved End	—	—	—	—	—	—	4.75	5.75	6.88	7.25	9.31	~~12.12~~	14.62	—	—	—	—	—	—	—	—	—
D Threaded	—	—	—	—	3.25	3.25	3.25	4.75	5.50	6.25	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	—	—	—	—	4.00	4.75	5.50	6.00	7.50	~~10.00~~	12.69	14.88	17.00	19.50	20.81	—	—	30.75	—	—
DDD 300 ANSI	—	—	—	—	—	—	4.25	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	—	—	31.62	—	—
DDDD Grooved End	—	—	—	—	—	—	—	4.75	—	6.00	7.50	—	—	—	—	—	—	—	—	—	—	—
E	1.25	0.88	0.88	1.63	1.12	1.12	1.12	1.50	1.69	2.06	3.19	~~4.31~~	5.31	9.25	10.75	12.62	15.50	12.95	15.00	17.75	21.31	24.56
EE Grooved End	—	—	—	—	—	—	2.00	2.50	2.88	3.12	4.25	~~6.00~~	7.56	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	—	—	—	—	2.50	3.00	3.50	3.75	4.50	~~5.50~~	6.75	8.00	9.50	10.50	11.75	15.00	16.50	19.25	22.50	28.50
FF 300 ANSI	—	—	—	—	—	—	3.06	3.25	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.00	16.50	19.25	24.00	30.00
G Threaded	—	—	—	—	1.88	1.88	1.88	3.25	4.00	4.50	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	—	—	—	—	4.00	3.25	4.00	4.00	5.00	~~6.00~~	8.00	8.62	13.75	14.88	15.69	—	—	22.06	—	—
GGG 300 ANSI	—	—	—	—	—	—	4.25	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50	—	—	22.90	—	—
GGGG Grooved End	—	—	—	—	—	—	—	3.25	—	4.25	5.00	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	—	0.125	0.125	0.25	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.125	0.125	0.125	0.25	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	—	0.125	0.125	0.25	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	—	—	—	—	0.40	0.40	0.40	0.60	0.70	0.80	1.10	1.70	2.30	2.80	3.40	4.00	4.50	5.10	5.63	6.75	7.50	8.50
Approx. Ship Weight (lbs)	3	3	8	8	15	15	15	35	50	70	140	285	500	780	1165	1600	2265	2982	3900	6200	7703	11720
Approx. **X** Pilot System	—	—	—	—	11	11	11	13	14	15	17	29	31	33	36	40	40	43	47	68	79	85
Approx. **Y** Pilot System	—	—	—	—	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	40	45
Approx. **Z** Pilot System	—	—	—	—	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	42	47

Note: The top two flange holes on valve size 36 are threaded to 1 1/2"-6 UNC.

*Non Guided Stem Auxiliary Hytrol Controls

†18 inch and larger 100-01 series Hytrol valves are equipped with flange feet for safety and convenience. Consult Cla-Val representative for details.

Cla-Val Control Valves operate with maximum efficiency when mounted in horizontal piping with the main valve cover UP, however, other positions are acceptable. Due to component size and weight of 8 inch and larger valves, installation with cover UP is advisable. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.

EPOXY PROTECTIVE COATING
(Blue Epoxy and Red Epoxy)

Epoxy resin powders were created and developed specifically for the application of thin film corrosion protection to metal or other substrates. Epoxy resin coatings are suitable for continuous exposure to a wide range of corrosive elements. Of particular interest for control valves is the high resistance to various water conditions. They also provide resistance to certain acids, chemicals, solvents and alkalis. They have excellent adhesion to almost any prepared surface. They are sufficiently flexible to be used to protect steel springs from corrosion and have an impact strength that allows retainability and restoration of surface coating under normal drop conditions.

Since the early 1970's the application process used by Cla-Val is the fusion method. This method of applying epoxy resins utilizes the principal of covering a suitably cleaned and preheated part with a one-part dry powdered resin. The dry powdered resin fuses itself to the heated part. A curing period in an oven at 400 degrees F completes the process. No volatile solvents are required and thus there are no pinholes left by evaporation of such materials. The coating is applied by electrostatic spray or flock spray to a nominal thickness recommended by the coating manufacturer.

Cla-Val valves specified with epoxy coating applied at the factory fully conform to the standards below. Applied to the inside and outside of all ferrous parts, this coating option is indicated with "KC" as a suffix to the valve catalog number.

CERTIFICATION

This is to confirm that Cla-Val uses AKZO Nobel R4-HJF42R (**Blue**) epoxy powder coating material for our factory applied protective coating. Our coating application process conforms to all applicable requirements of the American Water Works Association Standard C550 entitled “Protective Interior Coatings for Valves and Hydrants.

The AKZO Nobel R4-HJF42R (**Blue**) epoxy powder coating material is certified as a protective barrier material and approved by NSF Standard 61 - Drinking Water System Components - Health Effects (Nov. 16, 1995).

The AKZO Nobel R4-HJF42R (**Blue**) epoxy powder coating material is formulated with ingredients which are listed in or cited by the suppliers as in compliance with Federal Drug Administration Document, Title 21 of the Federal Regulations on Food Additives, Section 175.300, "Resinous and Polymeric Coatings."

This is to certify that Cla-Val uses H.B. Fuller Co. IF-1947 (**Red Oxide color**) epoxy powder coating material for our factory applied protective coating on Fire Protection main valves. Our coating application process conforms to all applicable requirements of the American WaterWorks Association Standard C550-90 entitled “Protective Interior Coatings for Valves and Hydrants."

This also certifies that H. B. Fuller Co. IF-1947 epoxy powder coating material (**Red Oxide color**) is applied and inspected according to Cla-Val procedures no. 97165 to interior and exterior of all ferrous parts.

Dura-Kleen Stem

▶ PRODUCT FEATURES

The Dura-Kleen Stem is a minimal maintenance stem designed to keep the valve operating when valve stem build-up occurs under conditions such as high lime content, hard water (high calcium), or secondary and tertiary effluent discharge. The Dura-Kleen Stem is ideally suited to those valve applications with high-pressure differentials.

▶ SPECIFICATIONS

MATERIAL

- 316 Stainless Steel
- ~~303 Stainless Steel~~
- ~~Monel~~

Model X101

Valve Position Indicator

▶ PRODUCT FEATURES

Cla-Val Model X101 Visual Position Indicator is designed to display Cla-Val valve position quickly and easily. A solid brass indicator rod fastened directly to the valve stem moves up and down inside a pyrex tube. The tube is contained within a brass housing which is open on two opposite sides to permit clear vision of the indicator rod.

To purge air that may be trapped in the valve cover, a vent valve in the top of the housing is provided. Model X101 valve position indicator is furnished complete for installation on specified size Cla-Val Automatic Control Valve.

▶ SPECIFICATIONS

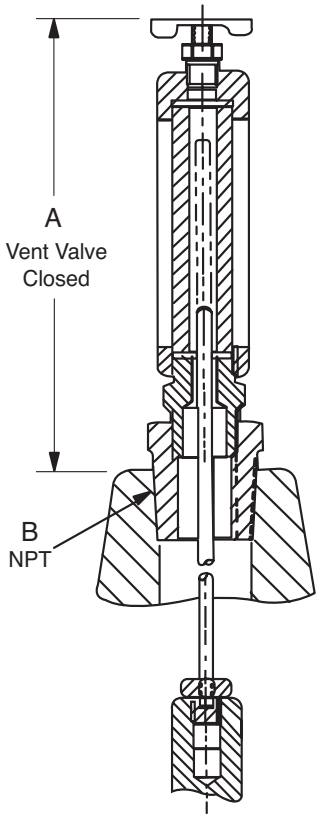
Sizes: 1" thru 24"

Standard Materials*: ~~Brass,~~ Pyrex Tube ;Stainless Steel

Pressure Rating: 400 psi

**Optional Materials Available*

▶ DIMENSIONS



VALVE SIZE	A INCHES	B NPT
1”	5.88	1/4”
1 1/4”	3.21	1/4”
1 1/2”	3.21	1/4”
2”	3.33	1/2”
2 1/2”	3.33	1/2”
3”	3.33	1/2”
4”	4.52	~~3/4~~”
6”	4.52	~~3/4~~”
8”	5.83	1”
10”	7.70	1”
12”	8.20	1 1/4”
14”	8.20	1 1/2”
16”	10.81	2”
18”	12.04	1”
20”	12.04	1”
24”	12.04	1”

Dimension “A” is height added to valve by indicator assembly

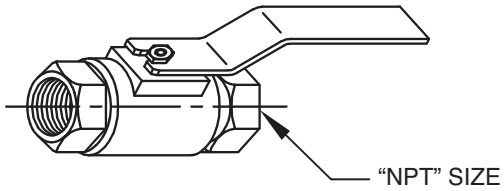
Model **CK2**

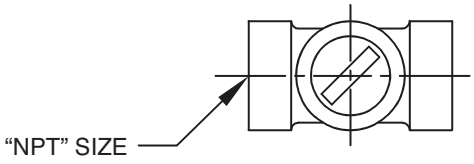
Isolation Valve

▶ PRODUCT FEATURES

Model CK2 is a ball valve used for isolating components within the pilot system.

▶ DIMENSIONS





"NPT" SIZE								
1/8"	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"

▶ SPECIFICATIONS

PART	MATERIAL
Body:	316 Stainless Steel
Handle and Nut:	316 Stainless Steel
Maximum working pressure:	600 psi
Temperature range:	33°F to 180°F

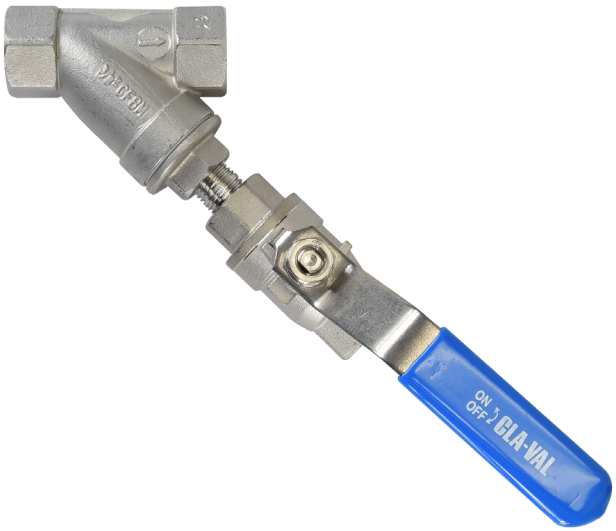
Model **X43A**

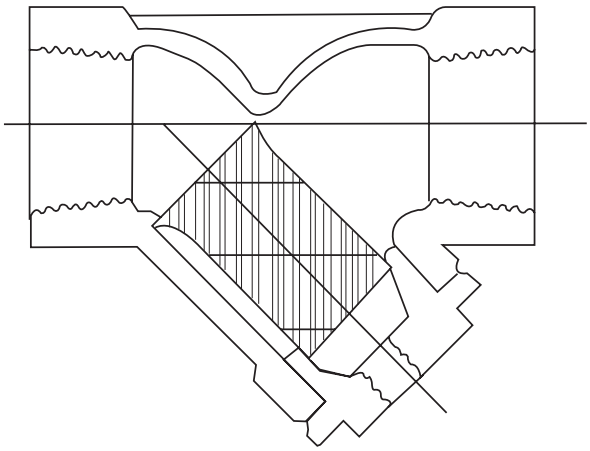
'Y' Strainer with Blowdown Ball Valve

▶ PRODUCT FEATURES

- **Stainless Steel Body**
- **Blow-off Standard**
- **Stainless Steel Mesh Screen**

Model X43A 'Y' Strainers are in-line strainers intended to be installed for protection of pilot systems. These strainers are constructed of corrosion resistant materials. All sizes have blow-off standard.





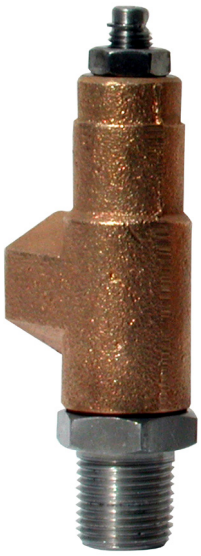
▶ SPECIFICATIONS

PART	MATERIAL
Body:	316 Stainless Steel
Screen:	304 Stainless Steel
Gasket:	Non-Asbestos Fiber
Ends:	Threaded ANSI/ASME B1.20 1
Maximum working pressure:	800 psi
Temperature range:	33°F to 180°F
Screen:	Standard screen size is 40 mesh perforated stainless steel
Standard:	Blowdown Ball Valve

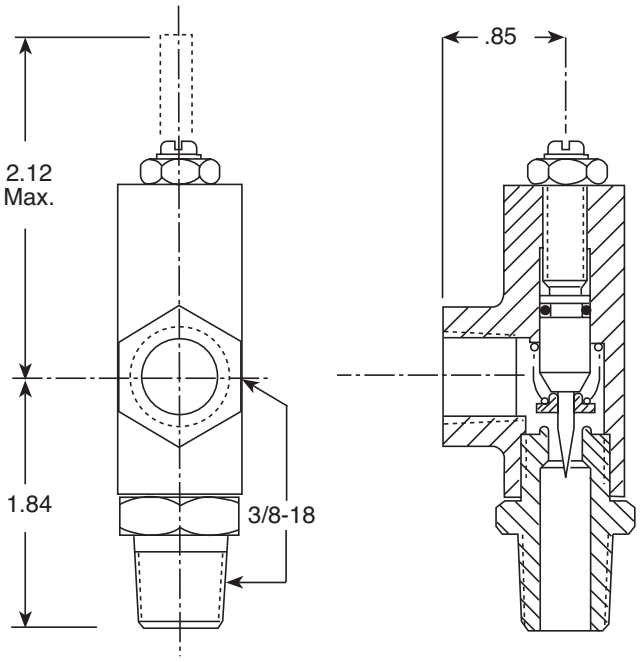
Model CV
Flow Control

▶ PRODUCT FEATURES

Cla-Val CV Control is an adjustable restriction which acts as a needle valve when flow is in the direction of the stem. When flow is in the reverse direction, the port area opens fully to allow unrestricted flow. When installed in the control system of a Cla-Val automatic valve, it can be arranged to function as either an opening or closing speed control.



▶ DIMENSIONS



▶ SPECIFICATIONS

Sizes:	3/8" NPT
Temperature Range:	250°F Max.
Standard Materials*:	
Housing:	~~Bronze ASTM B61~~ Stainless Steel
Trim:	Stainless Steel ~~303~~ 316
Pressure Rating:	400 psi Max.

**Optional Materials Available*

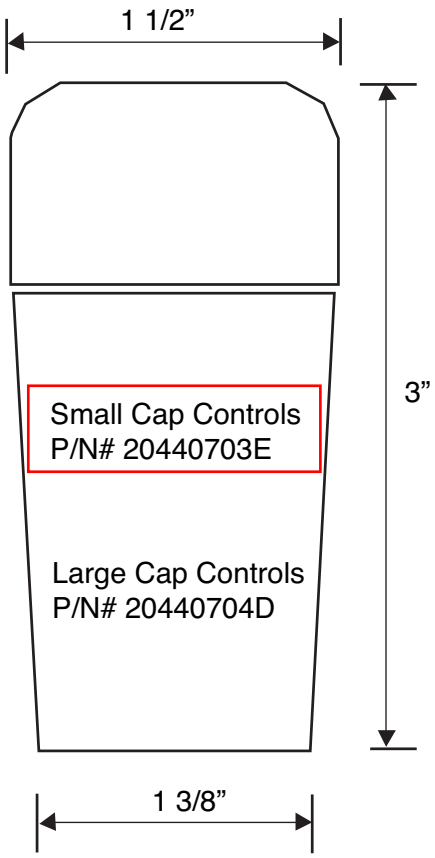
Model **X140-1**

Locking Security Cap

▶ PRODUCT FEATURES

The Cla-Val Model X140-1 Locking Security Cap is designed to completely encapsulate the pilot control adjustment screw with Stainless Steel. Even in the harshest environment, the X140-1 offers an extra level of protection, security and peace of mind for the system operator that pilot control settings will not change until appropriate personnel are present.

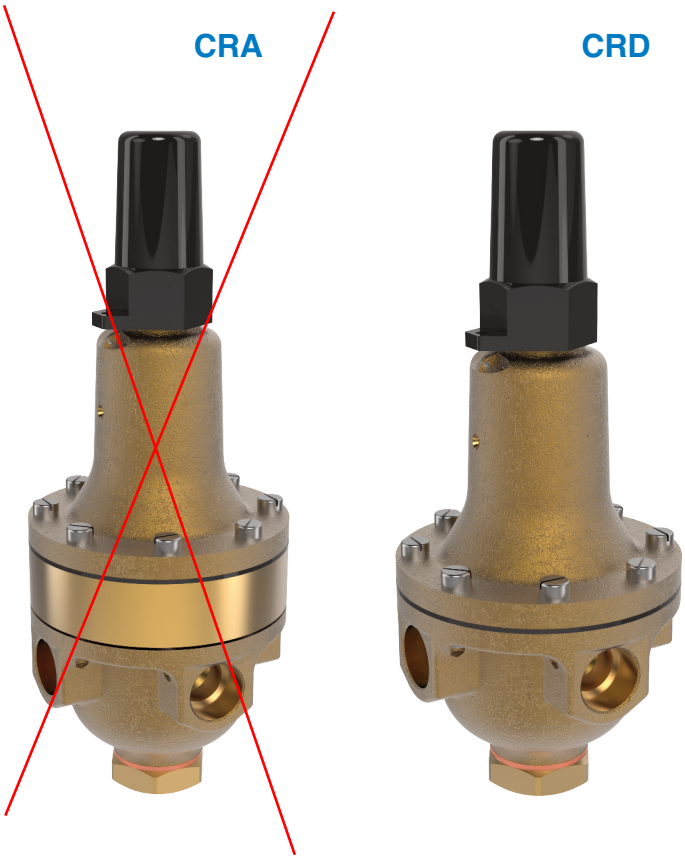
▶ DIMENSIONS



CLA-VAL™

—MODELS— CRA & CRD

Pressure Reducing Control Valves



- **Direct Acting**
- **Hydraulic or Pneumatic Operation**
- **Simplified Design, Easy Adjustments**
- **Operates in Any Position**
- **Gauge Connection Port**

The Cla-Val Models CRA and CRD Pressure Reducing Control automatically reduce a higher inlet pressure to a lower outlet pressure. They are direct acting, spring loaded, diaphragm type control regulators that operate hydraulically or pneumatically. These valves are held open by the force of the compression spring above the diaphragm, and close when the downstream pressure acting on the underside of the diaphragm exceeds the spring setting. The CRD senses downstream pressure directly and the CRA senses downstream pressure remotely.

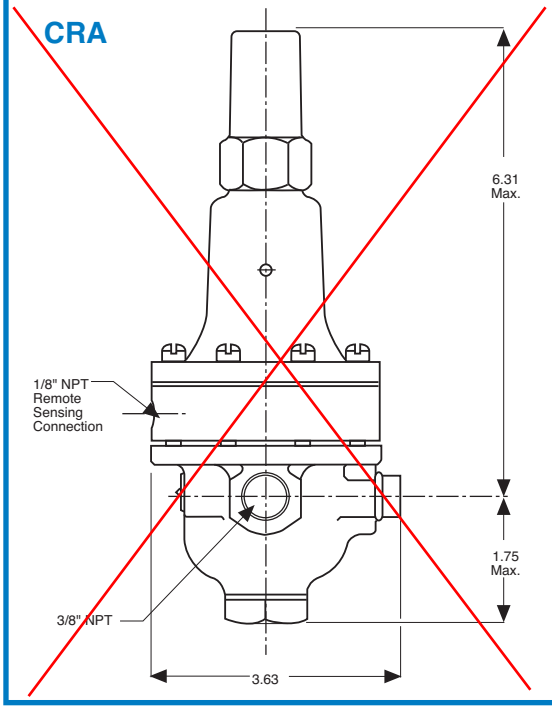
Flow through the control responds to changes in downstream pressure. Turning the adjusting screw clockwise increases the delivery pressure. Turning it counterclockwise decreases the pressure. A resilient disc assures tight shut-off on dead-end service.

Models CRA and CRD may be installed in any position. There is one inlet port and two outlets for either straight or angle installation. The second outlet port can be used for a gauge connection.

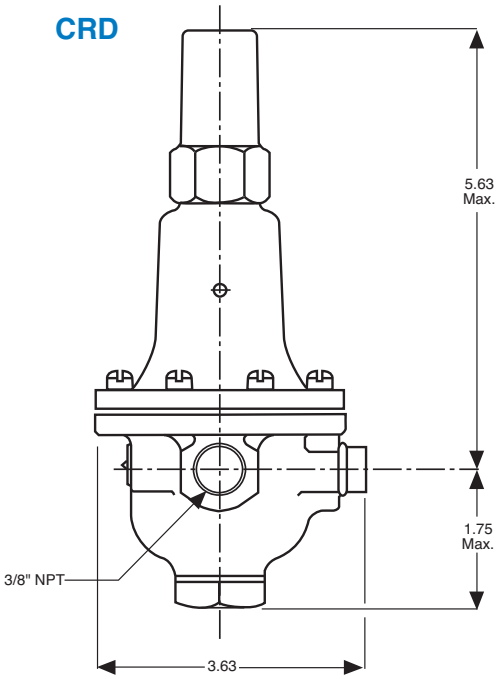
These valves are ideal small capacity regulators for applications such as water coolers, fountains, humidifiers, gas refrigerators, and air supply to tools and instruments. Remote pressure sensing is available with the CRA. They also have numerous applications as pilot controls on many Cla-Val Automatic Control Valves.

Dimensions (In Inches)

CRA



CRD



X140-1

The Cla-Val Model X140-1 Locking Security Cap completely encapsulates the pilot control adjustment screw with Stainless Steel providing protection against tampering.

Specifications

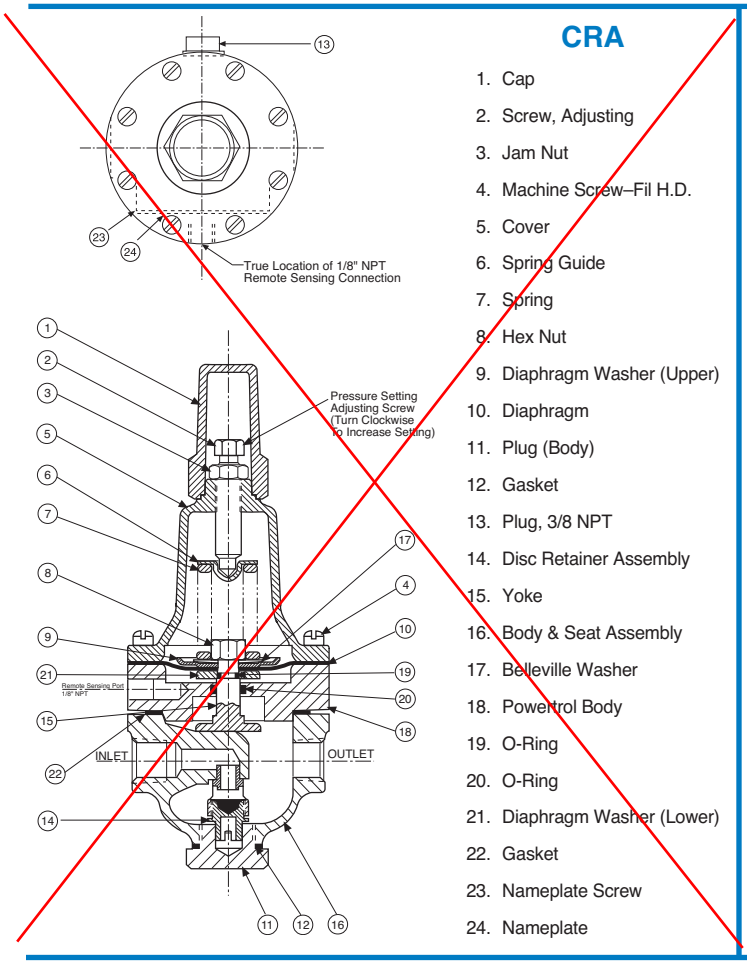
Size	⅜" NPT Threaded
Temperature Range	Water: to 180°F Max.
Standard Materials	
Body & Cover:	~~Low Lead Bronze~~
Trim:	Stainless Steel 303
Rubber:	Buna-N® Rubber
Optional Materials	Cast Aluminum 356-T6
	Stainless Steel 303
Pressure Ratings	Cast Bronze 400 psi Max.
	Cast Aluminum 275 psi Max.
	Stainless Steel 400 psi Max.

Adjustment Ranges

psi:		feet of water:	
2	- 7	4.5	- 15
2	- 30	5	- 70
15	- 75	35	- 170
20	- 105	46	- 242
30	- 300	70	- 695

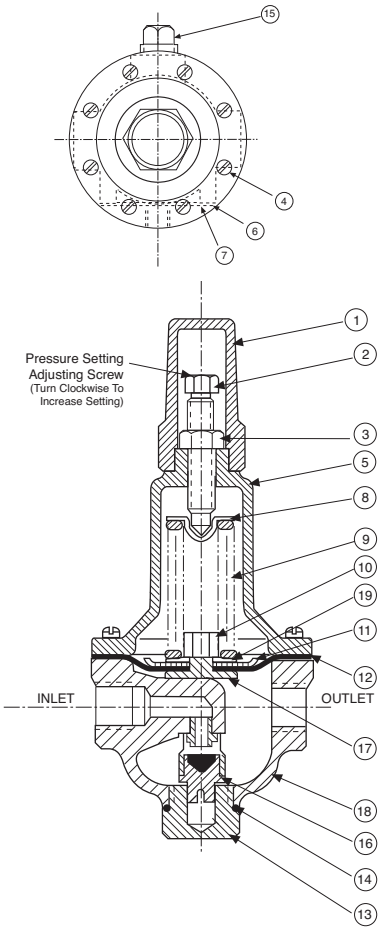
When Ordering, Specify:

1. Catalog No. CRA or No. CRD
2. Adjustment Range Desired
3. Materials Desired



CRA

1. Cap
2. Screw, Adjusting
3. Jam Nut
4. Machine Screw–Fil H.D.
5. Cover
6. Spring Guide
7. Spring
8. Hex Nut
9. Diaphragm Washer (Upper)
10. Diaphragm
11. Plug (Body)
12. Gasket
13. Plug, 3/8 NPT
14. Disc Retainer Assembly
15. Yoke
16. Body & Seat Assembly
17. Belleville Washer
18. Powertrol Body
19. O-Ring
20. O-Ring
21. Diaphragm Washer (Lower)
22. Gasket
23. Nameplate Screw
24. Nameplate



CRD

1. Cap
2. Screw, Adjusting
3. Jam Nut
4. Machine Screw–Fil. HD.
5. Cover
6. Nameplate Screw
7. Nameplate
8. Spring Guide
9. Spring
10. Hex Nut
11. Diaphragm Washer
12. Diaphragm
13. Plug (Body)
14. Gasket
15. Plug 3/8 NPT
16. Disc Retainer Assembly
17. Yoke
18. Body and Seat Assembly
19. Belleville Washer

OPTIONAL X140-1 SECURITY CAP

- **Controlled Security for Pilot Control Adjustment**
- **Long Life Stainless Steel Construction**
- **Tamper-Resistant Design**
- **X140-1 Key and Six Pin Cylinder Lock Supplied**

CLA-VAL®

CLA-VAL™

E-CRA/CRD (R-02/2019)

CLA-VAL

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Model **X141BA**

Gauge/Air Bleed Option

▶ PRODUCT FEATURES

Cla-Val Model X141BA Pressure Gauge/Air Bleed Assembly option consists of glycerin-filled pressure gauge, bleeder, and isolation valve. Cla-Val gauges are waterproof, shock resistant, and fully enclosed with a stainless steel case and bronze wetted parts. Ambient temperature ratings are -4 Degrees F to +140 Degrees F (-20 Degrees C to +60 Degrees C). Bleeder and isolation valve are stainless steel construction with 400 psi max working pressure.

All gauges have dual scale (PSI/BAR).

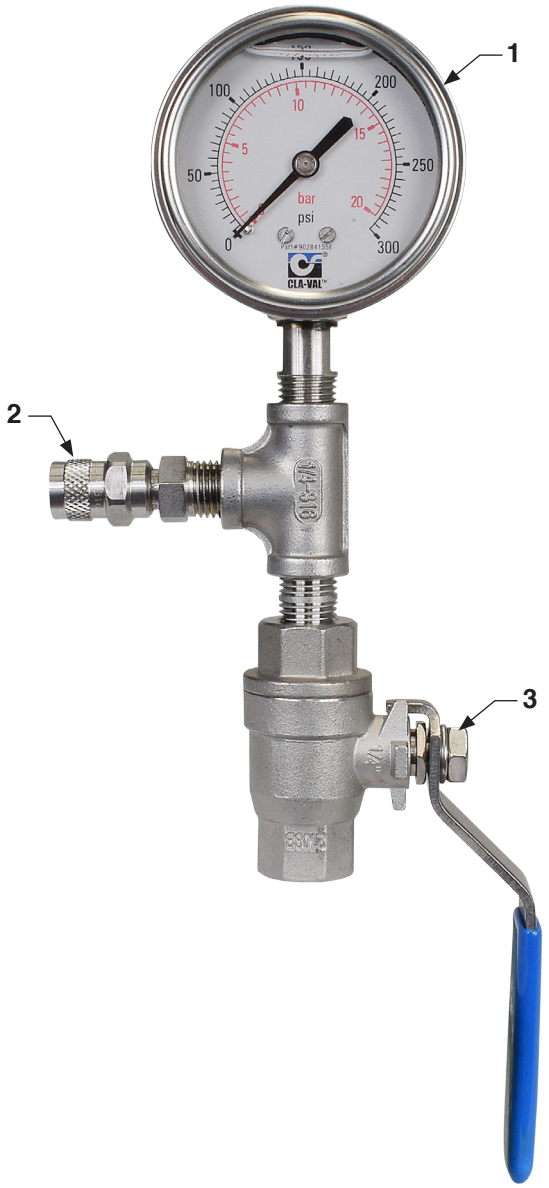
1. Gauge Assembly (2 1/2" Diameter Dial)

Available Pressure Range

- 0 - 60 psi
- 0 - 100 psi
- 0 - 160 psi
- 0 - 200 psi
- 0 - 300 psi
- 0 - 400 psi

2. Bleeder Valve

3. Isolation Valve



Model **X141**

Cla-Val Gauge Option

▶ PRODUCT FEATURES

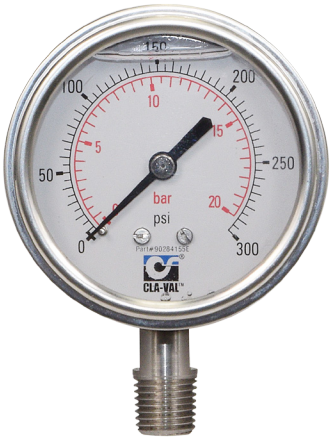
Cla-Val Model X141 Pressure Gauge Option consists of glycerin-filled pressure gauges. Cla-Val gauges are waterproof, shock resistant, and fully enclosed with a stainless steel case and bronze wetted parts. Ambient temperature ratings are -4 Degrees F to +140 Degrees F (-20 Degrees C to +60 Degrees C).

All gauges have dual scale (PSI/BAR) and are supplied with a 1/4" NPT bottom connection.

▶ AVAILABLE PRESSURE RANGES

X141 Gauge Assembly (2 1/2" Diameter Dial)

Pressure Range*
0 - 60 psi
0 - 100 psi
0 - 200 psi
0 - 300 psi
0 - 400 psi



Model X141
2-1/2" Pressure Gauge

X141 Gauge Assembly (4" Diameter Dial)

Pressure Range*
0 - 60 psi
0 - 100 psi
0 - 200 psi
0 - 300 psi
0 - 400 psi

Model X141
4" Pressure Gauge

919 PTFE STAINLESS STEEL BRAIDED HOSE

When high temperature performance and excellent chemical compatibility are demanded, Parker 919 PTFE Hose accepts the challenge. This medium pressure hose can withstand temperatures up to 450°F (232°C). A smooth bore natural PTFE core tube and stainless steel braided wire reinforcement tackle corrosive chemicals and abrasive environments.

FEATURES AND BENEFITS
- Low friction minimizes pressure drops and deposits
- Environmentally safe
- Resists moisture
- Maximum working pressures up to 3,000 psi
- Meets or exceeds SAE 100R14A -919; SAE 100R14B -919B (Static Dissipative PTFE); FDA CFR 177.1550 (Natural Tube)

Applications:

- Oil burner fronts (boiler)
- Fuel, lube, and oil skids
- Water injection, inlet fogging skids, and water wash
- Fuel control valves
- Compressed air discharge and coolant lines
- Gas analyzer systems
- High pressure steam lines
- Instrument test equipment

PERFORMANCE CHARACTERISTICS	
HOSE COVER MATERIAL	304 Stainless Steel Braid, Extruded Silicone, or Polyurethane
CORE TYPE	Natural PTFE or Static Dissipative PTFE
APPLICATION	Fluid Handling, Chemical Transfer, Manufacturing / Industrial, Medical/Pharmaceutical, Packaging, Instrumentation, Transportation
HOSE I.D. (INCH)	3/16, 1/4, 5/16, 13/32, 1/2, 5/8, 7/8, 1-1/8
HOSE I.D. (MM)	5, 6, 8, 10, 13, 16, 19, 22, 29
INDUSTRY STANDARDS	SAE 100R14A, FDA CFR 177.1550 (natural), SAE 100R14B
MAXIMUM WORKING PRESSURE (PSI)	625 - 3,000
MAXIMUM WORKING TEMPERATURE (C)	135 - 232
MAXIMUM WORKING TEMPERATURE (F)	275 - 450
MEDIA	Various
MINIMUM WORKING TEMPERATURE (C)	-40 to -73
MINIMUM WORKING TEMPERATURE (F)	-40 to -100
VACUUM RATING (INCH OF HG)	10 - 28
HOSE I.D. (SIZE)	-4,-5, -6, -8, -10, -12, -16, -20
HOSE O.D. (INCH)	0.32 - 1.28
HOSE O.D. (MM)	8 - 33
MAXIMUM WORKING PRESSURE (BAR)	43 - 207
MINIMUM BEND RADIUS (INCH)	1-1/2 - 7-1/2
MINIMUM BEND RADIUS (MM)	38 - 406
STYLE	Natural, Static-Dissipative
VACUUM RATING (MM OF HG)	25 - 711
WEIGHT (KG/M)	0.09 - 0.58
WEIGHT (LBS/FT)	0.06 - 0.39
DASH NUMBER	-3 to -20
MAXIMUM WORKING PRESSURE (MPA)	4.3 to 20.7 (dependent on size)
COMPATIBLE FITTINGS	90, 91, or 91N
HOSE TYPE	PTFE Hose or Smoothbore
COLOR	Silver, Red or Black

130LTSS1/4X3/8

SKU#: 130LTSS1/4X3/8

Hose Connector

St. St. 316 Pipe Fitting, Hose Connector 1/4" x Tube Stub 1/4"

BODY MATERIAL	Stainless Steel 316
FITTING TYPE	Adapter
CONNECTION TYPE	Tube Stub
CONNECTION SIZE	3/8"
CROSS REFERENCE	SS-4-HC-A-601
TUBE SIZE	1/4", 3/8"

CLA-VAL®

MODEL CRL-60

Pressure Relief Control

- **Direct Acting - Precise Pressure Control**
- **Positive Dependable Opening**
- **Drip Tight Closure**
- **Remote Sensing**
- **Sensitive to Small Pressure Variations**

The Cla-Val Model CRL-60 Pressure Relief Valve is a direct-acting, spring loaded, diaphragm type relief valve. Often used as a pilot control for Cla-Val Hytrol valves, it can also be used as a standalone pressure relief valve. The CRL-60 may be installed in any position. It opens and closes within very close pressure limits. The bottom plug may be removed and installed in the inlet to convert it to an angle pattern flow path.

The Model CRL-60 is normally held closed by the force of the compression spring above the diaphragm. Control pressure is applied under the diaphragm. When the controlling pressure exceeds the spring setting, the disc is lifted off its seat, permitting flow through the control. When control pressure drops below the spring setting, the spring forces the control back to its normally closed position. The controlling pressure is applied to the chamber beneath the diaphragm through a sensing port on the CRL-60 body.

Pressure adjustment is simply a matter of turning the adjusting screw to vary the spring pressure on the diaphragm. The CRL-60 is available in four pressure ranges: 0 to 75 psi, 20 - 75 psi, 20 to 105 psi, 20 to 200 psi, 40 to 200 psi and 100 to 300 psi. To prevent tampering, the adjustment cap can be wire sealed by using the lock wire holes provided in the cap and cover; or supplied with a X140-1 Locking Cap. The X140-1 is a key and six-pin cylinder locking security cap that completely encapsulates the pilot control adjustment screw and cannot be removed without the appropriate key.

Typical Application for CRL-60 Pressure Relief Control

50 Series Pressure Relief Control Valve

Model CRL-60 Pressure Relief Control is ideally suited as pilot control for Cla-Val Series 50 pressure relief or pressure sustaining automatic control valves. The 50 Series valves are hydraulically operated, pilot controlled, modulating type valves, used where pressure relief is needed in a waterworks pipeline distribution system downstream of any high pressure source, such as pressure reducing stations or pump stations, or they can also be used in a bypass to control pump delivery pressure.

Model CRL-60 is designed to maintain constant upstream pressure to close limits at a remote point in many Cla-Val pilot control systems. Cla-Val 50 Series Pressure Relief Valves use CRL-60 to sense and actuate main valve using inlet line pressure through pilot system. In event of a pressure surge in pipeline, CRL-60 remotely sensing valve inlet pressure opens quickly to control main valve opening and maintains water flow to atmosphere to dissipate pressure surge. CRL-60 closes slowly as the inlet pressure lowers to a safe pressure to prevent new surges, and finally when inlet pressure is below the pressure setting, the main valve closes drip tight. Pressure setting adjustment is made with a single adjusting screw that has a protective cap to discourage tampering.

Specifications

Size 1/2", 3/4" & 1"Threaded
Temperature Range Water, Air: to 180°F Max.
Standard Materials
Body & Cover: ~~Low Lead Bronze~~
Trim: Stainless Steel 303
Rubber: Buna-N® Synthetic Rubber

Pressure Ratings Bronze 400 psi Max.
Stainless Steel 400 psi Max.
Other Materials Available on special order
Adjustment Ranges
0 to 75 psi
20 to 75 psi (1" size only)
20 to 105 psi (1/2" size only)
20 to 200 psi
20 to 400 psi (1" size only)
100 to 300 psi

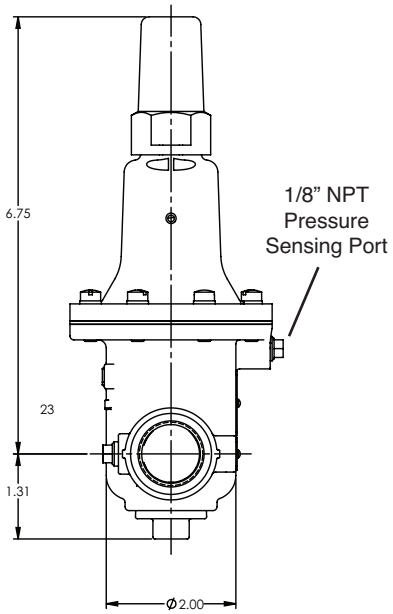
CRL-60 PSI	Approximate Increase For Each Clockwise Turn Of Adjusting Screw
0 to 75	8.5 psi
20 to 75	6.0 psi
20 to 105	12.0 psi
20 to 200	28.0 psi
40 to 200	18.0 psi
100 to 300	18.0 psi

Pressure Drop Chart (Full Open Valve)

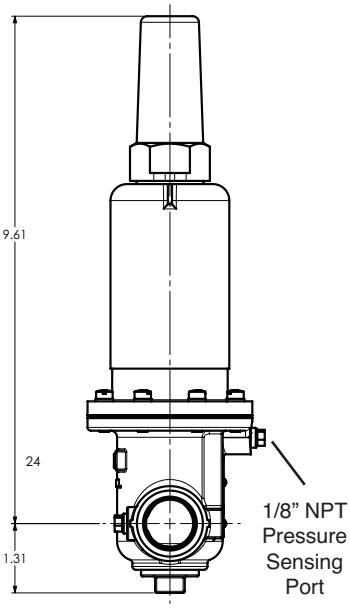
Valve Size	Cv Factor	Flow of Water - gpm					
		5	10	15	20	30	40
1/2"	6.0	0.7	2.7	6.0	11.0	- -	- -
3/4"	8.5	0.3	1.4	3.1	5.5	12.2	- -
1"	12.5	0.2	0.6	1.4	2.6	5.8	10.2

Dimensions 1/2" and 3/4" Sizes

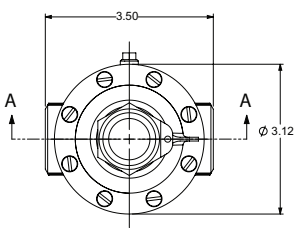
0 to 75, 20 - 105 and 20 to 200 psi design



100 to 300 psi design

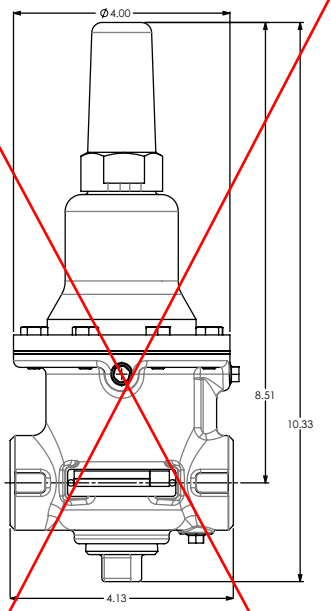


(applies to both configurations)



Dimensions 1" Size

20 - 75, 40 - 200 and 100 - 300 psi design



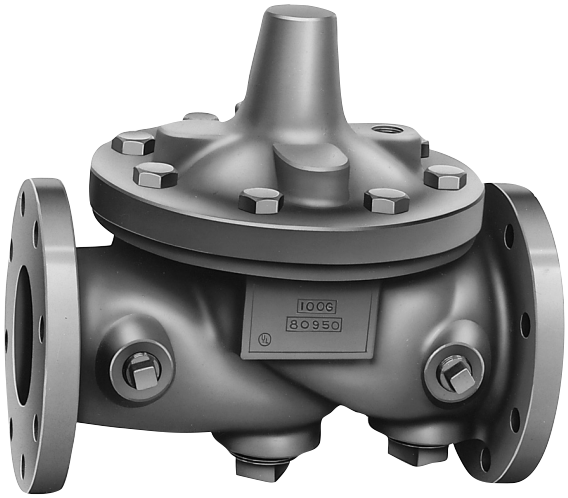
When Ordering, Specify:

1. Catalog No. CRL-60
2. Valve Size
3. Adjustment Range Desired
4. Optional Materials
5. Optional Security Cap

CLA-VAL 1701 Placentia Ave • Costa Mesa CA 92627 • Phone: 949-722-4800 • Fax: 949-548-5441 • E-mail: info@cla-val.com • www.cla-val.com

CLA-VAL WARRANTY

3 Year Warranty on Cla-Val Quality Products



This is a Limited Warranty

Automatic valves and controls as manufactured by Cla-Val are warranted for three years from date of shipment against manufacturing defects in material and workmanship that develop in the service for which they are designed, provided the products are installed and used in accordance with all applicable instructions and limitations issued by Cla-Val. Electronic components manufactured by Cla-Val are warranted for one year from the date of shipment.

We will repair or replace defective material, free of charge which is returned to our factory, transportation charges prepaid, provided that after inspection the material is found to have been defective at time of shipment. The warranty is expressly conditioned on the purchaser's giving Cla-Val immediate written notice upon discovery of the defect.

Components used by Cla-Val, but manufactured by others, are warranted only to the extent of that manufacturer's guarantee.

This warranty shall not apply if the product has been altered or repaired by others, and Cla-Val shall make no allowance or credit for such repairs or alterations unless authorized in writing by Cla-Val.

Disclaimer of Warranties & Limitation of Liability

The foregoing warranty is exclusive and in lieu of all other warranties and representations whether expressed, implied, oral or written, including but not limited to, any implied warranties or merchantability or fitness for a particular purpose. All such other warranties and representations are hereby cancelled.

Cla-Val shall not be liable for any incidental or consequential loss, damage or expense arising directly or indirectly from the use of the product. Cla-Val shall not be liable for any damages or charges for labor or expense in making repairs or adjustments to the product. Cla-Val shall not be liable for any damages or charges sustained in the adaptation or use of its engineering data and services.

No representative of Cla-Val may change any of the foregoing or assume any additional liability or responsibility in connection with the product.

The liability of Cla-Val is limited to material replacements F.O.B. Newport Beach, California.

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Fax: 33-4-72-25-04-17
E-mail: cla-val@cla-val.fr

CLA-VAL™

Submittal Data Cover Sheet

Date:

Model No.: 92G-01BCPSVYKCKD

Description: Combination Pressure Sustaining, Pressure Reducing Valve

Job/Project Name: Navajo Gallup Reach 26.3 PRV Vault

Engineering Firm: Souder, Miller and Associates

Project Engineer: Andrew Robertson

Company: Pipestone Equipment

Contact: Kira Witwer

Address: 676 Moss Street

City: Golden **State:** CO **Zip:** 80401

Fluid To Be Handled: Water

Specific Gravity: 1

Temperature: Ambient

Max. Flow Rate: **GPM**

Min. Flow Rate: **GPM**

Main Valve

Valve Size:
2"

Base Valve:
100-01 Hytrol

Quantity:
1

Main Valve Body & Cover:
Ductile Iron ASTM A-536

Main Valve Trim:
(Disc Guide, Seat & Cover Bearings)
316 Stainless Steel

Valve Pattern:
Globe

End Details:
Threaded Ductile Iron ANSI B1.20.1 Class 300

Pressure Rating:
250/350 Class @ 400 psi Max.

Elastomers: *(Max Temperature 180°F)*
Buna-N® Synthetic Rubber

Pilot System

Tubing & Fittings
Stainless Steel Braided Flex Hose

Pilot System Configuration
316 SST with 316 SST Trim

R.H. Pilot System Mount (standard)

Hydraulic Pilot System Adjustment Range(s)

CRL 20-200 PSI	60psi
CRD 30-300 PSI	60psi

Electronic Pilot Spring Ranges

Electrical

Electrical - Voltages & Accessories

VC-22D Electronic Valve Controller

VC-22D Power Converter

Features & Options

- [x] **Strainer:** Y-Pattern
- [x] Pilot System Isolation Valves
- [x] Closing Speed Control
- [x] Opening Speed Control
- [ ] Pilot System Check Feature
- [ ] Independent Operating Pressure
- [ ] Atmospheric Drain
- [x] Fusion Bonded Epoxy Coating 12 mil
- [ ] X144D e-FlowMeter
- [ ] Reservoir Gauge with Tester
- [ ] X145 External Display

Pressure Gauges:
Inlet: 2-1/2" 0 - 200 psi
Outlet: 2-1/2" 0 - 200 psi
Cover:

Valve Position Transmitter:
N/A

Valve Position Indicator:
X101

Stem Option:
Dura-Kleen® Stem

Limit Switch (SPDT):
N/A

Differential Pressure Transmitter:
N/A

Pressure Transmitter:
Inlet: N/A
Outlet: N/A

Orifice Plate:
N/A Bore: _____

Power Generator:
N/A

X43 H-Style Strainer:
Supplied Seperately

X43 H-Style Strainer Flange:
(Ductile Iron ASME B16.42)

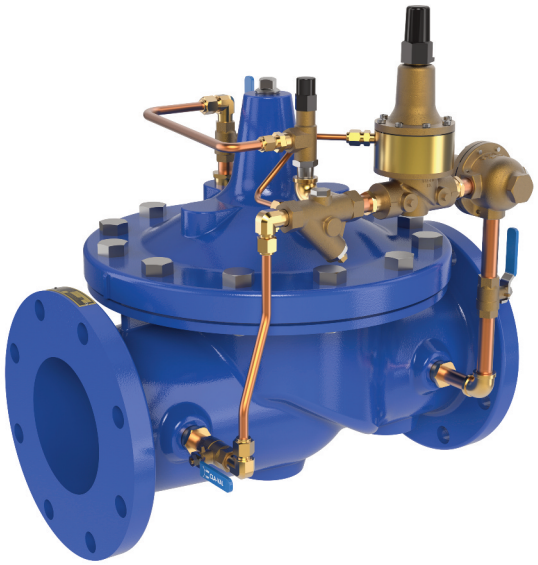
Notes:

Cla-Val Contact: **Phone:** **E-Mail:**

CLA-VAL®

MODEL 92-01

Combination Pressure Reducing & Pressure Sustaining Valve



- **Accurate Response to Slight Pressure Changes**
- **Check Feature Available**
- **Completely Automatic Operation**
- **Drip-Tight, Positive Seating Action**
- **Operation is Fully Hydraulic**

The Cla-Val Model 92-01 Combination Pressure Reducing and Pressure Sustaining Valve automatically performs two independent functions. It maintains a constant downstream pressure, regardless of fluctuating demand and sustains the upstream pressure to a pre-determined minimum.

The pressure reducing control responds to slight variations in downstream pressure and immediately repositions the main valve to maintain the desired downstream pressure. The pressure sustaining control is normally held open by the upstream pressure, but modulates should the pressure drop to the control set point. This, in turn, modulates the main valve to sustain the desired upstream pressure.

If a check feature is added, and a pressure reversal occurs, the downstream pressure is admitted into the main valve cover chamber and the valve closes to prevent return flow.

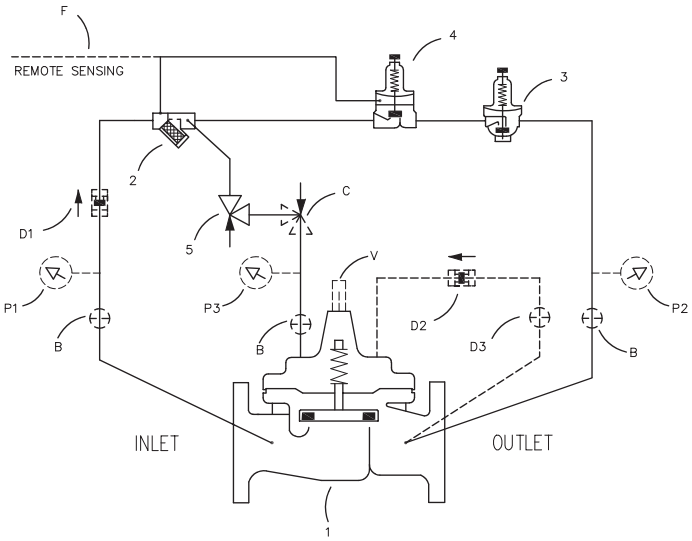
Schematic Diagram

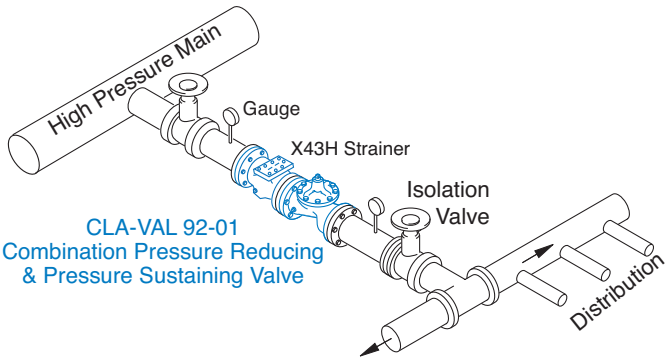
Item	Description
1	100-01 Hytrol Main Valve
2	X44A Strainer & Orifice
3	CRD Pressure Reducing Control
4	CRL-60 Pressure Relief Control
5	CV Flow Control (Opening)

Optional Features

Item	Description
B	CK2 Isolation Valve
C	CV Flow Control (Closing)*
D	Check Valves With Isolation Valve
F	Remote Pilot Sensing
P	X141 Pressure Gauge
V	X101 Valve Position Indicator

* The (optional) closing speed control on this valve should always be open at least three (3) turns off its seat.

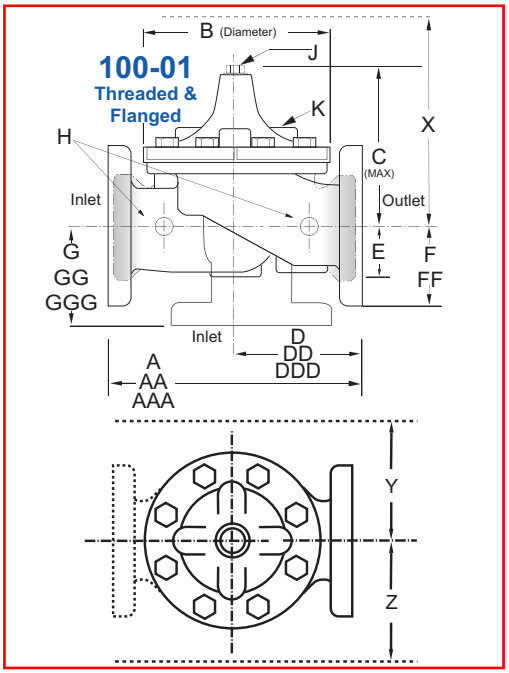




Typical Applications

A Combination Pressure Reducing and Pressure Sustaining Valve is typically used to automatically reduce pressure for the downstream distribution network and sustain a minimum pressure in the high pressure main regardless of distribution demand.

Model 92-01 (Uses 100-01 Hytrol Main Valve)



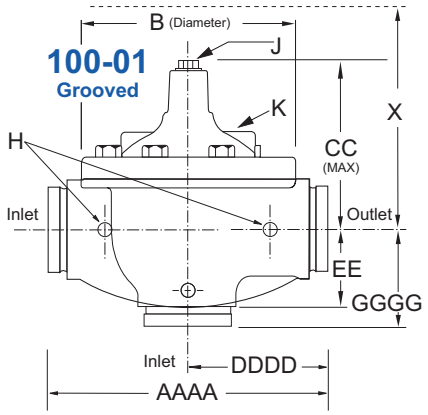
Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class				
		Flanged			Grooved	Threaded
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End‡ Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
UNS 87850	Bronze	B16.24	225	400	400	400

Note: * ANSI standards are for flange dimensions only.
Flanged valves are available faced but not drilled.
‡ End Details machined to ANSI B2.1 specifications.
Valves for higher pressure are available; consult factory for details

Materials

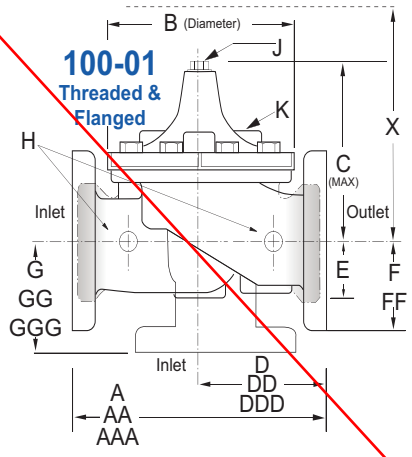
Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	1" - 36" 25 - 900mm	1" - 16" 25 - 400mm	1" - 16" 25 - 400mm
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is Optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		
For material options not listed, consult factory. Cla-Val manufactures valves in more than 50 different alloys.			

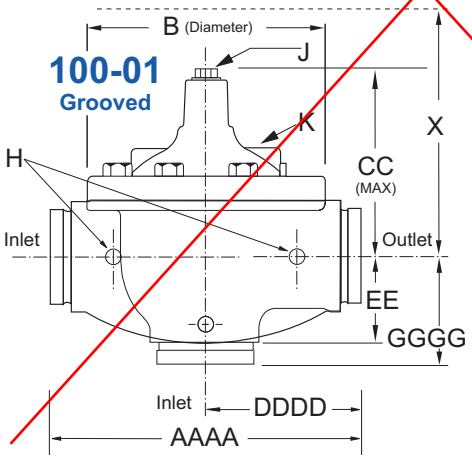


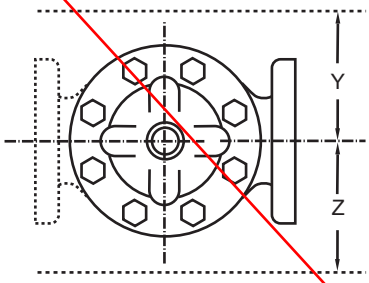
Model 92-01 Dimensions (In Inches)

Valve Size (Inches)	1	1¼	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
A Threaded	7.25	7.25	7.25	9.38	11.00	12.50	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	8.50	~~9.38~~	11.00	12.00	15.00	20.00	25.38	29.75	34.00	39.00	41.38	46.00	52.00	61.50	63.00	72.75
AAA 300 ANSI	—	—	9.00	~~10.00~~	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	47.64	53.62	63.24	64.50	74.75
AAAA Grooved End	—	—	8.50	~~9.00~~	11.00	12.50	15.00	20.00	25.38	—	—	—	—	—	—	—	—	—
B Diameter	5.62	5.62	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	41.50	45.00	53.16	56.00	66.00
C Maximum	5.50	5.50	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	39.06	41.90	43.93	54.60	59.00
CC Maximum Grooved End	—	—	4.75	~~5.75~~	6.88	7.25	9.31	12.12	14.62	—	—	—	—	—	—	—	—	—
D Threaded	3.25	3.25	3.25	4.75	5.50	6.25	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	4.00	~~4.75~~	5.50	6.00	7.50	10.00	12.69	14.88	17.00	19.50	20.81	—	—	30.75	—	—
DDD 300 ANSI	—	—	4.25	~~5.00~~	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	—	—	31.62	—	—
DDDD Grooved End	—	—	—	~~4.75~~	—	6.00	7.50	—	—	—	—	—	—	—	—	—	—	—
E	1.12	1.12	1.12	1.50	1.69	2.06	3.19	4.31	5.31	9.25	10.75	12.62	15.50	12.95	15.00	17.75	21.31	24.56
EE Grooved End	—	—	2.00	~~2.50~~	2.88	3.12	4.25	6.00	7.56	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	2.50	~~3.00~~	3.50	3.75	4.50	5.50	6.75	8.00	9.50	10.50	11.75	15.00	16.50	19.25	22.50	28.50
FF 300 ANSI	—	—	3.06	~~3.25~~	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.00	16.50	19.25	24.00	30.00
G Threaded	1.88	1.88	1.88	3.25	4.00	4.50	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	4.00	~~3.25~~	4.00	4.00	5.00	6.00	8.00	8.62	13.75	14.88	15.69	—	—	22.06	—	—
GGG 300 ANSI	—	—	4.25	~~3.50~~	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50	—	—	22.90	—	—
GGGG Grooved End	—	—	—	~~3.25~~	—	4.25	5.00	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	0.40	0.40	0.40	0.60	0.70	0.80	1.10	1.70	2.30	2.80	3.40	4.00	4.50	5.10	5.63	6.75	7.50	8.50
Approx. Ship Weight (lbs)	15	15	15	35	50	70	140	285	500	780	1165	1600	2265	2982	3900	6200	7703	11720
Approx. **X** Pilot System	11	11	11	13	14	15	17	29	31	33	36	40	40	43	47	68	79	85
Approx. **Y** Pilot System	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	40	45
Approx. **Z** Pilot System	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	42	47

Model 92-01 Metric Dimensions (Uses the 100-01 Hytrol Main Valve)







Valve Options

X141 Pressure Gauge

X101AR Valve Position Indicator with Air Release

X101 Valve Position Indicator

X144 e-FlowMeter

X43H Strainer

Stainless Steel Pilot

92-01 Dimensions (In mm)

Valve Size (mm)	25	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900
A Threaded	184	184	184	238	279	318	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	216	238	279	305	381	508	645	756	864	991	1051	1168	1321	1562	1600	1848
AAA 300 ANSI	—	—	229	254	295	337	397	533	670	790	902	1029	1105	1210	1326	1606	1638	1899
AAAA Grooved End	—	—	216	228	279	318	381	508	645	—	—	—	—	—	—	—	—	—
B Diameter	143	143	143	168	203	232	292	400	508	600	711	832	902	1054	1143	1350	1422	1676
C Maximum	140	140	140	165	192	208	270	340	406	435	530	614	635	992	1064	1116	1387	1499
CC Maximum Grooved End	—	—	120	146	175	184	236	308	371	—	—	—	—	—	—	—	—	—
D Threaded	83	83	83	121	140	159	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	102	121	140	152	191	254	322	378	432	495	528	—	—	781	—	—
DDD 300 ANSI	—	—	108	127	149	162	200	267	337	395	451	514	549	—	—	803	—	—
DDDD Grooved End	—	—	—	121	—	152	191	—	—	—	—	—	—	—	—	—	—	—
E	29	29	29	38	43	52	81	110	135	235	273	321	394	329	381	451	541	624
EE Grooved End	—	—	52	64	73	79	108	152	192	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	64	76	89	95	114	140	171	203	241	267	298	381	419	489	572	724
FF 300 ANSI	—	—	78	83	95	105	127	159	191	222	260	292	324	381	419	489	610	762
G Threaded	48	48	48	83	102	114	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	102	83	102	102	127	152	203	219	349	378	399	—	—	560	—	—
GGG 300 ANSI	—	—	102	89	110	111	135	165	216	236	368	397	419	—	—	582	—	—
GGGG Grooved End	—	—	—	83	—	108	127	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	10	10	10	15	18	20	28	43	58	71	86	102	114	130	143	171	190	216
Approx. Ship Weight (kgs)	7	7	7	16	23	32	64	129	227	354	528	726	1027	1353	1769	2812	3494	5316
Approx. **X** Pilot System	280	280	280	331	356	381	432	737	788	839	915	1016	1016	1093	1194	1728	2007	2159
Approx. **Y** Pilot System	229	229	229	229	254	280	305	508	559	610	661	737	762	813	864	991	1016	1143
Approx. **Z** Pilot System	229	229	229	229	254	280	305	508	559	610	661	737	762	813	864	991	1067	1194

92-01 Valve Selection	100-01 Pattern: Globe (G), Angle (A), End Connections: Threaded (T), Grooved (GR), Flanged (F) Indicate Available Sizes																		
	Inches	1	1¼	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
	mm	25	32	40	~~50~~	65	80	100	150	200	250	300	350	400	450	500	600	750	900
Main Valve 100-01	Pattern	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G	G	G, A	G	G
	End Detail	T	T	T, F, Gr*	T, F, Gr	T, F, Gr*	T, F, Gr	F, Gr	F, Gr*	F, Gr*	F	F	F	F	F	F	F	F	F
Suggested Flow (gpm)	Maximum	55	93	125	210	300	460	800	1800	3100	4900	7000	8400	11000	14000	17000	25000	42000	50000
	Maximum Intermittent	68	120	160	260	370	580	990	2250	3900	6150	8720	10540	13700	17500	21700	31300	48000	62500
	Minimum	1	1	1	1	2	2	4	10	15	35	50	70	95	120	150	275	450	650
Suggested Flow (Liters/Sec)	Maximum	3.5	6	8	13	19	29	50	113	195	309	442	530	694	883	1073	1577	2650	3150
	Maximum Intermittent	4.3	7.6	10	16	23	37	62	142	246	387	549	664	863	1104	1369	1972	3028	3940
	Minimum	.03	.03	.03	.06	.09	0.13	0.25	0.63	0.95	2.2	3.2	4.4	6.0	7.6	9.5	17.4	28.4	41.0

100-01 Series is the full internal port Hytrol. **For Lower Flows Consult Factory** *Globe Grooved Only

Many factors should be considered in sizing pressure reducing valves including inlet pressure, outlet pressure and flow rates.
For sizing questions or cavitation analysis, consult Cla-Val with system details.

CRD Pressure Reducing Pilot Control

The CRD Pilot is held open by the force of the compression spring above the diaphragm, and closes when the downstream pressure acting on the underside of the diaphragm exceeds the spring setting. The CRD senses downstream pressure directly.

Flow through the control responds to changes in downstream pressure. Turning the adjusting screw clockwise increases the delivery pressure. Turning it counterclockwise decreases the pressure. A resilient disc assures tight shut-off on dead-end service.

See the E-CRD E-Sheet for more details.

CRL-60 Pressure Relief Pilot Control

The Model CRL-60 is normally held closed by the force of the compression spring above the diaphragm. Control pressure is applied under the diaphragm. When the controlling pressure exceeds the spring setting, the disc is lifted off its seat, permitting flow through the control. When control pressure drops below the spring setting, the spring forces the control back to its normally closed position. The controlling pressure is applied to the chamber beneath the diaphragm through a sensing port on the CRL-60 body.

See the E-CRL-60 E-Sheet for more details.

Pilot System Specifications

Adjustment Ranges

CRD	CRL-60
2 to 30 psi	0 to 75 psi
15 to 75 psi	20 to 105 psi*
20 to 105 psi	20 to 200 psi
30 to 300 psi*	100 to 300 psi

*Supplied unless otherwise specified

Other ranges available, please consult factory.

Temperature Range

Water: to 180°F

Materials

Standard Pilot System Materials

Pilot Control: Low Lead Bronze
Trim: Brass & Stainless Steel Type 303
Rubber: Buna-N® Synthetic Rubber

Optional Pilot System Materials

Pilot Systems are available with optional Stainless Steel or Monel materials.

Note: Available with remote sensing control.

When Ordering, Specify:

1. Catalog No. 92-01
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded or Flanged
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed

CLA-VAL 1701 Placentia Ave • Costa Mesa CA 92627 • Phone: 949-722-4800 • Fax: 949-548-5441 • E-mail: info@cla-val.com • www.cla-val.com

CLA-VAL 100-01

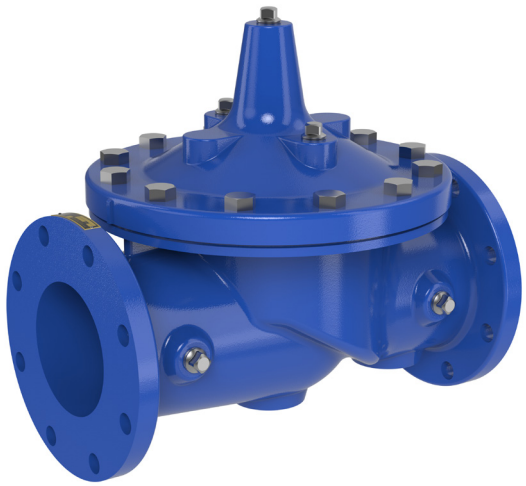
Main Valve

▶ PRODUCT FEATURES

Cla-Val Model 100-01 Hytrol Valve is a hydraulically operated, diaphragm actuated, valve. It consists of three major components: body, diaphragm assembly, and cover. The diaphragm assembly is the only moving part.

The diaphragm assembly is guided top and bottom by a precision machined stem. It utilizes a non-wicking diaphragm of nylon fabric bonded with synthetic rubber.

Model 100-01 is used in system applications, such as, remote control, pressure regulation, solenoid operation, rate of flow control, liquid level control or check valve operation. Applications are unlimited.



▶ SPECIFICATIONS

Available Sizes

Pattern	Threaded	Flanged	Grooved End
Globe	⅜" - 3"	1½" - 36"	1½"-2"- 2½"- 3"- 4"- 6"- 8"
Angle	1" - 3"	1½" - 16" & 24"	2" - 3" - 4"

Operating Temp. Range

Fluids
-40° to 180° F

Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class				
			Flanged		Grooved	Threaded
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End‡ Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
UNS 87850	Bronze	B16.24	225	400	400	400

Note: * ANSI standards are for flange dimensions only.
Flanged valves are available faced but not drilled.
‡ End Details machined to ANSI B2.1 specifications.
Valves for higher pressure are available; consult factory for details

Materials

Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	3/8" - 36"	1" - 16"	1" -16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		

For material options not listed, consult factory.
Cla-Val manufactures valves in more than 50 different alloys.

CLA-VAL 100-01

Main Valve

▶ FUNCTIONAL DATA

† Non Guided Stem

Valve Size		Inches	⅜†	½†	¾†	1†	1	1¼	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
		mm	10	15	20	25	25	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900
C_V Factor	Globe Pattern	Gal./Min.(gpm)	1.8	6	8.5	13.3	20	30	32	54	85	115	200	440	770	1245	1725	2300	3130	4463	5345	7655	10150	14020
		Litres/Sec. (l/s)	.11	.38	.54	.84	1.26	1.89	2	3.4	5.4	7.3	13	28	49	79	109	145	198	282	337	483	640	885
	Angle Pattern	Gal./Min.(gpm)	—	—	—	—	21	27	29	61	101	139	240	541	990	1575	2500*	3060*	4200*	—	—	9950*	—	—
		Litres/Sec. (l/s)	—	—	—	—	1.32	1.70	1.83	3.8	6.4	8.8	15	34	62	99	158	193	265	—	—	628	—	—
Equivalent Length of Pipe	Globe Pattern	Feet (ft)	25	7	16	23	10	19	37	51	53	85	116	211	291	347	467	422	503	612	595	628	1181	2285
		Meters (m)	7.6	2.2	4.8	7.1	3.1	5.7	12	15.5	16	26	35	64	89	106	142	129	154	187	181	192	360	696
	Angle Pattern	Feet (ft)	—	—	—	—	9.0	28	46	40	37	58	80	139	176	217	222*	238*	247*	—	—	372*	—	—
		Meters (m)	—	—	—	—	2.8	8.7	14	12	11	18	25	43	54	66	68	73	75	—	—	113	—	—
K Factor	Globe Pattern		16.3	3.7	5.7	6.1	2.7	3.6	5.9	5.6	4.6	6.0	5.9	6.2	6.1	5.8	6.1	5.0	4.6	5.2	3.9	4.0	6.4	6.4
	Angle Pattern		—	—	—	—	2.5	4.4	7.1	4.4	3.3	4.1	4.1	4.1	3.7	3.6	2.9	2.8	2.6	—	—	2.4	—	—
Suggested Flow (gpm)	Minimum			0.3	0.5	1	1	1	1	1	2	2	4	10	15	35	50	70	95	120	150	275	450	650
	Maximum			19.0	33.0	55	55	93	125	210	300	460	800	1800	3100	4500	7000	8400	11000	14000	17000	25000	42000	50000
	Max. Surge			42.0	75.0	120	120	210	280	470	670	1000	1800	4000	7000	11000	16000	19000	25000	31000	35000	56500	63000	85000
Suggested Flow (l/s)	Minimum			0.02	0.03	0.03	0.03	0.03	0.03	0.06	0.09	0.13	0.25	0.63	0.95	2.2	3.2	4.4	6.0	7.6	9.5	17.4	28.4	41.0
	Maximum			1.2	2.1	3.5	3.5	6	8	13	19	29	50	113	195	309	442	530	694	883	1073	1577	2650	3150
	Max. Surge			2.7	4.7	7.6	7.6	13	18	30	42	63	113	252	441	693	1008	1199	1577	1956	2461	3560	3975	5360
Liquid Displaced from Cover Chamber When Valve Opens	Fl. Oz		.12	.34	.34	.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	U.S. Gal.		—	—	—	—	.02	.02	.02	.03	.04	.08	.17	.53	1.26	2.51	4.0	6.5	9.6	11	12	29	42	90
	ml		3.5	10.1	10.1	20.7	75.7	75.7	75.7	121	163	303	643	—	—	—	—	—	—	—	—	—	—	—
	Litres		—	—	—	—	—	—	—	—	—	—	—	2.0	4.8	9.5	15.1	24.6	36.2	41.6	45.4	109.8	159	340

*Estimated

C_V Factor

Formulas for computing C_V Factor, Flow (Q) and Pressure Drop (▲P):

$$C_V = \frac{Q}{\sqrt{\triangle P}} \qquad Q = C_V \sqrt{\triangle P} \qquad \triangle P = \left(\frac{Q}{C_V}\right)^2$$

K Factor (Resistance Coefficient)
The Value of K is calculated from the formula: $K = \frac{894 d^4}{C_V^2}$
(U.S. system units)

Equivalent Length of Pipe
Equivalent lengths of pipe (L) are determined from the formula: $L = \frac{K d}{12 f}$
(U.S. system units)

Fluid Velocity
Fluid velocity can be calculated from the following formula: $V = \frac{.4085\ Q}{d^2}$
(U.S. system units)

Where:

C_V = U.S. (gpm) @ 1 psi differential at 60° F water
or
= (l/s) @ 1 bar (14.5 PSIG) differential at 15° C water

d = inside pipe diameter of Schedule 40 Steel Pipe (inches)

f = friction factor for clean, new Schedule 40 pipe (dimensionless) (from Cameron Hydraulic Data, 18th Edition, P 3-119)

K = Resistance Coefficient (calculated)

L = Equivalent Length of Pipe (feet)

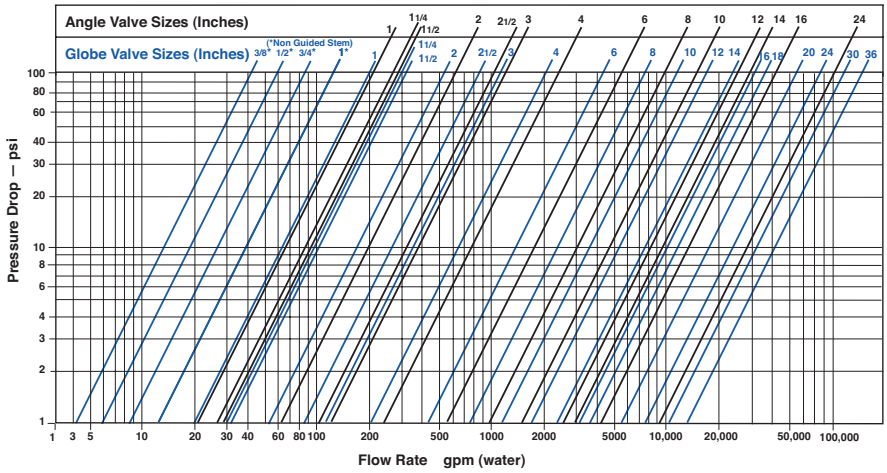
Q = Flow Rate in U.S. (gpm) or (l/s)

V = Fluid Velocity (feet per second) or (meters per second)

△ **P** = Pressure Drop in (psi) or (bar)

▶ FLOW CHART

(Based on normal flow through a wide open valve)

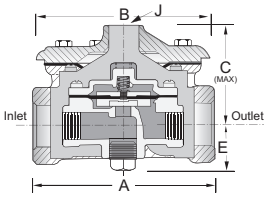


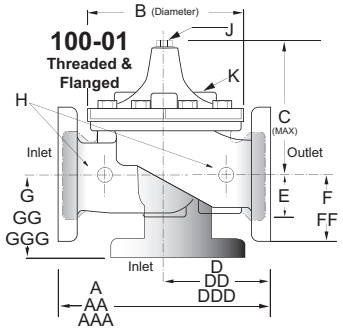
CLA-VAL 100-01

Main Valve

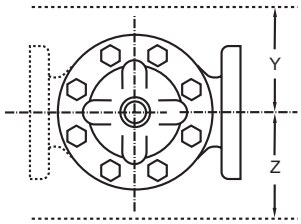
▶ DIMENSIONS (inches)

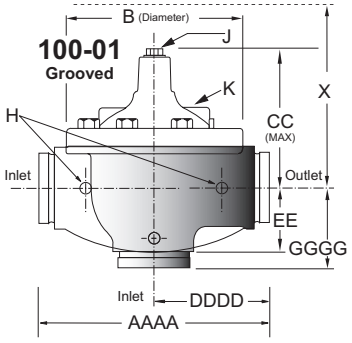
100-01
3/8", 1/2", 3/4", 1"
Auxillary Hytrol Valves with non Guided Stems





Model 100-01





Valve Size (Inches)	3/8*	1/2*	3/4*	1*	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18†	20†	24†	30†	36†
A Threaded	2.75	3.50	3.50	5.12	7.25	7.25	7.25	9.38	11.00	12.50	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	—	—	—	—	8.50	~~9.38~~	11.00	12.00	15.00	20.00	25.38	29.75	34.00	39.00	41.38	46.00	52.00	61.50	63.00	72.75
AAA 300 ANSI	—	—	—	—	—	—	9.00	~~10.00~~	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	47.64	53.62	63.24	64.50	74.75
AAAA Grooved End	—	—	—	—	—	—	8.50	~~9.00~~	11.00	12.50	15.00	20.00	25.38	—	—	—	—	—	—	—	—	—
B Diameter	2.50	3.12	3.12	4.38	5.62	5.62	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	41.50	45.00	53.16	56.00	66.00
C Maximum	2.33	5.88	5.88	6.25	5.50	5.50	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	39.06	41.90	43.93	54.60	59.00
CC Maximum Grooved End	—	—	—	—	—	—	4.75	~~5.75~~	6.88	7.25	9.31	12.12	14.62	—	—	—	—	—	—	—	—	—
D Threaded	—	—	—	—	3.25	3.25	3.25	4.75	5.50	6.25	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	—	—	—	—	4.00	~~4.75~~	5.50	6.00	7.50	10.00	12.69	14.88	17.00	19.50	20.81	—	—	30.75	—	—
DDD 300 ANSI	—	—	—	—	—	—	4.25	~~5.00~~	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	—	—	31.62	—	—
DDDD Grooved End	—	—	—	—	—	—	—	~~4.75~~	—	6.00	7.50	—	—	—	—	—	—	—	—	—	—	—
E	1.25	0.88	0.88	1.63	1.12	1.12	1.12	1.50	1.69	2.06	3.19	4.31	5.31	9.25	10.75	12.62	15.50	12.95	15.00	17.75	21.31	24.56
EE Grooved End	—	—	—	—	—	—	2.00	~~2.50~~	2.88	3.12	4.25	6.00	7.56	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	—	—	—	—	—	2.50	~~3.00~~	3.50	3.75	4.50	5.50	6.75	8.00	9.50	10.50	11.75	15.00	16.50	19.25	22.50	28.50
FF 300 ANSI	—	—	—	—	—	—	3.06	~~3.25~~	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.00	16.50	19.25	24.00	30.00
G Threaded	—	—	—	—	1.88	1.88	1.88	3.25	4.00	4.50	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	—	—	—	—	4.00	~~3.25~~	4.00	4.00	5.00	6.00	8.00	8.62	13.75	14.88	15.69	—	—	22.06	—	—
GGG 300 ANSI	—	—	—	—	—	—	4.25	~~3.50~~	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50	—	—	22.90	—	—
GGGG Grooved End	—	—	—	—	—	—	—	~~3.25~~	—	4.25	5.00	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	—	0.125	0.125	0.25	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.125	0.125	0.125	0.25	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	—	0.125	0.125	0.25	0.375	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	—	—	—	—	0.40	0.40	0.40	0.60	0.70	0.80	1.10	1.70	2.30	2.80	3.40	4.00	4.50	5.10	5.63	6.75	7.50	8.50
Approx. Ship Weight (lbs)	3	3	8	8	15	15	15	35	50	70	140	285	500	780	1165	1600	2265	2982	3900	6200	7703	11720
Approx. **X** Pilot System	—	—	—	—	11	11	11	13	14	15	17	29	31	33	36	40	40	43	47	68	79	85
Approx. **Y** Pilot System	—	—	—	—	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	40	45
Approx. **Z** Pilot System	—	—	—	—	9	9	9	9	10	11	12	20	22	24	26	29	30	32	34	39	42	47

Note: The top two flange holes on valve size 36 are threaded to 1 1/2"-6 UNC.

*Non Guided Stem Auxiliary Hytrol Controls

†18 inch and larger 100-01 series Hytrol valves are equipped with flange feet for safety and convenience. Consult Cla-Val representative for details.

Cla-Val Control Valves operate with maximum efficiency when mounted in horizontal piping with the main valve cover UP, however, other positions are acceptable. Due to component size and weight of 8 inch and larger valves, installation with cover UP is advisable. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.

EPOXY PROTECTIVE COATING
(Blue Epoxy and Red Epoxy)

Epoxy resin powders were created and developed specifically for the application of thin film corrosion protection to metal or other substrates. Epoxy resin coatings are suitable for continuous exposure to a wide range of corrosive elements. Of particular interest for control valves is the high resistance to various water conditions. They also provide resistance to certain acids, chemicals, solvents and alkalis. They have excellent adhesion to almost any prepared surface. They are sufficiently flexible to be used to protect steel springs from corrosion and have an impact strength that allows retainability and restoration of surface coating under normal drop conditions.

Since the early 1970's the application process used by Cla-Val is the fusion method. This method of applying epoxy resins utilizes the principal of covering a suitably cleaned and preheated part with a one-part dry powdered resin. The dry powdered resin fuses itself to the heated part. A curing period in an oven at 400 degrees F completes the process. No volatile solvents are required and thus there are no pinholes left by evaporation of such materials. The coating is applied by electrostatic spray or flock spray to a nominal thickness recommended by the coating manufacturer.

Cla-Val valves specified with epoxy coating applied at the factory fully conform to the standards below. Applied to the inside and outside of all ferrous parts, this coating option is indicated with "KC" as a suffix to the valve catalog number.

CERTIFICATION

This is to confirm that Cla-Val uses AKZO Nobel R4-HJF42R (**Blue**) epoxy powder coating material for our factory applied protective coating. Our coating application process conforms to all applicable requirements of the American Water Works Association Standard C550 entitled “Protective Interior Coatings for Valves and Hydrants.

The AKZO Nobel R4-HJF42R (**Blue**) epoxy powder coating material is certified as a protective barrier material and approved by NSF Standard 61 - Drinking Water System Components - Health Effects (Nov. 16, 1995).

The AKZO Nobel R4-HJF42R (**Blue**) epoxy powder coating material is formulated with ingredients which are listed in or cited by the suppliers as in compliance with Federal Drug Administration Document, Title 21 of the Federal Regulations on Food Additives, Section 175.300, "Resinous and Polymeric Coatings."

This is to certify that Cla-Val uses H.B. Fuller Co. IF-1947 (**Red Oxide color**) epoxy powder coating material for our factory applied protective coating on Fire Protection main valves. Our coating application process conforms to all applicable requirements of the American WaterWorks Association Standard C550-90 entitled “Protective Interior Coatings for Valves and Hydrants."

This also certifies that H. B. Fuller Co. IF-1947 epoxy powder coating material (**Red Oxide color**) is applied and inspected according to Cla-Val procedures no. 97165 to interior and exterior of all ferrous parts.

Dura-Kleen Stem

▶ PRODUCT FEATURES

The Dura-Kleen Stem is a minimal maintenance stem designed to keep the valve operating when valve stem build-up occurs under conditions such as high lime content, hard water (high calcium), or secondary and tertiary effluent discharge. The Dura-Kleen Stem is ideally suited to those valve applications with high-pressure differentials.

▶ SPECIFICATIONS

MATERIAL

- 316 Stainless Steel
- ~~303 Stainless Steel~~
- ~~Monel~~

Model **X101**

Valve Position Indicator

▶ PRODUCT FEATURES

Cla-Val Model X101 Visual Position Indicator is designed to display Cla-Val valve position quickly and easily. A solid brass indicator rod fastened directly to the valve stem moves up and down inside a pyrex tube. The tube is contained within a brass housing which is open on two opposite sides to permit clear vision of the indicator rod.

To purge air that may be trapped in the valve cover, a vent valve in the top of the housing is provided. Model X101 valve position indicator is furnished complete for installation on specified size Cla-Val Automatic Control Valve.

▶ SPECIFICATIONS

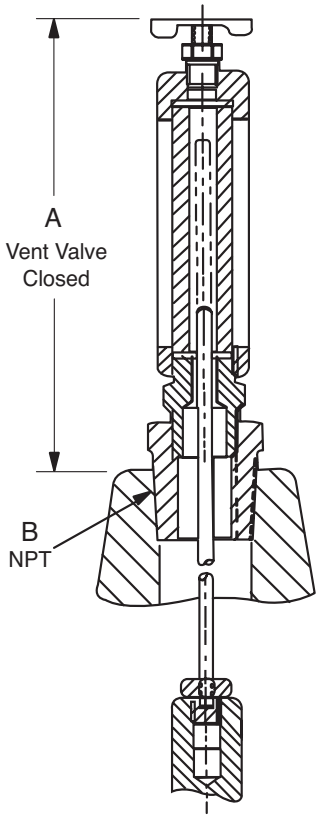
Sizes: 1" thru 24"

Standard Materials*: ~~Brass,~~ Pyrex Tube ;Stainless Steel

Pressure Rating: 400 psi

**Optional Materials Available*

▶ DIMENSIONS



VALVE SIZE	A INCHES	B NPT
1”	5.88	1/4”
1 1/4”	3.21	1/4”
1 1/2”	3.21	1/4”
2”	3.33	1/2”
2 1/2”	3.33	1/2”
3”	3.33	1/2”
4”	4.52	3/4”
6”	4.52	3/4”
8”	5.83	1”
10”	7.70	1”
12”	8.20	1 1/4”
14”	8.20	1 1/2”
16”	10.81	2”
18”	12.04	1”
20”	12.04	1”
24”	12.04	1”

Dimension “A” is height added to valve by indicator assembly

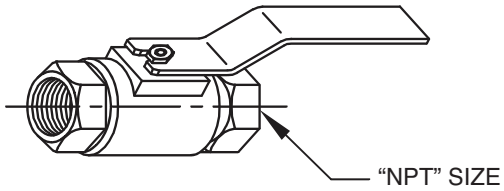
Model **CK2**

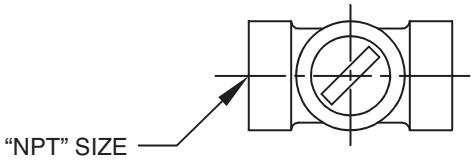
Isolation Valve

▶ PRODUCT FEATURES

Model CK2 is a ball valve used for isolating components within the pilot system.

▶ DIMENSIONS





"NPT" SIZE								
1/8"	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"

▶ SPECIFICATIONS

PART	MATERIAL
Body:	316 Stainless Steel
Handle and Nut:	316 Stainless Steel
Maximum working pressure:	600 psi
Temperature range:	33°F to 180°F

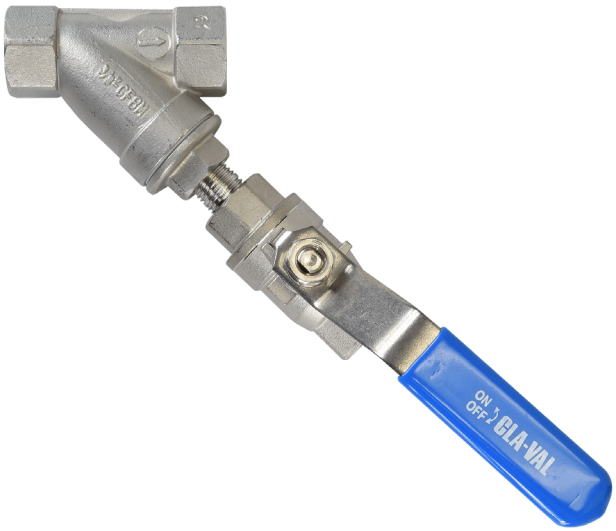
Model **X43A**

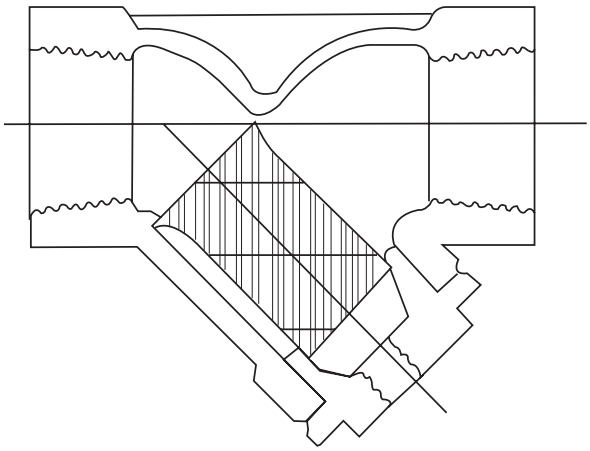
'Y' Strainer with Blowdown Ball Valve

▶ PRODUCT FEATURES

- **Stainless Steel Body**
- **Blow-off Standard**
- **Stainless Steel Mesh Screen**

Model X43A 'Y' Strainers are in-line strainers intended to be installed for protection of pilot systems. These strainers are constructed of corrosion resistant materials. All sizes have blow-off standard.





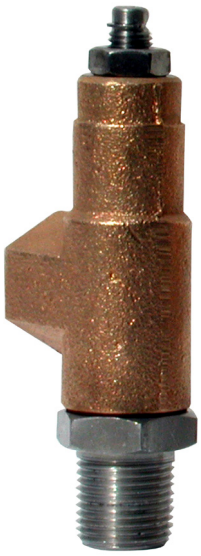
▶ SPECIFICATIONS

PART	MATERIAL
Body:	316 Stainless Steel
Screen:	304 Stainless Steel
Gasket:	Non-Asbestos Fiber
Ends:	Threaded ANSI/ASME B1.20 1
Maximum working pressure:	800 psi
Temperature range:	33°F to 180°F
Screen:	Standard screen size is 40 mesh perforated stainless steel
Standard:	Blowdown Ball Valve

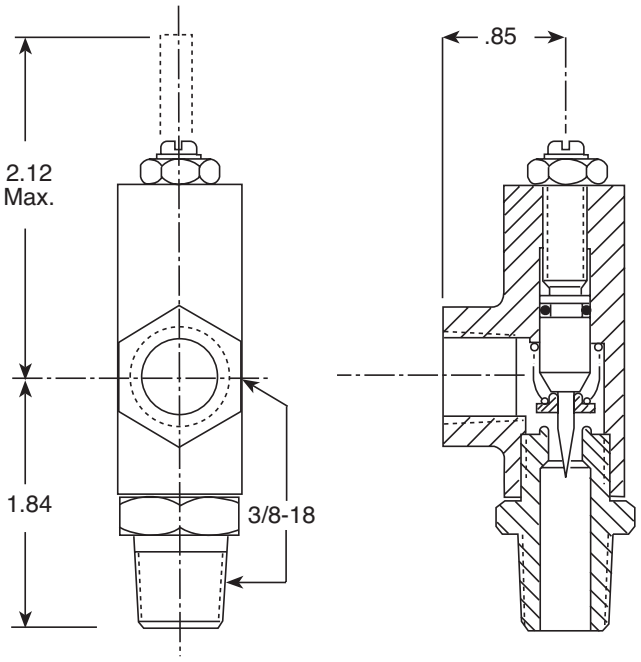
Model CV
Flow Control

▶ PRODUCT FEATURES

Cla-Val CV Control is an adjustable restriction which acts as a needle valve when flow is in the direction of the stem. When flow is in the reverse direction, the port area opens fully to allow unrestricted flow. When installed in the control system of a Cla-Val automatic valve, it can be arranged to function as either an opening or closing speed control.



▶ DIMENSIONS



▶ SPECIFICATIONS

Sizes:	3/8" NPT
Temperature Range:	250°F Max.
Standard Materials*:	
Housing:	~~Bronze ASTM B61~~ Stainless Steel
Trim:	Stainless Steel ~~303~~ 316
Pressure Rating:	400 psi Max.

**Optional Materials Available*

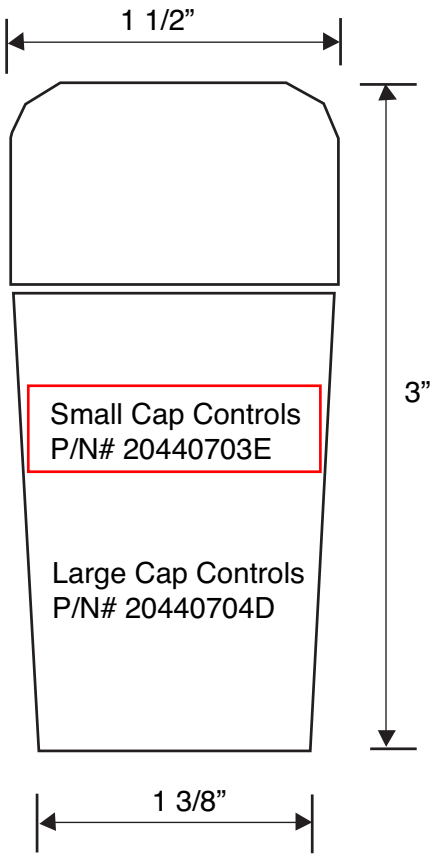
Model **X140-1**

Locking Security Cap

▶ PRODUCT FEATURES

The Cla-Val Model X140-1 Locking Security Cap is designed to completely encapsulate the pilot control adjustment screw with Stainless Steel. Even in the harshest environment, the X140-1 offers an extra level of protection, security and peace of mind for the system operator that pilot control settings will not change until appropriate personnel are present.

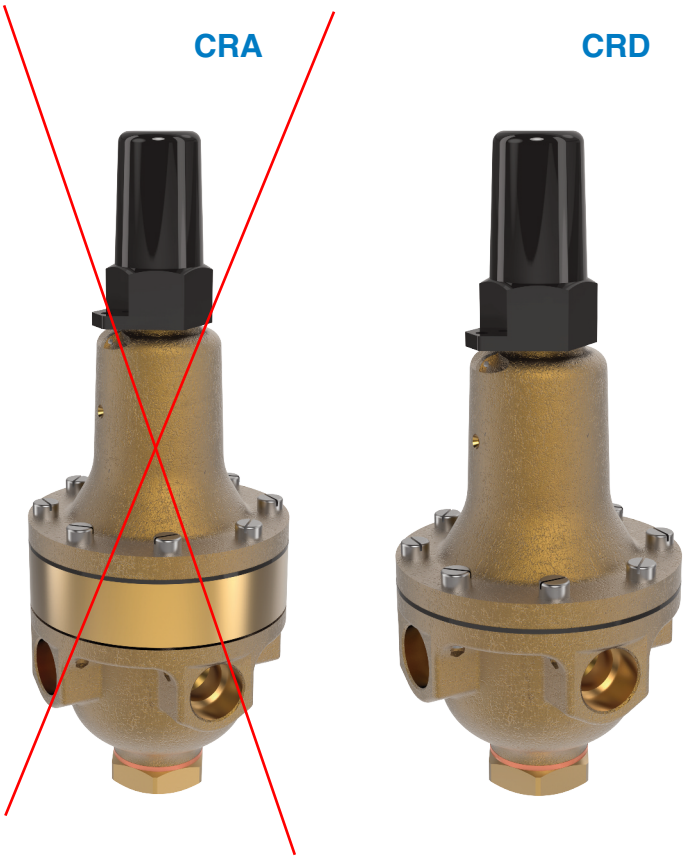
▶ DIMENSIONS



CLA-VAL™

—MODELS— CRA & CRD

Pressure Reducing Control Valves



- **Direct Acting**
- **Hydraulic or Pneumatic Operation**
- **Simplified Design, Easy Adjustments**
- **Operates in Any Position**
- **Gauge Connection Port**

The Cla-Val Models CRA and CRD Pressure Reducing Control automatically reduce a higher inlet pressure to a lower outlet pressure. They are direct acting, spring loaded, diaphragm type control regulators that operate hydraulically or pneumatically. These valves are held open by the force of the compression spring above the diaphragm, and close when the downstream pressure acting on the underside of the diaphragm exceeds the spring setting. The CRD senses downstream pressure directly and the CRA senses downstream pressure remotely.

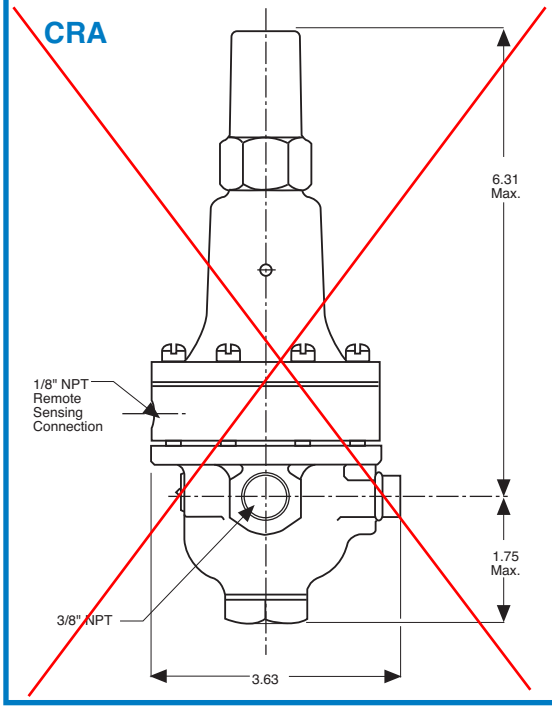
Flow through the control responds to changes in downstream pressure. Turning the adjusting screw clockwise increases the delivery pressure. Turning it counterclockwise decreases the pressure. A resilient disc assures tight shut-off on dead-end service.

Models CRA and CRD may be installed in any position. There is one inlet port and two outlets for either straight or angle installation. The second outlet port can be used for a gauge connection.

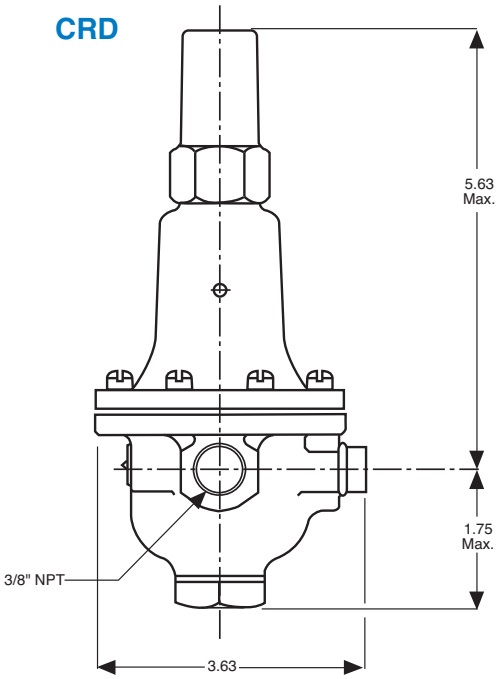
These valves are ideal small capacity regulators for applications such as water coolers, fountains, humidifiers, gas refrigerators, and air supply to tools and instruments. Remote pressure sensing is available with the CRA. They also have numerous applications as pilot controls on many Cla-Val Automatic Control Valves.

Dimensions (In Inches)

CRA



CRD



X140-1

The Cla-Val Model X140-1 Locking Security Cap completely encapsulates the pilot control adjustment screw with Stainless Steel providing protection against tampering.

Specifications

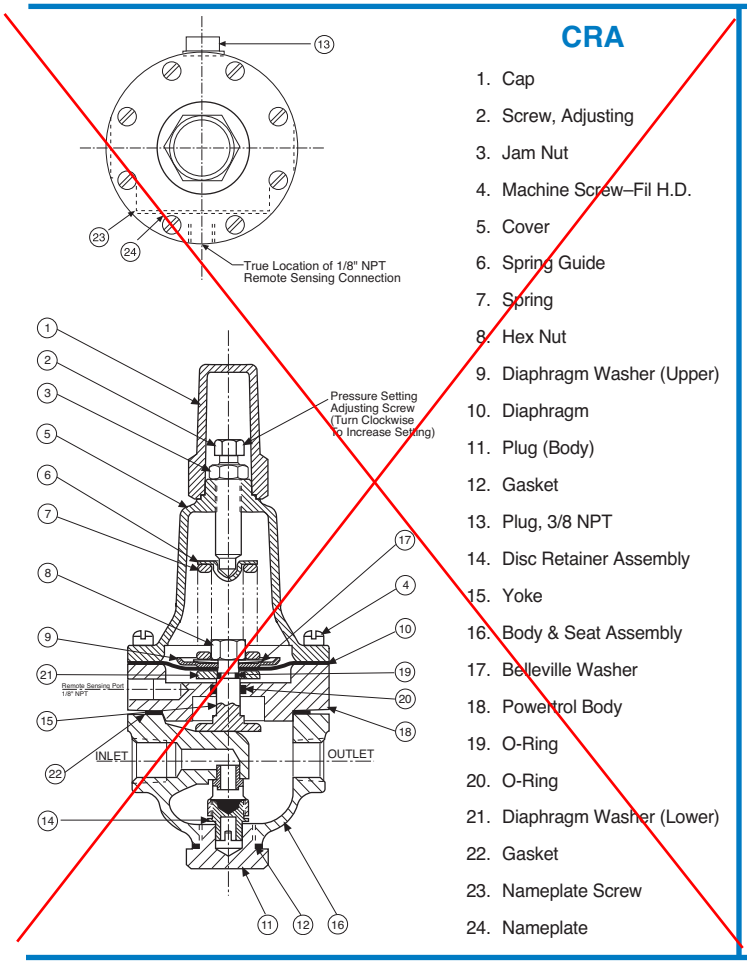
Size	⅜" NPT Threaded
Temperature Range	Water: to 180°F Max.
Standard Materials	
Body & Cover:	~~Low Lead Bronze~~
Trim:	Stainless Steel 303
Rubber:	Buna-N® Rubber
Optional Materials	Cast Aluminum 356-T6
	Stainless Steel 303
Pressure Ratings	Cast Bronze 400 psi Max.
	Cast Aluminum 275 psi Max.
	Stainless Steel 400 psi Max.

Adjustment Ranges

psi:		feet of water:	
2	- 7	4.5	- 15
2	- 30	5	- 70
15	- 75	35	- 170
20	- 105	46	- 242
30	- 300	70	- 695

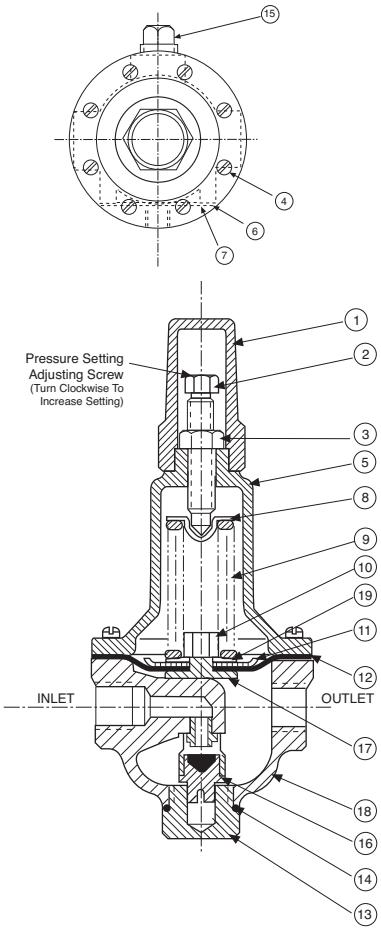
When Ordering, Specify:

1. Catalog No. CRA or No. CRD
2. Adjustment Range Desired
3. Materials Desired



CRA

1. Cap
2. Screw, Adjusting
3. Jam Nut
4. Machine Screw–Fil H.D.
5. Cover
6. Spring Guide
7. Spring
8. Hex Nut
9. Diaphragm Washer (Upper)
10. Diaphragm
11. Plug (Body)
12. Gasket
13. Plug, 3/8 NPT
14. Disc Retainer Assembly
15. Yoke
16. Body & Seat Assembly
17. Belleville Washer
18. Powertrol Body
19. O-Ring
20. O-Ring
21. Diaphragm Washer (Lower)
22. Gasket
23. Nameplate Screw
24. Nameplate



CRD

1. Cap
2. Screw, Adjusting
3. Jam Nut
4. Machine Screw–Fil. HD.
5. Cover
6. Nameplate Screw
7. Nameplate
8. Spring Guide
9. Spring
10. Hex Nut
11. Diaphragm Washer
12. Diaphragm
13. Plug (Body)
14. Gasket
15. Plug 3/8 NPT
16. Disc Retainer Assembly
17. Yoke
18. Body and Seat Assembly
19. Belleville Washer

OPTIONAL X140-1 SECURITY CAP

- **Controlled Security for Pilot Control Adjustment**
- **Long Life Stainless Steel Construction**
- **Tamper-Resistant Design**
- **X140-1 Key and Six Pin Cylinder Lock Supplied**

CLA-VAL®

CLA-VAL™

E-CRA/CRD (R-02/2019)

CLA-VAL

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Model **X141BA**

Gauge/Air Bleed Option

▶ PRODUCT FEATURES

Cla-Val Model X141BA Pressure Gauge/Air Bleed Assembly option consists of glycerin-filled pressure gauge, bleeder, and isolation valve. Cla-Val gauges are waterproof, shock resistant, and fully enclosed with a stainless steel case and bronze wetted parts. Ambient temperature ratings are -4 Degrees F to +140 Degrees F (-20 Degrees C to +60 Degrees C). Bleeder and isolation valve are stainless steel construction with 400 psi max working pressure.

All gauges have dual scale (PSI/BAR).

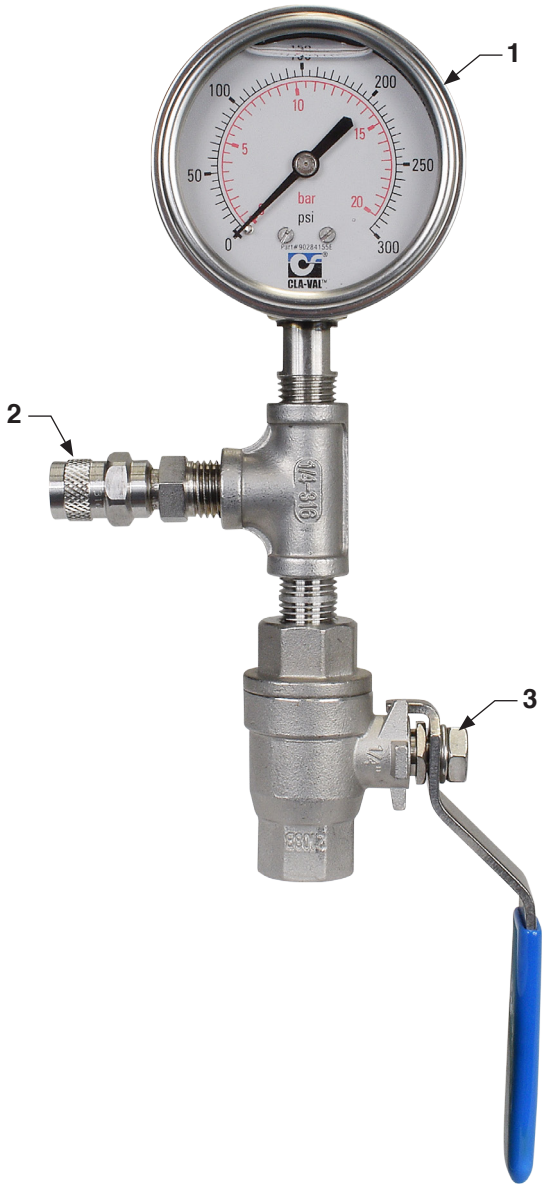
1. Gauge Assembly (2 1/2" Diameter Dial)

Available Pressure Range

- 0 - 60 psi
- 0 - 100 psi
- 0 - 160 psi
- 0 - 200 psi
- 0 - 300 psi
- 0 - 400 psi

2. Bleeder Valve

3. Isolation Valve



Model **X141**

Cla-Val Gauge Option

▶ PRODUCT FEATURES

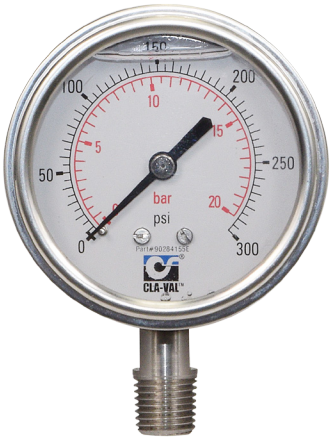
Cla-Val Model X141 Pressure Gauge Option consists of glycerin-filled pressure gauges. Cla-Val gauges are waterproof, shock resistant, and fully enclosed with a stainless steel case and bronze wetted parts. Ambient temperature ratings are -4 Degrees F to +140 Degrees F (-20 Degrees C to +60 Degrees C).

All gauges have dual scale (PSI/BAR) and are supplied with a 1/4" NPT bottom connection.

▶ AVAILABLE PRESSURE RANGES

X141 Gauge Assembly (2 1/2" Diameter Dial)

Pressure Range*
0 - 60 psi
0 - 100 psi
0 - 200 psi
0 - 300 psi
0 - 400 psi



Model X141
2-1/2" Pressure Gauge

X141 Gauge Assembly (4" Diameter Dial)

Pressure Range*
0 - 60 psi
0 - 100 psi
0 - 200 psi
0 - 300 psi
0 - 400 psi

Model X141
4" Pressure Gauge

919 PTFE STAINLESS STEEL BRAIDED HOSE

When high temperature performance and excellent chemical compatibility are demanded, Parker 919 PTFE Hose accepts the challenge. This medium pressure hose can withstand temperatures up to 450°F (232°C). A smooth bore natural PTFE core tube and stainless steel braided wire reinforcement tackle corrosive chemicals and abrasive environments.

FEATURES AND BENEFITS
- Low friction minimizes pressure drops and deposits
- Environmentally safe
- Resists moisture
- Maximum working pressures up to 3,000 psi
- Meets or exceeds SAE 100R14A -919; SAE 100R14B -919B (Static Dissipative PTFE); FDA CFR 177.1550 (Natural Tube)

Applications:

- Oil burner fronts (boiler)
- Fuel, lube, and oil skids
- Water injection, inlet fogging skids, and water wash
- Fuel control valves
- Compressed air discharge and coolant lines
- Gas analyzer systems
- High pressure steam lines
- Instrument test equipment

PERFORMANCE CHARACTERISTICS	
HOSE COVER MATERIAL	304 Stainless Steel Braid, Extruded Silicone, or Polyurethane
CORE TYPE	Natural PTFE or Static Dissipative PTFE
APPLICATION	Fluid Handling, Chemical Transfer, Manufacturing / Industrial, Medical/Pharmaceutical, Packaging, Instrumentation, Transportation
HOSE I.D. (INCH)	3/16, 1/4, 5/16, 13/32, 1/2, 5/8, 7/8, 1-1/8
HOSE I.D. (MM)	5, 6, 8, 10, 13, 16, 19, 22, 29
INDUSTRY STANDARDS	SAE 100R14A, FDA CFR 177.1550 (natural), SAE 100R14B
MAXIMUM WORKING PRESSURE (PSI)	625 - 3,000
MAXIMUM WORKING TEMPERATURE (C)	135 - 232
MAXIMUM WORKING TEMPERATURE (F)	275 - 450
MEDIA	Various
MINIMUM WORKING TEMPERATURE (C)	-40 to -73
MINIMUM WORKING TEMPERATURE (F)	-40 to -100
VACUUM RATING (INCH OF HG)	10 - 28
HOSE I.D. (SIZE)	-4,-5, -6, -8, -10, -12, -16, -20
HOSE O.D. (INCH)	0.32 - 1.28
HOSE O.D. (MM)	8 - 33
MAXIMUM WORKING PRESSURE (BAR)	43 - 207
MINIMUM BEND RADIUS (INCH)	1-1/2 - 7-1/2
MINIMUM BEND RADIUS (MM)	38 - 406
STYLE	Natural, Static-Dissipative
VACUUM RATING (MM OF HG)	25 - 711
WEIGHT (KG/M)	0.09 - 0.58
WEIGHT (LBS/FT)	0.06 - 0.39
DASH NUMBER	-3 to -20
MAXIMUM WORKING PRESSURE (MPA)	4.3 to 20.7 (dependent on size)
COMPATIBLE FITTINGS	90, 91, or 91N
HOSE TYPE	PTFE Hose or Smoothbore
COLOR	Silver, Red or Black

130LTSS1/4X3/8

SKU#: 130LTSS1/4X3/8

Hose Connector

St. St. 316 Pipe Fitting, Hose Connector 1/4" x Tube Stub 1/4"

BODY MATERIAL	Stainless Steel 316
FITTING TYPE	Adapter
CONNECTION TYPE	Tube Stub
CONNECTION SIZE	3/8"
CROSS REFERENCE	SS-4-HC-A-601
TUBE SIZE	1/4", 3/8"

CLA-VAL®

MODEL CRL-60

Pressure Relief Control

- **Direct Acting - Precise Pressure Control**
- **Positive Dependable Opening**
- **Drip Tight Closure**
- **Remote Sensing**
- **Sensitive to Small Pressure Variations**

The Cla-Val Model CRL-60 Pressure Relief Valve is a direct-acting, spring loaded, diaphragm type relief valve. Often used as a pilot control for Cla-Val Hytrol valves, it can also be used as a standalone pressure relief valve. The CRL-60 may be installed in any position. It opens and closes within very close pressure limits. The bottom plug may be removed and installed in the inlet to convert it to an angle pattern flow path.

The Model CRL-60 is normally held closed by the force of the compression spring above the diaphragm. Control pressure is applied under the diaphragm. When the controlling pressure exceeds the spring setting, the disc is lifted off its seat, permitting flow through the control. When control pressure drops below the spring setting, the spring forces the control back to its normally closed position. The controlling pressure is applied to the chamber beneath the diaphragm through a sensing port on the CRL-60 body.

Pressure adjustment is simply a matter of turning the adjusting screw to vary the spring pressure on the diaphragm. The CRL-60 is available in four pressure ranges: 0 to 75 psi, 20 - 75 psi, 20 to 105 psi, 20 to 200 psi, 40 to 200 psi and 100 to 300 psi. To prevent tampering, the adjustment cap can be wire sealed by using the lock wire holes provided in the cap and cover; or supplied with a X140-1 Locking Cap. The X140-1 is a key and six-pin cylinder locking security cap that completely encapsulates the pilot control adjustment screw and cannot be removed without the appropriate key.

Typical Application for CRL-60 Pressure Relief Control

50 Series Pressure Relief Control Valve

Model CRL-60 Pressure Relief Control is ideally suited as pilot control for Cla-Val Series 50 pressure relief or pressure sustaining automatic control valves. The 50 Series valves are hydraulically operated, pilot controlled, modulating type valves, used where pressure relief is needed in a waterworks pipeline distribution system downstream of any high pressure source, such as pressure reducing stations or pump stations, or they can also be used in a bypass to control pump delivery pressure.

Model CRL-60 is designed to maintain constant upstream pressure to close limits at a remote point in many Cla-Val pilot control systems. Cla-Val 50 Series Pressure Relief Valves use CRL-60 to sense and actuate main valve using inlet line pressure through pilot system. In event of a pressure surge in pipeline, CRL-60 remotely sensing valve inlet pressure opens quickly to control main valve opening and maintains water flow to atmosphere to dissipate pressure surge. CRL-60 closes slowly as the inlet pressure lowers to a safe pressure to prevent new surges, and finally when inlet pressure is below the pressure setting, the main valve closes drip tight. Pressure setting adjustment is made with a single adjusting screw that has a protective cap to discourage tampering.

Specifications

Size 1/2", 3/4" & 1"Threaded
Temperature Range Water, Air: to 180°F Max.
Standard Materials
Body & Cover: ~~Low Lead Bronze~~
Trim: Stainless Steel 303
Rubber: Buna-N® Synthetic Rubber

Pressure Ratings Bronze 400 psi Max.
Stainless Steel 400 psi Max.
Other Materials Available on special order
Adjustment Ranges
0 to 75 psi
20 to 75 psi (1" size only)
20 to 105 psi (1/2" size only)
20 to 200 psi
20 to 400 psi (1" size only)
100 to 300 psi

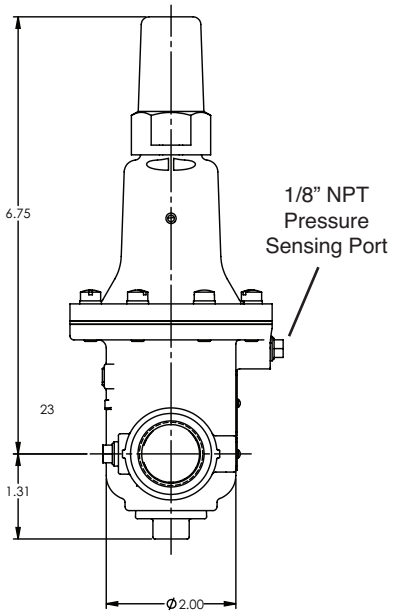
CRL-60 PSI	Approximate Increase For Each Clockwise Turn Of Adjusting Screw
0 to 75	8.5 psi
20 to 75	6.0 psi
20 to 105	12.0 psi
20 to 200	28.0 psi
40 to 200	18.0 psi
100 to 300	18.0 psi

Pressure Drop Chart (Full Open Valve)

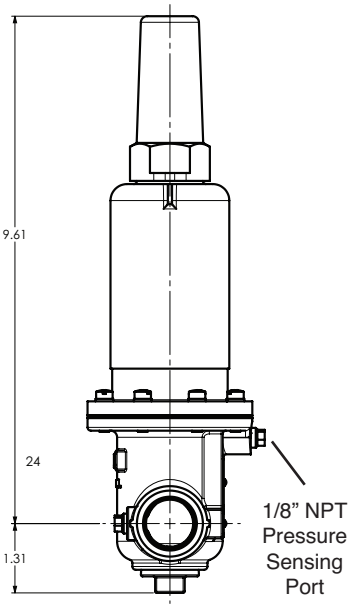
Valve Size	Cv Factor	Flow of Water - gpm					
		5	10	15	20	30	40
1/2"	6.0	0.7	2.7	6.0	11.0	- -	- -
3/4"	8.5	0.3	1.4	3.1	5.5	12.2	- -
1"	12.5	0.2	0.6	1.4	2.6	5.8	10.2

Dimensions 1/2" and 3/4" Sizes

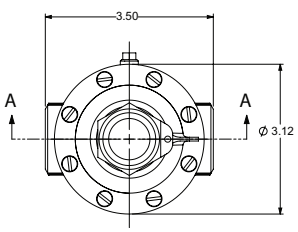
0 to 75, 20 - 105 and 20 to 200 psi design



100 to 300 psi design

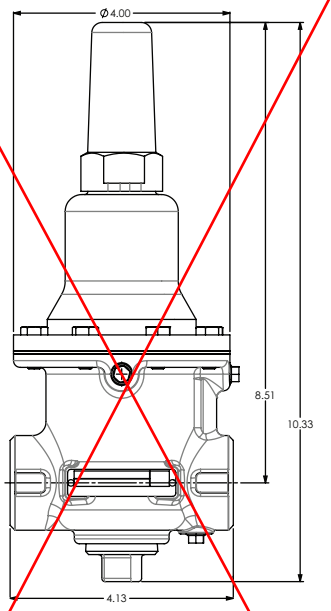


(applies to both configurations)



Dimensions 1" Size

20 - 75, 40 - 200 and 100 - 300 psi design



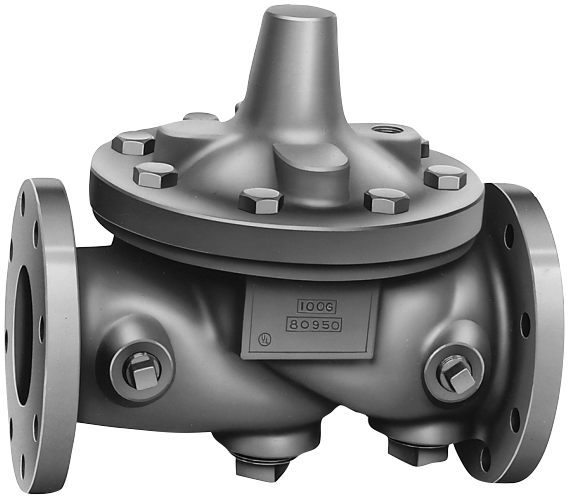
When Ordering, Specify:

1. Catalog No. CRL-60
2. Valve Size
3. Adjustment Range Desired
4. Optional Materials
5. Optional Security Cap

CLA-VAL 1701 Placentia Ave • Costa Mesa CA 92627 • Phone: 949-722-4800 • Fax: 949-548-5441 • E-mail: info@cla-val.com • www.cla-val.com

CLA-VAL WARRANTY

3 Year Warranty on Cla-Val Quality Products



This is a Limited Warranty

Automatic valves and controls as manufactured by Cla-Val are warranted for three years from date of shipment against manufacturing defects in material and workmanship that develop in the service for which they are designed, provided the products are installed and used in accordance with all applicable instructions and limitations issued by Cla-Val. Electronic components manufactured by Cla-Val are warranted for one year from the date of shipment.

We will repair or replace defective material, free of charge which is returned to our factory, transportation charges prepaid, provided that after inspection the material is found to have been defective at time of shipment. The warranty is expressly conditioned on the purchaser's giving Cla-Val immediate written notice upon discovery of the defect.

Components used by Cla-Val, but manufactured by others, are warranted only to the extent of that manufacturer's guarantee.

This warranty shall not apply if the product has been altered or repaired by others, and Cla-Val shall make no allowance or credit for such repairs or alterations unless authorized in writing by Cla-Val.

Disclaimer of Warranties & Limitation of Liability

The foregoing warranty is exclusive and in lieu of all other warranties and representations whether expressed, implied, oral or written, including but not limited to, any implied warranties or merchantability or fitness for a particular purpose. All such other warranties and representations are hereby cancelled.

Cla-Val shall not be liable for any incidental or consequential loss, damage or expense arising directly or indirectly from the use of the product. Cla-Val shall not be liable for any damages or charges for labor or expense in making repairs or adjustments to the product. Cla-Val shall not be liable for any damages or charges sustained in the adaptation or use of its engineering data and services.

No representative of Cla-Val may change any of the foregoing or assume any additional liability or responsibility in connection with the product.

The liability of Cla-Val is limited to material replacements F.O.B. Newport Beach, California.

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Phone: 33-4-72-25-92-93
Fax: 33-4-72-25-04-17
E-mail: cla-val@cla-val.fr

CLA-VAL™

Submittal Data Cover Sheet

Date:

Model No.: 50G-13BCPSVYKCKD

Description: Pressure Relief Valve with Cavitation Control Cage

Job/Project Name: Navajo Gallup Reach 26.3 PRV Vault

Engineering Firm: Souder, Miller and Associates

Project Engineer: Andrew Robertson

Company: Pipestone Equipment

Contact: Kira Witwer

Address: 676 Moss Street

City: Golden **State:** CO **Zip:** 80401

Fluid To Be Handled: Water

Specific Gravity: 1

Temperature: Ambient

Max. Flow Rate: 889 **GPM**

Min. Flow Rate: **GPM**

Main Valve

Valve Size:
6"

Base Valve:
100-01 Hytrol

Quantity:
1

Main Valve Body & Cover:
Ductile Iron ASTM A-536

Main Valve Trim:
(Disc Guide, Seat & Cover Bearings)
316 Stainless Steel

Valve Pattern:
Globe

End Details:
Flanged Ductile Iron ANSI B16.42 Class 150

Pressure Rating:
150 Class @ 250 psi Max.

Elastomers: *(Max Temperature 180°F)*
Buna-N® Synthetic Rubber

Pilot System

Hydraulic Pilot System Adjustment Range(s)
CRL 20-200 PSI 60psi

Electronic Pilot Spring Ranges

Tubing & Fittings
Stainless Steel Braided Flex Hose

Pilot System Configuration
316 SST with 316 SST Trim
R.H. Pilot System Mount (standard)

Electrical

Electrical - Voltages & Accessories

VC-22D Electronic Valve Controller

VC-22D Power Converter

Features & Options

- [x] **Strainer:** Y-Pattern
- [x] Pilot System Isolation Valves
- [x] Closing Speed Control
- [ ] Opening Speed Control
- [ ] Pilot System Check Feature
- [ ] Independent Operating Pressure
- [ ] Atmospheric Drain
- [x] Fusion Bonded Epoxy Coating 12 mil
- [ ] X144D e-FlowMeter
- [ ] Reservoir Gauge with Tester
- [ ] X145 External Display

Pressure Gauges:
Inlet: 2-1/2" 0 - 200 psi
Outlet: N/A
Cover:

Valve Position Transmitter:
N/A

Valve Position Indicator:
X101

Stem Option:
Dura-Kleen® Stem

Limit Switch (SPDT):
N/A

Differential Pressure Transmitter:
N/A

Pressure Transmitter:
Inlet: N/A
Outlet: N/A

Orifice Plate:
N/A Bore: _____

Power Generator:
N/A

X43 H-Style Strainer:
N/A

X43 H-Style Strainer Flange:
(Ductile Iron ASME B16.42)

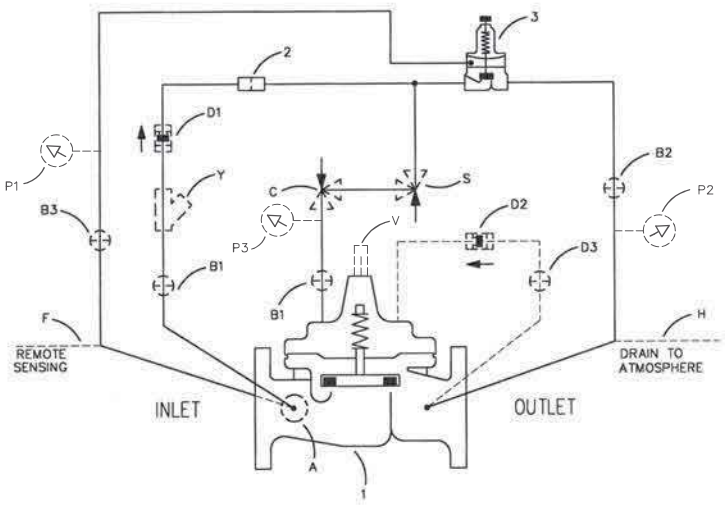
Notes:
KO CV 218

Cla-Val Contact: **Phone:** **E-Mail:**

CLA-VAL™

—MODEL— 50-13

Pressure Relief Valve



- **Accurate Pressure Control**
- **Optional Check Feature**
- **Fast Opening to Maintain Line Pressure**
- **Slow Closing to Prevents Surges**
- **Completely Automatic Operation**

The Cla-Val Model 50-13 Pressure Relief Valve is a hydraulically operated, pilot-controlled, modulating valve designed to maintain constant upstream pressure within close limits. This valve can be used for pressure relief, pressure sustaining, back pressure, or unloading functions in a by-pass system.

In operation, the valve is actuated by line pressure through a pilot control system, opening fast to maintain steady line pressure but closing gradually to prevent surges. Operation is completely automatic and pressure settings may be easily changed.

If a check feature is added, and a pressure reversal occurs, the downstream pressure is admitted into the main valve cover chamber, closing the valve to prevent return flow.

Schematic Diagram

Item	Description
1	Hytrol (Main Valve)
2	X58C Restriction Assembly
3	CRL Pressure Relief Control

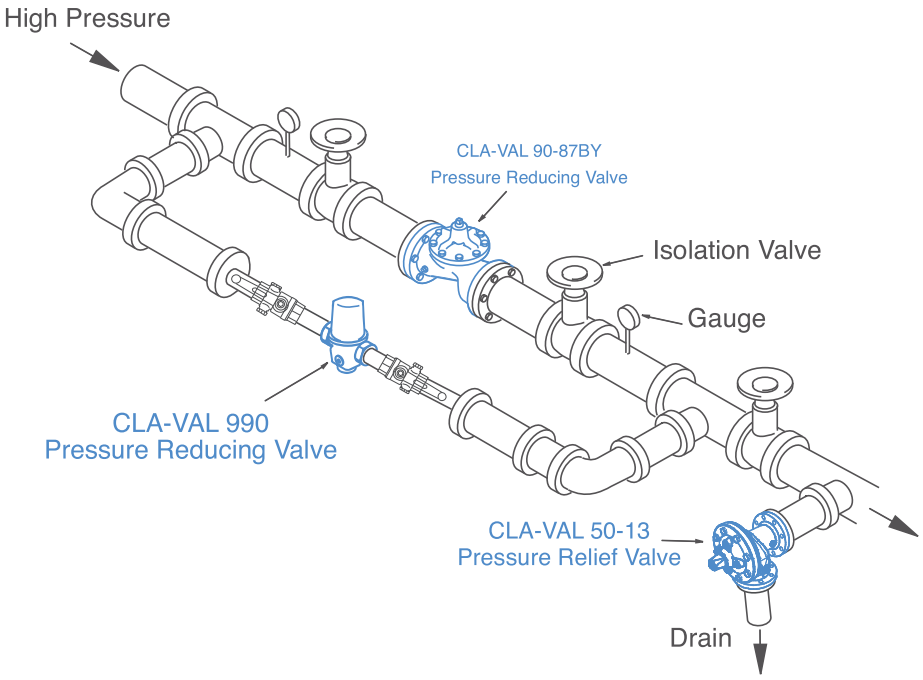
Optional Features

Item	Description
~~A~~	~~X46A Flow Clean Strainer~~
B	CK2 (Isolation Valve)
~~D~~	~~Check Valves with Isolation Valve~~
C	CV Flow Control (Closing)
~~F~~	~~Remote Pilot Sensing~~
~~H~~	~~Drain to Atmosphere~~
~~S~~	~~CV Speed Control (Opening)~~
Y	X43 “Y” Strainer

Typical Applications

Pressure Relief Service

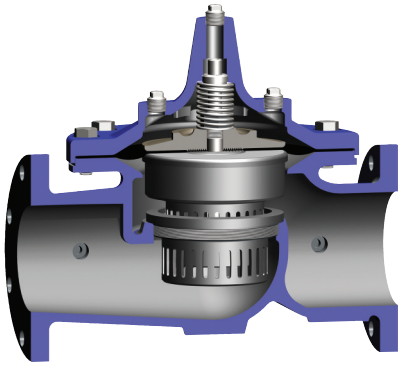
This fast opening, slow closing relief valve provides system protection against high pressure.



CLA-VAL™

— MODEL — 100-01KO

Anti-Cavitation Hytrol Valve



- **Virtually Cavitation Free Operation**
- **Severe Service Design - High Pressure Differentials**
- **Reduced Noise and Vibration**
- **316 Stainless Steel Disc Guide and Seat Standard**
- **Drip-Tight, Positive Sealing**
- **Service Without Removal From Line**
- **Retrofit to Standard Hytrol Valves**

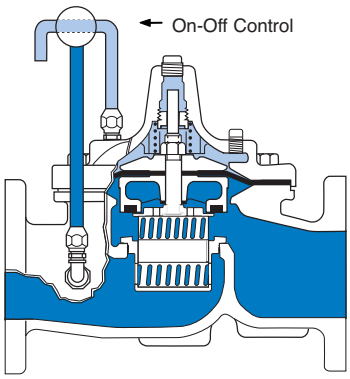
The Cla-Val Model 100-01KO Anti-Cavitation Hytrol Valve is designed for applications where there is a high potential for damage from cavitation. Specify this valve series for a wide variety of control valve applications having pressure differentials up to 300 psid or for relief valves having atmospheric discharge up to 150 psid.

The 100-01KO Hytrol main valve provides optimum internal pressure control through a unique anti-cavitation trim design. Constructed of 316 Stainless Steel, the seat and disc guide trim components feature dual interlocked sleeves containing radial slots that deflect internal flow to impinge upon itself in the center of the flow path, harmlessly dissipating the potential cavitation damage. This unique design also lessens the possibility of fouling if large particles in the water are present due to the large flow path of the radial slots.

The 100-01KO Hytrol is the basic valve used in Cla-Val Automatic Control Valves for high differential applications requiring remote control, pressure regulation, solenoid operation, rate of flow control, or liquid level control.

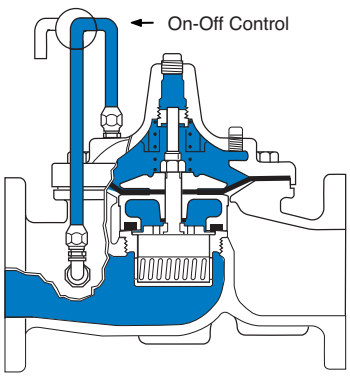
The Anti-Cavitation Trim components can be retrofitted to existing valves if the application indicates an appropriate need. Please consult factory for details.

Principle of Operation



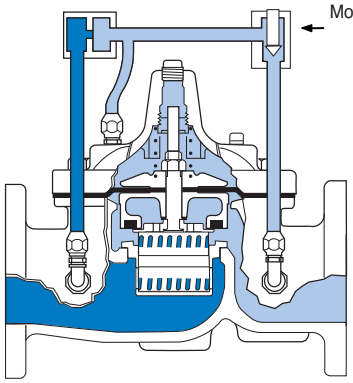
Full Open Operation

When pressure in the cover chamber is relieved to a zone of lower pressure, the line pressure at the valve inlet opens the valve, allowing full flow.



Tight Closing Operation

When pressure from the valve inlet is applied to the cover chamber, the valve closes drip-tight.



Modulating Action

The valve holds any intermediate position when operating pressures are equal above and below the diaphragm. A Cla-Val "Modulating" Pilot Control will allow the valve to automatically compensate for line pressure changes.

Specifications 100-01KO Hytrol Valve with KO Anti-Cavitation Trim

Patterns & End Connections

Pattern	Globe	Angle	Grooved End
Size	1-1/4" - 36" 32 - 900 mm	1-1/4"- 16" & 24" 32 - 400 & 600 mm	1-½" - 8" 40 - 200 mm

Operating Temp. Range

Fluids
-40 to 180 F

Pressure Ratings (Recommended Maximum Pressure - psi)

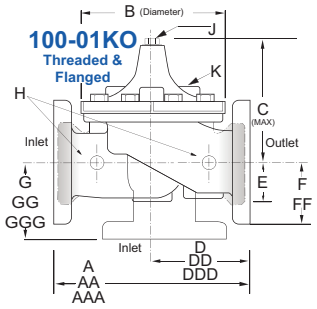
Valve Body & Cover		Pressure Class				
			Flanged		Grooved	Threaded
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End‡ Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
UNS 87850	Bronze	B16.24	225	400	400	400

Note: * ANSI standards are for flange dimensions only.
Flanged valves are available faced but not drilled.
‡ End Details machined to ANSI B2.1 specifications.

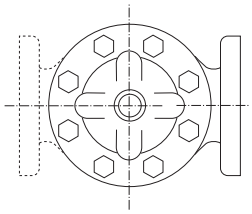
Materials

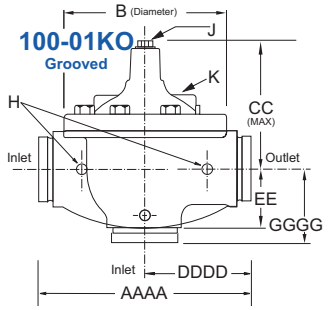
Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	1-1/4" - 36" 32 - 900 mm	3" - 16" 32 - 900 mm	3" 16" 32 - 900 mm
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Stainless Steel is Standard		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		

For material options not listed consult factory.



Note:
Consult Factory on 10",12", 16" angle pattern





Valve Size (Inches)	1¼	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
A Threaded	7.25	7.25	9.38	11.00	12.50	—	—	—	—	—	—	—	—	—	—	—	—
AA 150 ANSI	—	8.50	9.38	11.00	12.00	15.00	~~20.00~~	25.38	29.75	34.00	39.00	41.38	46.00	52.00	61.50	63.00	72.75
AAA 300 ANSI	—	9.00	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	47.64	53.62	63.24	64.50	74.75
AAAA Grooved End	—	8.50	9.00	11.00	12.50	15.00	~~20.00~~	25.38	—	—	—	—	—	—	—	—	—
B Diameter	5.62	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	41.50	45.00	53.16	56.00	66.00
C Maximum	5.50	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	39.06	41.90	43.93	54.60	59.00
CC Maximum Grooved End	—	4.75	5.75	6.88	7.25	9.31	~~12.12~~	14.62	—	—	—	—	—	—	—	—	—
D Threaded	3.25	3.25	4.75	5.50	6.25	—	—	—	—	—	—	—	—	—	—	—	—
DD 150 ANSI	—	4.00	4.75	5.50	6.00	7.50	~~10.00~~	12.69	14.88	17.00	19.50	20.81	—	—	30.75	—	—
DDD 300 ANSI	—	4.25	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	—	—	31.62	—	—
DDDD Grooved End	—	—	4.75	—	6.00	7.50	—	—	—	—	—	—	—	—	—	—	—
E	1.12	1.12	1.50	1.69	2.06	3.19	~~4.31~~	5.31	9.25	10.75	12.62	15.50	12.95	15.00	17.75	21.31	24.56
EE Grooved End	—	2.00	2.50	2.88	3.12	4.25	~~6.00~~	7.56	—	—	—	—	—	—	—	—	—
F 150 ANSI	—	2.50	3.00	3.50	3.75	4.50	~~5.50~~	6.75	8.00	9.50	10.50	11.75	15.00	16.50	19.25	22.50	28.50
FF 300 ANSI	—	3.06	3.25	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.00	16.50	19.25	24.00	30.00
G Threaded	1.88	1.88	3.25	4.00	4.50	—	—	—	—	—	—	—	—	—	—	—	—
GG 150 ANSI	—	4.00	3.25	4.00	4.00	5.00	~~6.00~~	8.00	8.62	13.75	14.88	15.69	—	—	22.06	—	—
GGG 300 ANSI	—	4.25	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50	—	—	22.90	—	—
GGGG Grooved End	—	—	3.25	—	4.25	5.00	—	—	—	—	—	—	—	—	—	—	—
H NPT Body Tapping	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
J NPT Cover Center Plug	0.25	0.25	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.50	2.00	1.00	1.00	1.00	2.00	2.00
K NPT Cover Tapping	0.375	0.375	0.375	0.50	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Stem Travel	0.40	0.40	0.60	0.70	0.80	1.10	1.70	2.30	2.80	3.40	4.00	4.50	5.10	5.63	6.75	7.50	8.50
Approx. Ship Weight (lbs)	15	15	35	50	70	140	285	500	780	1165	1600	2265	2982	3900	6200	7703	11720

Cla-Val Control Valves with KO ANTI-CAVITATION Trim operate with maximum efficiency when mounted in horizontal piping with the main valve cover Up. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.

Functional Data

100-01KO Valve Size		Inches	1¼	1½	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
		mm.	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900
C_V Factor	Globe Pattern	Gal./Min. (gpm.)	14	14	25	37	52	90	218	362	602	900	1100	1200	1550	1950	3900	4660	7100
		Litres/Sec. (l/s.)	3.4	3.4	6.0	8.9	12.5	21.6	52	87	144	216	264	288	360	469	938	1120	1706
	Angle Pattern	Gal./Min. (gpm.)	15	15	26	39	55	95	232	388	560	790	1075	1175	—	—	3775	—	—
		Litres/Sec. (l/s.)	3.6	3.6	6.2	9.4	13.2	22.8	56	93	134	190	258	282	—	—	906	—	—
Equivalent Length of Pipe	Globe Pattern	Feet (ft.)	196	196	237	277	416	572	858	1315	1483	2118	1937	3022	3537	4199	4532	6678	6567
		Meters (m.)	60	60	72	84	127	174	262	401	452	646	590	921	1078	1280	1381	2035	2002
	Angle Pattern	Feet (ft.)	171	171	219	250	372	514	757	1145	1714	2226	2021	3152	—	—	2583	—	—
		Meters (m.)	52	52	67	76	113	157	231	349	522	678	616	961	—	—	787	—	—
K Factor	Globe Pattern		30.6	30.6	26.1	24.3	29.3	29.0	25.5	27.7	24.9	27.7	22.8	31.4	30.2	29.5	15.4	30.1	25.1
	Angle Pattern		26.7	26.7	24.1	21.8	26.2	26.0	22.5	24.1	28.7	29.1	23.8	32.8	—	—	16.4	—	—
Liquid Displaced from Cover Chamber When Valve Opens		U.S. Gal.	0.2	0.2	.03	.04	.08	.17	.53	1.26	2.5	4.0	6.5	9.6	11	12	29	65	90
		Litres	0.8	0.8	.12	.16	.30	.64	2.0	4.8	9.5	15.1	25.6	36.2	41.6	45.4	110	246	340

For assistance in selecting appropriate valve options or valves manufactured with special design requirements, please contact our Regional Sales Office or Factory.

C_V Factor

Formulas for computing C_V Factor, Flow (Q) and Pressure Drop (▲P):

$$C_V = \frac{Q}{\sqrt{\triangle P}} \qquad Q = C_V \sqrt{\triangle P} \qquad \triangle P = \left(\frac{Q}{C_V}\right)^2$$

K Factor (Resistance Coefficient)
The Value of K is calculated from the formula: $K = \frac{894 d^4}{C_v^2}$
(U.S. system units)

Equivalent Length of Pipe
Equivalent lengths of pipe (L) are determined from the formula: $L = \frac{K d}{12 f}$
(U.S. system units)

Fluid Velocity
Fluid velocity can be calculated from the following formula: $V = \frac{.4085\ Q}{d^2}$
(U.S. system units)

Where:

C_V = U.S. (gpm) @ 1 psi differential at 60° F water
or
= (l/s) @ 1 bar (14.5 PSIG) differential at 15° C water

d = inside pipe diameter of Schedule 40 Steel Pipe (inches)

f = friction factor for clean, new Schedule 40 pipe (dimensionless) (from Cameron Hydraulic Data, 18th Edition, P 3-119)

K = Resistance Coefficient (calculated)

L = Equivalent Length of Pipe (feet)

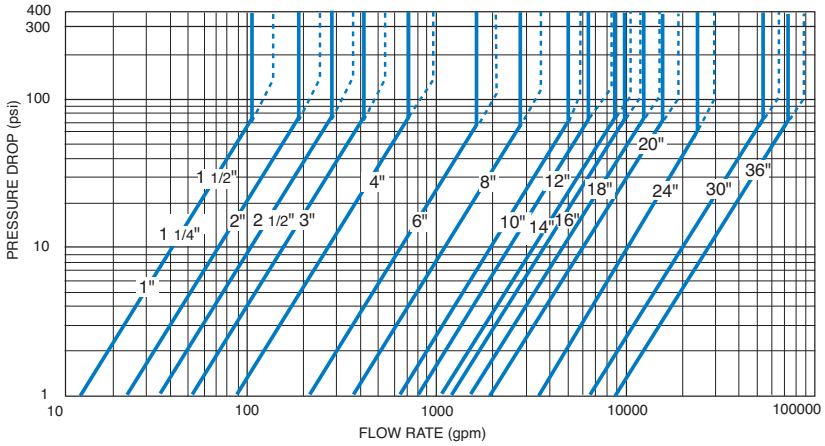
Q = Flow Rate in U.S. (gpm) or (l/s)

V = Fluid Velocity (feet per second) or (meters per second)

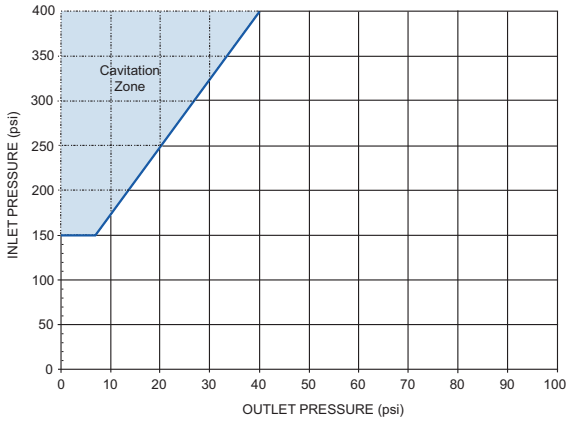
△ P = Pressure Drop in (psi) or (bar)

100G-01KO ANTI-CAVITATION VALVE CURVES

SOLID LINE IS FULL OPEN FLOW CURVES FOR 18 FT/SEC CONTINUOUS DUTY APPLICATIONS
DASHED LINE IS FULL OPEN FLOW CURVE FOR 25 FT/SEC INTERMITTENT DUTY APPLICATIONS

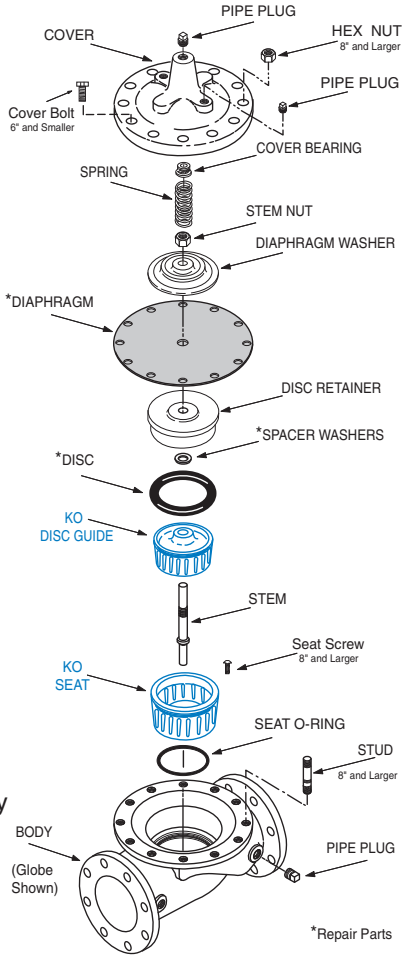


SELECTION GUIDELINE FOR KO ANTI-CAVITATION VALVES



Notes: On Operating Differential

1. For atmospheric discharge, the maximum inlet pressure cannot exceed 150 psi.
2. For pressure differentials greater than 300 psi the maximum flow velocity should not exceed 18 ft/sec.
3. Flow velocities greater than 25 ft/sec are not recommended.
4. Recommended minimum flow velocity is 1 ft/sec.
5. Consult factory for conditions exceeding these recommendations.



100-01KO Hytrol Main Valve with Anti-Cavitation Trim Purchase Specifications

Function

The valve shall be hydraulically operated, single diaphragm actuated, globe pattern. The valve shall consist of three major components: the body with seat installed, the cover with bearing installed, and the diaphragm assembly. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the main valve or pilot controls. Ductile Iron is standard, other materials shall be available. No fabrication or welding shall be used in the manufacturing process.

Description

The anti-cavitation features of the seat and disc guide detail shall have flow slots equally spaced around their perimeters. The seat slots shall be orientated around the perimeter of the seat so that fluid entering the valve shall flow through the seat slot detail such that the fluid flow converges in the center chamber of the seat allowing potential cavitation to dissipate. The disc guide slots shall be positioned around the perimeter of the disc guide, configured and oriented in an angular direction so that fluid flow exiting through the slots is diverted away from direct impact into pressure boundary surfaces. Flow exiting the disc guide slots is directed in an angular path to increase the distance between the slot geometry and pressure boundary surfaces. If cavitation conditions exist, the increased distance between the slots and pressure boundary surfaces minimizes the potential for damage by allowing the cavitation bubbles to dissipate before they come in contact with pressure boundary surfaces. Anti-cavitation characteristics shall be controlled by the described slotted seat and disc guide components. The disc guide shall slide in the seat and allow controlled flow through the seat slots into the central seat chamber where flow shall continue from the seat chamber and exit through the angularly oriented slots of the disc guide. The seat and disc guide features used together shall provide anti-cavitation characteristics suitable for applications where a large controlled pressure drop is desired.

The flexible, non-wicking, FDA approved diaphragm shall consist of nylon fabric bonded with synthetic rubber compatible with the operating fluid. The diaphragm must withstand a Mullins burst test of a minimum of 600 psi per layer of nylon fabric and shall be cycle tested 100,000 times to insure longevity. The diaphragm shall be fully supported in the valve body and cover by machined surfaces which support no less than one-half of the total surface area of the diaphragm in either the fully open or fully closed position.

The valve seat in six inch and smaller size valves shall be threaded into the body. Valve seat in eight inch and larger size valves shall be retained by flat head machine screws for ease of maintenance. The seat shall be of the solid, one-piece design and shall have a minimum of a five degree taper on the seating surface for positive drip-tight shut-off. Pressed-in bearings and/or multi-piece seats shall not be permitted.

To insure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline.

The valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of three years from date of shipment, provided the valve is installed and used in accordance with all applicable instructions. The valve manufacturer shall be able to supply a complete line of equipment from 1¼" through 48" sizes and a complete selection of complementary equipment.

Material Specification

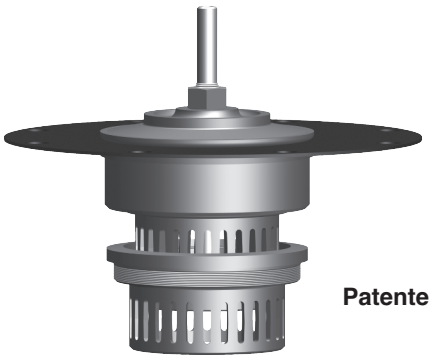
Valve Size:
Main Valve Body and Cover:
Main Valve Trim:
End Detail:
Pressure Rating:
Temperature Range:
Coating:
Desired Options:

Application Information

Inlet/Outlet Pressures:
Flow Rate:
Pipe Diameter:
Function (i.e. - Pressure Reducing, Pressure Relief, etc.):

This valve shall be a Cla-Val Model No. 100-01KO Hytrol Main Valve with Anti-Cavitation Trim as manufactured by Cla-Val, Newport Beach, CA

Note: Add this Hytrol Anti-Cavitation Trim Purchase Specification to main valve specification for control valves where there is a high potential for cavitation damage. Please contact our Regional Sales Offices or Factory for assistance.



Patented

The Anti-Cavitation Trim components can be retrofitted to existing Hytrol valves if the application indicates an appropriate need. Please consult factory for details.

CLA-VAL

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E-100-01KO US Units (R-02/2019)

visit www.cla-val-latinamerica.com for Spanish literature

EPOXY PROTECTIVE COATING
(Blue Epoxy and Red Epoxy)

Epoxy resin powders were created and developed specifically for the application of thin film corrosion protection to metal or other substrates. Epoxy resin coatings are suitable for continuous exposure to a wide range of corrosive elements. Of particular interest for control valves is the high resistance to various water conditions. They also provide resistance to certain acids, chemicals, solvents and alkalis. They have excellent adhesion to almost any prepared surface. They are sufficiently flexible to be used to protect steel springs from corrosion and have an impact strength that allows retainability and restoration of surface coating under normal drop conditions.

Since the early 1970's the application process used by Cla-Val is the fusion method. This method of applying epoxy resins utilizes the principal of covering a suitably cleaned and preheated part with a one-part dry powdered resin. The dry powdered resin fuses itself to the heated part. A curing period in an oven at 400 degrees F completes the process. No volatile solvents are required and thus there are no pinholes left by evaporation of such materials. The coating is applied by electrostatic spray or flock spray to a nominal thickness recommended by the coating manufacturer.

Cla-Val valves specified with epoxy coating applied at the factory fully conform to the standards below. Applied to the inside and outside of all ferrous parts, this coating option is indicated with "KC" as a suffix to the valve catalog number.

CERTIFICATION

This is to confirm that Cla-Val uses AKZO Nobel R4-HJF42R (**Blue**) epoxy powder coating material for our factory applied protective coating. Our coating application process conforms to all applicable requirements of the American Water Works Association Standard C550 entitled “Protective Interior Coatings for Valves and Hydrants.

The AKZO Nobel R4-HJF42R (**Blue**) epoxy powder coating material is certified as a protective barrier material and approved by NSF Standard 61 - Drinking Water System Components - Health Effects (Nov. 16, 1995).

The AKZO Nobel R4-HJF42R (**Blue**) epoxy powder coating material is formulated with ingredients which are listed in or cited by the suppliers as in compliance with Federal Drug Administration Document, Title 21 of the Federal Regulations on Food Additives, Section 175.300, "Resinous and Polymeric Coatings."

This is to certify that Cla-Val uses H.B. Fuller Co. IF-1947 (**Red Oxide color**) epoxy powder coating material for our factory applied protective coating on Fire Protection main valves. Our coating application process conforms to all applicable requirements of the American WaterWorks Association Standard C550-90 entitled “Protective Interior Coatings for Valves and Hydrants."

This also certifies that H. B. Fuller Co. IF-1947 epoxy powder coating material (**Red Oxide color**) is applied and inspected according to Cla-Val procedures no. 97165 to interior and exterior of all ferrous parts.

Model X101

Valve Position Indicator

▶ PRODUCT FEATURES

Cla-Val Model X101 Visual Position Indicator is designed to display Cla-Val valve position quickly and easily. A solid brass indicator rod fastened directly to the valve stem moves up and down inside a pyrex tube. The tube is contained within a brass housing which is open on two opposite sides to permit clear vision of the indicator rod.

To purge air that may be trapped in the valve cover, a vent valve in the top of the housing is provided. Model X101 valve position indicator is furnished complete for installation on specified size Cla-Val Automatic Control Valve.

▶ SPECIFICATIONS

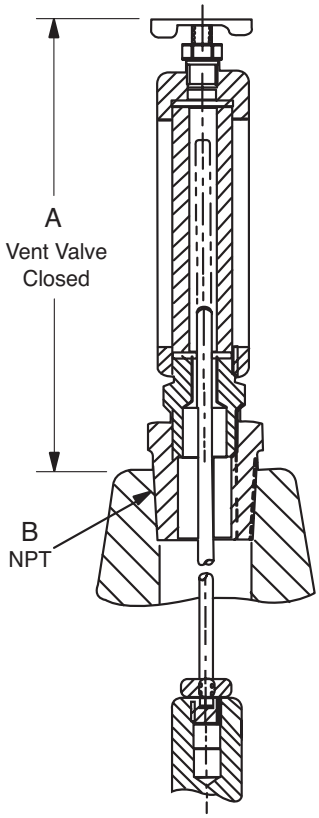
Sizes: 1" thru 24"

Standard Materials*: ~~Brass,~~ Pyrex Tube ;Stainless Steel

Pressure Rating: 400 psi

**Optional Materials Available*

▶ DIMENSIONS



VALVE SIZE	A INCHES	B NPT
1”	5.88	1/4”
1 1/4”	3.21	1/4”
1 1/2”	3.21	1/4”
2”	3.33	1/2”
2 1/2”	3.33	1/2”
3”	3.33	1/2”
4”	4.52	~~3/4~~”
6”	4.52	~~3/4~~”
8”	5.83	1”
10”	7.70	1”
12”	8.20	1 1/4”
14”	8.20	1 1/2”
16”	10.81	2”
18”	12.04	1”
20”	12.04	1”
24”	12.04	1”

Dimension “A” is height added to valve by indicator assembly

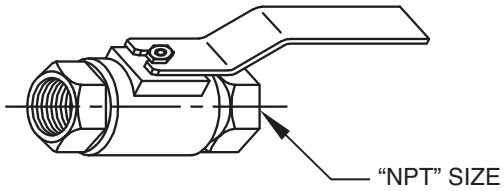
Model **CK2**

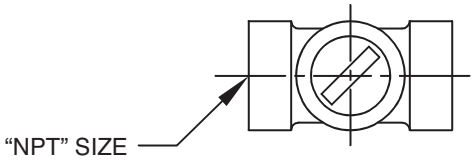
Isolation Valve

▶ PRODUCT FEATURES

Model CK2 is a ball valve used for isolating components within the pilot system.

▶ DIMENSIONS





"NPT" SIZE								
1/8"	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"

▶ SPECIFICATIONS

PART	MATERIAL
Body:	316 Stainless Steel
Handle and Nut:	316 Stainless Steel
Maximum working pressure:	600 psi
Temperature range:	33°F to 180°F

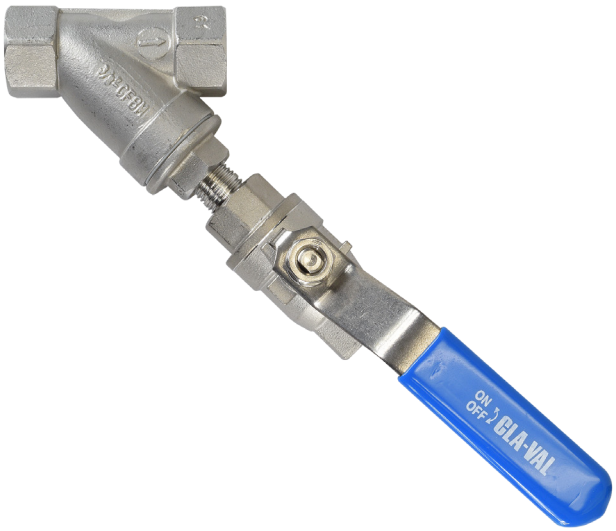
Model **X43A**

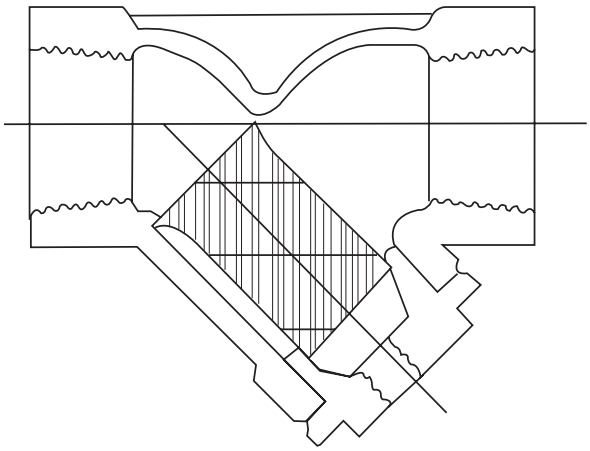
'Y' Strainer with Blowdown Ball Valve

▶ PRODUCT FEATURES

- **Stainless Steel Body**
- **Blow-off Standard**
- **Stainless Steel Mesh Screen**

Model X43A 'Y' Strainers are in-line strainers intended to be installed for protection of pilot systems. These strainers are constructed of corrosion resistant materials. All sizes have blow-off standard.





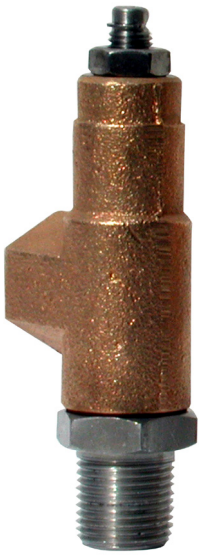
▶ SPECIFICATIONS

PART	MATERIAL
Body:	316 Stainless Steel
Screen:	304 Stainless Steel
Gasket:	Non-Asbestos Fiber
Ends:	Threaded ANSI/ASME B1.20 1
Maximum working pressure:	800 psi
Temperature range:	33°F to 180°F
Screen:	Standard screen size is 40 mesh perforated stainless steel
Standard:	Blowdown Ball Valve

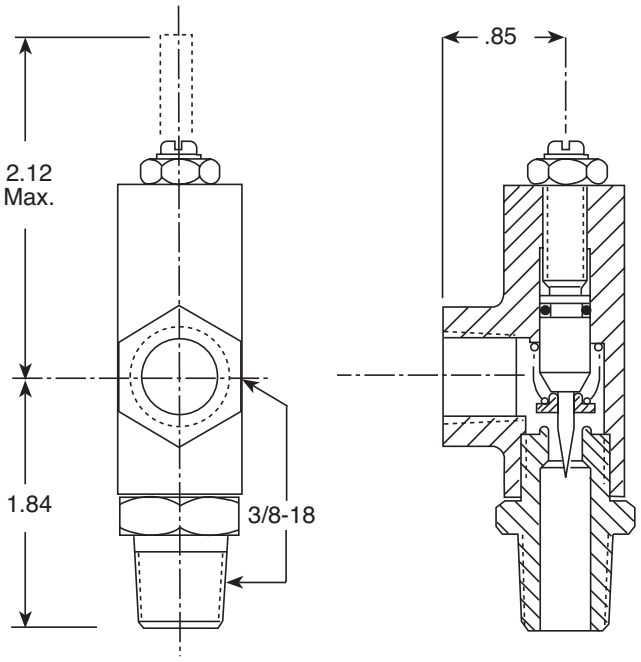
Model CV
Flow Control

▶ PRODUCT FEATURES

Cla-Val CV Control is an adjustable restriction which acts as a needle valve when flow is in the direction of the stem. When flow is in the reverse direction, the port area opens fully to allow unrestricted flow. When installed in the control system of a Cla-Val automatic valve, it can be arranged to function as either an opening or closing speed control.



▶ DIMENSIONS



▶ SPECIFICATIONS

Sizes:	3/8" NPT
Temperature Range:	250°F Max.
Standard Materials*:	
Housing:	~~Bronze ASTM B61~~ Stainless Steel
Trim:	Stainless Steel ~~303~~ 316
Pressure Rating:	400 psi Max.

**Optional Materials Available*

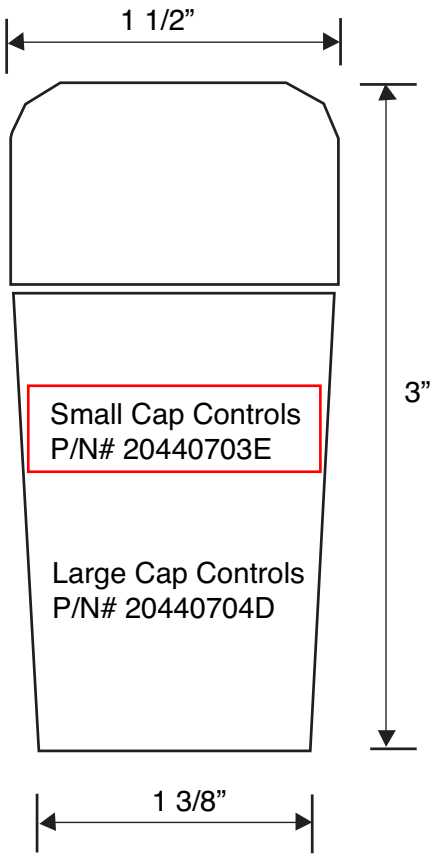
Model **X140-1**

Locking Security Cap

▶ PRODUCT FEATURES

The Cla-Val Model X140-1 Locking Security Cap is designed to completely encapsulate the pilot control adjustment screw with Stainless Steel. Even in the harshest environment, the X140-1 offers an extra level of protection, security and peace of mind for the system operator that pilot control settings will not change until appropriate personnel are present.

▶ DIMENSIONS



Model **CRL-60**

Pressure Relief Control

▶ PRODUCT FEATURES

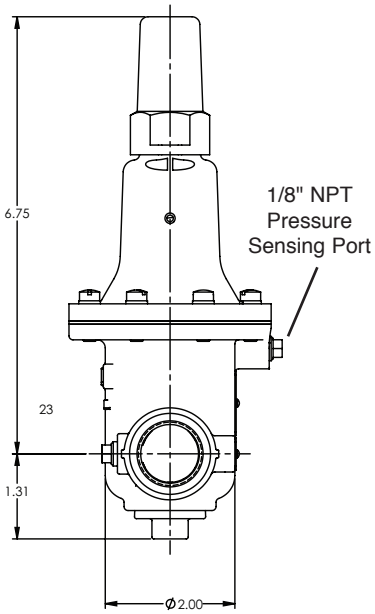
Cla-Val Model CRL-60 Pressure Relief Valve is a direct-acting, spring loaded, diaphragm type relief valve. Often used as a pilot control for Cla-Val Hytrol valves, it can also be used as a standalone pressure relief valve. The CRL-60 may be installed in any position. The bottom plug may be removed and installed in the inlet to convert it to an angle pattern flow path.

When the controlling pressure exceeds the spring setting, the disc is lifted off its seat, permitting flow through the control. When control pressure drops below the spring setting, the spring forces the control back to its normally closed position.

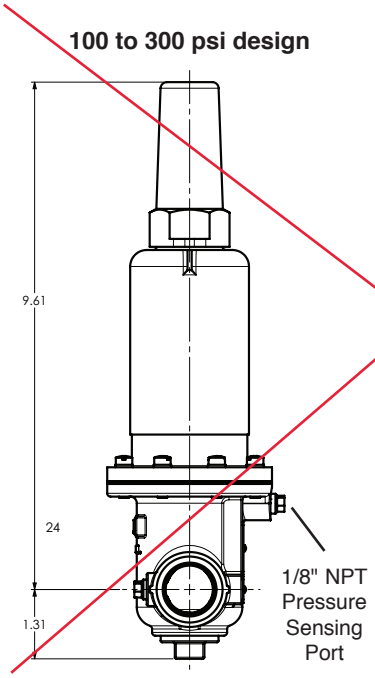
▶ DIMENSIONS

1/2" & 3/4" SIZES

0 to 75, 20 - 105 & 20 to 200 psi design

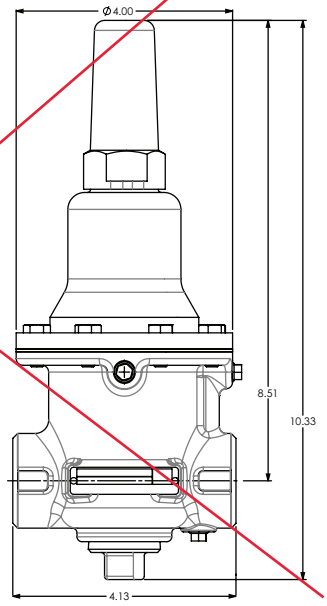


100 to 300 psi design



1" SIZE

20 - 75, 40 - 400 & 100 - 300 psi design



▶ SPECIFICATIONS

Size: 1/2", 3/4" & 1" Threaded

Temperature Range: Water, Air: to 180°F Max.

Standard Materials*

Body & Cover: ~~Low Lead Bronze~~ Stainless Steel

Trim: Stainless Steel ~~303~~ 316

Rubber: Buna-N® Synthetic Rubber

Pressure Ratings: Bronze 400 psi Max.
Stainless Steel 400 psi Max.

**Optional Materials Available*

Adjustment Ranges:
0 to 75 psi
20 to 105 psi (1/2" size only)
20 to 200 psi
100 to 300 psi

Pressure Drop Chart (Full Open Valve)

Valve Size	Cv Factor	Flow of Water - gpm					
		5	10	15	20	30	40
1/2"	6.0	0.7	2.7	6.0	11.0	- -	- -
3/4"	8.5	0.3	1.4	3.1	5.5	12.2	- -
1"	12.5	0.2	0.6	1.4	2.6	5.8	10.2

Model **X141BA**

Gauge/Air Bleed Option

▶ PRODUCT FEATURES

Cla-Val Model X141BA Pressure Gauge/Air Bleed Assembly option consists of glycerin-filled pressure gauge, bleeder, and isolation valve. Cla-Val gauges are waterproof, shock resistant, and fully enclosed with a stainless steel case and bronze wetted parts. Ambient temperature ratings are -4 Degrees F to +140 Degrees F (-20 Degrees C to +60 Degrees C). Bleeder and isolation valve are stainless steel construction with 400 psi max working pressure.

All gauges have dual scale (PSI/BAR).

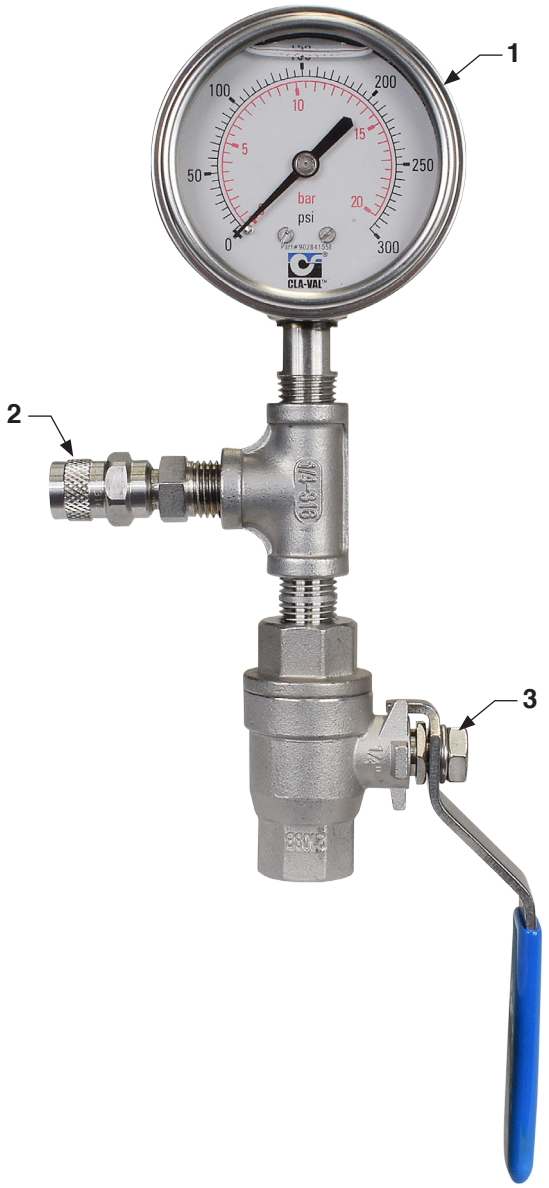
1. Gauge Assembly (2 1/2" Diameter Dial)

Available Pressure Range

- 0 - 60 psi
- 0 - 100 psi
- 0 - 160 psi
- 0 - 200 psi
- 0 - 300 psi
- 0 - 400 psi

2. Bleeder Valve

3. Isolation Valve



Model X141

Cla-Val Gauge Option

▶ PRODUCT FEATURES

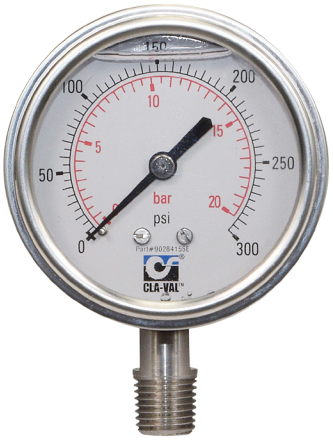
Cla-Val Model X141 Pressure Gauge Option consists of glycerin-filled pressure gauges. Cla-Val gauges are waterproof, shock resistant, and fully enclosed with a stainless steel case and bronze wetted parts. Ambient temperature ratings are -4 Degrees F to +140 Degrees F (-20 Degrees C to +60 Degrees C).

All gauges have dual scale (PSI/BAR) and are supplied with a 1/4" NPT bottom connection.

▶ AVAILABLE PRESSURE RANGES

X141 Gauge Assembly (2 1/2" Diameter Dial)

Pressure Range*
0 - 60 psi
0 - 100 psi
0 - 200 psi
0 - 300 psi
0 - 400 psi



Model X141
2-1/2" Pressure Gauge

X141 Gauge Assembly (4" Diameter Dial)

Pressure Range*
0 - 60 psi
0 - 100 psi
0 - 200 psi
0 - 300 psi
0 - 400 psi

Model X141
4" Pressure Gauge

919 PTFE STAINLESS STEEL BRAIDED HOSE

When high temperature performance and excellent chemical compatibility are demanded, Parker 919 PTFE Hose accepts the challenge. This medium pressure hose can withstand temperatures up to 450°F (232°C). A smooth bore natural PTFE core tube and stainless steel braided wire reinforcement tackle corrosive chemicals and abrasive environments.

FEATURES AND BENEFITS
- Low friction minimizes pressure drops and deposits
- Environmentally safe
- Resists moisture
- Maximum working pressures up to 3,000 psi
- Meets or exceeds SAE 100R14A -919; SAE 100R14B -919B (Static Dissipative PTFE); FDA CFR 177.1550 (Natural Tube)

Applications:

- Oil burner fronts (boiler)
- Fuel, lube, and oil skids
- Water injection, inlet fogging skids, and water wash
- Fuel control valves
- Compressed air discharge and coolant lines
- Gas analyzer systems
- High pressure steam lines
- Instrument test equipment

PERFORMANCE CHARACTERISTICS	
HOSE COVER MATERIAL	304 Stainless Steel Braid, Extruded Silicone, or Polyurethane
CORE TYPE	Natural PTFE or Static Dissipative PTFE
APPLICATION	Fluid Handling, Chemical Transfer, Manufacturing / Industrial, Medical/Pharmaceutical, Packaging, Instrumentation, Transportation
HOSE I.D. (INCH)	3/16, 1/4, 5/16, 13/32, 1/2, 5/8, 7/8, 1-1/8
HOSE I.D. (MM)	5, 6, 8, 10, 13, 16, 19, 22, 29
INDUSTRY STANDARDS	SAE 100R14A, FDA CFR 177.1550 (natural), SAE 100R14B
MAXIMUM WORKING PRESSURE (PSI)	625 - 3,000
MAXIMUM WORKING TEMPERATURE (C)	135 - 232
MAXIMUM WORKING TEMPERATURE (F)	275 - 450
MEDIA	Various
MINIMUM WORKING TEMPERATURE (C)	-40 to -73
MINIMUM WORKING TEMPERATURE (F)	-40 to -100
VACUUM RATING (INCH OF HG)	10 - 28
HOSE I.D. (SIZE)	-4,-5, -6, -8, -10, -12, -16, -20
HOSE O.D. (INCH)	0.32 - 1.28
HOSE O.D. (MM)	8 - 33
MAXIMUM WORKING PRESSURE (BAR)	43 - 207
MINIMUM BEND RADIUS (INCH)	1-1/2 - 7-1/2
MINIMUM BEND RADIUS (MM)	38 - 406
STYLE	Natural, Static-Dissipative
VACUUM RATING (MM OF HG)	25 - 711
WEIGHT (KG/M)	0.09 - 0.58
WEIGHT (LBS/FT)	0.06 - 0.39
DASH NUMBER	-3 to -20
MAXIMUM WORKING PRESSURE (MPA)	4.3 to 20.7 (dependent on size)
COMPATIBLE FITTINGS	90, 91, or 91N
HOSE TYPE	PTFE Hose or Smoothbore
COLOR	Silver, Red or Black

130LTSS1/4X3/8

SKU#: 130LTSS1/4X3/8

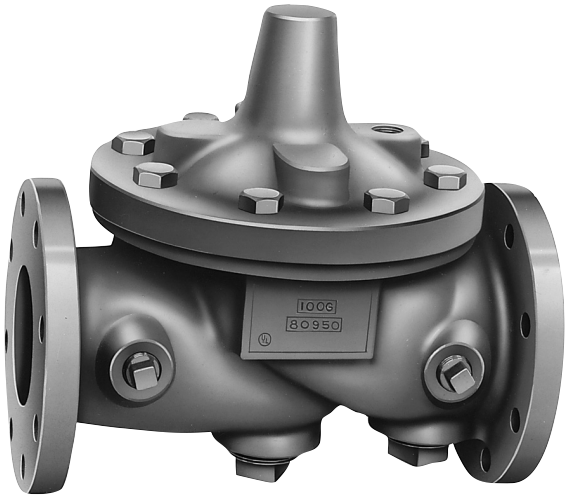
Hose Connector

St. St. 316 Pipe Fitting, Hose Connector 1/4" x Tube Stub 1/4"

BODY MATERIAL	Stainless Steel 316
FITTING TYPE	Adapter
CONNECTION TYPE	Tube Stub
CONNECTION SIZE	3/8"
CROSS REFERENCE	SS-4-HC-A-601
TUBE SIZE	1/4", 3/8"

CLA-VAL WARRANTY

3 Year Warranty on Cla-Val Quality Products



This is a Limited Warranty

Automatic valves and controls as manufactured by Cla-Val are warranted for three years from date of shipment against manufacturing defects in material and workmanship that develop in the service for which they are designed, provided the products are installed and used in accordance with all applicable instructions and limitations issued by Cla-Val. Electronic components manufactured by Cla-Val are warranted for one year from the date of shipment.

We will repair or replace defective material, free of charge which is returned to our factory, transportation charges prepaid, provided that after inspection the material is found to have been defective at time of shipment. The warranty is expressly conditioned on the purchaser's giving Cla-Val immediate written notice upon discovery of the defect.

Components used by Cla-Val, but manufactured by others, are warranted only to the extent of that manufacturer's guarantee.

This warranty shall not apply if the product has been altered or repaired by others, and Cla-Val shall make no allowance or credit for such repairs or alterations unless authorized in writing by Cla-Val.

Disclaimer of Warranties & Limitation of Liability

The foregoing warranty is exclusive and in lieu of all other warranties and representations whether expressed, implied, oral or written, including but not limited to, any implied warranties or merchantability or fitness for a particular purpose. All such other warranties and representations are hereby cancelled.

Cla-Val shall not be liable for any incidental or consequential loss, damage or expense arising directly or indirectly from the use of the product. Cla-Val shall not be liable for any damages or charges for labor or expense in making repairs or adjustments to the product. Cla-Val shall not be liable for any damages or charges sustained in the adaptation or use of its engineering data and services.

No representative of Cla-Val may change any of the foregoing or assume any additional liability or responsibility in connection with the product.

The liability of Cla-Val is limited to material replacements F.O.B. Newport Beach, California.

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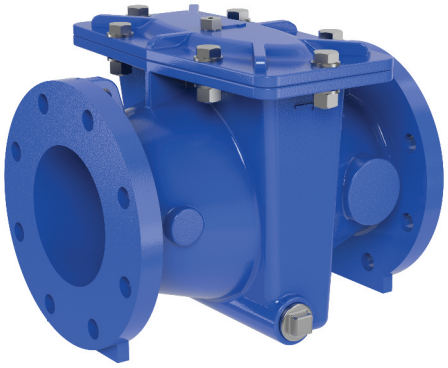
CLA-VAL™

CLA-VAL™

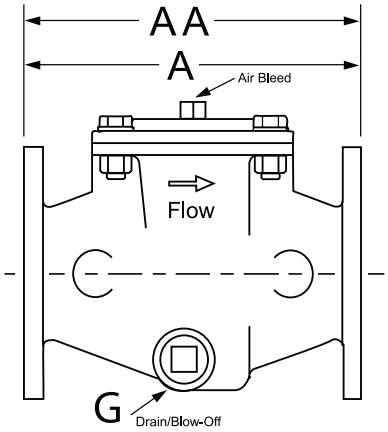
— MODEL — X43H

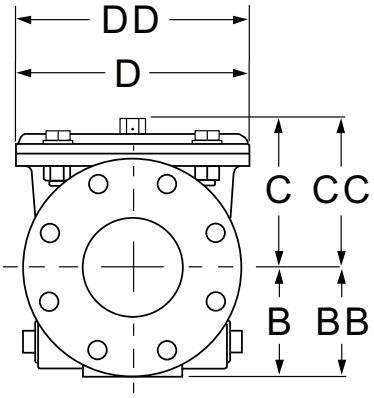
H Style Strainer



- **Low Pressure Drop**
- **Ductile Iron Fusion Bonded Epoxy Coated Construction with a 316 Stainless Steel Strainer**
- **Large Flow Area H-Style Design**
- **Service Without Removal From Line**
- **The materials of construction and epoxy coating used in this product meets the intent of the federal NSF-61 lead content mandate**

The Cla-Val Model X43H Strainer offers an effective means of removing unwanted solid particles in pipeline flow. These strainers are ideal for preventing fouling, debris and particle buildup in Cla-Val Automatic Control Valves. The large flow area design, with a flat stainless steel strainer mesh perpendicular to flow, is optimized for low pressure drop applications. Maintenance is fast and easy with the compact H-pattern, requiring only top cover removal. Though the strainer may be installed in any position, installation with the cover up is recommended.





Dimensions

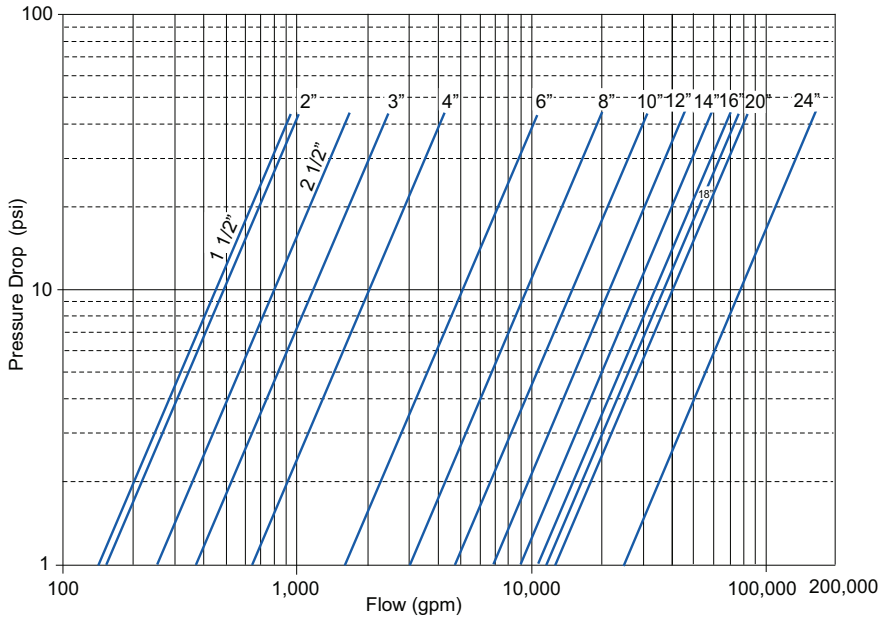
Strainer Size (inches)	1 ½	2	2 ½	3	4	6	8	10	12	14	16	18	20	24	30	36	48
A 150 ANSI	9.06	9.06	9.06	11.81	11.81	15.75	19.69	22.83	24.02	25.59	31.50	31.50	37.40	43.31	45.27	45.67	45.67
AA 300 ANSI	9.13	9.13	9.13	11.89	11.89	15.83	19.76	22.91	24.09	25.67	31.57	31.57	37.48	43.39	- -	- -	- -
B 150 ANSI	2.50	3.26	3.66	4.06	4.33	5.63	6.69	8.40	9.40	10.24	12.20	13.18	19.09	19.09	22.49	26.00	34.00
BB 300 ANSI	3.26	3.26	3.66	4.06	5.02	5.63	7.50	8.86	10.20	10.94	12.70	15.00	19.09	19.09	- -	- -	- -
C Max. 150 ANSI	3.78	3.78	3.78	5.91	5.91	7.52	8.82	11.61	15.16	14.96	19.69	19.69	23.98	23.98	25.10	36.20	34.11
CC Max. 300 ANSI	5.20	5.20	5.35	6.22	6.22	7.99	9.33	12.79	15.67	15.67	19.69	19.69	23.98	23.98	- -	- -	- -
D Dia. 150 ANSI	7.87	7.87	7.87	9.25	9.25	15.74	18.11	22.05	26.77	26.77	35.43	35.43	46.85	46.85	46.85	61.65	61.65
DD Dia. 300 ANSI	7.99	7.99	7.99	9.37	9.37	15.86	18.23	22.17	26.85	26.85	35.43	35.43	46.85	46.85	- -	- -	- -
G Drain/Blow-off Plug NPT	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼	2	2	2	2	2	2	2	2	2
Approx. Ship Wt. Lbs.	33	36	39	59	73	143	212	432	626	683	970	1073	1175	1962	2249	4123	4828

Strainer Size (mm)	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900	1200
A 150 ANSI	230	230	230	300	300	400	500	580	610	650	800	800	950	1100	1150	1160	1160
AA 300 ANSI	232	232	232	302	302	402	502	582	612	652	802	802	952	1102	- -	- -	- -
B 150 ANSI	64	83	93	103	110	143	170	213	240	260	310	335	485	485	571.5	660.5	862.5
BB 300 ANSI	83	83	93	103	128	143	191	225	259	278	321	380	485	486	- -	- -	- -
C Max. 150 ANSI	96	96	96	150	150	191	224	295	385	380	500	500	609	609	637.5	919.5	866.5
CC Max. 300 ANSI	132	132	136	158	158	203	237	325	398	398	500	500	609	609	- -	- -	- -
D Dia. 150 ANSI	200	200	200	235	235	400	460	560	680	680	900	900	1190	1190	1190	1566	1566
DD Dia. 300 ANSI	203	203	203	238	238	403	463	563	682	682	900	900	1190	1190	- -	- -	- -
G Drain/Blow-off Plug NPT	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼	2	2	2	2	2	2	2	2	2
Approx. Ship Wt. (kg)	15	16	18	27	33	65	96	196	284	310	440	600	810	890	1020	1870	2190

Specifications

Sizes (Inches):	1½, 2, 2½, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 24, 30, 36 and 48
Sizes (mm):	40, 50, 65, 80,100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 750, 900, 1200
Ends:	Flanged, ANSI Class 150 and 300 (**Note:** 300# Flanges are Raised Face)
Max Pressure Rating:	150# - 250 psi • 300# - 400 psi
Temperature:	Maximum 175°F
Materials:	
Body & Cover:	Ductile Iron ANSI B16.42; Fusion Bonded Epoxy Coating Standard
Cover Seal:	Buna-N® Synthetic Rubber
Strainer:	316 Stainless Steel; Ductile Iron, Epoxy Coated Frame
Strainer Mesh Sizes:	Standard 10 mesh / 2000 Micron / Openings 0.078 inch • Optional .039 and .059 inch openings available
Drain/Blow-Off:	Connection furnished with Standard Stainless Steel Plug
Cover Fasteners:	Stainless Steel

Model X43H Flow Chart



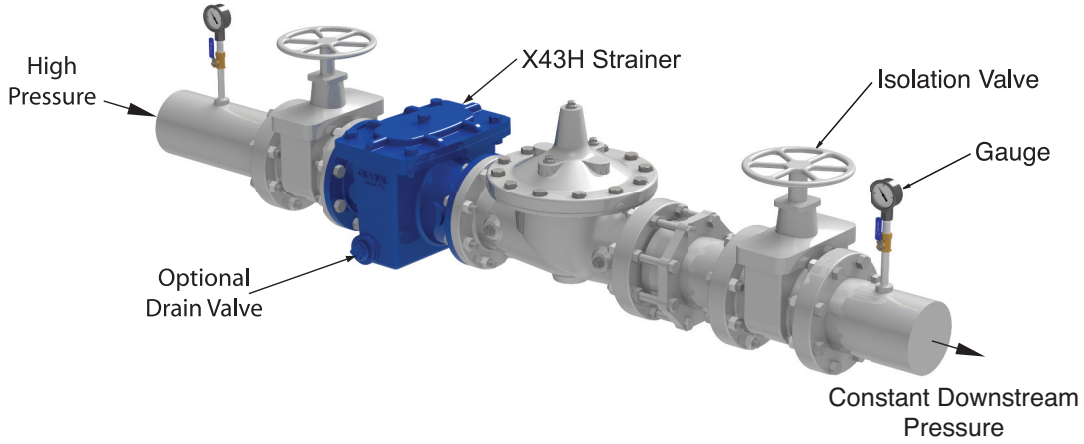
C_V Factor

Size (inches)	1 ½	2	2 ½	3	4	6	8	10	12	14	16	18	20	24	*30	*36	*48
Size (millimeters)	**40**	**50**	**65**	**80**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**600**	**750**	**900**	**1200**
C_V (Gal/Min. - gpm.)	96	150	254	367	654	1644	3922	4566	6800	8949	11692	12796	18264	26302	CF	CF	CF
C_V (Litres/Sec - l/s.)	23	36	61	88	157	395	942	1097	1634	2150	2809	3074	4388	6319	CF	CF	CF

C_V in gpm = gpm @ 1psid head loss • C_V in l/s = l/s @ 1bar head loss

*Consult factory to confirm flow data for 30-inch/750mm and larger strainers

Model X43H Strainer Typical Application



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PRODUCT SPECIFICATIONS

A2361 RESILIENT WEDGE GATE VALVES, 350psi

Mueller Co.
Reliable Connections®

1. General Classification

1.1 Mueller® Resilient Wedge Gate Valves comply with ANSI/AWWA C515.

1.2 Mueller Resilient Wedge Gate Valves are approved by Factory Mutual Research Corporation (FM).

1.3 Mueller Resilient Wedge Gate Valves are listed by Underwriters Laboratories, Inc. (UL). Valves with actuators are not listed.

1.4 Mueller Resilient Wedge Gate Valves are tested and certified to ANSI/NSF Standard 61 & 372.

1.5 Mueller Resilient Wedge Gate Valves are suitable for potable water applications.

1.6 Mueller Resilient Wedge Gate Valves are iron body, fully encapsulated resilient wedge type.

1.7 Mueller Resilient Wedge Gate Valves are manufactured in the U.S.A. at an ISO9001 Certified factory.

2. Size Range, Working Temperature, and Working Pressure

2.1 Sizes: 3” to 12”.

2.2 Working Temperature: 33°F minimum to 170°F maximum working temperature.

2.3 Working Pressure: 350psi for AWWA, UL and FM.

3. Type of Valve

3.1 Resilient Wedge Gate Valves are non-rising stem type.

3.2 NRS Resilient Wedge Gate Valves feature O-ring stem seals.

3.3 Resilient Wedge Gate Valves are available to either open left or open right.

3.4 Resilient Wedge Gate Valves have a 2" square wrench nut complying with AWWA C515. Optional hand wheels are available.

3.5 Resilient Wedge Gate Valves are offered with the following end connections:

3.5.1 Flanged Ends with flange drilling complying to ASME B16.1 Class 125 (ISO PN10/PN16 drilling optional). Per ANSI/AWWA C111, working pressure above 250psi requires the use of a special gasket rated for the higher pressure.

3.5.2 Mechanical Joint Ends complying with ANSI/AWWA C111/A21.11.

3.6 Resilient Wedge Tapping valves are offered with the following end connections:

3.6.1 Inlet flange machined specifically for mating with Tapping Sleeves and Crosses. Raised ring on flange face complies with MSS SP-60. Drilling complies with ASME B16.1 Class 125 flange.

3.6.2 Standard Mechanical Joint outlet connection complies with ANSI/AWWA C111/A21.11 and is precision machined for proper alignment of Mueller® Drilling Machines.

A2361 RESILIENT WEDGE GATE VALVES, 350psi

Mueller Co.
Reliable Connections®

4. MATERIAL SPECIFICATIONS

4.1 **Cap screw** – Stainless Steel Type 316.

4.2 **Wrench nut** – Ductile Iron, ASTM A-536.

4.3 **Handwheel** – Cast Iron, ASTM A-126, Class B.

4.4 **Stuffing box** – Ductile Iron, ASTM A-536.

4.5 **Stem O-rings** – Nitrile, ASTM D2000.

4.6 **Anti-friction washers** – Acetal.

4.7 **Stem** – Manganese Bronze, CDA Alloy C67600.

4.8 **Bonnet** – Ductile Iron, ASTM A-536.

4.9 **Bonnet seal** – O-ring, Nitrile, ASTM D2000.

4.10 **Stuffing box bolts & nuts** – Stainless Steel Type 316.

4.11 **Bonnet bolts & nuts** – Stainless Steel Type 316.

4.12 **Disc nut** – Bronze, ASTM B-584 Alloy C89833.

4.13 **Guide cap bearings** – Acetal.

4.14 **Disc** – 3" Cast Iron, ASTM A-126, Class B

4"-12" Ductile Iron, ASTM A-536.

4.15 **Disc encapsulated** – SBR ASTM D2000.

4.16 **Body** – Ductile Iron, ASTM A-536.

4.17 **Coating** – inside and outside of valve fully coated Mueller PRO-GARD® Fusion Bonded Epoxy - coating complies with ANSI/AWWA C550 and valve is certified to ANSI/NSF Standard 61 & 372.

5. DESIGN FEATURES

5.1 **Flow way** – fully unobstructed, oversized flow-way. The sealing mechanism is withdrawn from the flow-way in a full open position. No pockets in bottom of flow-way to trap sediment or debris. The flow-way will permit passage of full-sized shell cutters.

5.2 **Bronze Disc Nut** – on all valves.

5.3 **Anti-Friction Washers** on non-rising stem valves – located above and below the thrust collar portion of the stem to reduce friction and provide more effective conversion of operating torques into seating loads.

5.4 **Stem** for non-rising stem valves, with O-ring Seals – One O-ring is located below the thrust collar of the stem and two are located above the thrust collar, the upper most serving as a dirt seal. The O-rings and thrust collar are factory lubricated. The two primary O-rings seal the thrust collar area from outside contaminants and water, and retain an ample amount of lubricant on the thrust collar and anti-friction washers to reduce operating torque and wear.

5.5 **Stem** – The threads on the bronze stem are Acme form threads for strength and efficiency. The stem thrust collar is made integral with the stem -- and is formed by a heat upset operation.

5.6 **Upper Stem O-ring Replacement** – The two O-rings above the thrust collar of all Mueller Resilient Wedge Gate Valves can be replaced with the valve in the fully open position, under

pressure, with no leakage.

5.7 **Corrosion Resistance** – all inside and outside cast iron surfaces are coated with Mueller PRO-GARD® Epoxy Coating, 10 mils nominal. Mueller PRO-GARD® Epoxy Coating is non-toxic and imparts no taste to water. Valves comply with ANSI/AWWA C550 and are certified to ANSI/NSF Standard 61 & 372.

6. Optional Features

6.1 Mueller A-2361 350psi Resilient Wedge Gate Valves can be furnished with the following optional designs or features:

6.1.1 **Gearing** – Bevel and Spur gearing available. Bevel geared valves are for horizontal installations; spur geared for vertical. Geared valves provide an additional bearing to support the extreme end of the stem.

6.1.2 **Position indicator** – Available for NRS valves 3” and larger.

6.1.3 **Stem** – Silicon bronze - ASTM B98 C66100; 304 Stainless Steel or 316 Stainless Steel.

6.1.4 **Disc encapsulation and O-rings** – EPDM ASTM D2000.

7. Test Pressure

7.1 The pressure test on each Mueller Resilient Wedge Gate Valve meets the requirements of AWWA Standard C515 for Resilient Seated Valves.

7.1.1 Each Mueller Resilient Wedge Gate Valve is subjected to two pressure tests. The seat test is at the working pressure of AWWA valves and 1-1/2 times working pressure of UL Listed valves. Shell tests are at two times the working pressure.

7.1.2 Pressure tests at the working pressure shall show NO leakage past the seat from either side of the wedge or at the flange joints. Pressure tests at twice the working pressure shall show NO leakage through the metal or flange joints.

7.1.3 Test pressures are as follows: 525psi seat test, 700psi shell test.

Mueller Co.
Reliable Connections®

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more-info@muellercanada.com

International 1.423.490.9555
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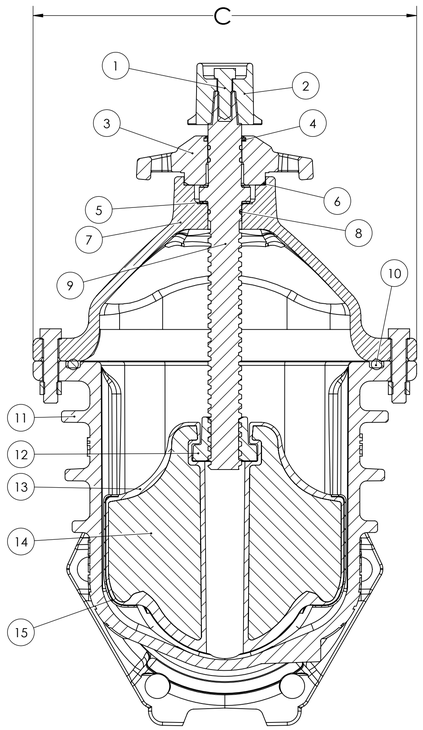
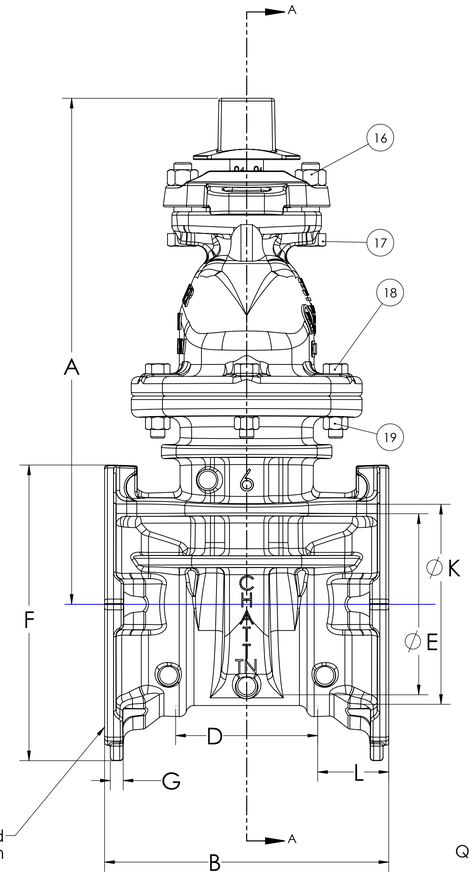
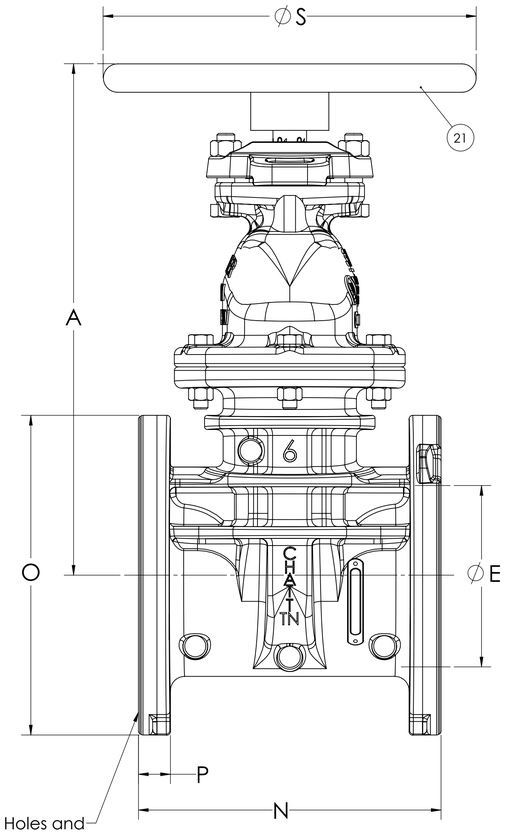


SECTION A-A - TYPICAL

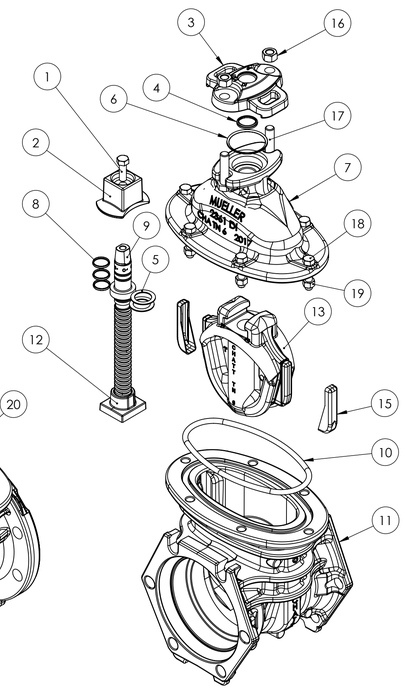


MECH JOINT ENDS - MJ x MJ



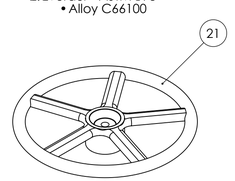
FLANGE ENDS - FL x FL

ITEM NO.	DESCRIPTION	B. QTY.	MATERIAL	ASTM	NOTES
1	Cap Screw	1		F593	Group 2 - CW
2	Wrench Nut	1	Ductile Iron	A536	
3	Stuffing Box	1	Ductile Iron	A536	
4	Wiper Ring (dirt seal)	1	Thermoplastic Polyurethane	D412/ D624 D2240/D792	HY-52D
5	Anti-friction Washer	2	Acetal		
6	Stuffing Box O-Ring	1	Nitrile Rubber		R34
7	Bonnet	1	Ductile Iron	A536	
8	Stem O-ring	3	Nitrile Rubber		R34
9	Stem	1	Bronze	‡	**See Note**
10	Bonnet O-ring	1	Nitrile Rubber		R34
11	Body MJ Ends	1	Ductile Iron	A536	
12	Stem Nut	1	Bronze	B584	C89833 / NSF 372
13	Encapsulated Disc	1	♦	D2000	**See Note**
14	Disc Casting	1	Ductile Iron	A536	
15	Guide Cap	2	Acetal		
18		2	316 Stainless Steel	F594	Group 2 - CW
19	Stuffing Box Bolts	2	316 Stainless Steel	F593	Group 2 - SH
17	Bonnet Bolts	"M"	316 Stainless Steel	F593	Group 2 - SH
16	Bonnet Nuts	"M"	316 Stainless Steel	F594	Group 2 - CW
20	Body FL Ends		Ductile Iron	A536	
21	Handwheel		Ductile Iron	A536	



♦ Rubber Encapsulated Ductile Iron Disc
Ductile Iron - ASTM A536
Rubber Options
1. SBR - ASTM D2000
2. EPDM - ASTM D2000

‡ Bronze Stem Options:
1. Manganese - ASTM B138
   • Alloy C67600
2. Everdur - ASTM B98
   • Alloy C66100



ECO# 2205739

Valve Size	A	B	C	D	ØE (Thru Ø)	F	G	H	ØJ (Bolt Circle Ø)	ØK	L	M	Turns to Open	Weight MJ x MJ	N	O	P	Q	ØR (Bolt Circle Ø)	ØS	Weight FL x FL
4	14.19	9.5	10.79	4.50	4.30	8.40	0.50	4--0.88	7.50	4.90	2.50	4	14	75	9.00	9.00	1.00	8--0.75	7.50	11	85
6	18.00	10	13.5	5.00	6.30	10.41	0.45	6--0.88	9.50	7.00	2.50	6	20.5	~~124~~	10.50	11.25	1.13	8--0.88	9.50	13	145
8	21.50	10.5	16.36	5.50	8.30	12.68	0.50	6--0.88	11.75	9.15	2.50	6	26.5	181	11.50	13.50	1.15	8--0.88	11.75	14	208
10	25.50	11.5	20	6.50	10.30	15.24	0.62	8--0.88	14.00	11.20	2.50	8	33	270	13.00	16.00	1.29	12--1.00	14.25	16	310
12	28.62	12	21	7.00	12.30	18.024	0.62	8--0.88	16.25	13.30	2.50	8	38.5	345	14.00	19.00	1.33	12--1.00	17.00	16	420

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES.
ANGULAR: ±
TWO DECIMAL: ±
THREE DECIMAL: ±

Mueller Co.

MATERIAL SEE TABLE
FINISH

	NAME	DATE
DRAWN	JMH	9/1/2016
CHECKED	AO	
ENG APPR.	MS	
MFG APPR.		
Q.A.		

DO NOT SCALE DRAWING

DESCR. 2361 RWGV 350W w/ 316 Fasteners

SIZE D | DWG. NO. 7334 | REV A

SCALE: | WEIGHT (lbs): SEE TABLE | SHEET 1 OF 1

PRODUCT SPECIFICATIONS

A-2362 RESILIENT WEDGE GATE VALVES, 2”-12”

Mueller Co.
Reliable Connections®

1. General Classification

1.1 Mueller® Resilient Wedge Gate Valves comply with ANSI/AWWA C509 where applicable.

1.2 Mueller Resilient Wedge Gate Valves are approved by Factory Mutual Research Corporation (FM).

1.3 Mueller Resilient Wedge Gate Valves are listed by Underwriters Laboratories, Inc. (UL). Valves with actuators are not listed.

1.4 Mueller Resilient Wedge Gate Valves are tested and certified to ANSI/NSF Standard 61 & 372.

1.5 Mueller Resilient Wedge Gate Valves are suitable for potable water applications.

1.6 Mueller Resilient Wedge Gate Valves are iron body, fully encapsulated resilient wedge type.

1.7 Mueller Resilient Wedge Gate Valves are manufactured in the U.S.A. at an ISO9001 Certified factory.

2. Size Range, Working Temperature & Working Pressure

2.1 **Sizes:** 2” thru 12”

2.2 **Working Temperature:** 33° F minimum to 170° F maximum.

2.3 **Working Pressure**

2.3.1 250 psi for AWWA.

2.3.2 250 psi for UL/FM.

3. Type of Valve

3.1 Mueller Resilient Wedge Gate Valves are non-rising stem or post indicator type.

3.2 Mueller NRS Resilient Wedge Gate Valves are offered with O-ring stem seals.

3.3 Mueller Resilient Wedge Gate Valves are offered to open either left or right.

3.4 Mueller Resilient Wedge Gate Valves have a 2" square wrench nut complying with AWWA C509. Optional hand wheels are available.

3.5 Mueller Resilient Wedge Gate Valves of the non-rising stem type and post indicator type are offered with the following end connections:

3.5.1 Flanged Ends (2” thru 12”) with flange drilling complying to ANSI B16.1 Class 125 (ISO PN10/PN16 drilling optional).

3.5.2 Standard Mechanical Joint Ends (2”, 3” thru 12”) for cast iron pipe or ductile iron pipe with end dimensions complying with ANSI/AWWA C111/A21.11.

3.5.3 Slip-On Joint Ends* (4” thru 12”) complete with Mueller Slip-On Gasket, complying with ANSI/AWWA C111/A21.11. Fits plain end of classes 150, 200 and 250 cast iron; ductile iron, and classes 150 and 200 cast iron O.D. PVC**.

**Design and dimensions of the joint are manufactured under license of U.S. Pipe and Foundry Company.*
***When using DI O.D. PVC pipe, the gaskets supplied by Mueller Co. must be used with this valve connection.*

3.5.4 Radial Compression Joint Ends (2” thru 8”) for I.P. size PVC pipe.

3.6 Mueller Resilient Wedge Tapping valves (2”, 3” thru 12”) have an inlet flange complying with ANSI B16.1 Class 125 and MSS SP-60, and are offered with a Standard Mechanical Joint outlet end with dimensions complying with ANSI/AWWA C111/A2.11.

A-2362 RESILIENT WEDGE GATE VALVES, 2”-12”

3.7 Mueller® Resilient Wedge Cut-In valves (4” thru 8”) have D-150 Mechanical Joint Ends with two specially designed gaskets to fit either of two diameters of Cast Iron or Ductile Iron Pipe; duck-tipped rubber gasket for Class 150 pipe, or plain rubber gasket for Class D pit cast pipe.

4. MATERIAL SPECIFICATIONS

4.1 **Cap screw –** Stainless Steel, Type 316.
4.2 **Wrench nut** – Ductile, ASTM A-536.
4.3 **Handwheel** – Cast Iron, ASTM A-126, Class B.
4.4 **Stuffing box** – Cast Iron, ASTM A-126, Class B.
4.5 **Stem O-rings** – Nitrile, ASTM D2000.
4.6 **Anti-friction washers** – Acetal Copolymer.
4.7 **Stem –** Manganese Bronze, ASTM B138 Alloy C67600.
4.8 **Bonnet** - Ductile Iron, ASTM A-536.
4.9 **Bonnet seal**
4.9.1 2” thru 3" – Flat gasket, Neoprene, ASTM D-2000.
4.9.2 4” thru 12” - O-ring, Nitrile, ASTM D-2000.
4.10 **Stuffing box bolts & nuts –** Stainless Steel, Type 316.
4.11 **Bonnet bolts & nuts** - Stainless Steel, Type 316.
4.12 **Disc nut** – Bronze, ASTM B-584 Alloy.
4.13 **Guide cap bearings** – Acetal Copolymer.
4.14 **Disc**
4.14.1 2” thru 3” sizes – Cast Iron, ASTM A-126, Class B.
4.14.2 4” thru 12” sizes – Ductile Iron, ASTM A-536.
4.15 **Disc encapsulated** – SBR ASTM D-2000.
4.16 **Body** – Ductile Iron, ASTM A-536.
4.17 **Coating** – Inside and outside of valve fully coated with Mueller PRO-GARD® Fusion Bonded Epoxy. Coating complies with ANSI/AWWA C550 and is certified to ANSI/NSF Standard 61 & 372.

5. DESIGN FEATURES

5.1 **Fully unobstructed, oversized flow-way** – the sealing mechanism is withdrawn from the flow-way in a full open position. No pockets in bottom of flow-way to trap sediment or debris. The flow-way will permit passage of full-sized shell cutters.
5.2 **Bronze Disc Nut** - all valves.
5.3 **Anti-Friction Washers on non-rising stem valves** – Located above and below the thrust collar portion of the stem to reduce friction and provide more effective conversion of operating torques into seating loads.

5.4 **Stem for non-rising stem valves, with O-ring Seals** – One O-ring is located below the thrust collar of the stem and two are located above the thrust collar, with the uppermost serving as a dirt seal (4” thru 12”). The O-rings and thrust collar are factory lubricated. The two primary O-rings seal the thrust collar area from outside contaminants and water, and retain an ample amount of lubricant on the thrust collar and anti-friction washers to reduce operating torque and wear.

5.5 **Stem** – The threads on the bronze stem are Acme form threads for strength and efficiency. The stem thrust collar is made integral with the stem -- and is formed by a heat upset operation.

5.6 **Upper Stem O-ring Replacement** – The two O-rings above the thrust collar of all Mueller® Resilient Wedge Gate Valves can be replaced with the valve in the fully open position, under pressure, with no leakage.

5.7 **Corrosion Resistant** – all inside and outside cast iron surfaces are coated with Mueller PRO-GARD® Fusion Bonded Epoxy Coating, 10 mils nominal. Mueller PRO-GARD® Fusion Bonded Epoxy Coating is non-toxic, imparts no taste to water, and complies with ANSI/AWWA C550. Valves are certified to ANSI/NSF Standard 61 & 372.

6. OPTIONAL FEATURES

6.1 Mueller 2362 Resilient Wedge Gate Valves can be furnished with the following optional designs or features:

6.1.1 **Gearing** – Bevel and Spur gearing available on 3” thru 12” valves. Bevel-geared valves are for horizontal installations; spur-geared for vertical. Geared valves provide an additional bearing to support the extreme end of the stem.

6.1.2 **Position indicator** – Available for NRS valves 3” and larger.

6.1.3 **Stem** – Silicon bronze - ASTM B98 C66100; 304 Stainless Steel or 316 Stainless Steel.

6.1.4 **Disc encapsulation & O-rings** – EPDM ASTM D2000.

7. TEST PRESSURE

7.1 The pressure test on each Mueller Resilient Wedge Gate Valve meets the requirements of AWWA Standard C509 for Resilient Seated Valves.

7.1.1 Each Mueller Resilient Wedge Gate Valve is subjected to two pressure tests. The seat test is at the working pressure of AWWA valves and 1-1/2 times working pressure of UL Listed valves. Shell tests are at 2 times the working pressure.

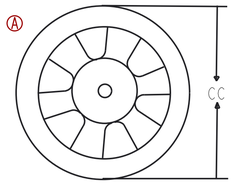
7.1.2 Pressure tests at the working pressure shall show NO leakage past the seat from either side of the wedge or at the flange joints. Pressure tests at twice the working pressure shall show NO leakage through the metal or flange joints.

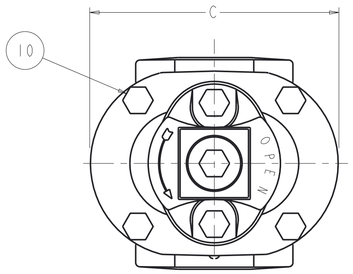
7.1.3 Test pressures are as follows: 300 psi seat test, 500 psi shell test.

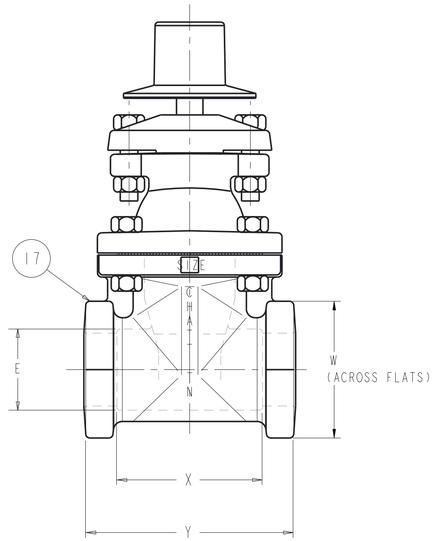
Water (U.S.) 1.800.423.1323
www.muellercompany.com
moreinfo@muellercompany.com

Mueller Canada 1.705.719.9965
www.muellercanada.com
more-info@muellercanada.com

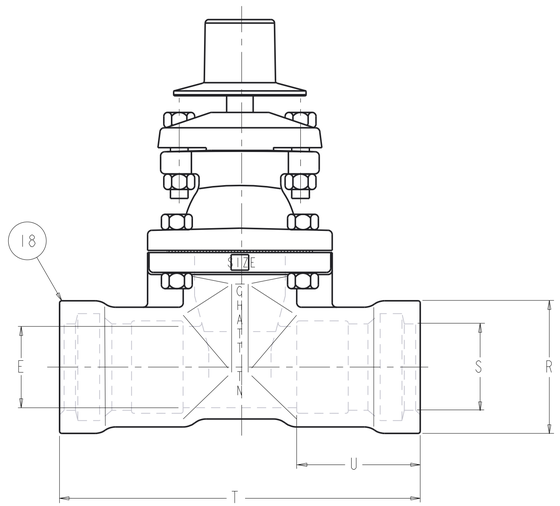
International 1.423.490.9555
www.mueller-international.com
international@muellercompany.com







SCREW ENDS

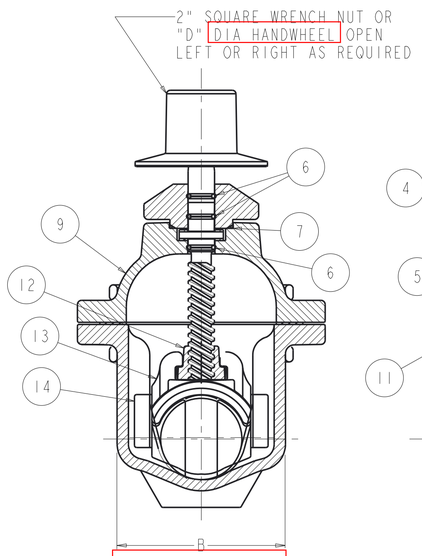


RADIAL ENDS

PART LIST					
ITEM	DESCRIPTION	REQ'D	MATEIAL	ASTM	
1	CAP SCREW	1	316 STAINLESS STEEL	F593	GROUP 2-CW
2	WRENCH NUT	1	DUCTILE IRON	A536	
3	STEM	1	BRONZE	B138	ALLOY C67600
4	STUFFING BOX	1	CAST IRON (SEE NOTE 2)	A126	CLASS B
5	STUFFING BOX BOLT STUFFING BOX NUT	2	316 STAINLESS STEEL 316 STAINLESS STEEL	F593 F594	GROUP 2-CW GROUP 2-CW
6	O-RING	3	RUBBER		NITRILE
7	O-RING	1	RUBBER		NITRILE
8	ANTI-FRICTION WASHER	2	ACETAL		
9	BONNET	1	DUCTILE IRON	A536	
10	BONNET BOLT BONNET NUT	"Z"	316 STAINLESS STEEL 316 STAINLESS STEEL	F593 F594	GROUP 2-CW GROUP 2-CW
11	BONNET GASKET	1	RUBBER	D2000	NEOPRENE
12	DISC NUT	1	BRONZE	B62	
13	DISC	1	SEE NOTE 1 & 2		
14	GUIDE CAP	2	ACETAL		
15	BODY - FLANGE ENDS	1	DUCTILE IRON	A536	
16	BODY - M.J. ENDS	1	DUCTILE IRON	A536	
17	BODY - SCREW ENDS	1	DUCTILE IRON	A536	
18	BODY - PVC ENDS	1	DUCTILE IRON	A536	

1. RUBBER ENCAPSULATED CAST IRON DISC
   CAST IRON - ASTM A126 CLASS B
   RUBBER - SBR - ASTM D2000

2. MANUFACTURER'S OPTION TO UPGRADE MAT'L
   TO DI - A536 GR 65-45-12 OR 70-50-05



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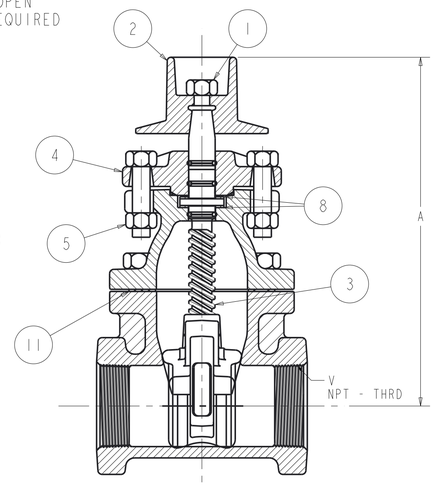

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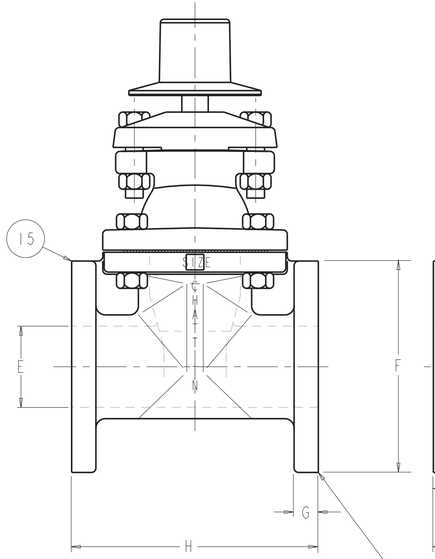
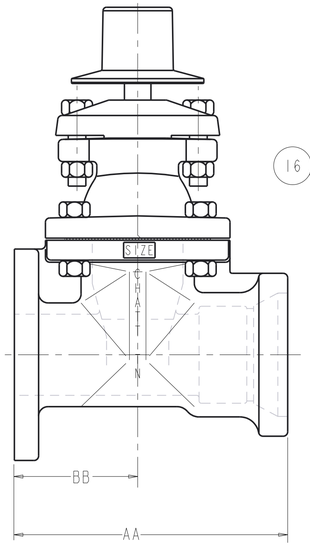
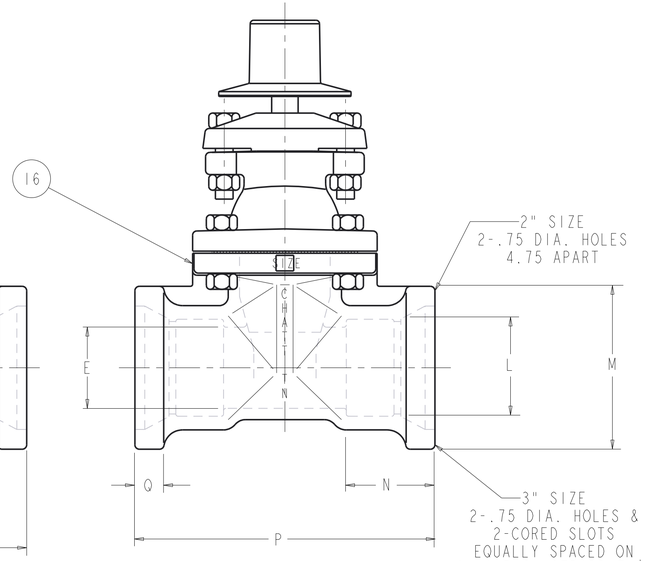


FLANGE ENDS



FLANGE x MECH. JOINT ENDS



MECH. JOINT ENDS

* MUELLER DOES NOT OFFER A 2.5" FL X MJ VALVE

DIMENSIONS - INCHES (ths drawing only)																											
VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC Ⓐ	TURN TO OPEN
2	9.88	4.77	7.02	6.00	2.30	6.00	.69	7.00	4 - .75	4.75	2.61	4.62	2.50	8.50	.81	3.75	2.44	10.25	3.50	2 - 11.5	3.88	4.12	5.88	4	8.39	4.36	6.00	8
2.5	12.38	6.01	8.63	6.00	2.80	7.00	.75	7.50	4 - .75	5.50	N/A	N/A	N/A	N/A	N/A	4.44	2.93	12.24	3.69	2.5 - 8	4.38	4.12	6.76	6	N/A *	N/A *	8.00	11
3	12.38	6.01	8.63	6.00	3.30	7.50	.80	8.00	4 - .75	6.00	4.08	7.50	2.50	9.62	.94	5.16	3.56	11.75	4.12	3 - 8	5.12	5.12	6.88	6	8.80	4.55	8.00	11

Ⓐ ECO 180391 3
ADDED HAND WHEEL
AO 4/25/17
ECO 178689

DR BY	AO	3/28/17	UNLESS OTHERWISE NOTED BREAK CAST CORNER(S) BREAK MACH CORNER(S)
CHKR	BB	3/28/17	
ENGR	MS	3/28/17	
MGR			TOLERANCES UNLESS OTHERWISE NOTED LINEAR ± ANGULAR ±
MFG			
TOOL			
FDRY			

THIRD ANGLE PROJECTION | C.B. NO.
PURCH. NO | FINISH ASSY | PATT. NO.
REF. NO. | SCALE NONE
STK. NO.
MAT'L NOTED

Mueller Co.

DESCR: 2IN - 3IN RWGV
A-2362-6,-8,-23, & -27
NRS - AWWA - 250W - 500 TEST

NUMBER 7399

7399

DJ400 DISMANTLING JOINT 3" - 12"
CLASS "E" FLANGE

SUBMITTAL INFORMATION

MATERIALS

FLANGED SPOOL
AWWA C207 Class E Steel Ring Flange, compatible with ANSI Class 125 and 150 bolt circles. Pipe is STD weight class per ASTM A53.

END RING AND BODY
The end ring and body are made from ASTM A536 65-45-12 Ductile Iron.

GASKETS
Compounded for water and sewer service meeting the requirements of ASTM D 2000. Other compounds available on request.

BOLTS AND NUTS
ASTM A588 HSLA bolt material. Stainless Steel, Types 304 or 316 is optional.

TIE RODS
High tensile steel per ASTM A193 grade B7. Stainless steel, type 304 or 316 is optional.

COATINGS
Fusion bonded epoxy, NSF 61 certified. All surfaces are coated, including flange faces.

PRESSURE

When properly installed on a pipe that is within the coupling manufacturer's tolerances, Romac style DJ400 can work at pressures up to the maximum rating of the flange. AWWA Class E flanges are rated for 275 psi. Higher working pressures can be accommodated. Consult your representative.

ASSEMBLY TOLERANCE

Two inch adjustment see catalog. For a different length, contact Romac Engineering.

SIZE

3" – 12", See drawing B2114-A. Larger sizes available on request.

STANDARD

The DJ400 meet the specifications set forth in the AWWA C219 Standard.

1/17
Document # 20-8-0028

This information is based on the best data available at the date printed above. Please check with Romac for any updates or changes.

ROMAC INDUSTRIES, INC.
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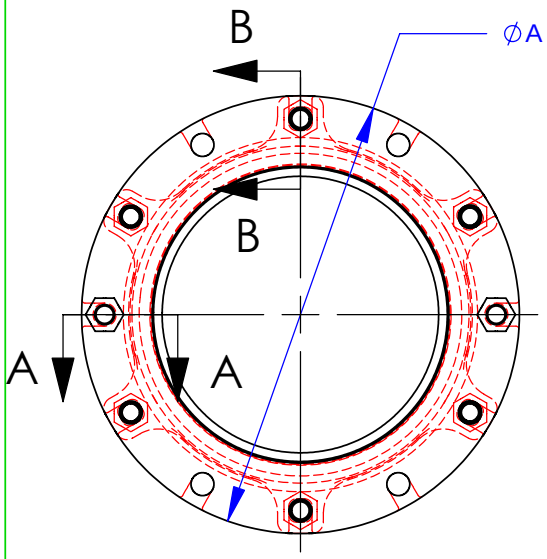
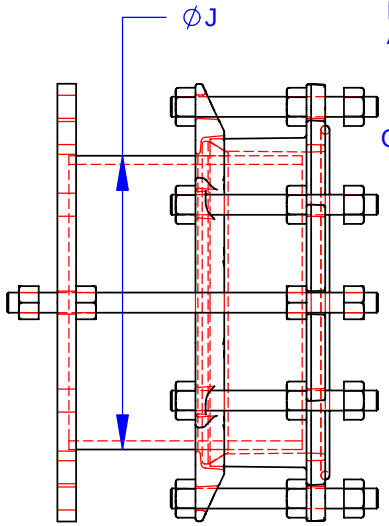
21919 20th Avenue SE • Suite 100 • Bothell, WA 98021
Phone (425) 951-6200 • 1-800-426-9341 • Fax (425) 951-6201

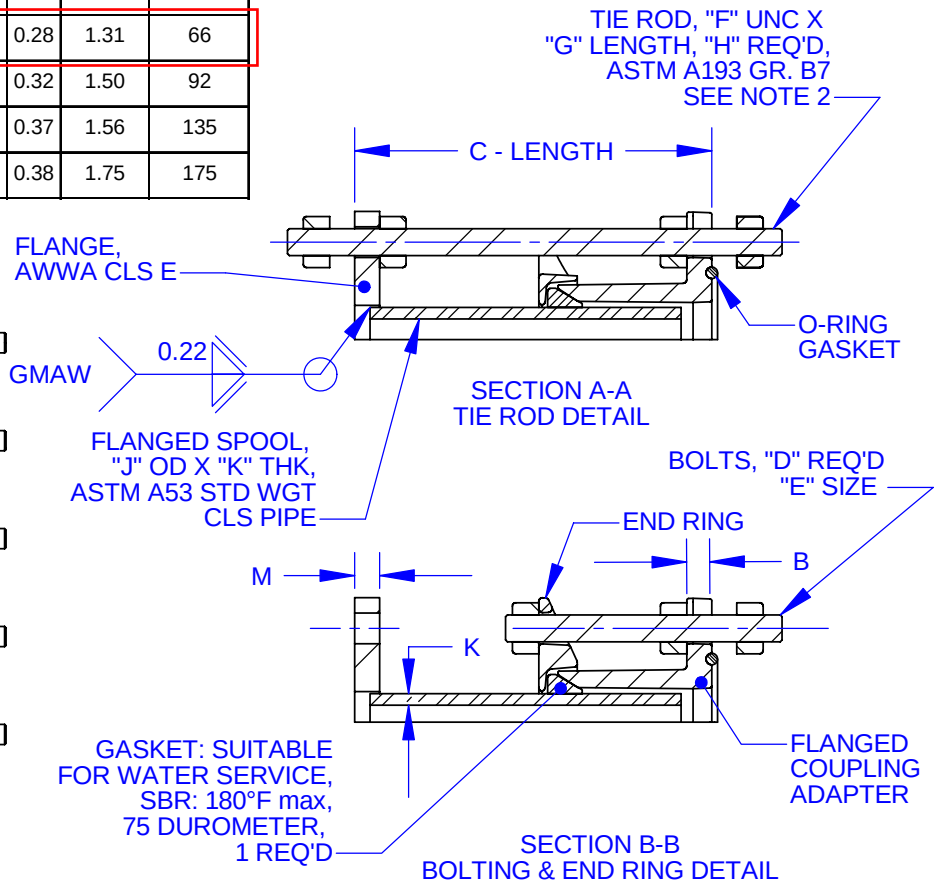
B2114-A

NOM SIZE	DIMENSIONS					BOLTS		TIE RODS				SPOOL			APPROX. WEIGHT
	FLANGE OD	FCA FLANGE THK	C - LENGTH			QTY	SIZE	SIZE	LENGTH	STEEL QTY	SS QTY	OD	THK	FLANGE THK	
	A	B	NOM.	MIN.	MAX.	D	E	F	G	H	H	J	K	M	LBS
3	7.50	0.60	9.00	8.00	10.00	4	5/8 - 11	5/8 - 11	14.50	2	2	3.50	0.22	0.94	35
4	9.00	0.60	9.00	8.00	10.00	4	5/8 - 11	5/8 - 11	14.50	2	2	4.50	0.24	1.13	44
6	11.00	0.63	9.38	8.38	10.38	4	3/4 - 10	3/4 - 10	16.00	2	2	6.63	0.28	1.31	66
8	13.50	0.63	9.38	8.38	10.38	4	3/4 - 10	3/4 - 10	16.00	2	2	8.63	0.32	1.50	92
10	16.00	1.24	11.50	10.50	12.50	6	5/8 - 11X 7/8 - 9	7/8 - 9	18.75	2	4	10.75	0.37	1.56	135
12	19.00	1.25	11.50	10.50	12.50	6	7/8 - 9	7/8 - 9	18.75	2	4	12.75	0.38	1.75	175

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
1	ADDED O-RING, REMOVED EXTRA FLANGES	4-Feb-03	NST III
2	ADDED SS TIE ROD COLUMN	15-Mar-05	NST III
3	ADDED NOTE 6 AND WELD SYMBOL	26-Jun-06	NST III







NOTES:

1. COATING: CUSTOMER SPECIFIED. ROMAC NSF 61 SHOPCOAT PAINT OR NSF 61 CERTIFIED FUSION BONDED EPOXY.
2. FASTENERS: CUSTOMER SPECIFIED. HSLA PER ASTM A588 OR STAINLESS STEEL TYPE 304 (ASTM A193 B8) OR 316 (ASTM A193 B8M).
3. PRESSURE RATED UP TO FLANGES PROVIDED; 3" -12" AWWA CLS E 275 PSIG WORKING, 413 PSIG TEST.
4. WHEN INSTALLING, POSITION THE FLANGED COUPLING END IN THE REQUIRED LOCATION & THEN FOLLOW BOLTING INSTRUCTIONS.
5. NOT INTENDED TO PROVIDE LATERAL MOVEMENT IN PIPELINE.
6. ALL WELDING PERFORMED IN ACCORDANCE WITH AWS D1.1

SIGNATURES		DATE
DRWN	DEL EATON	2 DEC 02
CHECKED	GEORGE DENISON	2 DEC 02
ISSUED		
ENGRG	NIELS THOGERSEN	20 DEC 02

MATERIAL:
ASTM
A536 - DUCTILE IRON
A53 - PIPE

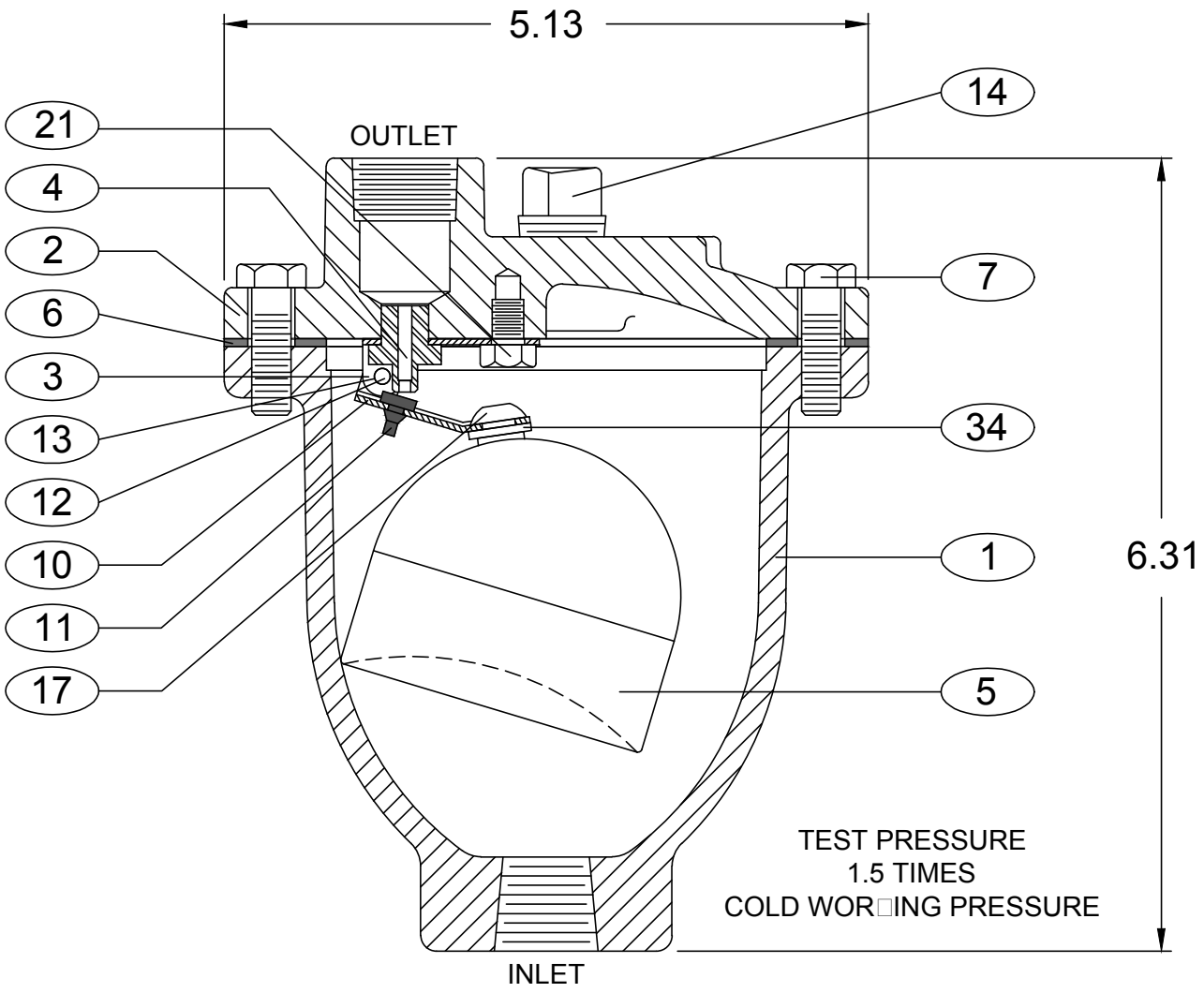
ROMAC IND. INC.,
SEATTLE, WA

TITLE: DISMANTLING JOINT
DJ400 - W/ TIE RODS
3" - 12", CLS E FLANGE

SIZE	DWG. NO.	REV. NO.
A	B2114-A	3

SCALE: NTS

SHEET 1 OF 1



SEE DRAWING NO. VM-22SV-M FOR MATERIALS OF CONSTRUCTION
SEE DRAWING NO. VM-22DISV-M FOR MATERIALS OF CONSTRUCTION

VALVE SI□E	MODEL NUMBER	INLET SI□E	OUTLET SI□E	MAX. W.P. P.S.I.	ORIFICE SI□E
1/2" - 3/4"	22.4SV *	3/4" NPT	1/2" NPT	175	3/32"
1"	22.3SV	1" NPT	1/2" NPT	175	3/32"
1/2"	22.7SV	1/2" NPT	1/2" NPT	300	1/16"
3/4"-1"	22.9SV *	1" NPT	1/2" NPT	300	1/16"

* THE VALVE BODY IS THREADED FOR THE INLET NOTED AND REDUCER BUSHINGS ARE PROVIDED FOR THE SMALLER VALVE SI□ES INDICATED.

1	BODY
2	COVER
3	LEVER FRAME
4	SEAT
5	FLOAT
6	GAS□ET
7	COVER BOLT
10	FLOAT ARM
11	ORIFICE BUTTON
12	PIVOT PIN
13	RETAINING RING (NOT SHOWN)
14	PIPE PLUG
17	FLOAT RETAINER
21	LOCATOR
34	LOC□ WASHER

Revised 8-26-15 (Rev 2)

AIR RELEASE VALVE

DATE 1-24-11

VAL-MATIC® VALVE AND MANUFACTURING CORP.

DRWG. NO. VMC-22SV

AIR RELEASE VALVE

SERIES NO. 22

DI SUPER VALVE MATERIALS OF CONSTRUCTION

PART NO.	PART NAME	MATERIAL
1	BODY	DUCTILE IRON ASTM 536, GRADE 65-45-12
2	COVER	DUCTILE IRON ASTM 536, GRADE 65-45-12
3	LEVER FRAME	STAINLESS STEEL T316, ASTM A240
4	SEAT	STAINLESS STEEL T316, ASTM A276
5	FLOAT	STAINLESS STEEL T316, ASTM A240
6	GASKET	COMPRESSED NON-ASBESTOS FIBER
7	COVER BOLT	STAINLESS STEEL T316, ASTM F593
10	FLOAT ARM	STAINLESS STEEL T316, ASTM A240
11	ORIFICE BUTTON	VITON
12	PIVOT PIN	STAINLESS STEEL T316, ASTM A479
13	PIN RETAINER	STAINLESS STEEL PH 15-7 MO
14	PIPE PLUG	STAINLESS STEEL
17	FLOAT RETAINER	STAINLESS STEEL T316, ASTM F879
21	LOCATOR	STAINLESS STEEL T316, ASTM F593
34	LOCK WASHER	STAINLESS STEEL T316, ASTM A240

NOTE: ALL SPECIFICATIONS AS LAST REVISED.

FUSION BONDED EPOXY (FBE) COATING

General Description:

Fusion Bonded Epoxy is a one-part, heat cured, thermosetting epoxy coating that is applied as a dry powder to the sandblasted surface of a pre-heated valve and then fused and cured in a high-temperature oven. The result is a durable coating with exceptional abrasion and chemical resistance ideally suited for valves in water and wastewater applications.

Advantages of FBE:

1. The coating is applied in accordance with AWWA Standard C550 “Protective Epoxy Coatings for Valves and Hydrants” and certified by to the requirements of ANSI/ NSF Standard 61 - “Drinking Water System Components - Health Effects” for coating valves and fittings.
2. FBE coatings are applied in an automated one-part process so that the mixing, surface preparation, and multiple-coat problems associated with liquid paints are eliminated.
3. The electrostatic application process for FBE provides a smooth, even coating thickness with no runs, sags, or thin spots common with applying liquid paints.
4. FBE coatings are durable and provide twice the impact strength of liquid epoxies. The surface provides high abrasion resistance and has become a standard seating material for resilient gate and check valves.
5. FBE has a long-term performance history in water and sewage environments including salt water, slurries, methane and hydrogen sulfide exposure.

Application Process:

1. FBE is applied in an automated manufacturing process in accordance with the coating manufacturers’ procedures and industry standards to assure consistency and high quality.
2. The valve is cleaned, sandblasted, and preheated in an oven.
3. An electrical charge is applied to the body and the powder is deposited over the surfaces of the valve to the specified thickness.
4. The epoxy is post cured in an oven to cure specifications and allowed to air cool to room temperature.
5. The final surface is visually and electrically (when specified) tested to verify thickness and that it is holiday free.

Typical Performance Characteristics:

1.	Color:	Blue	
2.	Thickness	12-20 mils	1 Coat
3.	Gloss at 60 deg:	60-80 units	Din 67 530
4.	Impact Resistance	>5 Joule (44 in-lb)	Din 30 677-2
5.	Elongation:	>5%	Din 30 671
6.	Hardness:	>100	Din 53 153
7.	Water Immersion:	No visible change	90C, 672 Hours
8.	Salt Spray Test:	>3000 hours	Din 53167
9.	Adhesion:	16 Mpa (2320 psi)	7 days, 90C EN 24 624

Revised 2-15-17

FUSION BONDED EPOXY (FBE) COATING	DATE 7-17-02
VAL-MATIC® VALVE AND MANUFACTURING CORP.	DRWG. NO. SS-1847

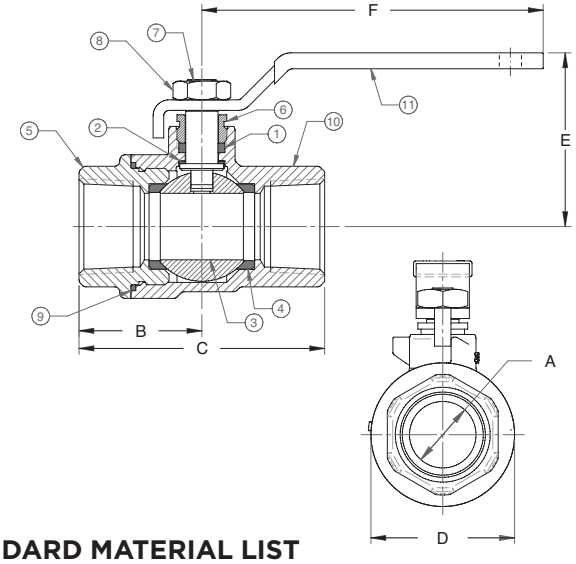
76F-100-A SERIES

STAINLESS STEEL FULL PORT BALL VALVE

Female NPT Thread, 1/4"-3" 1000 CWP (psig), Cold Non-Shock. (See referenced P/T chart)
150 psig Saturated Steam.
Vacuum Service to 29 inches Hg.
MSS SP-110 Compliant.
Designed, cast, machined, assembled, and 100% factory tested in USA.

FEATURES

- Investment cast components
- Reinforced seats
- Blowout-proof stem design
- Adjustable packing gland
- Stainless steel lever and nut



STANDARD MATERIAL LIST

	PART	MATERIAL
1	Stem packing	MPTFE
2	Stem bearing	RPTFE
3	Ball	A276-316SS (1/4" to 2", except 1.25") A276-316SS or A351-CF8M stainless (1.25") A351-CF8M stainless (3")
4	Seat (2)	RPTFE (2" & smaller); RTFM (3")
5	Retainer	ASTM A276-316SS (1/4" & 3/8") ASTM A351-CF8M stainless (1/2" to 3")
6	Gland	A276-316 Stainless Steel
7	Stem	A276-316 Stainless Steel
8	Lever nut	304 Stainless Steel
9	Body Seal	RPTFE (1/2" to 3")
10	Body	A351-CF8M
11	Lever and grip	SS w/vinyl

DIMENSIONS

PRODUCT NO.	SIZE	A	B	C	D	E	F	WT.
76F-101-01	1/4"	0.37	0.95	1.91	1.12	1.60	3.85	0.47
76F-102-01	3/8"	0.37	0.95	1.91	1.12	1.60	3.85	0.44
76F-103-01A	1/2"	0.50	1.21	2.35	1.27	1.73	3.85	0.57
76F-104-01A	3/4"	0.81	1.39	2.77	1.62	1.96	3.85	0.91
76F-105-01A	1"	1.00	1.67	3.34	2.00	2.27	4.75	1.38
76F-106-01A	1.25"	1.25	1.96	3.92	2.73	3.21	7.77	4.17
76F-107-01A	1.5"	1.50	2.05	4.10	2.92	3.31	7.77	4.69
76F-108-01A	2"	2.00	2.37	4.74	3.75	3.69	7.77	6.90
76F-100-01A	3"	3.00	3.70	7.40	5.68	5.23	10.00	22.40

- Fire safe to API 607 (requires -24 suffix)
- Meets NACE MR0175 (2000) & MR0103 (2012)
- CSA CGA 3.16-M88 (Requires "GS" suffix)
- NSF/ANSI 61 Section 8, Annex G (1/4" to 2")
- NSF/ANSI 372 - Drinking Water System Components - Lead Content

OPTIONS AVAILABLE

(MORE INFORMATION IN SECTION J)

- Minimum quantities apply
- To specify an option, replace the "01" standard suffix with the suffix of the option.
- To specify multiple options, replace the "01" suffix with the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.

(SUFFIX)	OPTION	SIZES
-01	Standard Configuration	All
-P -01-	BSPP (Parallel) Thread Connection	1/2" to 2"
-T -01-	BSPT (Tapered) Thread Connection	1/2" to 3"
-02-	Stem Grounded	1/2" to 3"
-04-	2.25" Stem Extension (Carbon Steel, Zinc Plated)	1/2" to 2"
-08-	90º Reversed Stem	1/2" to 2"
-11-	Therma-Seal™ Insulating Tee Handle	1/4" to 2"
-14-	Side Vented Ball (Uni-Directional)	3/8" to 3"
-24-	Graphite packing, PTFE body seal, RPTFE bearing (Fire Safe API 607, 6th edition, ISO 10497:2010)	1/2" to 3"
-27-	SS Latch-Lock Lever & Nut	3/8" to 3"
-30-	Cam-Lock and Grounded	1/2" to 2"
-32-	SS Tee Handle & Nut	1/2" to 2"
-35-	PTFE Trim	3"
-39-	SS Hi-Rise Locking Wheel Handle, SS Nut	1/2" to 2"
-40-	Cyl-Loc and Grounded	1/2" to 2"
-44-	Seal Welded	1/4" to 3"
-45-	Less Lever & Nut	1/2" to 3"
-46-	Latch Lock Lever - Lock in Closed Position Only	1/2" to 2"
-47-	SS Latch Lock Oval Handle	1/2" to 2"
-48-	SS Oval Handle (No Latch) & Nut	1/4" to 2"
-49-	No Lubrication. Assembled Dry.	1/2" to 3"
-50-	2.25" CS Locking Stem Extension	1/2" to 2"
-56-	Multifill Seats & Packing	1/2" to 3"
-57-	Oxygen Cleaned	1/4" to 3"
-60-	Static Grounded Ball & Stem	1/2" to 3"
-GS	CSA CGA 3.16 (RTFE Seat - All sizes)	All

Pressure/Temperature Ratings - Page M-12, Graph No. 8

**LEAD FREE: The wetted surfaces of this product shall contain no more than 0.25% lead by weighted average. Complies with Federal Public Law 111-380. ANSI 3rd party approved and listed.*

REV. 14FEB18

FLOW DATA

FLOW DATA

The listed C_v "factors" are derived from actual flow testing, at Apollo's Pageland, South Carolina factory. These tests were completed using standard "off the shelf" valves with no special preparation and utilizing standard schedule 40 pipe. It should be understood that these factors are for the valve only and also include the connection configuration. The flow testing is done utilizing water as a fluid media and is a direct statement of the gallons of water flowed per minute with a 1 psig pressure differential across the valve/connection unit. Line pressure is not a factor. Because the C_v is a factor, the formula can be used to estimate flow of most media for valve sizing.

FLOW OF LIQUID

$$Q = C_V \sqrt{\frac{\Delta P}{SpGr}}$$

$$\text{or } \Delta P = \frac{(Q)^2\,(SpGr)}{(C_v)^2}$$

WHERE:

- Q = Flow in US gpm
- ΔP = Pressure drop (psig)
- SpGr = Specific gravity at flowing temperature
- C_v = Valve constant

FLOW OF GAS

$$Q = 1360\, C_V \sqrt{\frac{(\Delta P)\,(P_2)}{(SpGr)\,(T)}}$$

$$\text{or } \Delta P = \frac{5.4 \times 10^{-7}\,(SpGr)\,(T)\,(Q)^2}{(Cv)^2\,(P_2)}$$

WHERE:

- Q = Flow in SCFH
- ΔP = Pressure drop (psig)
- SpGr = Specific gravity (based on air = 1.0)
- P2 = Outlet pressure–psia (psig + 14.7)
- T = (temp. °F + 460)
- C_v = Valve constant

CAUTION: The gas equation shown, is valid at very low pressure drop ratios. The gas equation is NOT valid when the ratio of pressure drop (ΔP) to inlet pressure (P1) exceeds 0.02.

NOTE: Only use the gas equation shown if (P1-P2)/P1 is less than 0.02.

CV FACTORS FOR APOLLO® VALVES (CONTINUED ON M-4)

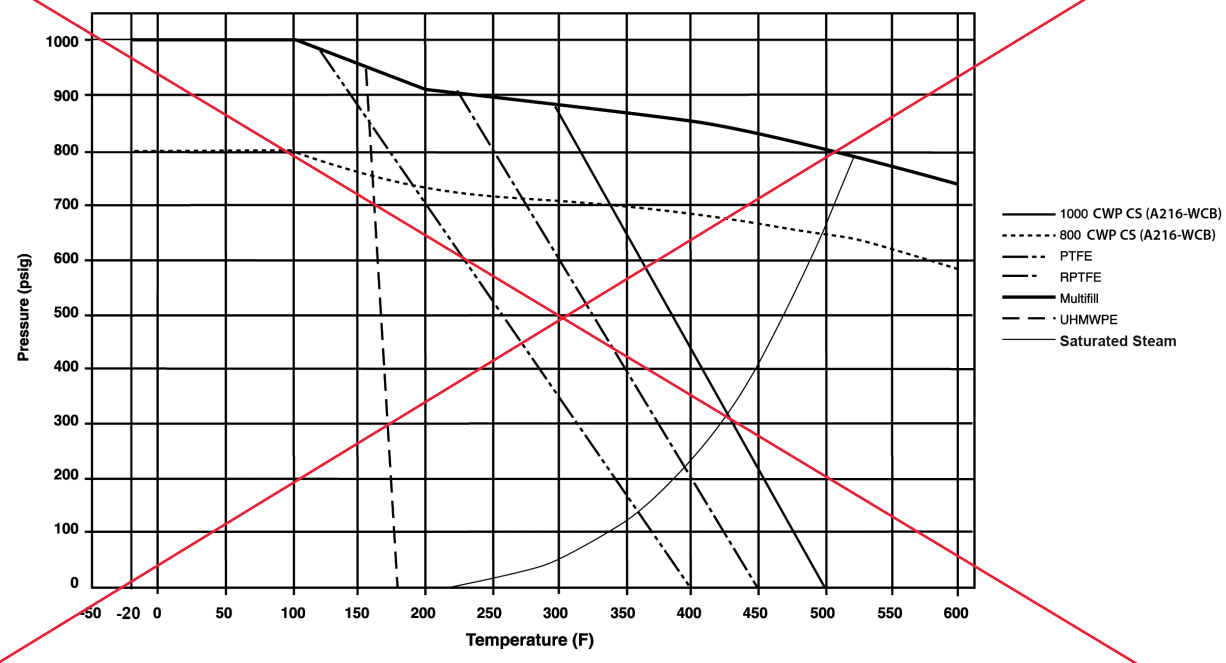
VALVE	SIZE (IN.)														
	1/4	3/8	1/2	3/4	1	1.25	1.5	2	2.5	3	4	6	8	10	12
70B-140 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
70-100/200 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	---
70-300/400 Series	--	--	15	30	43	48	84	108	--	--	--	--	--	--	--
70-600 Series	2.3	4.5	5.4	12	14	21	34	47	--	--	--	--	--	--	--
70-800 Series	8.4	7.2	15	30	43	48	84	--	--	--	--	--	--	--	--
71-AR Series	--	--	--	30	43	48	84	108	190	370	--	--	--	--	--
71-100/200 Series	--	--	--	30	43	48	84	108	190	370	--	--	--	--	--
72-100/900 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
72-1xx-A/72-9xx-A Series	--	--	26	48	65	125	170	245	--	--	--	--	--	--	--
73A-100 Series	8.4	7.2	15	30	43	48	84	108	--	--	--	--	--	--	--
73-300/400 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
74-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
75-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76F-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76FJ-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76FK-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76-300/400 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
76-600 Series	2.3	4.5	5.4	12	14	21	34	47	--	--	--	--	--	--	--
76J-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76J-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76K-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76K-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
7K-100 Series	--	--	15	51	68	125	177	389	503	--	--	--	--	--	--
77-AR Series	8.1	15	15	51	68	--	177	389	--	--	--	--	--	--	--

REV. 21APR17

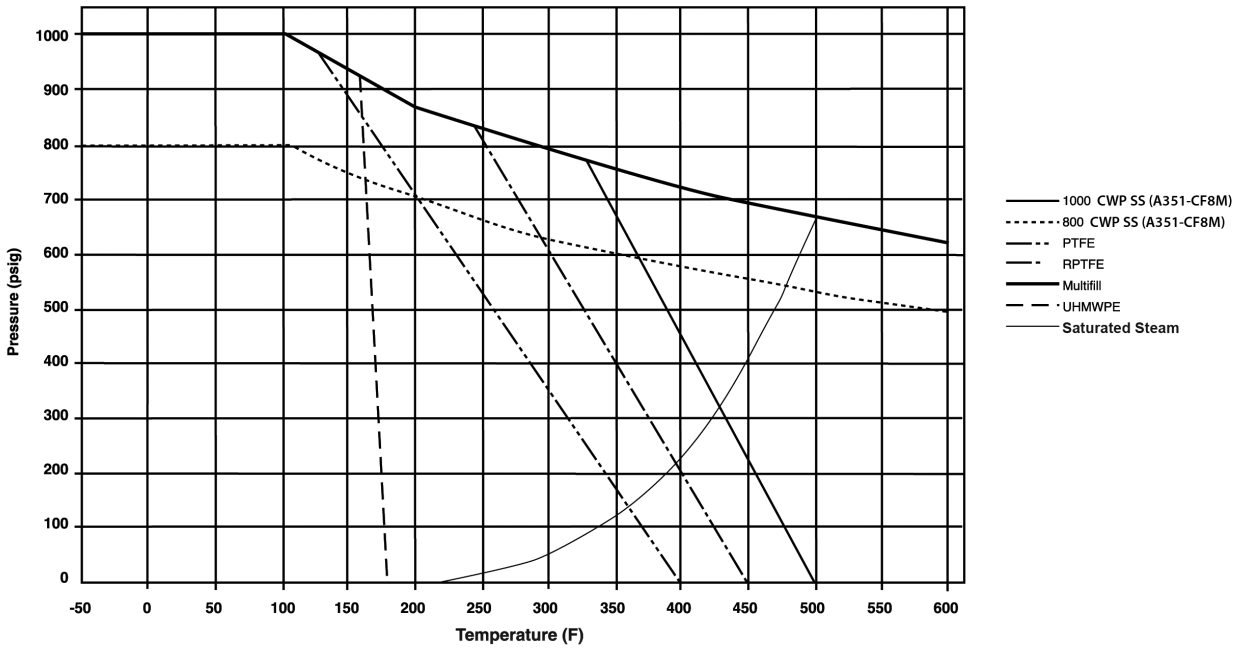
PRESSURE/TEMPERATURE RATINGS

ENGINEERING DATA

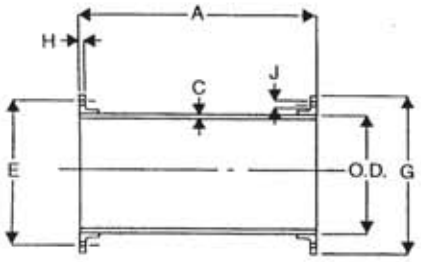
1000 CWP (CS) ASTM A216-WCB GRAPH 7



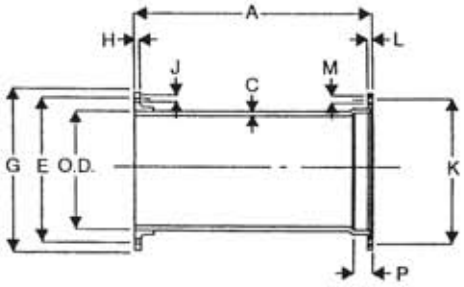
1000 CWP (SS) ASTM A351-CF8M GRAPH 8



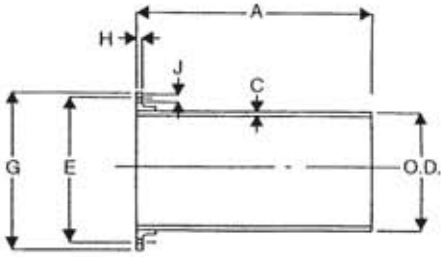
FABRICATED FLANGE PIPES



FLG. x FLG.



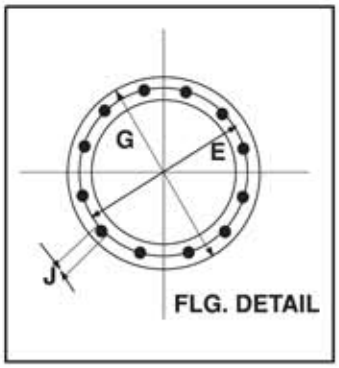
FLG. x M.J.



FLG. xP.E

SIZE	A	B	C	O.D. MIN.	O.D. MAX.	E	G	H MIN.	H MAX.	NO. OF FLG'D BOLT HOLES	J	K MIN.	K MAX.	L MIN.	L MAX.	NO. OF M.J. BOLT HOLES	M MIN.	M MAX.	P
3	•	•	0.31	3.90	4.02	6.00	7.50	0.63	0.87	4	0.75	6.13	6.25	0.88	0.94	4	0.75	0.81	2.50
4	A	A	0.32	4.74	4.86	7.50	9.00	0.82	1.06	8	0.75	7.44	7.56	0.94	1.00	4	0.875	0.935	2.50
6	S	S	0.34	6.84	6.96	9.50	11.00	0.88	1.12	8	0.875	9.44	9.56	1.00	1.06	6	0.875	0.935	2.50
8	•	•	0.36	8.99	9.11	11.75	13.50	1.00	1.24	8	0.875	11.69	11.81	1.04	1.12	6	0.875	0.935	2.50
10	•	•	0.38	11.04	11.16	14.25	16.00	1.07	1.31	12	1.00	13.94	14.06	1.11	1.19	8	0.875	0.935	2.50
12	R	R	0.40	13.14	13.26	17.00	19.00	1.13	1.37	12	1.00	16.19	16.31	1.17	1.25	8	0.875	0.935	2.50
14	E	E	0.42	15.22	15.35	18.75	21.00	1.19	1.57	12	1.125	18.69	18.81	1.19	1.31	10	0.875	0.935	3.50
16	Q	Q	0.43	17.32	17.45	21.25	23.50	1.25	1.63	16	1.125	20.94	21.06	1.26	1.38	12	0.875	0.935	3.50
18	U	U	0.44	19.42	19.55	22.75	25.00	1.37	1.75	16	1.25	23.19	23.31	1.32	1.44	12	0.875	0.935	3.50
20	I	I	0.45	21.52	21.65	25.00	27.50	1.50	1.88	20	1.25	25.44	25.56	1.38	1.50	14	0.875	0.935	3.50
24	R	R	0.47	25.72	25.85	29.50	32.00	1.69	2.07	20	1.375	29.94	30.06	1.50	1.62	16	0.875	0.935	3.50
30	E	E	0.51	31.94	32.08	36.00	38.75	1.87	2.37	28	1.375	36.82	36.94	1.69	1.81	20	1.125	1.185	4.00
36	D	D	0.58	38.24	38.38	42.75	46.00	2.13	2.63	32	1.625	43.69	43.81	1.88	2.00	24	1.125	1.185	4.00
42	•	•	0.65	44.44	44.58	49.50	53.00	2.37	2.87	36	1.625	50.56	50.68	1.88	2.00	28	1.375	1.435	4.00
48	•	•	0.72	50.74	50.88	56.00	59.50	2.50	3.00	44	1.625	57.44	57.56	1.88	2.00	32	1.375	1.435	4.00
54	•	•	0.81	57.40	57.64	62.75	62.75	2.75	3.25	44	1.875	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
60	•	•	0.83	61.51	61.65	69.25	73.00	2.87	3.37	52	2.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
64	•	•	0.87	65.57	65.71	76.00	80.00	3.13	3.63	52	2.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

1. Tolerance on length of FLG. x FLG. and FLG. x M.J. pipe shall be ± 0.125".
2. Tolerance on length of FLG. x P.E. shall be ± 0.25"/
3. Above material shall meet all applicable sections of ANSI A21.10, A21.15, A21.51, B2.1, B16.1/ AWWA, C110, C115, C150, C151, and all revisions thereto.
4. Flanged pipe shall be ductile iron pipe with ductile iron flanges threaded on.
5. Flange pipe is provided with cement lining per AWWA C104/A21.4. If other linings are required, contact your local sales representative.
6. The mechanical joint bell for 30" & 36" sizes of ductile iron pipe have thicknesses different from those shown in ANSI A21.11, which are based on gray iron pipe. These reduced thicknesses provide a lighter-weight bell which is compatible with the wall thickness of ductile iron pipe.
7. Submitted material only. Consult engineer for application.
8. 250 lb. faced and drilled flanges available upon request.



U.S. PIPE FABRICATION, LLC

Flanged Fittings
ANSI/AWWA C110/A21.10

1" - 64" DUCTILE IRON FLANGED FITTINGS

GENERAL SPECIFICATIONS

MATERIAL: Ductile iron per ASTM A536

PRESSURE: 250 PSI ratiing for 1" - 48" sizes ~~and 150 PSI rating for 54" - 64"~~

TESTING: In accordance with ANSI/AWWA C110/A21.10, UL and FM requirements

LAYING LENGTH: 2" - 48" sizes in accordance with ANSI/AWWA C110/A21.10 and ANSI B16.1 ~~and 54" - 64" sizes in accordance with ANSI/AWWA C153/A21.53 (fittings not listed in ANSI/AWWA have dimensions per Star design as noted in the catalog)~~

WEIGHTS: Are in pounds, unless noted otherwise and do not include accessories, cement lining and coatings

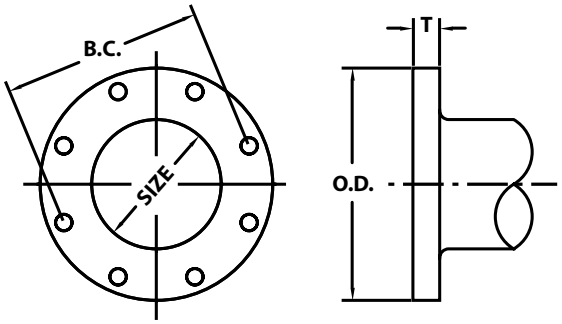
DRILLING: In accordance with ANSI/AWWA C110/A21.10, ANSI/AWWA C153/A21.53 and ANSI B16.1 Class 125 Flanges

~~**CEMENT LINING:** In accordance with ANSI/AWWA C104/A21.4 - sizes 1" - 3" single thickness and sizes 4" - 64" double thickness~~

~~**COATING:** Asphaltic seal coat inside in accordance with ANSI/AWWA C104/A21.4 and prime coat outside~~

APPROVALS: 4" - 12" Underwriters Laboratories Listed and Factory Mutual approved for 300 PSI rating
2" and greater are UL/NSF-61

DIMENSIONS: All dimensions are in inches unless noted otherwise



AWWA MEMBER

FM APPROVED

UL

CLASSIFIED UL WATER QUALITY

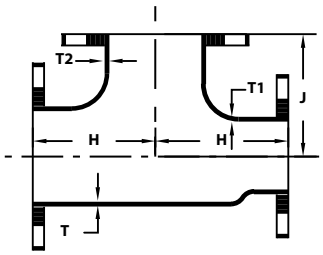
FLANGE DETAILS

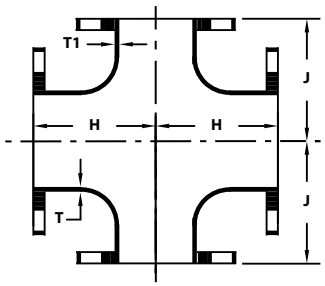
	NOM. SIZE	O.D.	B.C.	T	BOLT HOLE DIA.	BOLTS	
						SIZE	NO.
★	1	4.25	3.12	0.44	0.62	½ x 2	4
★	1 ½	5.00	3.88	0.56	0.62	½ x 2	4
★	2	6.00	4.75	0.62	0.75	⅝ x 2 ¼	4
★	2 ½	7.00	5.50	0.69	0.75	⅝ x 2 ½	4
	3	7.50	6.00	0.75	0.75	⅝ x 2 ½	4
	4	9.00	7.50	0.94	0.75	⅝ x 3	8
★	5	10.00	8.50	0.94	0.88	¾ x 3	8
	6	11.00	9.50	1.00	0.88	¾ x 3 ½	8
	8	13.50	11.75	1.12	0.88	¾ x 3 ½	8
	10	16.00	14.25	1.19	1.00	⅞ x 4	12
	12	19.00	17.00	1.25	1.00	⅞ x 4	12
	14	21.00	18.75	1.38	1.13	1 x 4 ½	12
	16	23.50	21.25	1.44	1.13	1 x 4 ½	16
	18	25.00	22.75	1.56	1.25	1 ⅛ x 5	16
	20	27.50	25.00	1.69	1.25	1 ⅛ x 5	20
	24	32.00	29.50	1.88	1.38	1 ¼ x 5 ½	20
	30	38.75	36.00	2.12	1.38	1 ¼ x 6 ½	28
	36	46.00	42.75	2.38	1.63	1 ½ x 7	32
	42	53.00	49.50	2.62	1.63	1 ½ x 7 ½	36
	48	59.50	56.00	2.75	1.63	1 ½ x 8	44
★	54	66.25	62.75	3.00	2.00	1 ¾ x 8 ½	44
★	60	73.00	69.25	3.12	2.00	1 ¾ x 9	52
★	64	80.00	76.00	3.38	2.00	1 ¾ x 9	52

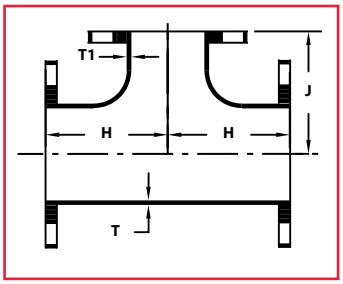
★Not Included in AWWA C110

Flanged Fittings

ANSI/AWWA C110/A21.10







FLANGED TEES & CROSSES

	NOM. SIZE	T	T1	T2	H	J	WT. (LBS.) TEE	WT. (LBS.) CROSS
★	1 ½ x 1 ½ x 2	0.31	0.31	0.31	4.50	4.50	15	---
★	2 x 1 ½ x 1 ½	0.31	0.31	0.31	4.50	4.50	16	---
★	2 x 2	0.31	0.31	---	4.50	4.50	20	---
★	2 ½ x 2 x 2	0.31	0.31	0.31	5.00	5.00	27	---
★	2 ½ x 2 x 2 ½	0.31	0.31	0.31	5.00	5.00	28	---
★	2 ½ x 1	0.31	0.31	---	5.00	5.00	25	---
★	2 ½ x 1 ½	0.31	0.31	---	5.00	5.00	26	---
★	2 ½ x 2 ½	0.31	0.31	---	5.00	5.00	30	---
★	3 x 1	0.48	0.31	---	5.50	5.50	32	---
★	3 x 1 ½	0.48	0.31	---	5.50	5.50	33	---
★	3 x 2	0.48	0.31	---	5.50	5.50	35	45
★	3 x 2 ½	0.48	0.31	---	5.50	5.50	36	---
	3 x 3	0.48	0.48	---	5.50	5.50	40	50
★	4 x 3 x 3	0.52	0.48	0.48	6.50	5.50	55	---
★	4 x 2	0.52	0.31	---	6.50	6.50	50	60
★	4 x 2 ½	0.52	0.31	---	6.50	6.50	56	65
	4 x 3	0.52	0.48	---	6.50	6.50	60	70
	4 x 4	0.52	0.52	---	6.50	6.50	65	80
★	4 x 4 x 5	0.50	0.50	0.50	7.50	7.50	75	---
★	4 x 4 x 6	0.52	0.52	0.55	8.00	8.00	90	---
★	5 x 2 ½	0.50	0.31	---	7.50	7.50	73	---
★	5 x 4	0.50	0.50	---	7.50	7.50	77	---
★	5 x 5	0.50	0.50	---	7.50	7.50	80	---
★	5 x 5 x 6	0.50	0.50	0.55	8.00	8.00	87	---
★	6 x 3 x 5	0.55	0.48	0.50	8.00	8.00	81	---
★	6 x 4 x 4	0.55	0.52	0.52	8.00	8.00	85	---
★	6 x 4 x 5	0.55	0.50	0.50	8.00	8.00	85	---
★	6 x 4 x 6	0.55	0.52	0.55	8.00	8.00	90	---
★	6 x 5 x 2 ½	0.55	0.50	0.31	8.00	8.00	73	---
★	6 x 5 x 3	0.55	0.50	0.48	8.00	8.00	81	---
★	6 x 5 x 5	0.55	0.50	0.50	8.00	8.00	87	---
★	6 x 2	0.55	0.31	---	8.00	8.00	82	90
★	6 x 2 ½	0.55	0.31	---	8.00	8.00	84	---
	6 x 3	0.55	0.48	---	8.00	8.00	85	95
★	6 x 4	0.55	0.52	---	8.00	8.00	90	110
★	6 x 5	0.55	0.50	---	8.00	8.00	91	---
	6 x 6	0.55	0.55	---	8.00	8.00	95	120
★	6 x 6 x 8	0.55	0.55	0.60	9.00	9.00	140	---
	8 x 4 x 8	0.60	0.52	0.60	9.00	9.00	138	---
★	8 x 5 x 4	0.60	0.50	0.50	9.00	9.00	126	---
★	8 x 6 x 4	0.60	0.55	0.52	9.00	9.00	130	---
★	8 x 6 x 6	0.60	0.55	0.55	9.00	9.00	135	---

(Con't)➡

FLANGED TEES & CROSSES (Con't)

	NOM. SIZE	T	T1	T2	H	J	WT. (LBS.) TEE	WT. (LBS.) CROSS
★	8 x 6 x 8	0.60	0.55	0.60	9.00	9.00	145	---
★	8 x 2 ½	0.60	0.31	---	9.00	9.00	128	---
	8 x 3	0.60	0.48	---	9.00	9.00	130	140
	8 x 4	0.60	0.52	---	9.00	9.00	140	155
★	8 x 5	0.60	0.50	---	9.00	9.00	144	---
	8 x 6	0.60	0.55	---	9.00	9.00	145	165
	8 x 8	0.60	0.60	---	9.00	9.00	155	195
★	8 x 8 x 10	0.60	0.60	0.68	11.00	11.00	260	---
★	8 x 8 x 12	0.60	0.60	0.75	12.00	12.00	310	---
★	10 x 4 x 10	0.68	0.52	0.68	11.00	11.00	250	---
★	10 x 6 x 4	0.68	0.55	0.52	11.00	11.00	195	---
★	10 x 6 x 6	0.68	0.55	0.55	11.00	11.00	200	---
★	10 x 6 x 10	0.68	0.55	0.68	11.00	11.00	255	---
★	10 x 8 x 6	0.68	0.60	0.55	11.00	11.00	210	---
★	10 x 8 x 8	0.68	0.60	0.60	11.00	11.00	220	---
★	10 x 8 x 10	0.68	0.60	0.68	11.00	11.00	265	---
★	10 x 2	0.68	0.31	---	11.00	11.00	199	---
★	10 x 3	0.68	0.48	---	11.00	11.00	201	---
	10 x 4	0.68	0.52	---	11.00	11.00	205	220
★	10 x 5	0.68	0.50	---	11.00	11.00	211	---
	10 x 6	0.68	0.55	---	11.00	11.00	215	240
	10 x 8	0.68	0.60	---	11.00	11.00	225	265
	10 x 10	0.68	0.68	---	11.00	11.00	270	330
★	10 x 10 x 12	0.68	0.68	0.75	12.00	12.00	355	---
★	10 x 10 x 14	0.68	0.68	0.66	14.00	14.00	375	---
★	12 x 6 x 6	0.75	0.55	0.55	12.00	12.00	325	---
★	12 x 6 x 8	0.75	0.55	0.60	12.00	12.00	345	---
★	12 x 8 x 6	0.75	0.60	0.55	12.00	12.00	340	---
★	12 x 8 x 8	0.75	0.60	0.60	12.00	12.00	290	---
★	12 x 8 x 12	0.75	0.60	0.75	12.00	12.00	365	---
★	12 x 10 x 6	0.75	0.68	0.55	12.00	12.00	375	---
★	12 x 10 x 8	0.75	0.68	0.60	12.00	12.00	380	---
★	12 x 10 x 10	0.75	0.68	0.68	12.00	12.00	345	---
★	12 x 10 x 12	0.75	0.68	0.75	12.00	12.00	370	---
	12 x 4	0.75	0.52	---	12.00	12.00	290	310
	12 x 5	0.75	0.50	---	12.00	12.00	291	---
	12 x 6	0.75	0.55	---	12.00	12.00	295	320
	12 x 8	0.75	0.60	---	12.00	12.00	310	345
	12 x 10	0.87	0.80	---	12.00	12.00	360	415
	12 x 12	0.87	0.87	---	12.00	12.00	385	460
★	14 x 4	0.66	0.52	---	14.00	14.00	370	---
	14 x 6	0.66	0.55	---	14.00	14.00	375	400

(Con't)➡

★Not Included in AWWA C110

Akzo Nobel Coatings Inc.
Functional Powder Coatings

Product Datasheet

Resicoat® R4-ES
for Electrostatic Spray Application on Preheated Surfaces
Code: HJF42R

Product Description

Resicoat® R4 is a high quality thermosetting epoxy powder coating for the corrosion protection of valves and fittings, manufactured from cast iron or steel. The powder coating is available to be applied in one layer on a preheated surface by electrostatic spray application. Typical film thickness achieved is in the range of 250 – 500 µm. The resultant thermoset epoxy has a high mechanical resistance with excellent electrical insulation properties. Drinking water approvals are available to confirm the coatings suitability, as a hygienic and environmental friendly coating. The outstanding adhesion of Resicoat® R4 epoxy powders to the metal substrate provides long term protection of the coated component. It ensures a reliable conservation to the function and value of the parts for the common water and gas distribution network. The applicator of Resicoat® R4 benefits from a modern and environmentally friendly process. It is possible to overcoat Resicoat® R4 with polyester powder and liquid coatings to achieve UV protection.

Powder Properties

	Typical value	Method
Binder System	Epoxy resin	
Density	1.45 – 1.55 g/cm³	ASTM D5965
Gel time at 392° F (200° C)	25 – 40 sec.	ASTM D4217
Particle size distribution	D10 = 10 – 15 µm D90 = 135 – 160 µm	Malvern ISO 8130-1
Storage stability	6 months at ≤ 74 °F (23 °C)	
Safety precautions	See Material Safety Datasheet (MSDS)	

Application Data

Preheating temperature object	392 – 428 °F (200 – 220 °C) object temperature
Post cure conditions object	The coating is self curing, if the wall thickness of the steel/cast iron is greater than 8 mm. If the wall thickness of the steel/cast iron is less than 8 mm, additional curing of 3 to 8 minutes at 392 °F (200 °C) object temperature is required.

1. Pre-cleaning	The surface must be free of oil, grease, salt, and other impurities.
2. Blasting	Molding sand, rust and sharp edges must be removed with angular steel grit. The graphite from the cast iron must be removed from the blasting material according NACE No.2/ SSPC-10/Sa 2.5. Recommended anchor profile of ≥60 µm should be stored max. 4 hours before pre-heating (dust-free and dry).
3. Pre-heating	This form of heating produces a uniform, defined temperature in the component. Any oxidation should be avoided.
4. Coating application	Immediately after preheating, the coating process starts without loosing any object temperature. The coating is done in the shortest possible time in a single pass with no interruption

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RESICOAT®
Experts in Functional Powder Coatings

		Typical value	Method
Coating Process	**5. Coating cure**	Curing is achieved by the heat contained in the object. If the heating capacity of the work piece is sufficient. To confirm fully curing, MIBK is dropped for 30 sec. on the film surface with no visible change.	
Material Properties	**Color**	blue	
	Recommended film thickness	10 – 14 mils (250 – 350 µm) Film thickness up to 30 mils (750 µm) is acceptable providing that the coating film is completely cured.	
	Flow	smooth	
	Gloss at 60° angle	70 – 90 units	ISO 2813
	Cross cut test	Gt 0	DIN EN ISO 2409
	Impact resistance	> 5 Joule	DIN 3476-1
		> 2.26 Joule	ASTM D 2794 20 inchpound
		> 18 Joule	ASTM G 14 modified 1/8 in (3.2 mm) steel plate
	Abrasion resistance	< 40 mg	ASTM D 4060 CS-17, 1000 g, 1000 cycles
	Dielectric strength	≥ 30 kV/mm	IEC 60243-1
	Volume resistivity (DC voltage)	1.1 x 10^{15}	ASTM D 257
	Elongation	> 5 %	DIN 3476-1
	Indentation resistance **48 h, 158 °F (70 °C)** **24 h, 140 °F (60 °C)**	 < 30 % < 10 %	 DIN 3476-1/DIN EN 14901 ASTM G 17
	Compressive strength	> 100 MPa	ASTM D 695
	Shear adhesion	> 35 MPa	ASTM D 1002
	Heat aging in air (90 d), water	fulfilled	DIN EN 14901
	Thermal stability under heat aging	pass	AS/NZS 4158:2003
	Weathering (Xenon test), 100 d	pass	ASTM D 2565
	Hardness	F	Pencil
	Strain polarization	pass	WIS 4-52-01
	Cathodic disbonding **30 d, 74 °F (23 °C)**	≤ 10 mm	DIN 3476-1, GSK
	Hot water immersion **90 d, 158 °F (70 °C)**	pass	AWWA C550
	Adhesion	> 20 MPa	ASTM D 4541
	Adhesion after 7 d, 194 °F (90 °C) water	≥ 16 MPa	ISO 4624, GSK
	Tensile strength	approx. 500 kg/cm³	ASTM D 2370
	Penetration	< 5 %	ASTM G 17

		Typical value	Method
Material Properties	**Disinfectant resistance** according DVGW work sheet W 291 (chlorine dioxide, sodium hypochlorite)	no change of surface, no chalking The following migration test with demineralised water showed no defects of the film. The concentration of the examined parameters in the tested water were below the limits of the epoxy guideline for ancillaries for pipes DN >300 mm (in main trunks).	after 10 test stages à 15 h
	Water condensation test (Cleveland test), 21 d	no change	ASTM D 4585
	Salt spray resistance, 2000 h	no blistering, no loss of adhesion	BS 3900:F4
	Salt spray test, 4000 h	no under-rusting on the cut	ISO 9227 (steel substrate)
	Water absorption, 100 d, 74 °F (23 °C)	pass	AS/NZS 3862
	Chemical resistance (pH 3 – 13, 23° C)	fulfilled	EN 598

Conformities

- **AWWA C116**
- **AWWA C550**
- **EN 14901**
- **ISO 12944-2, table 1** (standard does not include powder coating systems)
  It is assumed that Resicoat® R4 is suitable to meet the high atmospheric corrosivity category C4 (typically in industrial areas and coastal areas with moderate salinity) and the very high atmospheric- corrosivity - categories C5-I (industrial) and C5-M (marine) if applied as a holiday-free coating at a film thickness >400 µm. A sufficient film thickness is highly required to ensure good edge coverage. For gloss and color stability a UV-resistant polyester topcoat has to be applied.

Drinking Water Approvals

US: ANSI/NSF 61 Drinking Water System Components – Health Effects, NSF
DE: UBA-Coatings Guideline, Approval no.: K-301162-18, Hygiene Institut
DE: DVGW directive work sheet W 270, Approval no. W-279700k-17e, Hygiene Institut
UK: BS 6920, Approval No. 1701509, WRAS

Date of issue:	October 23, 2018
Authorized by:	**GK**
Revision No.:	**4**

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RESICOAT®
Experts in Functional Powder Coatings

SUNRISE™ GROUP
The Dawn of New Era in Stainless Steel
AN ISO 9001 EMS : 14001, 18001 CERTIFIED COMPANY

SUNRISE STAINLESS PVT. LTD.
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INSPECTION CERTIFICATE

(PED 2014/68/EU) & (AS PER EN 10204 Type 3.1)

T.C.NO	SSPL/EXP/18-19/447 (05)	**DATE :**	05-01-2019	
CUSTOMER	ALLIED STAINLESS GROUP INC.			
WO NO	025-D / 10 / 18	**DATE :**	09-10-2018	
P.O.NO	W20618DSSI	**DATE :**	08-10-2018	
PRODUCT	STAINLESS STEEL WELDED ANNEALED & PICKLED ROUND PIPES	**PRODUCT CODE:**	304/L.IWSS2-SSI	
SPECIFICATION	AS PER ASTM A312-19 / ASME SA312-19 NACE MRO103; NACE MRO175	**GRADE :**	TP304/304L P5032	

Po.Sr. No.	DESCRIPTION OF PRODUCT	Nos	Total FEET	Total Kgs
05	2"NB (60.33mm OD) X SCH40S (3.91mm THK) X 20 FEET LONG	389	7780	12186.000

CHEMICAL COMPOSITION

Heat No	Chemistry	C %	Si %	Mn %	P %	S %	Ni %	Cr %	Mo%	N%	OTHER (Pb)
	Required	---	---	---	---	---	8.000	18.000	---	---	<100
		0.035	1.000	2.000	0.045	0.030	11.000	20.000	---	---	
5N657	H	0.023	0.390	1.430	0.030	0.0084	8.030	18.140	---	0.0748	78
	P	0.026	0.420	1.450	0.035	0.008	8.020	18.150	0.046	0.076	

PHYSICAL TEST

Parameter	Tensile Test	Y.S. (Mpa)	U.T.S (Mpa)	Elongation % (G.L: 50 mm)	Hardness Test(HRB)	IMPACT TEST -N/A	1	2	3	Avg.
Heat No	Required	205	515	35%	90	WELD	---	---	---	---
						HAZ	---	---	---	---
		MIN	MIN	MIN	MAX	PARENT	---	---	---	---
5N657	EXP/025-D/05-A	236.00	629.00	53.75%	76	---	---	---	---	---
	EXP/025-D/05-B	228.00	620.00	53.71%	77	---	---	---	---	---

FLANGE TEST	N/A
FLATTENING TEST	OK
FLARING TEST	N/A
PREN VALUE	19.52 =(1 x Cr%)+(3.3 x Mo%)+(16 x N%)
BEND/R.BEND	N/A
HYDROSTATIC TEST	OK (Done at 2000 PSIG)

Remarks :-

Solution Annealing Done at 1040º C Minimum followed by immediate Water Quenching.
100% Dimension & Visual checked by SSPL As Per ANSI B16.19 & 36.10,ASTM A999 & ASME SA312/ASTM A312 & Found Satisfactory
100% Hydrostatic Test carried out by SSPL As Per ASTM A999 & ASME SA 312 / ASTM A 312 and Found Satisfactory
Product analysis carried out by NABL lab and reviewed by SSPL As Per ASME SA312/ASTM A312 and Found Satisfactory
Lead(Pb) Content carried out by NABL lab and reviewed by SSPL As Per ASME SA312/ASTM A312 and Found Satisfactory
Mechanical Testing carried out by SSPL As Per ASME SA312/ASTM A312 and Found Satisfactory
Hardness Test carried out by SSPL & meet requirement of NACE MRO103-12; NACE MRO175-09 and Found Satisfactory
100% PMI Test carried out by SSPL As Per ASME SA312/ASTM A312 and Found Satisfactory
Marking on Pipes: LOGO MFG_NB(_MM OD) X SCH_s (_MM THK) X _ LONG WELDED ASTM A312/ASME SA312 TP 304/304L HEAT NO. _ .
done by Mfg. : Found Satisfactory
The material Described above is free from Mercury & Radioactive Contamination.
We here by certify that material Passed according to ASTM A262 Practice "E".
Microstructure reveals equated Austenitic Grains, ASTM Grain Size: No. 6-7, No Carbide Precipitation observed on Grain Boundaries.
PED 2014/68/EU CERTIFICATE NO: 07/203/1409/WP/1791/17 VALIDITY: JANUARY 2020.

ABBREVIATION: H - Heat Test **P -** Product Test, **RL-** Random Length, **N/A-** Not Applicable, **MFG**-Manufacturer

SUNRISE STAINLESS PVT. LTD. A Patel QUALITY

Tested By

Approved by
authorised WI Narendra Thakor

We hereby certify that the material described herein are in accordance with the specification and that results comply with the requirements of the specification

Forged Carbon Steel Fittings and Outlets

2000# - 3000# - 6000#

Specifications

- SCI branded fittings
- Forged carbon steel fitting material conforms to ASTM SA105N, NORMALIZED
- Forged carbon steel fitting dimensions conform to ASME B16.11
- Forged carbon steel fitting dimensions listed are either minimums or set by the factory per ASME B16.11, contact SCI for exact dimensional information
- NPT threads on forged steel fittings conform to ASME B1.20.1
- Forged carbon steel socket weld inserts conform to MSS-SP-79
- Forged carbon steel unions conform to MSS-SP-83
- Forged carbon steel outlet fittings conform to MSS-SP-97
- Manufacturing facility is ISO 9001:2008
- MTR's are available upon request
- ProPak™ Packaging

3000# Stainless Fittings

Specifications

- Forged stainless steel material conforms to ASTM A182 grade F304/304L - F316/316L
- Forged stainless steel fitting dimensions conform to ASME B16.11
- NPT threads conform to ASME B1.20.1
- Socket weld fittings conform to ASME B16.11
- Forged stainless union conform to MSS SP-83
- Forged stainless outlets conform to MSS SP-97
- Forged stainless socket weld inserts conform to MSS SP-79
- Manufacturing facility is ISO 9001:2008

3000#

Fig. 42E 3, S4034E & S4036E – 90° Elbow

Size in	Part Number Steel	304/304L	316/316L	A in	B in	Master	Weight lb
1/8	42E 3001	S4034E 001	S4036E 001	0.81	0.88	100	0.2
1/4	42E 3002	S4034E 002	S4036E 002	0.97	1.00	100	0.7
3/8	42E 3003	S4034E 003	S4036E 003	1.12	1.31	80	0.6
1/2	42E 3004	S4034E 004	S4036E 004	1.31	1.50	50	0.9
3/4	42E 3006	S4034E 006	S4036E 006	1.50	1.81	25	1.5
1	42E 3010	S4034E 010	S4036E 010	1.75	2.19	20	2.2
1-1/4	42E 3012	S4034E 012	S4036E 012	2.00	2.44	15	3.1
1-1/2	42E 3014	S4034E 014	S4036E 014	2.38	2.97	6	4.8
2	42E 3020	S4034E 020	S4036E 020	2.50	3.31	5	5.4
2-1/2	42E 3024	S4034E 024	S4036E 024	3.25	4.00	2	13.2
3	42E 3030	S4034E 030	S4036E 030	3.75	4.75	1	19.5
4	42E 3040	-	-	4.50	6.00	1	32.7

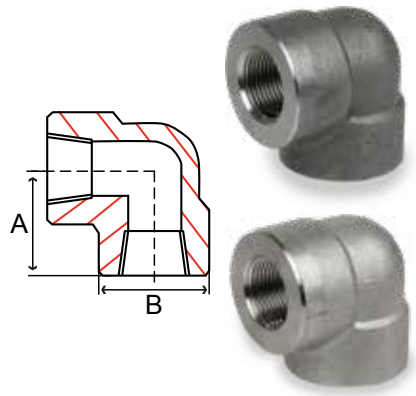


Fig. 42SE3, S4034SE & S4036SE – 90° Street Elbow

Size in	Part Number Steel	304/304L	316/316L	A in	B in	C in	Master	Weight lb
1/8	42SE3001	S4034SE001	S4036SE001	0.75	0.75	1.25	200	0.2
1/4	42SE3002	S4034SE002	S4036SE002	0.88	1.00	1.25	150	0.2
3/8	42SE3003	S4034SE003	S4036SE003	1.00	1.25	1.50	80	0.4
1/2	42SE3004	S4034SE004	S4036SE004	1.12	1.50	1.69	50	0.6
3/4	42SE3006	S4034SE006	S4036SE006	1.38	1.75	1.94	30	1.1
1	42SE3010	S4034SE010	S4036SE010	1.75	2.00	2.31	20	2.2
1-1/4	42SE3012	S4034SE012	S4036SE012	2.00	2.44	2.69	15	2.4
1-1/2	42SE3014	S4034SE014	S4036SE014	2.12	2.75	2.81	8	4.4
2	42SE3020	S4034SE020	S4036SE020	2.50	3.31	3.38	5	6.4

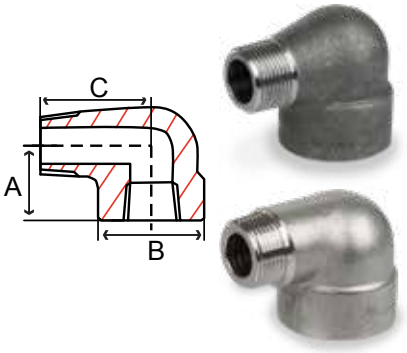


Fig. 42F 3, S4034F & S4036F – 45° Elbow

Size in	Part Number Steel	304/304L	316/316L	A in	B in	Master	Weight lb
1/8	42F 3001	S4034F 001	S4036F 001	0.66	0.86	100	0.2
1/4	42F 3002	S4034F 002	S4036F 002	0.75	1.00	100	0.2
3/8	42F 3003	S4034F 003	S4036F 003	0.88	1.31	80	0.5
1/2	42F 3004	S4034F 004	S4036F 004	1.00	1.50	50	0.7
3/4	42F 3006	S4034F 006	S4036F 006	1.12	1.81	30	1.2
1	42F 3010	S4034F 010	S4036F 010	1.31	2.19	20	2.0
1-1/4	42F 3012	S4034F 012	S4036F 012	1.38	2.44	15	2.2
1-1/2	42F 3014	S4034F 014	S4036F 014	1.69	2.97	8	4.5
2	42F 3020	S4034F 020	S4036F 020	1.72	3.31	6	4.9
2-1/2	42F 3024	S4034F 024	S4036F 024	2.06	4.00	2	8.1
3	42F 3030	S4034F 030	S4036F 030	2.50	4.75	2	13.1
4	42F 3040	-	-	3.12	6.00	1	19.7

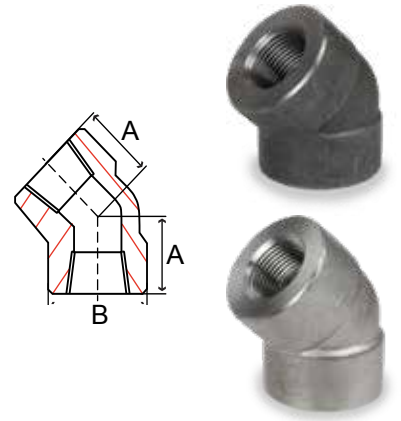
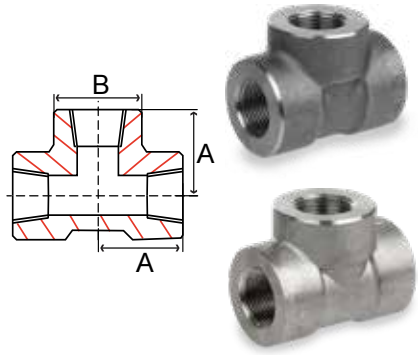


Fig. 42T 3, S4034T & S4036T – Tee

Size in	Part Number Steel	304/304L	316/316L	A in	B in	Master	Weight lb
1/8	42T 3001	S4034T 001	S4036T 001	0.81	0.88	80	0.2
1/4	42T 3002	S4034T 002	S4036T 002	0.97	1.00	80	0.4
3/8	42T 3003	S4034T 003	S4036T 003	1.12	1.31	50	0.8
1/2	42T 3004	S4034T 004	S4036T 004	1.31	1.50	35	1.2
3/4	42T 3006	S4034T 006	S4036T 006	1.50	1.81	20	2.0
1	42T 3010	S4034T 010	S4036T 010	1.75	2.19	15	3.2
1-1/4	42T 3012	S4034T 012	S4036T 012	2.00	2.44	10	3.8
1-1/2	42T 3014	S4034T 014	S4036T 014	2.38	2.97	5	7.2
2	42T 3020	S4034T 020	S4036T 020	2.50	3.31	4	7.7
2-1/2	42T 3024	S4034T 024	S4036T 024	3.25	4.00	2	15.4
3	42T 3030	S4034T 030	S4036T 030	3.75	4.75	1	22.4
4	42T 3040	-	-	4.50	6.00	1	39.6



3000#

Fig. 42CP3, S4034CP & S4036CP – Coupling

Size in	Part Number Steel	304/304L	316/316L	A in	B in	Master	Weight lb
1/8	42CP3001	S4034CP001	S4036CP001	1.25	0.62	250	0.1
1/4	42CP3002	S4034CP002	S4036CP002	1.38	0.75	250	0.1
3/8	42CP3003	S4034CP003	S4036CP003	1.50	0.88	200	0.1
1/2	42CP3004	S4034CP004	S4036CP004	1.88	1.12	100	0.2
3/4	42CP3006	S4034CP006	S4036CP006	2.00	1.38	70	0.4
1	42CP3010	S4034CP010	S4036CP010	2.38	1.75	35	0.9
1-1/4	42CP3012	S4034CP012	S4036CP012	2.62	2.25	20	1.7
1-1/2	42CP3014	S4034CP014	S4036CP014	3.12	2.50	15	2.3
2	42CP3020	S4034CP020	S4036CP020	3.38	3.00	10	3.0
2-1/2	42CP3024	S4034CP024	S4036CP024	3.62	3.62	5	5.0
3	42CP3030	S4034CP030	S4036CP030	4.25	4.25	3	7.4
4	42CP3040	S4034CP040	S4036CP040	4.75	5.50	2	13.8

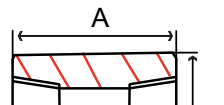


Fig. 42HP3, S4034HC & S4036HC – Half Coupling

Size in	Part Number Steel	304/304L	316/316L	A in	B in	Master	Weight lb
1/8	42HC3001	S4034HC001	S4036HC001	0.62	0.62	400	0.04
1/4	42HC3002	S4034HC002	S4036HC002	0.69	0.75	800	0.04
3/8	42HC3003	S4034HC003	S4036HC003	0.75	0.88	500	0.06
1/2	42HC3004	S4034HC004	S4036HC004	0.94	1.12	250	0.1
3/4	42HC3006	S4034HC006	S4036HC006	1.00	1.38	150	0.2
1	42HC3010	S4034HC010	S4036HC010	1.17	1.75	80	0.5
1-1/4	42HC3012	S4034HC012	S4036HC012	1.31	2.25	35	0.7
1-1/2	42HC3014	S4034HC014	S4036HC014	1.56	2.50	30	1.1
2	42HC3020	S4034HC020	S4036HC020	1.67	3.00	20	1.5
2-1/2	42HC3024	S4034HC024	S4036HC024	1.81	3.62	12	2.4
3	42HC3030	S4034HC030	S4036HC030	2.12	4.25	6	3.7
4	42HC3040	-	-	2.37	5.50	4	6.8

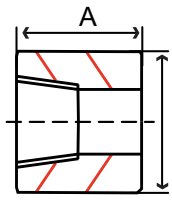
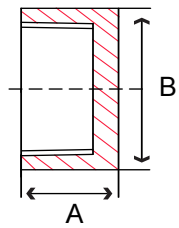
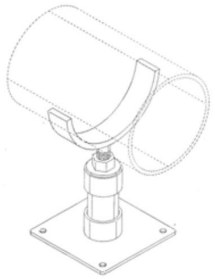


Fig. 42C 3, S4034C & S4036C – Cap

Size in	Part Number Steel	304/304L	316/316L	A in	B in	Master	Weight lb
1/8	42C 3001	S4034C 001	S4036C 001	0.75	0.62	300	0.05
1/4	42C 3002	S4034C 002	S4036C 002	1.00	0.75	300	0.1
3/8	42C 3003	S4034C 003	S4036C 003	1.00	0.88	250	0.1
1/2	42C 3004	S4034C 004	S4036C 004	1.25	1.12	130	0.2
3/4	42C 3006	S4034C 006	S4036C 006	1.44	1.38	80	0.3
1	42C 3010	S4034C 010	S4036C 010	1.62	1.75	50	0.8
1-1/4	42C 3012	S4034C 012	S4036C 012	1.75	2.25	30	1.3
1-1/2	42C 3014	S4034C 014	S4036C 014	1.75	2.50	25	1.5
2	42C 3020	S4034C 020	S4036C 020	1.88	3.00	15	2.4
2-1/2	42C 3024	S4034C 024	S4036C 024	2.38	3.62	10	4.8
3	42C 3030	S4034C 030	S4036C 030	2.56	4.25	5	7.7
4	42C 3040	-	-	2.69	5.50	3	10.6



Standon Model S92 Adjustable Pipe Saddle Support



The "Standon" model **#S92** pipe support is specifically designed to fit ductile iron pipe. A nearly 50% circumferential cradle, and a pipe to saddle gap of less than .125" guarantees excellent performance. A neoprene liner is available for IPS size pipe for a perfect fit.

- Accepts standard IPS pipe - No threading required.
- Comes complete with over-sized anchorable base plate.
- Available in sizes 2" through 36".
- Also available in 100% 304 Stainless Steel.

MATERIAL

Saddle Strap:	ASTM A36
Collar/ Base Cups:	ASTM A53 D.O.M. tubing
Threaded Stud:	ASTM A36; rolled thread Grade ASTM A307
Base Plate:	ASTM A36 Sheet Steel - .25" plate
Optional Material:	100% 304 Stainless Steel

FABRICATION

All welds:	100% MIG welding, electrode E70XX
Saddles:	Formed to ductile iron radius.

FINISH

All pipe supports have a corrosion resistant, galvanized finish.

DIMENSIONS

SUPPORT SIZE	*PIPE O.D.*	*STRAP SIZE*	*THREAD STUD*	*BASE PLATE*	*EXTENSION PIPE REQ'D*	*MINIMUM DIST. TO FLOOR*
2"	2.5"	3/8" x 2"	1" x 6"	4"x6"x¼"	2" SCH. 40	7"
2½"	3"	3/8" x 2"	1" x 6"	4"x6"x¼"	2" SCH. 40	7"
3"	3.96"	3/8" x 2"	1" x 6"	4"x6"x¼"	2" SCH. 40	7"
4"	4.80"	½" x 2"	1" x 6"	8"x8"x¼"	2" SCH. 40	7"
6"	6.90"	½" x 2"	1" x 6"	8"x8"x¼"	2" SCH. 40	7"
8"	9.05"	½" x 2"	1" x 6"	8"x8"x¼"	2" SCH. 40	7"
10"	11.10"	½" x 2"	1" x 6"	8"x8"x¼"	2" SCH. 40	7"
12"	13.20"	½" x 2"	1" x 6"	8"x8"x¼"	2" SCH. 40	7"
14"	15.30"	5/8" x 3"	1½" x 6"	8"x8"x½"	3" SCH. 40	9½"
16"	17.40"	5/8" x 3"	1½" x 6"	8"x8"x½"	3" SCH. 40	9½"
18"	19.50"	¾" x 4"	2" x 6"	8"x8"x½"	4" SCH. 40	10"
20"	21.60"	¾" x 4"	2" x 6"	8"x8"x½"	4" SCH. 40	10"
24"	25.80"	¾" x 4"	2" x 6"	8"x8"x½"	4" SCH. 40	10"
30"	32.00"	1" x 5"	3" x 6"	15"x15"x½"	6" DIP	10"
36"	38.30"	1" x 5"	3" x 6"	15"x15"x½"	6" DIP	10"

Pipe Penetration Seals

PROCO's PEN-SEAL Pipe Penetration Seals have been designed to assist in achieving an efficient, low-cost mechanical seal between any Electrical Conduit, Concrete, Cast Iron, Steel, Copper, or PVC/CPVC pipes passing through Walls, Floors, Tanks, Pipeline Casings, and Vaults. The PEN-SEAL, while being used to seal the gap in electrical conduit lines, will also act as an insulator.

The PEN-SEAL has been designed to provide a gas and watertight seal. All sizes have been tested to withstand a hydrostatic seal up to 20 psig or 40 feet of head pressure in addition to withstanding temperatures up to 250° F.

PEN-SEAL's standard elastomer material is EPDM, which is suitable for temperatures ranging from -40° F to 250° F. EPDM is suitable for most applications in water—above ground and direct burial—and will provide the electrical insulation where cathodic protection is required. Silicone material is also available for higher temperature applications up to 400° F.

Where the PEN-SEAL may come in contact with Hydrocarbons, Oil, Gas, Jet Fuel, and miscellaneous solvents, a Nitrile material is available with temperatures ranging from -40° F to 210° F.

The PEN-SEAL utilizes glass-reinforced plastic for the pressure plates and all hardware is manufactured from Steel Zinc Dichromate. For corrosion resistance, 316 Stainless Steel hardware is also available.

Various applications for the PROCO PEN-SEAL:

- Wall Sleeves
- Floor Sleeves
- Interior Piping
- Noise Dampener
- Electrical Contractors
- Precast Concrete
- Mining
- Marine
- Water & Wastewater
- HVAC
- Valve Pits
- Offshore Oil Platforms
- Telecommunications
- Dual Containment Seal
- Underground Steel Tanks
- Coal Preparation Plants
- Pulp & Paper
- Power Generation

Sizing Tables

Sizing for Standard Weight Steel, PVC and CPVC Pipe

Table 1		Standard Weight Steel or PVC Pipe Sleeve[1]				Cast or Core Bit Drilled Hole[1]		
NOMINAL PIPE SIZE (Inches)	ACTUAL PIPE O.D. (Inches)	SLEEVE NOMINAL PIPE SIZE (Inches)	SLEEVE ACTUAL I.D. (Inches)	PEN-SEAL PART NUMBER	REQUIRED NUMBER OF LINKS	HOLE I.D. (Inches)	PEN-SEAL PART NUMBER	REQUIRED NUMBER OF LINKS
0.5	0.840	2.000	2.067	PS-200	4	2.000	PS-200	4
0.75	1.050	2.500	2.469	PS-275	6	2.500	PS-275	6
1	1.315	2.500	2.469	PS-200	5	3.000	PS-315	4
1.25	1.660	3.000	3.068	PS-275	8	3.000	PS-275	8
1.5	1.900	3.000	3.068	PS-200	7	3.500	PS-300	5
2	2.375	3.500	3.548	PS-200	8	4.000	PS-300	6
2.5	2.875	4.000	4.026	PS-200	9	4.000	PS-200	9
3	3.500	5.000	5.047	PS-300	8	5.000	PS-300	8
3.5	4.000	6.000	6.065	PS-315	10	6.000	PS-315	10
4	4.500	6.000	6.065	PS-300	10	6.000	PS-300	10
5	5.563	8.000	7.981	PS-340	13	8.000	PS-340	13
6	6.625	10.000	10.020	PS-475	10	10.000	PS-475	10
8	8.625	12.000	12.000	PS-475	12	12.000	PS-475	12
10	10.750	14.000	13.250	PS-425	10	14.000	PS-475	14
12	12.750	16.000	15.250	PS-425	12	16.000	PS-475	17
14	14.000	18.000	17.250	PS-475	18	18.000	PS-575	16
16	16.000	20.000	19.250	PS-475	21	20.000	PS-575	18
18	18.000	22.000	21.250	PS-475	23	22.000	PS-575	20
20	20.000	24.000	23.250	PS-475	25	24.000	PS-575	22
22	22.000	26.000	25.250	PS-475	28	26.000	PS-575	24
24	24.000	28.000	27.250	PS-475	30	28.000	PS-575	26
26	26.000	30.000	29.250	PS-475	33	30.000	PS-575	28
28	28.000	32.000	31.250	PS-475	35	32.000	PS-575	30
30	30.000	34.000	33.250	PS-475	37	34.000	PS-575	32
32	32.000	36.000	35.250	PS-475	40	36.000	PS-575	34
34	34.000	40.000	39.250	PS-500	29	38.000	PS-575	36
36	36.000	42.000	41.250	PS-500	31	40.000	PS-575	38
42	42.000	48.000	47.250	PS-500	36	46.000	PS-575	44
48	48.000	54.000	53.250	PS-500	41	52.000	PS-575	50

Notes:
1. *Minimum recommended sleeve length or wall thickness is 4" for PEN-SEAL Model PS-325 and smaller and 6" for Models PS-400 and larger.*
2. *PEN-SEAL sets are sold in belts of ten (10) links.*

Sizing Tables

Sizing for Ductile Iron Pipe (AWWA-Type)

Table 2		Standard Weight Steel or PVC Pipe Sleeve[1]				Cast or Core Bit Drilled Hole[1]		
NOMINAL PIPE SIZE (Inches)	ACTUAL PIPE O.D. (Inches)	SLEEVE NOMINAL PIPE SIZE (Inches)	SLEEVE ACTUAL I.D. (Inches)	PEN-SEAL PART NUMBER	REQUIRED NUMBER OF LINKS	HOLE I.D. (Inches)	PEN-SEAL PART NUMBER	REQUIRED NUMBER OF LINKS
2	2.500	3.500	3.548	PS-200	8	4.000	PS-300	6
2.25	2.750	5.000	5.047	PS-340	7	5.000	PS-340	7
3	3.960	6.000	6.065	PS-315	10	6.000	PS-315	10
4	4.800	8.000	7.981	PS-410	7	8.000	PS-410	7
6	6.900	12.000	10.020	PS-410	10	10.000	PS-410	10
8	9.050	12.000	12.000	PS-400	9	12.000	PS-400	9
10	11.100	14.000	13.250	PS-340	24	14.000	PS-400	10
12	13.200	16.000	15.250	PS-325	14	16.000	PS-360	21
14	15.300	18.000	17.250	PS-325	16	18.000	PS-360	24
16	17.400	20.000	19.250	PS-315	39	20.000	PS-360	27
18	19.500	24.000	23.250	PS-475	25	24.000	PS-525	17
20	21.600	26.000	25.250	PS-475	28	26.000	PS-525	19
24	25.800	30.000	29.250	PS-475	32	29.000	PS-410	33
30	32.000	36.000	35.250	PS-475	40	35.000	PS-400	29
36	38.300	42.000	41.250	PS-400	34	41.000	PS-360	59
42	44.500	50.000	49.250	PS-500	38	48.000	PS-475	55
48	50.800	54.000	53.250	PS-425	45	54.000	PS-410	63

Sizing for Copper Tubing

Table 3		Standard Weight Steel or PVC Pipe Sleeve[1]				Cast or Core Bit Drilled Hole[1]		
NOMINAL PIPE SIZE (Inches)	ACTUAL PIPE O.D. (Inches)	SLEEVE NOMINAL PIPE SIZE (Inches)	SLEEVE ACTUAL I.D. (Inches)	PEN-SEAL PART NUMBER	REQUIRED NUMBER OF LINKS	HOLE I.D. (Inches)	PEN-SEAL PART NUMBER	REQUIRED NUMBER OF LINKS
0.5	0.625	2.000	2.067	PS-275	4	2.000	PS-275	4
0.75	0.875	2.000	2.067	PS-200	4	2.000	PS-200	4
1	1.125	2.500	2.469	PS-275	6	3.000	PS-315	4
1.25	1.375	2.500	2.469	PS-200	5	3.000	PS-300	4
1.5	1.625	3.000	3.068	PS-275	8	3.000	PS-275	8
2	2.125	3.500	3.548	PS-300	5	3.500	PS-275	9
2.5	2.625	4.000	4.026	PS-275	11	4.000	PS-275	11
3	3.125	5.000	5.047	PS-315	8	5.000	PS-315	8
4	4.125	6.000	6.065	PS-315	10	6.000	PS-315	10
6	6.125	8.000	7.981	PS-315	15	8.000	PS-315	15
8	8.125	10.000	10.020	PS-325	9	12.000	PS-575	10
10	10.125	14.000	13.250	PS-410	14	14.000	PS-575	12
12	12.125	16.000	15.250	PS-410	16	16.000	PS-575	14

Notes:
1. *Minimum recommended sleeve length or wall thickness is 4" for PEN-SEAL Model PS-325 and smaller and 6" for Models PS-400 and larger.*
2. *PEN-SEAL sets are sold in belts of ten (10) links.*

Calculating PEN-SEAL Sizes

Use the following method if you cannot find the correct pipe size or wall sleeve from the Sizing Charts on pages 4 through 7.

Step 1 Calculate the Annular Space
The Annular Space is the space between the Outside Diameter of the pipe and the Inside Diameter of the Wall Sleeve or opening. This is calculated by using the following formula:

$$\text{Annular Space} = \frac{\text{Wall Opening I.D.} - \text{Pipe O.D.}}{2}$$

Step 2 Selecting the PEN-SEAL Model
Select the proper PEN-SEAL model from the Dimensional Chart (shown below) by comparing the Annular Space to the Neutral State and Expanded State Thickness. The Annular Space calculated must fall between the Neutral State Thickness and the Expanded State Thickness.

Step 3 Calculate the Number of Links Required
First, calculate the Bolt Circle:

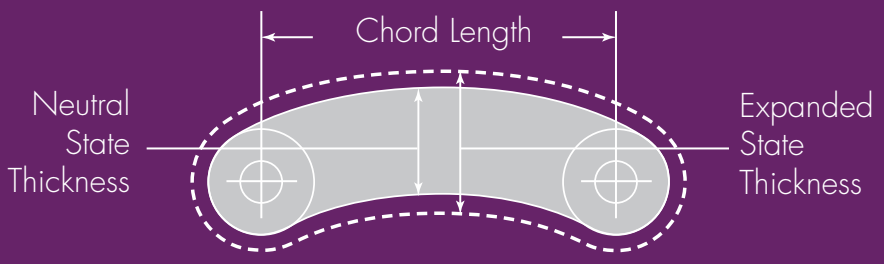
$$\text{Bolt Circle} = \frac{\text{Wall Opening I.D.} + \text{Pipe O.D.}}{2}$$

Then, determine the number of links required by using the following formula. Chord Length is found in the PEN-SEAL Dimensional Chart shown below.

$$\text{Number of Links} = \frac{\text{Bolt Circle x 3.14 (p)}}{\text{Chord Length}}$$

Finally, the number of links determined must be rounded down to the next whole number.

Please Note: **PEN-SEAL** sets are sold in belts of ten (10) links.



PEN-SEAL Dimensional Chart

SEALING RANGE			
SIZE	NEUTRAL STATE THICKNESS (Inches)	EXPANDED STATE THICKNESS (Inches)	CHORD LENGTH (Inches)
200	0.500	0.620	1.125
275	0.620	0.800	0.910
300	0.710	0.920	1.510
315	0.820	1.100	1.470
325	0.940	1.140	3.100
340	1.050	1.330	1.570
360	1.290	1.650	2.106
400	1.430	1.870	3.625
410	1.480	1.910	2.600
425	1.130	1.430	3.625
475	1.620	2.080	2.625
500	2.370	2.810	3.860
525	2.180	2.580	3.860
575	1.880	2.350	3.100
600	3.200	4.000	6.000

Materials Guide

TYPE	SEAL MATERIAL	PRESSURE PLATES	BOLTS & NUTS	TEMPERATURE RANGE (°F)	APPLICATIONS*
E	EPDM Black	GLASS REINFORCED PLASTIC	STEEL Zinc Dichromate	-40° to +250°	Suitable for most applications in water, above ground and direct burial. Provides electrical insulation where cathodic protection is required.
ES	EPDM Black	GLASS REINFORCED PLASTIC	STAINLESS STEEL (316)	-40° to +250°	Suitable for environments where the corrosion resistance of stainless steel hardware is required.
P	NITRILE	GLASS REINFORCED PLASTIC	STEEL Zinc Dichromate	-40° to +210°	Resistant to most hydrocarbons, oil, gas, jet fuel, and many solvents.
PS	NITRILE	GLASS REINFORCED PLASTIC	STAINLESS STEEL (316)	-40° to +210°	Same as above, but with corrosion resistance of stainless steel hardware.
K	SILICONE	STEEL Zinc Dichromate	STEEL Zinc Dichromate	-40° to +400°	High temperature applications.

**For more details and complete chemical compatibility contact PROCO.*

vaughn
concrete products, inc.

12650 Tucson Street Henderson, Colorado 80640-9443 (303) 659-3747 Fax (303) 659-1333
2671 S. Greeley Hwy Cheyenne, Wyoming 82007-3681 (307) 634-0695 Fax (307) 634-0694
10021 Amarillo Blvd E. Amarillo, Texas 79108-7542 (806) 374-3747 Fax (806) 335-3717
Toll Free Phone (877) 827-8255 Toll Free Fax (877) 827-7363
www.vaughnconcreteproducts.com

ENGINEER'S CERTIFICATE

I, being a Registered Professional Engineer under the laws of New Mexico, hereby certify that this document was prepared by me or under my direct supervision, and is correct to the best of my knowledge and belief.

Our submittal packet was prepared for our standard size products that utilize industry standard precast production procedures and manufacturing techniques. The precast concrete products being submitted on herein may differ from that specified for this project but it is our belief they are suitable for this application.

6-27-19

P.E. No. 13161

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www.vaughnconcreteproducts.com

REQUEST FOR DEVIATIONS

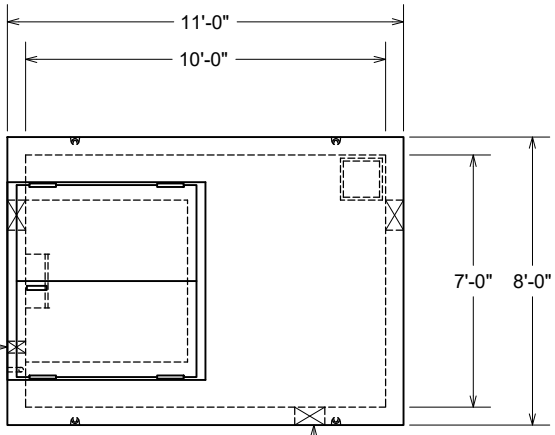
We request a thorough review of our submittal. The attached submittal packet includes product drawings that are for standard size products that utilize standard precast manufacturing techniques, materials and items that are industry standard that may differ from that shown on the project drawings.

PRECAST CONCRETE VAULT

7'-0" WIDE X 10'-0" LONG X 7'-0" HIGH INSIDE DIMENSIONS

USED FOR 6" PRV VAULT

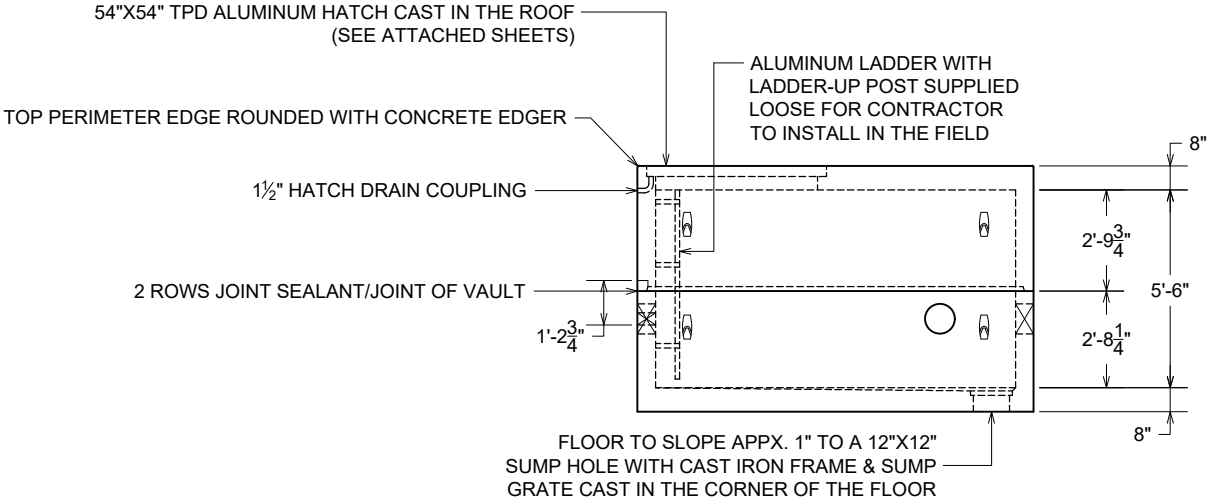
PIPESTONE EQUIPMENT
NAVAJO GALLUP WATER SUPPLY
PROJECT REACH 26.3
GALLUP, NM
1 REQUIRED
SHEET 1 OF 1



(1) 4" DIAMETER BLOCKOUT FOR CONTRACTOR'S LINK SEAL;
LOCATION PER CONTRACTOR

10" DIAMETER PIPING BLOCKOUTS FOR CONTRACTOR'S LINK SEALS;
QTY & LOCATIONS PER CONTRACTOR

PLAN VIEW



ELEVATION

WEIGHTS:
- HEAVIEST PIECE WEIGHS APPX. 17,000 LBS.

LIFTING:
- SECTIONS TO EACH LIFT FROM 4 RECESSED GALVANIZED LIFT BARS

NOTES:
- CONCRETE: 5000 PSI MINIMUM
- REINFORCING: GRADE 60 MINIMUM
- FLOOR & ROOF 8" THICK, WALLS 6" THICK
- MANUFACTURED TO SATISFY AASHTO HS-20-44 LOADINGS

ACTUAL DIMENSIONS OF CONCRETE PRODUCTS MAY VARY SLIGHTLY

COATINGS:
- INTERIOR COATED WITH SHERWIN-WILLIAMS A-100 WHITE PAINT
- EXTERIOR COATED WITH OUR STANDARD BITUMINOUS COATING FOR DAMPPROOFING

DRAWING SCALE IS 1:64

7X10 VAULT FOR PRV VAULT, PIPESTONE, NAVAJO GALLUP 26.3.DWG
DATE CREATED: 6.20.19
DATE MODIFIED: 1.10.20

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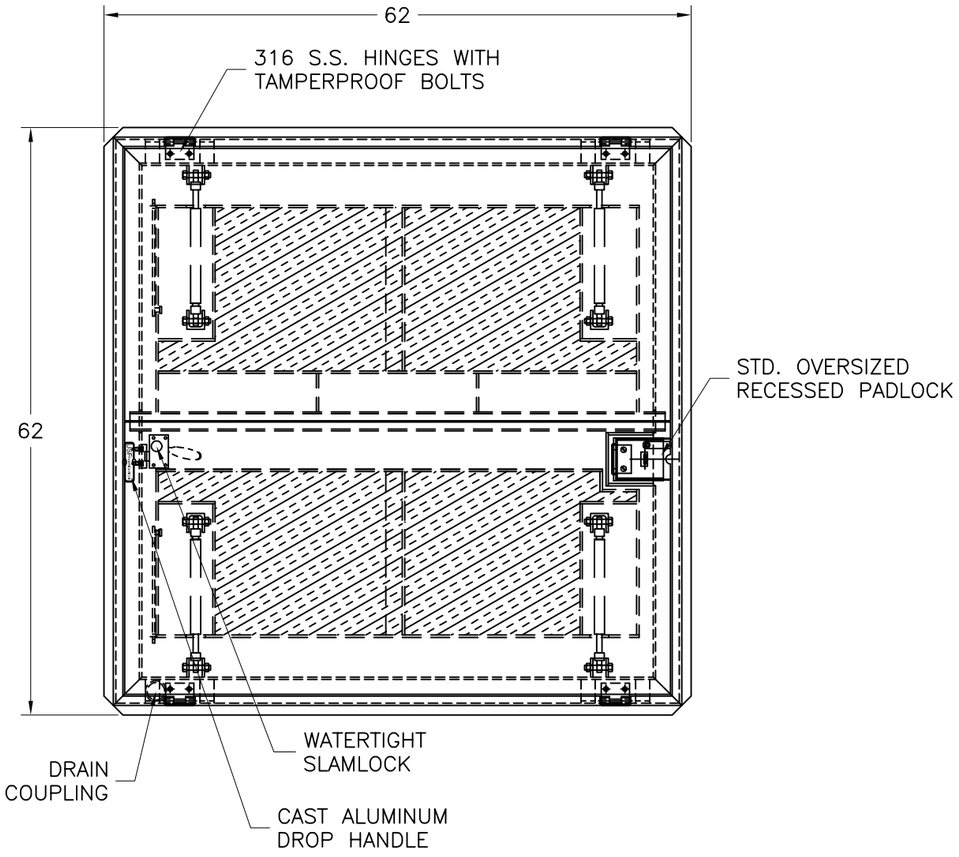
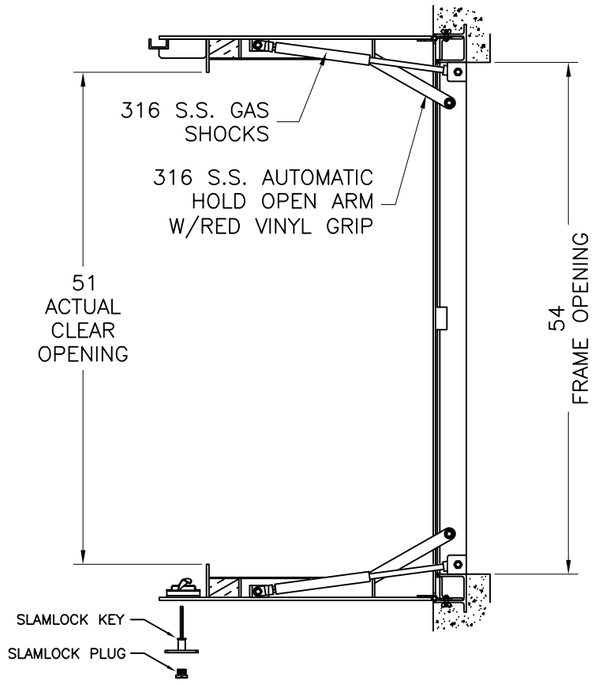
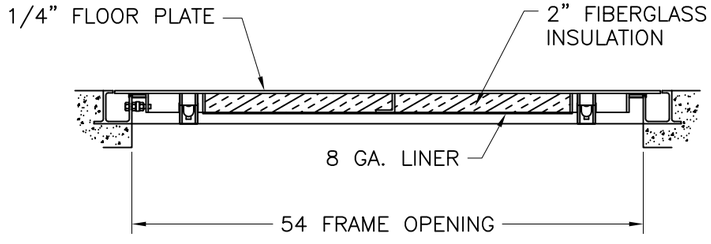
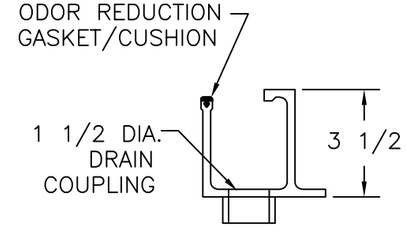






SELECTED FEATURES
1. S.S GAS SHOCKS
2. SLAMLOCK
3. OVERSIZED RECESSED PADLOCK
4. BITUMINOUS COATING
4. 2" STD. INSULATION

NOTES
1. MATERIAL: ALUMINUM
2. FINISH: MILL
3. LOADING: 300 PSF
4. 316 SS NUTS & BOLTS
5. AREA OF FRAME IN CONTACT WITH CONCRETE TO BE PAINTED WITH BITUMINOUS COATING
6. APPROX HATCH WT: 214.41 LBS



1/4" EXTRUDED TROUGH SECTION W/INTEGRAL CONT. ANCHOR FLANGE & GROOVE FOR GASKET/CUSHION
FRAME MAT'L: ALUMINUM 6063–T5

FRAME DETAIL

INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M

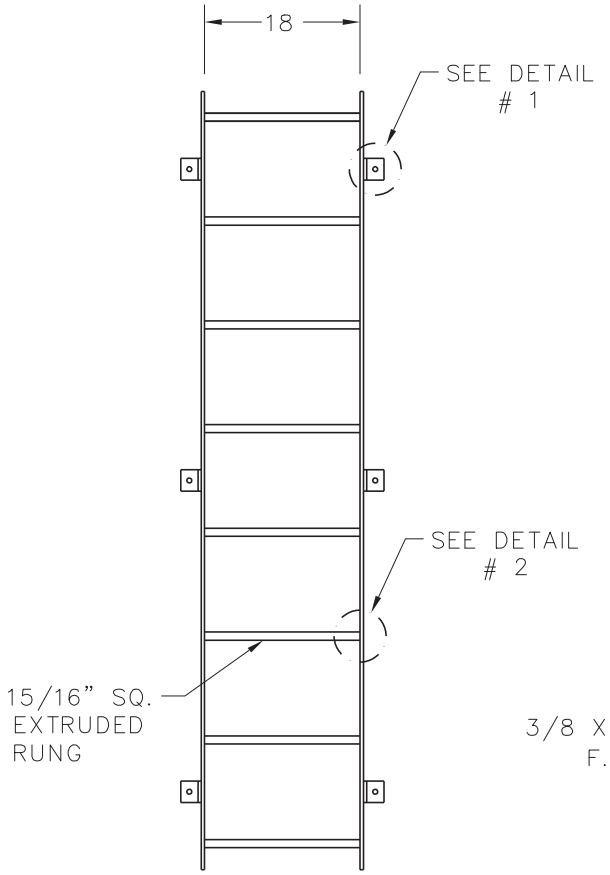
BREAK ALL SHARP CORNERS & EDGES TO 0.01

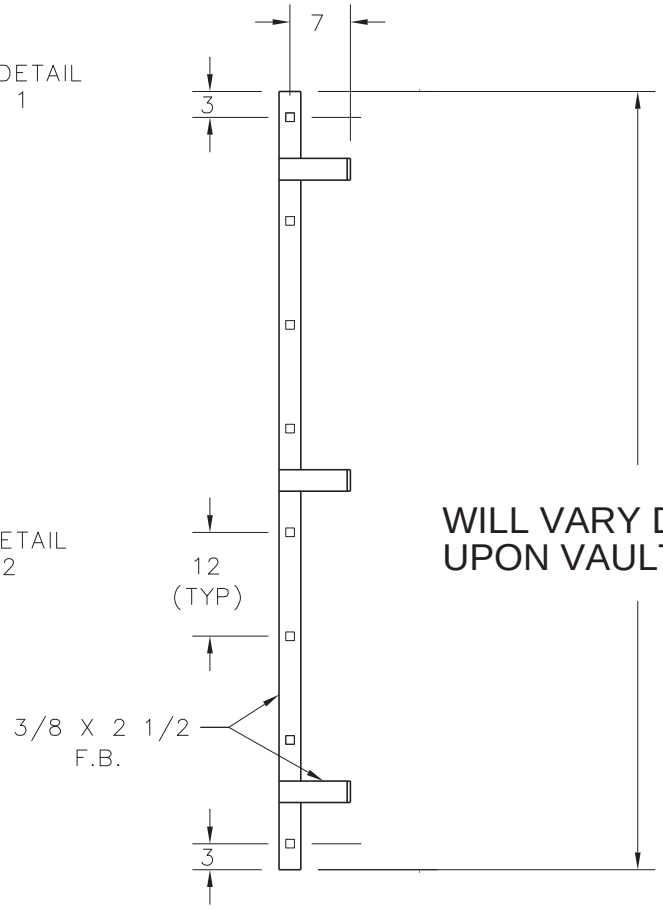
TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTIONAL
INCHES = ± 1/16
1/16 = ± 1/32
1/32 = ± 1/64

U.S.F. FABRICATION INC.
HIALEAH, FLORIDA

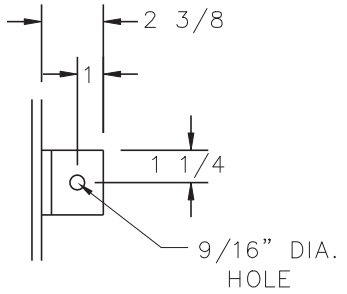
HATCH TPD 54 X 54 ALUM

DWN. BY:	SCALE:	SHEET:	DATE:
BOB	1:16	1 OF 1	09/16/19
CHK. BY:	DWG.#	SHEET SIZE:	REV:
C.S.	1000135133	B	0

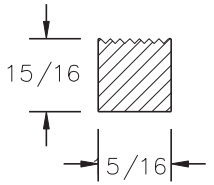




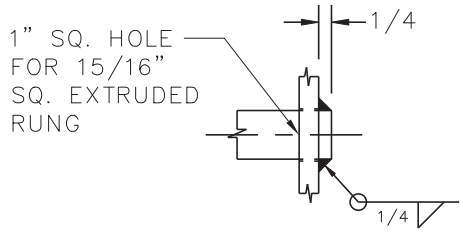
WILL VARY DEPENDING UPON VAULT HEIGHT



DETAIL # 1



RUNG DETAIL



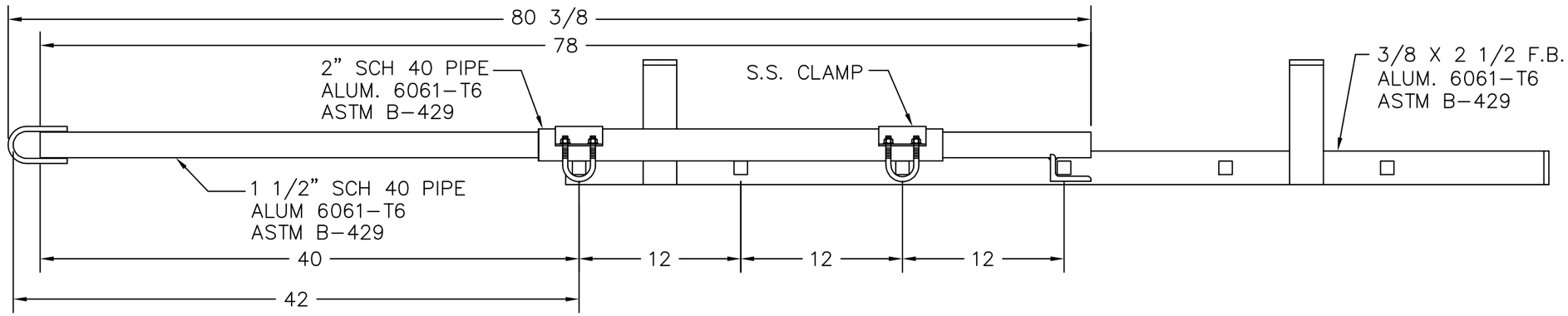
DETAIL # 2

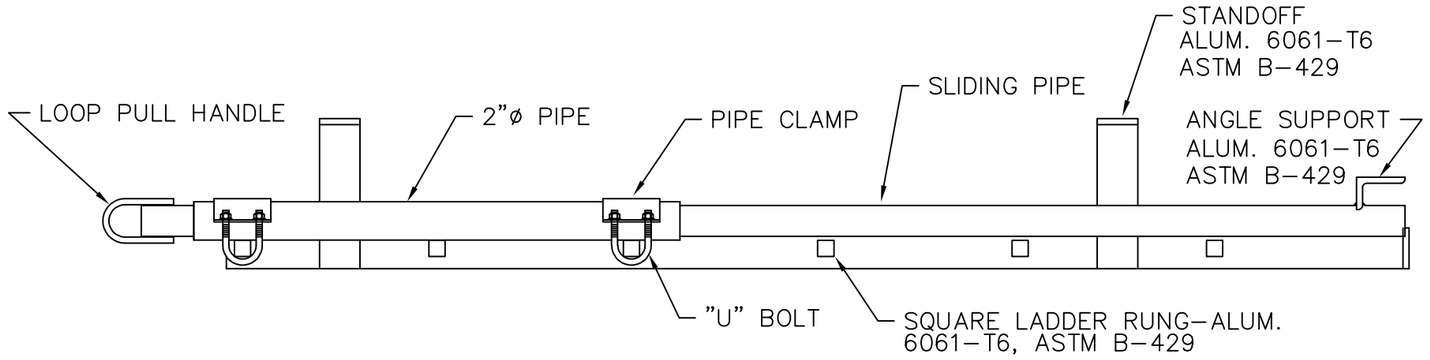
NOTES:
1– MATERIAL: ALUMINUM

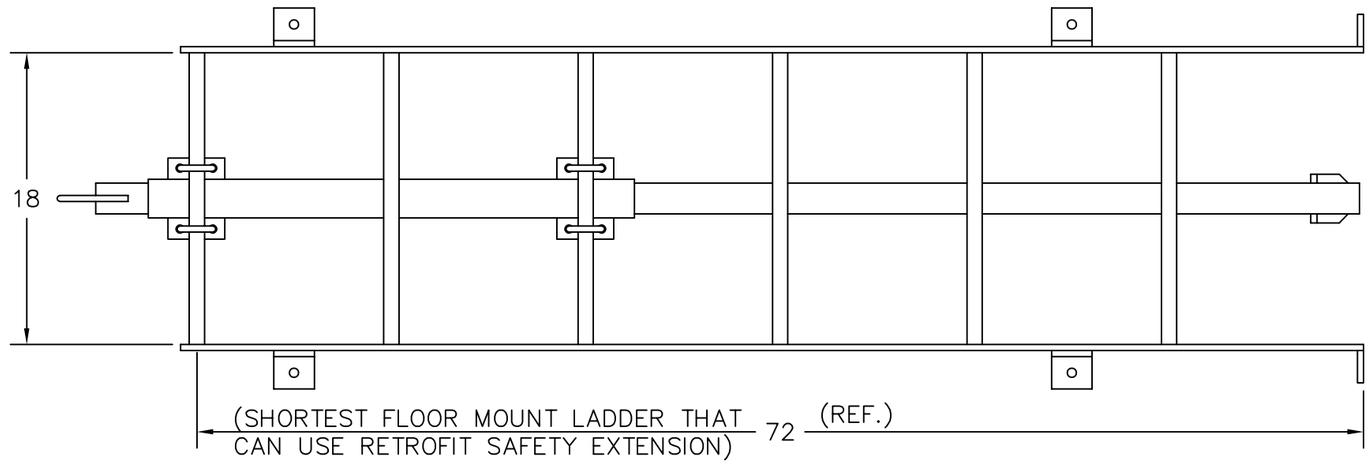
U.S.F. FABRICATION INC.
HIALEAH, FLORIDA

LADDER – WALL MOUNTED

DWN. BY: C.S.	SCALE: 1/16"=1"	QUOTE#	DATE: 11/28/05
CHK. BY:	DWG. NO: 42879	SHEET 1 OF 1	REV:







INSTALLATION & OPERATION INSTRUCTIONS

INSTALLATION INSTRUCTIONS:

1- PLACE THE LADDER ON A FLAT SURFACE WITH THE STANDOFFS FACING UP.

2- LAY THE SLIDING PIPE ASSEMBLY IN THE CENTER OF THE SQUARE LADDER RUNGS WITH THE PULL LOOP AT THE TOP OF THE LADDER.

3- PLACE THE (2) PIPE CLAMPS OVER THE 2"ø PIPE CENTERED ON THE FIRST AND THIRD RUNGS OF THE LADDER.

4- PLACE THE (4) "U" BOLTS OVER THE SQUARE RUNGS AND THROUGH THE HOLES IN THE PIPE CLAMPS.

5- TIGHTEN ALL THE "U" BOLT NUTS APPLYING 10 – 15 FT LB. TORQUE TO EACH.

6- VERIFY THAT THE EXTENSION ASSEMBLY IS ATTACHED SECURELY TO THE LADDER.

OPERATION INSTRUCTIONS:

1- TO ENGAGE THE SAFETY LADDER EXTENSION, GRASP THE LOOP HANDLE AT THE TOP OF THE SLIDING PIPE ASSEMBLY AND PULL STRAIGHT UP UNTIL THE ANGLE AT THE BOTTOM OF THE SLIDING PIPE PASSES THE SQUARE LADDER RUNG ON WHICH YOU WANT IT TO SEAT.

2- ROTATE THE SLIDING PIPE 180 DEG. AND LOWER THE ANGLE UNTIL IT SEATS SECURELY ON THE SQUARE LADDER RUNG.

3- VERIFY THAT THE EXTENSION IS SECURELY SEATED BEFORE STEPPING ONTO THE LADDER.

APPROXIMATE WEIGHT: 13 LBS.
MATERIAL: ALUMINUM

INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M

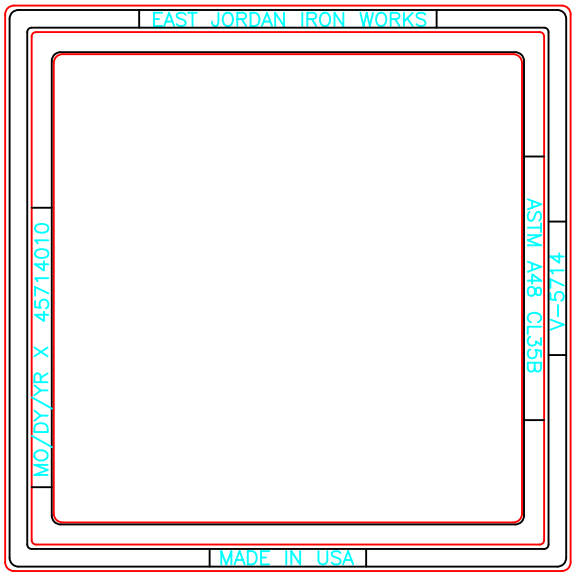
BREAK ALL SHARP CORNERS & EDGES TO 0.01

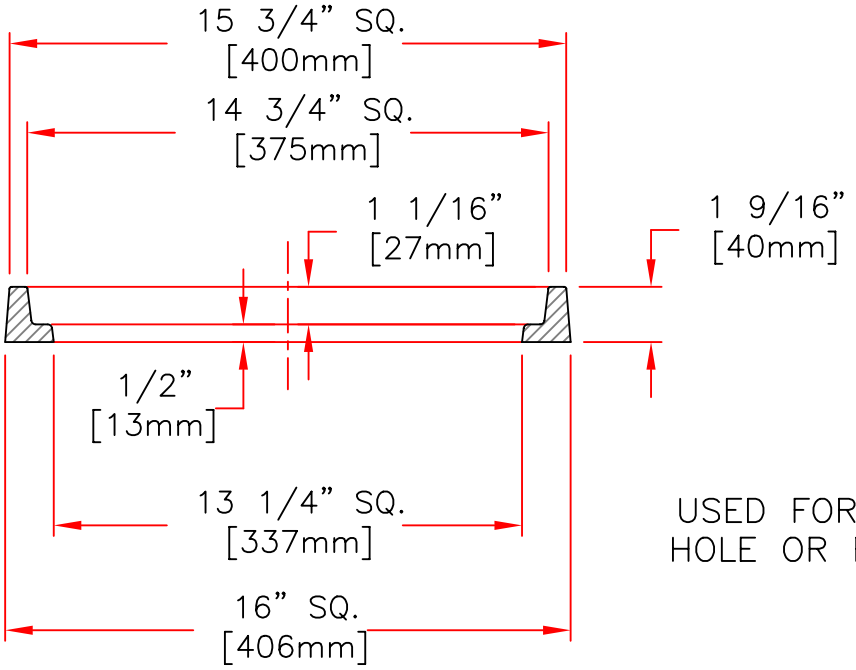
TOLERANCES UNLESS OTHERWISE SPECIFIED:
INCHES = ± 1/16
1/16 = ± 1/32
1/32 = ± 1/64

U.S.F. FABRICATION INC.
HIALEAH, FLORIDA

RETROFIT SAFETY EXTENSION FOR LADDER – ASSEMBLY DETAIL

DRAWN BY:	SCALE:	SHEET:	DATE:
RT	1=10	1 OF 2	10/19/15
APP'D BY:	DWG. NO:	SHEET SIZE:	REV:
RT	1000001804	B	0





USED FOR SUMP
HOLE OR RECESS

FRAME SECTION

EAST JORDAN
IRON WORKS, INC.
P.O. BOX 439
EAST JORDAN, MI. 49727
1-800-874-4100
FAX 231-536-4458

DRAWN	DATE
SBB	06/06/02
APPROVED	DATE

V-5714
FRAME

PRODUCT NO.
45714010

CATALOG NO.
V-5714

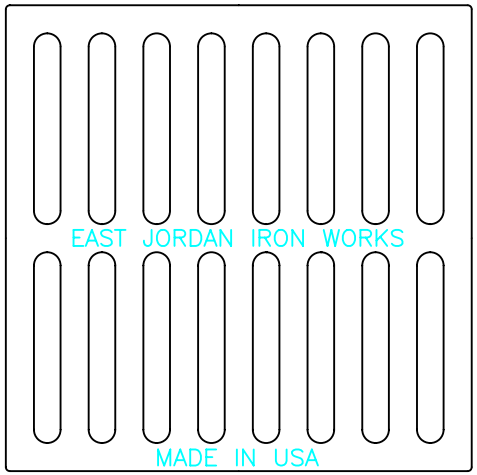
REF. PRODUCT DRAWING
45714013

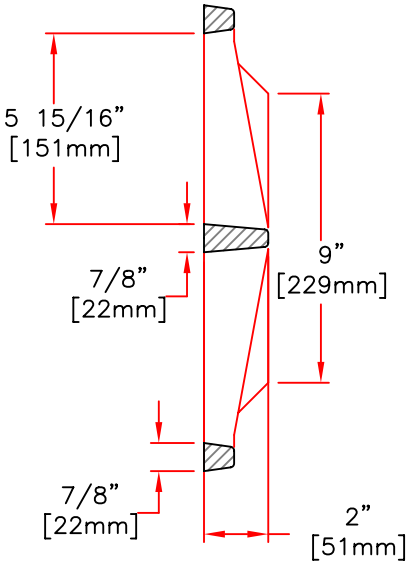
EST. WT.
FRAME: 22 LBS 10kg

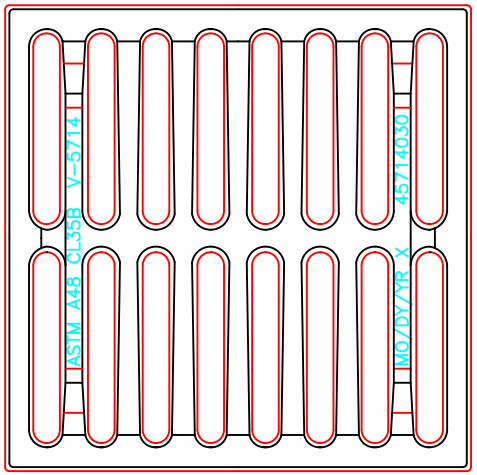
OPEN AREA
N/A

MAT'L SPEC.
FRAME – GRAY IRON
ASTM A48 CL35

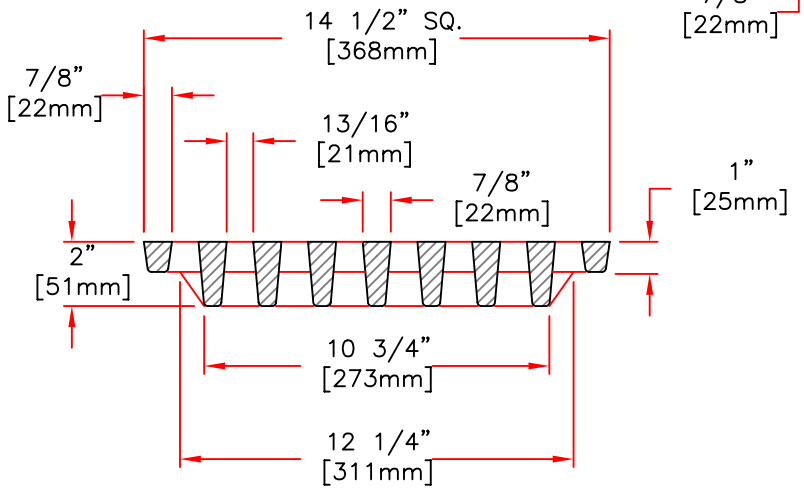
LOAD RATING
HEAVY DUTY







GRATE SECTION



GRATE SECTION

USED FOR SUMP
HOLE OR RECESS

EAST JORDAN
IRON WORKS, INC.
P.O. BOX 439
EAST JORDAN, MI. 49727
1-800-874-4100
FAX 231-536-4458

DRAWN	DATE
JIJ	02/04/02
APPROVED	DATE

V-5714
GRATE

PRODUCT NO.

45714030

CATALOG NO.

V-5714

REF. PRODUCT DRAWING

45714033

EST. WT.

GRATE: 45 LBS 20kg

OPEN AREA
76 sq. in.
[490sq. cm.]

MAT'L SPEC.

GRATE – GRAY IRON
ASTM A48 CL35

LOAD RATING

HEAVY DUTY

BH5011 Liquid Asphalt Coating Data Sheet

DESCRIPTION:

Blackhawk Liquid Asphalt Coating is a liquefied asphalt damp proofing compound formulated to be easily applied by roller brush or spray equipment. Blackhawk Liquid Asphalt Coating can be used as a primer on surfaces to receive Blackhawk Pipe Joint Mastic, Hawk-Seal, and Hawk-Wrap, or as a coating. It can be brushed, rolled, or sprayed on surface and dries to a tough, durable, and water-deterring layer that maintains excellent performance over a wide range of temperatures and conditions.

USES:

Blackhawk Liquid Asphalt Coating is used to create an impermeable, reinforcing, and water-deterring layer. Blackhawk Liquid Asphalt Coating can be used on surfaces below and above grade, interior, and exterior, wall, pipe, and cavity situations.

SURFACE PREPARATION:

Surface must be clean, dry and free from oil, grease, dirt, dust, and all other loose impediments to ensure excellent adhesion.

APPLICATION:

Apply to surface by brush, spray, or roller application. Material is ready to use as supplied. Do not thin with additional solvents.

BRUSH APPLICATION:

Apply with a wide fiber brush in order to create a smooth uniform film.

ROLLER APPLICATION:

Use appropriate roller size to cover the particular surface to be coated. Dip the entire head of roller into coating and allow dripping for a few seconds before use.

SPRAY APPLICATION:

Utilize a standard heavy-duty airless spray pump. Consult spray equipment manufacturers for details regarding pump ratio, spray tip, and hose requirements. Allow film to cure for at least 24 to 48 hours.

COVERAGE RATE:

Recommended coverage rate is 1 gallon per 300 square feet. Application rates will vary depending upon the surface to be covered.

PACKAGING:

Available in 5 gallon pails, 55 gallon drums, and 275 gallon plastic totes.

CARE OF TOOLS:

Dried material on equipment and brushes may be cleaned and removed with mineral spirits.

CAUTION:

For industrial use only. Keep out of reach of children. Dispose of empty containers in accordance with all local, state and federal regulations. Read Material Safety Data Sheet (MSDS) before using this product.

ErgonArmor TECHNICAL COATING SOLUTIONS™ | A Division of Ergon Asphalt & Emulsions, Inc. | P.O. Box 1639, Jackson, MS 39215-1639
913-371-1354 Fax | 877-98ARMOR | ergonarmor.com

BH5011 Liquid Asphalt Coating Data Sheet

CHEMICAL RESISTANCE:

Acids
Alkaline
Salts

SPECIFICATIONS:

ASTM D41
ASTM D449 Type I

PHYSICAL PROPERTIES

Color	Black
Weight per gallon	7.8 lbs
Cure Time	24 hours and can vary with climatic conditions
Application	Brush/Roll/Spray
Service Temp. Range	20° to 160°F
VOC Content	350 grams/liter

ORDERING INFORMATION

For additional information, prices, or to place an order, please contact your ErgonArmor sales representative. If you do not know the name of your sales representative, call 877-98ARMOR.

Data Sheet Revised July 2009

A Division of Ergon Asphalt & Emulsions, Inc. | P.O. Box 1639, Jackson, MS 39215-1639
913-371-1354 Fax | 877-98ARMOR | ergonarmor.com

vaughn
concrete products, inc.

12650 Tucson Street Henderson, Colorado 80640-9443 (303) 659-3747 Fax (303) 659-1333
2671 S. Greeley Hwy Cheyenne, Wyoming 82007-3681 (307) 634-0695 Fax (307) 634-0694
10021 Amarillo Blvd E. Amarillo, Texas 79108-7542 (806) 374-3747 Fax (806) 335-3717
Toll Free Phone (877) 827-8255 Toll Free Fax (877) 827-7363
www.vaughnconcreteproducts.com

MIX DESIGN

General: Type III Portland Cement Will Be Used.
(See Attached Mill Certification Sheet)

Mix Design B:

Each Yard Of Concrete Contains:

700 lbs.	**Type III Portland Cement**
1620 lbs.	**Coarse Aggregate**
1300 lbs.	**Fine Aggregate**

Water Based On Admixture
24-28 gal. w/ 50 oz. ViscoCrete 2110 Admixture

This Mix Design Is Used To Yield A Minimum 28 Day Compressive Strength Of 5000 PSI.

Aggregate Industries
Technical Services Department

Vaughn Concrete Products Gradation Report
April 2019

Plant: Platte Valley							
#67		1 in.	3/4 in.	1/2 in.	3/8 in.	No. 4	No. 8
04/01/2019		100.0	92.3	47.7	21.6	1.1	0.9
04/02/2019		100.0	90.1	42.0	22.7	3.1	0.8
04/03/2019		100.0	90.0	40.6	20.7	1.3	0.8
04/04/2019		100.0	91.3	39.9	21.1	2.3	0.9
04/05/2019		100.0	90.4	42.9	23.4	3.1	1.0
04/08/2019		100.0	93.0	44.3	24.9	2.1	0.9
04/09/2019		100.0	91.0	41.3	22.9	2.6	1.1
04/10/2019		100.0	92.6	44.3	25.4	2.6	0.8
04/11/2019		100.0	90.4	40.4	23.2	4.2	1.6
04/17/2019		100.0	90.2	39.4	20.1	1.1	0.6
04/19/2019		100.0	90.1	39.6	20.4	2.3	0.7
04/22/2019		100.0	91.3	39.6	20.7	1.6	0.4
04/23/2019		100.0	92.3	39.7	22.3	1.8	1.0
04/25/2019		100.0	91.6	40.3	24.9	3.9	0.8
04/26/2019		100.0	90.9	41.3	22.9	1.6	0.9
04/29/2019		100.0	91.3	39.0	22.7	1.6	0.8
	Average	100.0	91.2	41.4	22.5	2.3	0.9
	Std Dev For Avg	0.0	1.0	2.4	1.7	0.9	0.3

Aggregate Industries
Technical Services Department

Vaughn Concrete Products Gradation Report
April 2019

AGGREGATE INDUSTRIES

Plant Platte Valley										
Concrete Sand		No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	Pan	Fineness Modulus
04/01/2019		100.0	91.5	61.4	35.7	14.0	2.5	0.5	0.0	2.95
04/02/2019		100.0	92.3	62.7	34.4	13.6	2.9	1.0	0.0	2.94
04/03/2019		100.0	89.5	57.4	31.7	11.0	2.3	1.5	0.0	3.08
04/04/2019		100.0	90.9	61.8	33.1	12.4	2.6	0.8	0.0	2.99
04/05/2019		100.0	91.6	62.8	32.7	13.0	2.1	0.8	0.0	2.98
04/08/2019		100.0	92.9	63.7	33.0	12.7	3.0	1.2	0.0	2.95
04/09/2019		100.0	90.8	61.7	31.9	11.8	2.6	0.8	0.0	3.01
04/10/2019		100.0	92.1	64.4	33.7	13.9	2.4	0.9	0.0	2.94
04/11/2019		100.0	93.7	65.4	34.2	14.0	3.9	1.2	0.0	2.89
04/17/2019		100.0	92.6	64.8	37.6	13.2	3.9	0.9	0.0	2.88
04/19/2019		100.0	92.6	67.7	41.2	14.5	3.8	0.9	0.0	2.80
04/22/2019		100.0	93.7	66.4	38.7	13.9	2.6	0.9	0.0	2.85
04/23/2019		100.0	94.0	65.3	37.0	15.3	3.0	0.8	0.0	2.85
04/25/2019		100.0	93.9	67.2	36.0	14.7	2.9	0.8	0.0	2.85
04/26/2019		100.0	92.0	65.3	34.0	13.8	2.7	0.9	0.0	2.92
04/29/2019		100.0	91.8	66.0	35.7	14.2	3.0	0.8	0.0	2.89
	Average	100.0	92.2	64.0	35.0	13.5	2.9	0.9	0.0	2.92
	Std Dev For Avg	0.0	1.2	2.6	2.6	1.1	0.6	0.2	0.0	0.07

P.O. Box 529
Lyons, CO 80540
Plant (303) 823-2100
Sales (303) 475-3988

CEMENT MILL TEST REPORT

Cement Identified as:

Plant: CEMEX Lyons Cement **TYPE III & HE CEMENT** **Date: 6/13/2019**

Location: Lyons, CO

Production Dates:

Beginning: May 1, 2019

Ending: May 31, 2019

STANDARD CHEMICAL REQUIREMENTS (ASTM C114)	TEST RESULTS		ASTM C150 SPEC.	TYPE III	ASTM C1157 SPEC.	TYPE HE
Silicon Dioxide (SiO_2), %	**20.7**			----		----
Aluminum Oxide (Al_2O_3), %	**4.3**			----		----
Ferric Oxide (Fe_2O_3), %	**3.0**			----		----
Calcium Oxide (CaO), %	**64.3**			----		----
Magnesium Oxide (MgO), %	**1.0**		Maximum	6.0		----
Sulfur Trioxide (SO_3), % **	**3.7**		Maximum	3.5**		----
Loss on Ignition (LOI), %	**2.1**		Maximum	3.5		----
Insoluble Residue, %	**0.39**		Maximum	1.5		----
Alkalies (Na_2O equivalent), %	**0.76**			----		----
Tricalcium Silicate (C_3S), % *	**56**			----		----
Dicalcium Silicate (C_2S), % *	**16**			----		----
Tricalcium Aluminate (C_3A), % *	**6**		Maximum	15		----
Tetracalcium Aluminoferrite (C_4AF), % *	**9**			----		----
($C_4AF + 2C_3A$) or ($C_4AF + C_2F$), %	**22**			----		----
CO_2, %	**1.7**			----		----
Limestone, %	**4.0**		Maximum	5.0		----
$CaCO_3$ in Limestone, %	**96**		Minimum	70		----
PHYSICAL REQUIREMENTS						
(ASTM C 204) Blaine Fineness, cm^2/gm	**5160**			----		----
(ASTM C 430) -325 Mesh, %	**99.1**			----		----
(ASTM C 191) Time of Setting (Vicat)						
Initial Set, minutes	**105**		Min. - Max.	45 - 375	Min. - Max.	45 - 420
Final Set, minutes	**200**			----		----
(ASTM C 451) False Set, %	**83**		Minimum	50	Minimum	50
(ASTM C 185) Air Content, %	**7**		Maximum	12	Maximum	----
(ASTM C 151) Autoclave Expansion, %	**-0.03**		Maximum	0.80	Maximum	0.80
(ASTM C 187) Normal Consistency, %	**28.0**			----		----
(ASTM C 1038) Expansion in Water, %	**0.006**		Maximum	0.020	Maximum	0.020
(ASTM C 109) Compressive Strength, psi (MPa)	psi	MPa				
1 Day	**3890**	**26.8**	Minimum	1740 (12.0)	Minimum	1450 (10)
3 Day	**5380**	**37.1**	Minimum	3480 (24.0)	Minimum	2470 (17)
7 Day	**6550**	**45.2**		----		----

*** Note D in Table 1 of ASTM C150-17 allows for additional sulfate, provided expansion as measured by ASTM C1038 does not exceed 0.020%.*

** Adjusted for Limestone Addition per ASTM C 150-17, A1.6*

CEMEX hereby certifies that this cement meets or exceeds the chemical and physical Specifications of:

ASTM C150 - 17 for Type III Portland Cement
ASTM C1157 - 11 for Type HE Hydraulic Cement

By: Timothy W. Rawlsky
Quality Control Manager
CEMEX - Lyons Cement Plant

Sika ViscoCrete® Technology

Sika® ViscoCrete® 2110

High Range Water Reducing Admixture

Construction

Description

Sika ViscoCrete 2110 is a high range water reducer and superplasticizer utilizing Sika's ViscoCrete' polycarboxylate polymer technology. Sika ViscoCrete 2110 meets the requirements for ASTMC-494 Types A and F and AASHTO M-194 Types A and F.

Applications

Sika ViscoCrete 2110 may be used in both ready mix and precast applications, as a plant added high range water reducer to provide excellent plasticity while maintaining slump for up to 90 minutes. Controlled set times make Sika ViscoCrete 2110 ideal for horizontal and vertical applications. Sika ViscoCrete 2110 is ideal for production of Self Consolidating Concrete (SCC).

Advantages

Sika ViscoCrete 2110 can be used for all levels of water reduction in various types of concrete ranging from dry cast applications, conventional concrete to SCC (Self Consolidating Concrete). Sika ViscoCrete 2110 will deliver water reduction up to 45% The special formulation of Sika ViscoCrete 2110 increases compressive strength of concrete and helps maintain the plasticity of the concrete over prolonged period of time. Sika ViscoCrete 2110 extends concrete workability time during warmer months when slump loss and fast stiffening of the fresh concrete can be a concern. The superplasticizing action of Sika ViscoCrete 2110 provides high slump / flowing concrete that can be placed with minimal or no vibration even at very low water cement ratios as low as 0.25.

Water Reduction: Sika ViscoCrete 2110 can be dosed in small amounts to obtain water reduction from 10-15%, and will achieve water reduction up to 45% at high dosage rates. Sika ViscoCrete 2110 is suitable for all levels of water reduction.

Plasticizing effect: The superplasticizing action of Sika ViscoCrete 2110 provides high-slump, flowing concrete that maintains excellent workability and may be placed with minimal vibration even at very low water cement ratio's as low as 0.25. Sika ViscoCrete 2110 plasticized concrete is highly fluid while maintaining complete cohesion within the concrete matrix to eliminate excessive bleeding or segregation.

Extended Slump Life and Set Control: Sika ViscoCrete 2110 has been formulated to provide controlled and predictable extended slump life for periods of 60 to 90 minutes with normal set times. The combined high range water reduction and superplasticizing action of Sika ViscoCrete 2110 provide the following benefits in hardened concrete:

Higher ultimate strengths allow for greater engineering design flexibility and structural economy. Reduced water cement ratios produce more durable, dense concrete with reduced permeability. Highly effective plasticizer reduces surface defects in concrete elements and improves aesthetic appearance.

Sika ViscoCrete 2110 has been formulated to provide maximum water reduction and extended slump retention throughout entire dosage range.

- Extended slump life
- Increased compressive strength when compared to reference concrete with same w/c ratio
- High early compressive strengths for earlier removal of forms and structural use of concrete.
- High ultimate strengths allow for greater engineering design flexibility and structural economies.
- Reduced water cement ratios produce more durable, dense concrete with reduced permeability.
- Highly effective plasticizer reduces surface defects in concrete elements and improves aesthetic appearance.
- Ideal for the production of Self Consolidating Concrete.

How to Use

Dosage

Dosage rates will vary according to materials used, ambient conditions and the requirements of a specific project. Sika recommends dosage at 3-8 fl. oz. per 100 lbs. (195-520 ml/100 kg) of cementitious materials for general concrete applications. If maximum water reduction is required, dosage up to 12 fl. oz./100 lbs (780 ml/100 kg) of cementitious may be used. In this case, delayed setting times may occur. Dosage rates outside the recommended range may be used where specialized materials such as microsilica are specified, extreme ambient conditions are encountered or unusual project conditions require special consideration. In this case please contact your local regional office or technical service department at 1-800-933-7452 for further information.

Construction

Cure Mechanism	Proper curing according to ACI guidelines should be always followed to achieve maximum possible quality of concrete.
Mixing	For best superplasticizing results, add Sika ViscoCrete 2110 directly to freshly mixed concrete in the concrete mixer at the end of the batching cycle. Sika ViscoCrete 2110 may also be dispensed as an integral material during the regular admixture batching cycle, or into freshly mixed concrete in a Ready Mix truck, at the concrete plant or at the job site. To optimize the superplasticizing effect after the addition of Sika ViscoCrete 2110, Sika recommends that the combined materials be mixed for 80-100 revolutions either in the concrete mixer or in the Ready Mix truck. **Combination with other admixtures:** Sika ViscoCrete 2110 is highly effective as a single admixture or in combination with other Sika admixtures. If used in combination with certain Sikament high range water reducers it may affect the plastic properties of fresh concrete. Please contact your local regional office or technical service department at 1-800-933-7452 for further information. **Combination with microsilica:** Sika ViscoCrete 2110 is particularly well suited for use with microsilica because of its water reduction capability. Do not introduce Sika ViscoCrete 2110 directly onto dry cementitious materials.
Packaging	Sika ViscoCrete 2110 is available in 55 gallon drum (208 liter), 275 gallon totes (1040 liters) drums and bulk delivery.
Storage and Shelf-life	Shelf life when stored in dry warehouse conditions between 50°F and 80°F (10°C - 27°C) is one year minimum. Sika ViscoCrete 2110 should be stored at above 40°F (5°C). If frozen, thaw and agitate thoroughly to return to normal state.
Typical Data	
Appearance	Orange liquid
Specific Gravity	Approx. 1.1
CAUTION: IRRITANT	May cause eye/skin/respiratory irritation. May be harmful if swallowed.
Handling and Storage	Avoid direct contact. Wear personal protective equipment (chemical resistant goggles/gloves/clothing) to prevent direct contact with skin and eyes. Use only in well ventilated areas. Wash thoroughly with soap and water after use. Remove contaminated clothing and launder before reuse.
First Aid	**Eyes:** Hold eyelids apart and flush thoroughly with water for 15 minutes. **Skin:** Remove contaminated clothing. Wash skin thoroughly for 15 minutes with soap and water. **Inhalation:** Remove person to fresh air. **Ingestion:** Do not induce vomiting. Dilute with water. Contact physician. **In all cases contact a physician immediately if symptoms persist.**
Clean Up	Use personal protective equipment (chemical resistant goggles/gloves/clothing). Without direct contact, remove spilled or excess product and place in suitable sealed container. Dispose of excess product and container in accordance with applicable environmental regulations.

KEEP CONTAINER TIGHTLY CLOSED • KEEP OUT OF REACH OF CHILDREN • NOT FOR INTERNAL CONSUMPTION • FOR INDUSTRIAL USE ONLY

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: (201) 933-8800
Fax: (201) 933-6225
www.sikausa.com

Sika Canada Inc.
601, Delmar Avenue
Pointe-Claire, QC H9R 4A9
Phone: (514) 697-2610
Fax: (514) 697-3087
www.sika.ca

1-800-933-SIKA

Regional Information and Sales Centers. For the location of your nearest Sika representative, contact your regional center.

U.S. : **North East Region:** Fairless Hills, PA, Phone: (215) 295 -6600 **North Central Region:** Marion, OH, Phone: (800) 851-1545
South East Region: Conyers, GA, Phone: (770) 760-1300 **South Central Region:** Mesquite, TX, Phone: (972) 289-6480
Western Region: Santa Fe Springs, CA, Phone: (562) 903-3650

Canada: **Ontario:** Mississauga, ON, Phone: (905) 795-3177, **Alberta:** Edmonton, AB, Phone: (780) 486-6111

Quality Certification Numbers: Lyndhurst: FM 69711 (ISO 9000), FM 70421 (QS 9000), Marion: FM 69715, Kansas City: FM 69107, Santa Fe Springs: FM 69408

Product Data Sheet
Edition 09.25.2009
Identification no. 147-540
Sika Air

Construction

Sika® Air

Air Entraining Admixture

Description

Sika Air admixture is an aqueous solution of organic materials.

Sika Air meets the requirements of ASTM C-260 for air entraining admixtures.

Applications

Sika Air is recommended for use whenever air entrained concrete is desired. Ready-mix, precast and block producers can achieve predictable and uniform entrained air contents in concrete, even where harsh lean mixes are used or fly-ash is added to the concrete.

Advantages

Durability:

- Air entrainment is recognized as the most effective prevention against concrete scaling in exposed environments. Air entrained concrete delivers particular benefits in the form of increased concrete durability. This is important in colder climates where frost and freeze-thaw cycles can cause scaling and damage to the concrete surface.
- Air entraining agents help to prevent scaling by creating microscopic air voids that water trapped in the concrete can expand into when the concrete freezes, thus preventing cracks caused by the natural expansion. Entrained air voids in the concrete will also increase durability in harsh environments where concrete is exposed to deicing salts, marine salts and sulfates.

Workability and Placeability:

- Workability and placeability are also improved by the lubricating action of the microscopic bubbles in the concrete. Concrete will flow better, and bleeding and shrinkage will be reduced because less water is needed to obtain the desired workability.

How to Use

Dosage

Dosage rates for Sika Air will typically fall between 0.5 and 3 fl. oz. per 100 lbs. (32 - 195 ml/100 kg) of cementitious to entrain between 4 and 6 percent air. Higher air contents may be obtained by increasing the dosage rate.

Dosage rates will vary depending on the air content required for a particular project. Typically air contents will be specified in the range of 4 to 8 percent by volume.

Other factors that may affect the amount of air entrained into the concrete including total cementitious content, type of pozzolanic materials, sand gradation, salt/clay in aggregates, temperature and water content. The use of fly ash, particularly high LOI fly ash, can result in a higher dosage of air entrainment. Sika recommends that trial mixes be performed whenever material or any other changes are made that may affect the amount of entrained air.

In mixes requiring a lower or higher amount dosage rate, please contact your local regional Sika office or Sika technical service department at 1-800-933-7452 for further information.

Construction

Mixing	Measure the required quantity per batch manually or with automatic dispenser equipment. Add Sika Air to mixing water or sand. Do not mix with dry cement. When Sika Air is used in combination with other admixtures, care must be taken to dispense each admixture separately into the mix. **Combination with Other Admixtures:** Combination with other admixtures, particularly water reducers and retarders, may increase the amount of entrained air in the mix. Air contents should be checked with an air-meter after batching and dosage adjustments made at the concrete plant.
Packaging	Sika Air is available in 55 gallon drum (208 liter), 275 gallon totes (1040 liters) drums and bulk delivery.
Storage and Shelf life	Sika Air should be stored at above 40°F (5°C). If frozen, thaw and agitate thoroughly to return to normal state. Shelf life when stored in dry warehouse conditions between 50°F and 80°F (10°C - 27°C) is one year.

Typical Data

Appearance	Dark Amber liquid.
Specific Gravity	Approx. 1.0
CAUTION: IRRITANT	Contains Aqueous Solution (CAS:Mixture). May cause eye/skin/respiratory irritaton. May be harmful if swallowed.
Handling and Storage	Avoid direct contact. Wear personal protective equipment (chemical resistant goggles/gloves/clothing) to prevent direct contact with skin and eyes. Use only in well ventilated areas. Wash thoroughly with soap and water after use. Remove contaminated clothing and launder before reuse.
First Aid	**Eyes:** Hold eyelids apart and flush thoroughly with water for 15 minutes. **Skin:** Remove contaminated clothing. Wash skin thoroughly for 15 minutes with soap and water. **Inhalation:** Remove person to fresh air. **Ingestion:** Do not induce vomiting. Dilute with water. Contact physician. **In all cases contact a physician immediately if symptoms persist.**
Safety	Tested and Certified by WQA according to NSF/ANSI 61 Section 5 for materials safety.
Clean Up	Use personal protective equipment (chemical resistant goggles/gloves/clothing). Without direct contact, remove spilled or excess product and place in suitable sealed container. Dispose of excess product and container in accordance with applicable environmental regulations.

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Phone: (201) 933-8800
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www.sikaconstruction.com

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South East Region: Conyers, GA, Phone: (770) 760-1300 **South Central Region:** Mesquite, TX, Phone: (972) 289-6480
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Canada: **Ontario:** Mississauga, ON, Phone: (905) 795-3177, **Alberta:** Edmonton, AB, Phone: (780) 486-6111

Quality Certification Numbers: Lyndhurst: FM 69711 (ISO 9000), FM 70421 (QS 9000), Marion: FM 69715, Kansas City: FM 69107, Santa Fe Springs: FM 69408

BAYOU STEEL GROUP
VINTON

MILL TEST CERTIFICATE
MANUFACTURER: BAYOU STEEL GROUP VINTON

SOLD TO: VAUGHN CONCRETE PRODUCTS, INC.
12650 TUCSON STREET
HENDERSON CO 80640

SHIP TO: VAUGHN CONCRETE - WY
S. GREELEY HWY
CHEYENNE WY 82007

PROGRAM NUMBER: 80650918

MATERIAL: RV13706D11PA #4 X 40' GRADE 60 (ASTM A706) (ASTM A706/A706M)
DELIVERY LIST NUMBER:
P.O. CUSTOMER NUMBER: MIKE81916

ISSUING DATE: 23.08.2016
CERTIFICATE NUMBER: 44250
PAGE: 1/1

MECHANICAL PROPERTIES

HEAT NUMBER	YIELD STRENGTH psi	TENSILE STRENGTH psi	PERCENT ELONGATION %	BEND	ACTUAL W. PER FOOT lb/ft
1611538	70100	93500	15	ACCEPTABLE	0.633
1621627	69575	94300	16	ACCEPTABLE	0.635

CHEMICAL COMPOSITION

HEAT NUMBER	C %	Mn %	P %	S %	Si %	Ni %	Cr %	Mo %	Cu %	V %	Cb %	CE %			
1611538	0.2311	1.1369	0.0242	0.0362	0.1908	0.1396	0.2365	0.0426	0.2863	0.0344	0.0010	0.4539			
1621627	0.2567	1.1653	0.0197	0.0224	0.1623	0.1070	0.1652	0.0299	0.2831	0.0364	-0.001	0.4758			

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.
MELTED AND MANUFACTURED IN THE U.S.A.
This reinforcing steel meets all the requirements of the Buy America Act requirements of 23 CFR 635.410
Approved by BSGV Quality Assurance
Manual REV-20 10/09/2014

Hector De Aguero

CERTIFIED BY THE QUALITY DEPARTMENT - SIGNATURE ON FILE

MAILING ADDRESS
BAYOU STEEL GROUP VINTON P.O. BOX 12843
EL PASO, TEXAS 79913-0843 915 886-2000

STREET ADDRESS
I-10 & VINTON ROAD
VINTON, TEXAS 79835-9998

BAYOU STEEL GROUP
VINTON

MILL TEST CERTIFICATE
MANUFACTURER: BAYOU STEEL GROUP VINTON

SOLD TO: VAUGHN CONCRETE PRODUCTS, INC.
12650 TUCSON STREET
HENDERSON CO 80640

SHIP TO: VAUGHN CONCRETE PRODUCTS, INC.
12650 TUCSON STREET
HENDERSON CO 80640

PROGRAM NUMBER: 80655321

MATERIAL: RV16706D14PA #5 X 40' GRADE 60 (ASTM A706) (ASTM A706/A706M)
DELIVERY LIST NUMBER: 910039207
P.O. CUSTOMER NUMBER: M29-2

ISSUING DATE: 12.04.2017
CERTIFICATE NUMBER: 47716
PAGE: 1/1

MECHANICAL PROPERTIES

HEAT NUMBER	YIELD STRENGTH psi	TENSILE STRENGTH psi	PERCENT ELONGATION %	BEND	ACTUAL W. PER FOOT lb/ft
1710721	71290	93226	18	ACCEPTABLE	0.993
1720786	69355	95645	17	ACCEPTABLE	0.991

CHEMICAL COMPOSITION

HEAT NUMBER	C %	Mn %	P %	S %	Si %	Ni %	Cr %	Mo %	Cu %	V %	Cb %	CE %			
1710721	0.2570	0.9620	0.0151	0.0266	0.1432	0.1013	0.2213	0.0184	0.2630	0.0319	-0.000	0.4476			
1720786	0.2808	0.9606	0.0171	0.0287	0.1778	0.1147	0.1906	0.0210	0.3027	0.0330	-0.000	0.4730			

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.
MELTED AND MANUFACTURED IN THE U.S.A.
This reinforcing steel meets all the requirements of the Buy America Act requirements of 23 CFR 635.410
Approved by BSGV Quality Assurance
Manual REV-20 10/09/2014

Hector De Aguino

CERTIFIED BY THE QUALITY DEPARTMENT - SIGNATURE ON FILE

MAILING ADDRESS
BAYOU STEEL GROUP VINTON P.O. BOX 12843
EL PASO, TEXAS 79913-0843 915 886-2000

STREET ADDRESS
I-10 & VINTON ROAD
VINTON, TEXAS 79835-9998

BAYOU STEEL GROUP
VINTON

MILL TEST CERTIFICATE
MANUFACTURER: BAYOU STEEL GROUP VINTON

SOLD TO: VAUGHN CONCRETE PRODUCTS, INC.
12650 TUCSON STREET
HENDERSON CO 80640

SHIP TO: VAUGHN CONCRETE PRODUCTS, INC.
12650 TUCSON STREET
HENDERSON CO 80640

PROGRAM NUMBER: 0080655686

MATERIAL: RV19706D15PA #6 X 40' GRADE 60 (ASTM A706) (ASTM A706/A706M)
DELIVERY LIST NUMBER:
P.O. CUSTOMER NUMBER: M29-2

ISSUING DATE: 27.04.2017
CERTIFICATE NUMBER: 47985
PAGE: 1/1

MECHANICAL PROPERTIES

HEAT NUMBER	YIELD STRENGTH psi	TENSILE STRENGTH psi	PERCENT ELONGATION %	BEND	ACTUAL W. PER FOOT lb/ft
1720891	68182	92159	15	ACCEPTABLE	1.457

CHEMICAL COMPOSITION

HEAT NUMBER	C %	Mn %	P %	S %	Si %	Ni %	Cr %	Mo %	Cu %	V %	Cb %	CE %			
1720891	0.2644	1.1131	0.0107	0.0235	0.1664	0.0883	0.2195	0.0183	0.1690	0.0270	0.0013	0.4771			

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.
MELTED AND MANUFACTURED IN THE U.S.A.
This reinforcing steel meets all the requirements of the Buy America Act requirements of 23 CFR 635.410
Approved by BSGV Quality Assurance
Manual REV-20 10/09/2014

Hector De Cequino

CERTIFIED BY THE QUALITY DEPARTMENT - SIGNATURE ON FILE

MAILING ADDRESS
BAYOU STEEL GROUP VINTON P.O. BOX 12843
EL PASO, TEXAS 79913-0843 915 886-2000

STREET ADDRESS
I-10 & VINTON ROAD
VINTON, TEXAS 79835-9998

Oklahoma Steel and Wire

Highway 70 South
Madill, OK 73446
(580) 795-7311 (800) 654-4164 Fax (580) 795-7422

Physical Test Report

Date: 05/02/2017
Customer Name VAUGHN CONCRETE PRODUCTS
Customer Address: 10021 AMARILLO BLVD EAST

AMARILLO, TX 79107
Customer Order Number: 00322907
PONumber: MIKE 3/27-4
Item Number: 3026-0
Item Description: 6X6XD10XD10 8'X20' BLK

First Bundle #: 212686
Last Bundle #: 212691
Pieces Per Bundle: 15
Number of Bundles: 6
Number of Pieces: 90

Description	Original Diameter	Original Area	Breaking Strength LBS	Tensile Strength PSI	Yield Strength LBS	Reduced Diameter	Reduced Area	Percent Reduction of Area	Bend Test	Weld Shear Test 1	Weld Shear Test 2	Weld Shear Test 3	Weld Shear Test 4	Required Weld Shear
Line Wire	0.357	0.100	10588	105776	0	0.000	0.000	100.00	Pass	4748	4677	4492	4310	3504
Cross Wire	0.357	0.100	11098	110871	0	0.000	0.000	100.00						

CHEMICAL PROPERTIES

Description	Heat Number	Carbon	Manganese	Phosphorus	Sulfur	Silicon
Line Wire	1720919	0.080	0.410	0.011	0.026	0.150
Cross Wire	1720919	0.080	0.410	0.011	0.026	0.150

This material has been produced and tested
in acordance withthe requirements of ASTM 1064-16
and we hereby certify that the above test results are
representative of those obtainedon the material in this shipment.
The raw material used to produce this product was
melted and rolled in the United States.

Quality Manager
Oklahoma Steel and Wire Co., Inc.

Sworn and Subscribed to before me this
26th Day of June, 2017 A.D.

Notary Public

My Commisson Expires

NOTARY PUBLIC State of OK
TINO DIAZ
Comm. # 09004486
Expires 05-27-2021

ConSeal™ Concrete Sealants INC.

CS102

Butyl Rubber Sealant For All Precast Structures; Meets Specs.

APPLICATIONS

For self-sealing joints in: Manholes, Concrete Vaults, Septic Tanks, Concrete Pipe, Box Culverts, Utility Vaults, Burial Vaults, and Vertical Panel Structures.

SEALING PROPERTIES

- Provides permanently flexible watertight joints.
- Low to high temperature workability: 30°F to 120°F (-1°C to 48°C)
- Rugged service temperature: -30°F to +200°F (-34°C to +93°C)
- Excellent chemical and mechanical adhesion to clean, dry surfaces.
- Sealed Joints will not shrink, harden or oxide upon aging.
- No priming normally necessary. When confronted with difficult installation conditions, such as wet concrete or temperatures below 40°F (4°C), priming the concrete will improve the bonding action. Consult Concrete Sealants for the proper primer to meet your application.

HYDROSTATIC STRENGTH

ConSeal CS-102 meets the hydrostatic performance requirement as set forth In ASTM C-990 section 10.1 (Performance requirement: 10psi for 10 minutes in straight alignment – in plant, quality control test for joint materials.)

SPECIFICATIONS

ConSeal CS-102 meets or exceeds the requirements of Federal Specification SS-S-210 (210-A), AASHTO M-198B, and ASTM C-990-91.

P.O. Box 176, New Carlisle OH, 45344 • 937.845.8776 or 800.332.7325
FAX 937-845-3587 • www.conseal.com

ConSeal™ Concrete Sealants INC.

CS102

Butyl Rubber Sealant For All Precast Structures; Meets Specs.

PHYSICAL PROPERTIES

	Spec	Required*	CS 102
Hydrocarbon blend content % by weight	ASTM D4 (mod.)	50% min.	51%
Inert mineral filler % by weight	AASHTO T111	30% min.	35%
Volatile Matter % by weight	ASTM D6	2% max.	1.2
Specific Gravity, 77°F	ASTM D71	1.15-1.50	1.25
Ductility, 77°F	ASTM D113	5.0 min.	10
Penetration, cone 77°F, 150 gm. 5 sec.	ASTM D217	50-100	55-60
Penetration, cone 32°F, 150 gm. 5 sec.	ASTM D217	40 mm	40-65
Flash Point, C.O.C., °F	ASTM D92	350°F min.	450°F
Fire point, C.O.C., °F	ASTM D92	375°F min.	475°F

IMMERSION TESTING

- 30-Day Immersion Testing: No visible deterioration when tested in 5% Caustic Potash, 5% Hydrochloric Acid, 5% Sulfuric Acid, and 5% saturated Hydrogen Sulfide. *

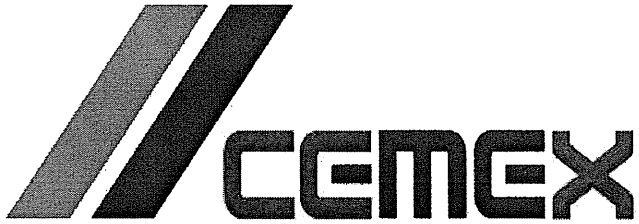
- One Year Immersion Testing: No visible deterioration when tested in 5% Formaldehyde, 5% Formic Acid, 5% Sulfuric Acid, 5% Hydrochloric Acid, 5% Sodium Hydroxide, 5% Hydrogen Sulfide and 5% Potassium Hydroxide.

- Requirements of ASTM C-990 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.

P.O. Box 176, New Carlisle OH, 45344 • 937.845.8776 or 800.332.7325
FAX 937-845-3587 • www.conseal.com

MATERIAL SAFETY DATA SHEET (MSDS) FOR PORTLAND CEMENT

(Complies with OSHA's Hazard Communication Standard, 29 CFR 1910.1200)



CEMEX, INC.

Section 1 - IDENTIFICATION

Supplier/Manufacturer	Emergency Contact Information
CEMEX, Inc. 5134 Ute Highway Lyons, CO 80540	(303) 823-2100
Chemical name and synonyms	**Product name**
Portland Cement (CAS #65997-15-1)	"CEMEX Type I" "CEMEX Type I/II" "CEMEX Type I/II-Low Alkali" "CEMEX Product" "CEMEX Type III-Low Alkali" "CEMEX Type V-Low Alkali"
Chemical family	**Formula**
Calcium salts	$3CaO.SiO_2$ (CAS#12168-85-3) $2CaO.SiO_2$ (CAS#10034-77-2) $3CaO.Al_2O_2$ (CAS#12042-78-3) $4CaO..Al_2O_3Fe_2O_3$ (CAS#12068-35-8) $CaSO_2.2H_2O$ (CAS#13397-24-5)
Other salts:	Small amounts of MgO, and trace amounts of K_2SO_4 and Na_2SO_4 may also be present.

Section 2 - COMPONENTS

Hazardous Ingredients

Portland cement clinker (CAS#65997-15-1) - approximately - 93.5-96.0% by weight
ACGIH TLV-TWA (1996)=10 mg total dust/m^3
OSHA PEL (8-hour TWA)=50 million particles/ft^3

Gypsum (CAS#7778-18-9) - approximately - 4.0-6.5% by weight
ACGIH TLV-TWA (1996)=10 mg total dust/m^3
OSHA PEL (8-hour TWA)= 10 mg total dust/m^3
OSHA PEL (8-hour TWA)= 5 mg respirable dust/m^3

Respirable quartz (CAS#14808-60-7) - approximately - 0.02-0.03% by weight
ACGIH TLV-TWA (1996)=0.10 mg respirable quartz dust/m^3
OSHA PEL (8-hour TWA)=(10 mg respirable dust/m^3)/(percent silica +2)
NIOSH REL (8-hour TWA)=0.05 mg respirable dust/m^3

Trace Ingredients

Trace amounts of naturally occurring chemicals might be detected during chemical analysis. Trace constituents may include up to 0.75% insoluble residue, some of which may be free crystalline silica, calcium oxide (Also known as lime or quick lime), magnesium oxide, potassium sulfate, sodium sulfate, chromium compounds, and nickel compounds.

Section 3 - HAZARD IDENTIFICATION

Emergency Overview

Masonry cement is a light gray powder that poses little immediate hazard. A single short-term exposure to the dry powder is not likely to cause serious harm. However, exposure of sufficient duration to wet Masonry cement can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns. The same type of tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry Masonry cement.

Potential Health Effects

Relevant Routes of Exposure:
Eye contact, skin contact, inhalation, and ingestion.

Effects Resulting from Eye Contact:
Exposure to airborne dust may cause immediate or delayed irritation or inflammation. Eye contact by large amounts of dry powder or splashes of wet Masonry cement may cause effects ranging from moderate eye irritation to chemical burns or blindness. Such exposures require immediate first aid (see Section 4) and medical attention to prevent significant damage to the eye.

Effects Resulting from Skin Contact:
Discomfort or pain cannot be relied upon to alert a person to hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly with wet cement. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred.

Dry Masonry cement contacting wet skin or exposure to moist or wet Masonry cement may cause more severe skin effects including thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of (alkali) chemical burns.

Some individuals may exhibit an allergic response upon exposure to Masonry cement, possibly due to trace elements of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to their first contact with the product. Other persons may first experience this effect after years of contact with Masonry cement products.

Effects Resulting from Inhalation:
Masonry cement may contain trace amounts of free crystalline silica. Prolonged exposure to respirable free silica can aggravate other lung conditions and cause silicosis, a disabling and potentially fatal lung disease.

Exposure to Masonry cement may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system. It may also leave unpleasant deposits in the nose.

Effects Resulting from Ingestion:
Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. Masonry cement should not be eaten.

Carcinogenic potential:
Masonry cement is **not** listed as a carcinogen by NTP, OSHA, or IARC. It may however, contain trace amounts of substances listed as carcinogens by these organizations.

Crystalline silica, a contaminate in Masonry cement, is now classified by IARC as known human carcinogen (Group I). NTP has characterized respirable silica as "reasonably anticipated to be [a] carcinogen".

Medical conditions which may be aggravated be, inhalation or dermal exposure:
Pre-existing upper respiratory and lung diseases.
Unusual (hyper) sensitivity to hexavalent chromium (chromium^{+6}) salts.

Section 4 - FIRST AID

Eyes

Immediately flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.

Skin

Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment in all cases of prolonged exposure to wet cement, cement mixtures, liquids from fresh cement products, or prolonged wet skin exposure to dry cement.

Inhalation of Airborne Dust

Remove to fresh air. Seek medical help if coughing and other symptoms do not subside.

Ingestion

Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

Section 5 - FIRE AND EXPLOSION DATA

Flash point .....None	Lower Explosive Limit.....None
Upper Explosive Limit.....None	Auto ignition temperature.....Not Combustible
Extinguishing media.....Not Combustible	Special fire fighting Procedures.....None
Hazardous combustion products..None	Unusual fire and explosion hazards...None

Section 6 - ACCIDENTAL RELEASE MEASURES

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin.

Wear appropriate personal protective equipment as described in Section 8.

Scrape up wet material and place in an appropriate container. Allow the material to "dry" before disposal. Do not attempt to wash Masonry cement down drains.

Dispose of waste material according to local, state and federal regulations.

Section 7 - HANDLING AND STORAGE

Keep Masonry cement dry until used. Normal temperatures and pressures do not affect the material.

Promptly remove dusty clothing or clothing which is wet with cement fluids and launder before reuse. Wash thoroughly after exposure to dust or wet cement mixtures or fluids.

Section 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Skin Protection

Prevention is essential to avoiding potentially severe skin injury. Avoid contact with unhardened Masonry cement. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to unhardened Masonry cement products might occur, wear impervious clothing and gloves to eliminate skin contact. Wear sturdy boots that are impervious to water to eliminate foot and ankle exposure.

Do not rely on barrier creams: barrier creams should not be used in place of gloves.

Periodically wash areas contacted by dry Masonry cement or by wet cement or concrete fluids with a pH neutral soap. Wash again at the end of work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with wet concrete, it should be removed and replaced with clean dry clothing.

Respiratory Protection

Avoid actions that cause dust to become airborne. Use local or general exhaust ventilation to control exposures below applicable exposure limits.

Use NIOSH/MSHA approved (under 30 CFR 11) or NIOSH approved (under 42 CFR 84) respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation. (Advisory: Respirators and filters purchased after June 10, 1998 must be certified under 42 CFR 84.)

Ventilation

Use local exhaust or general dilution ventilation to control exposure within applicable limits.

Eye Protection

Where potentially subject to splashes or puffs of cement, wear safety glasses with side shields or goggles. In extremely dusty environments and unpredictable environments wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working with Masonry cement or fresh cement products.

Section 9 - PHYSICAL AND CHEMICAL, PROPERTIES

Appearance.....Gray Powder
Physical state.....Solid (powder)
Solubility in water...Slightly soluble (0.1 to 1.0%)
Vapor density.....Not applicable
Melting point.....Not applicable
Evaporation rate.....Not applicable

Odor.....No distinct odor
pH (in water).....12 to 13
Vapor pressure.....Not applicable
Boiling point.....Not applicable (i.e., > 1000 C)
Specific gravity (H20 = 1.0).....2.87-3.00

Section 10 - STABILITY AND REACTIVITY

Stability

Stable.

Conditions to avoid

Unintentional contact with water.

Incompatibility

Wet Masonry cement is alkaline. As such it is incompatible with acids, ammonium salts and phosphorous.

Hazardous decomposition

Will not spontaneously occur. Adding water produces (caustic) calcium hydroxide

Hazardous Polymerization

Will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

For a description of available, more detailed toxicological information contact the supplier or manufacturer.

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity

No recognized unusual toxicity to plants or animals

Relevant physical and chemical properties

(See Sections 9 and 10.)

Section 13 - DISPOSAL

Dispose of waste material according to local, state and federal regulations. (Since Masonry cement is stable, uncontaminated material may be saved for future use).

Dispose of bags in an approved landfill or incinerator.

Section 14 - TRANSPORTATION DATA

Hazardous materials description/proper shipping name

Masonry is cement is not hazardous under U.S. Department of Transportation (DOT) regulations.

Hazard class

Not applicable

Identification number

Not applicable.

Required label text

Not applicable.

Hazardous substances/reportable quantities (RQ)

Not applicable.

Section 15 - OTHER REGULATORY INFORMATION

Status under USDOL-OSHA Hazard Communication Rule, 29 CFR 1910.1200

Masonry cement is considered a "hazardous chemical" under this regulation, and should be part of any hazard communication program.

Status under CERCLA/SUPERFUND 40 CFR 117 and 302

Not listed.

Hazard Category under SARA(Title III), Sections 311 and 312

Masonry cement qualifies as a "hazardous substance" with delayed health effects.

Status under SARA (Title III), Section 313

Not subject to reporting requirements under Section 313.

Status under TSCA (as of May 1997)

Some substances in Masonry cement are on the TSCA inventory list.

Status under the Federal Hazardous Substances Act

Masonry cement is a "hazardous substance" subject to statutes promulgated under the subject act.

Status under California Proposition 65

This product contains up to 0.05 percent of chemicals (trace elements) known to the State of California to cause cancer, birth defects or other reproductive harm. California law requires the manufacturer to give the above warning in the absence of definitive testing to prove that the defined risks do not exist.

Section 16 - OTHER INFORMATION

Prepared by

Kevin Keegan
Director - Health and Safety
CEMEX, Inc.
Houston, Texas

Approval date or Revision date

Approved: July, 1997
Revised: March, 2001

Other important information

Masonry cement should only be used by knowledgeable persons. A key to using the product safely requires the user to recognize that Masonry cement chemically reacts with water, and that some of the intermediate products of this reaction (that is those present while a Masonry cement product is "setting") pose a more severe hazard than does dry Masonry cement itself.

While the information provided in this material safety data sheet is believed to provide a useful summary of the hazards of Masonry cement as it is commonly used, the sheet cannot anticipate and provide the all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

SELLER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY CEMEX, Inc. except that the product shall conform to contracted specifications. The information provided herein was believed by CEMEX, Inc. to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information to comply with all laws and procedures applicable to the safe handling and use of product and to determine the suitability of the product for its intended use. Buyer's exclusive remedy shall be for damages and no claim of any kind, whether as to product delivered or for non-delivery of product, and whether based on contract, breach of warranty, negligence, or otherwise shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event shall Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

In particular, the data furnished in this sheet do not address hazards that may be posed by other materials mixed with Masonry cement to produce Masonry cement products. Users should review other relevant material safety data sheets before working with this Masonry cement or working on Masonry cement products, for example, Masonry cement concrete.

Material Safety Data Sheet

Sika ViscoCrete 2110

1 . Product and company identification

Product name : Sika ViscoCrete 2110

Supplier : Sika Corporation, Construction
201 Polito Avenue
Lyndhurst, NJ 07071
www.sikaconstruction.com

Telephone no. : (201) 933 - 8800

Fax no. : (201) 804 - 1076

In case of emergency : CHEMTREC: 800-424-9300
INTERNATIONAL: 703-527-3887

Manufacturer : Sika Corporation, Operations
201 Polito Avenue
Lyndhurst, NJ 07071
www.sikacorp.com

Telephone no. : (201) 933 - 8800

Validation date : **23. February 2011.**

Print date : 23. February 2011.

Product type : Liquid.

2 . Composition/information on ingredients

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

3 . Hazards identification

OSHA/HCS status : This material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential acute health effects

Inhalation : May cause respiratory irritation.

Ingestion : May be harmful if swallowed.

Skin : May cause skin irritation.

Eyes : May cause eye irritation.

See toxicological information (section 11)

4 . First aid measures

Eye contact : Check for and remove any contact lenses. Get medical attention if irritation occurs. Immediately flush eyes with plenty of water for at least 15 minutes.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. Maintain an open airway.

Ingestion : Wash out mouth with water. Move exposed person to fresh air. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person.

4 . First aid measures

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

Flammability of the product : In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous combustion products : No specific data.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Consult local authorities for acceptable exposure limits.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

9 . Physical and chemical properties

Flash point : Closed cup: Not applicable.

Odor : Characteristic.

pH : 5.5

Density : ~1.094 g/cm^3 [20°C (68°F)]

10 . Stability and reactivity

Stability : The product is stable.

Conditions to avoid : No specific data.

Materials to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Additional information
DOT Classification	Not regulated.		-	-	-
TDG Classification	Not regulated.		-	-	-
ADR/RID Class	Not regulated.		-	-	-
IMDG Class	Not regulated.		-	-	-
IATA-DGR Class	Not regulated.		-	-	-

PG* : Packing group

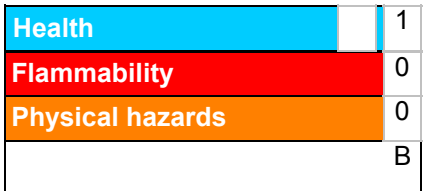
15 . Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b)**: All components are listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: No products were found.
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: No products were found.

United States inventory (TSCA 8b) : All components are listed or exempted.

16 . Other information

Hazardous Material Information System (U.S.A.) :



16 . Other information

Personal Protection Equipment

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

Date of printing : **23.02.2011.**

Date of issue : **23.02.2011.**

Date of previous issue : **No previous validation.**

Version : **1.01**

Indicates information that has changed from previously issued version.

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All sales of Sika products are subject to its current terms and conditions of sale available at www.sikacorp.com or 201-933-8800.

Material Safety Data Sheet

Sika Air

1 . Product and company identification

Product name : Sika Air

Supplier : Sika Corporation, Operations
201 Polito Avenue
Lyndhurst, NJ 07071
www.sikacorp.com

Telephone no. : (201) 933 - 8800

Fax no. : (201) 804 - 1076

In case of emergency : CHEMTREC: 800-424-9300
INTERNATIONAL: 703-527-3887

Manufacturer : Sika Corporation, Operations
201 Polito Avenue
Lyndhurst, NJ 07071
www.sikacorp.com

Telephone no. : (201) 933 - 8800

Validation date : **10. April 2008.**

Print date : 10. April 2008.

Product type : Liquid.

2 . Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Potential acute health effects

Inhalation : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Skin : No known significant effects or critical hazards.

Eyes : No known significant effects or critical hazards.

See toxicological information (section 11)

3 . Composition/information on ingredients

There are no ingredients or additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First aid measures

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

Flammability of the product : In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

5 . Fire-fighting measures

Hazardous combustion products : No specific data.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Expose controls/personal protection

Consult local authorities for acceptable exposure limits.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

8 . Expose controls/personal protection

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

9 . Physical and chemical properties

Physical state : Liquid.

10 . Stability and reactivity

Stability : The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid : No specific data.

Materials to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 . Toxicological information

Acute toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Additional information
DOT Classification	Not regulated.		-	-	-
TDG Classification	Not regulated.		-	-	-
ADR/RID Class	Not regulated.		-	-	-
IMDG Class	Not regulated.		-	-	-
IATA-DGR Class	Not regulated.		-	-	-

PG* : Packing group

15 . Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b):** Not determined.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: No products were found.
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: No products were found.

Clean Water Act (CWA) 311: sodium hydroxide

Clean Air Act (CAA) 112 accidental release prevention: No products were found.

Clean Air Act (CAA) 112 regulated flammable substances: No products were found.

Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

State regulations : **Connecticut Carcinogen Reporting**: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: None of the components are listed.
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: None of the components are listed.
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: None of the components are listed.
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: None of the components are listed.
Rhode Island Hazardous Substances: None of the components are listed.

United States inventory (TSCA 8b) : **United States inventory (TSCA 8b):** Not determined.

16 . Other information

Hazardous Material Information System (U.S.A.) :

Health	0
Flammability	0
Physical hazards	0
Personal protection	D

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

Date of printing : **10.04.2008.**

Date of issue : **10.04.2008.**

Date of previous issue : **No previous validation.**

Version : **1**

Indicates information that has changed from previously issued version.

Notice to reader

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All sales of Sika products are subject to its current terms and conditions of sale available at www.sikacorp.com or 201-933-8800.

MATERIAL SAFETY DATA SHEET

ConSeal™ Concrete Sealants INC.

CS-102

Butyl Sealant For All Precast Structures: Meets Specs.

PRODUCT IDENTIFICATION

PRODUCT NAME: CS-102
PRODUCT DESCRIPTION: Butyl Sealant

H.M.I.S RATING
HEALTH : 0
FIRE : 1
REACTIVITY : 0

NFPA RATING
HEALTH : 0
FIRE : 1
REACTIVITY : 0

HAZARDOUS INGREDIENTS

Not applicable for this product.

HAZARDOUS COMPONENTS

Not applicable for this product.

PHYSICAL DATA

SPECFIC GRAVITY (H_20=1) : 1.25
VOLATILE (% VOLUME) : 0.00 %
SOLUBILITY IN WATER : Insoluble
EVAPORATION RATE (BuAc=1) : N/A
VOLATILE ORGANIC CONTENT : N/A
APPEARANCE / ODOR : Black tacky solid, slight petroleum odor

BOILING POINT : N/A
MELT / FREEZE PT. : N/A
VAPOR DENSITY : N/A
VAPOR PRESURE : N/A

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 450 °F **METHOD USED:** COC

FLAMMABLE LIMINTS IN AIR, % BY VOLUME: **UEL UPPER:** N/D **LEL LOWER:** N/D

Extinguishing Media: Dry chemical, carbon dioxide, foam, water

Unusual Fire and Explosion Hazards: None known

Special Fire fighting Procedures: None Known

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ConSeal™ Concrete Sealants INC.

CS-102

Butyl Sealant For All Precast Structures: Meets Specs.

REACTIVITY DATA

STABILITY: Stable

MATERIALS TO AVOID: Strong oxidizing agents

CONDICTIONS TO AVOID: None known

HAZARDOUS POLYMERIZATION: Will not occur

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: Upon ignition may form CO_2, CO, and various hydrocarbon fumes.

HEALTH HAZARDS

ACUTE: None known

CHRONIC: None known

SIGNS AND SYMPTOMS OF EXPOSURE: None known

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: None known

TOXICITY DATA: National Toxicology Program: No
I.A.R.C. Monographs: No
OSHA: No

EMERGENCY AND FIRST AID PROCEDURES:

Eye contact: Flush with warm water for 15 minutes. If irritation persists, contact physion.
Skin contact: wash contaminated area with soap and water .
Ingestion: DO NOT INDUCE VOMITING, Contact a physician.

ROUTES OF ENTRY:

Inhalation: No
Eyes: No
Skin: No
Ingestion: Not likely

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PRECAUTIONS FOR SAFE HANDLING AND USE

Steps To Be Taken In Case Material Is Released Or Spilled: Remove sources of ignition.

Waste Disposal: Dispose of in accordance with local, state and federal regulations.

Precautions to be taken in handling and storage: Rotate stock. Do not stack cartons on end.

CONTROL MEASURES

Respiratory Protection: Not required under normal applications.

Ventilation:
Local exhaust : N/A
Mechanical : N/A
Special : N/A
Other : N/A

Protective Gloves: Chemical resistant, Imperious

Eye Protection: Safety goggles or glasses

Other protective clothing or equipment: N/A

Hygienic Practices: Wash hands with soap and water after working with this material. Practice good personal hygiene.

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BLACKHAWK

Asphalt Primer

Material Safety Data Sheet

Emergency Phone #: 800.456.8556

PRODUCT:
Blackhawk Liquid Asphalt Coating

MANUFACTURER:
Blackhawk Products
450 Funston
Kansas City, Kansas 66115
913.371.8555

SECTION 2 – HAZARDOUS INGREDIENTS

Hazardous Components

	OSHA PEL	ACGIH TLV	Other Limits
Mineral Spirits	100ppm	100ppm	N/A
Asphalt	100ppm	10ppm	N/A

HMIS Rating
Health: 1
Fire: 2
Reactivity: 0

SECTION 3 – PHYSICAL CHARACTERISTICS

Boiling Point: 315†F
Vapor Pressure: 4.6mmHg
Vapor Density: 4.8 (Air=1)
Specific Gravity: 0.92 (H20=1)
Melting Point: N/A
Evaporation Rate: N/D
Solubility in Water: Insoluble
Appearance/Odor: Black / Mild, non-residual

N/A: not applicable; N/D: not determined

SECTION 4 – FIRE & EXPLOSION DATA

Flash Point: >105†F (CC)
Flammable Limits: LEL – 0.7%
UEL – 6.0%
Extinguishing Media: Chemical Foam / CO2 / Dry Chemical
Special Fire Fighting Procedures: Self-contained breathing apparatus may be necessary.
COMBUSTIBLE: Keep away from high heat and open flame.
Unusual Fire and Explosion Hazards: N/A

SECTION 5 – REACTIVITY DATA

Stability: Stable
Conditions and Materials to Avoid: Keep away from open flame or high heat
Incompatibility: Isolate from strong oxidizers
Hazardous Decomposition Products: Carbon dioxide and carbon monoxide when burned. Hazardous polymerization will not occur.

SECTION 6 - HEALTH HAZARD DATA

Route(s) of entry:
Inhalation: Yes
Skin: Yes
Ingestion: Yes
Prolonged exposure may cause irritation to respiratory tract, eyes, and skin
Harmful or fatal if swallowed.

Carcinogenicity: NTP: No
IARC: No
OSHA Regulated: No

Signs and symptoms of overexposure: Dizziness, headache, nose and throat irritation

Medical conditions aggravated by exposure: Existing eye, skin, and respiratory disorders

Emergency and first aid procedures:
Skin: Wash with soap and water.
Ingestion: Do not induce vomiting, seek medical attention.
Inhalation: Remove to fresh air.

SECTION 7 – SPECIAL PRECAUTIONS & SPILL/LEAK PROCEDURES

PRECAUTIONS IN HANDLING AND STORING: Do not store near heat or flame. Use protective gloves when handling material. Use with adequate ventilation.
IN CASE OF SPILL: Isolate from open flame and strong oxidizers.
WASTE DISPOSAL: Discard according to Federal, State and Local regulations.

SECTION 8 – SPECIAL PROTECTION / CONTROL MEASURES

RESPIRATORY: Not normally required
EYE PROTECTION: Use goggles or safety glasses
HAND PROTECTION: Use protective gloves
OTHER PROTECTION: None required
VENTILATION: Ventilate as needed for exposure limits
WORK / HYGIENIC PRACTICES: Standard hygienic practices
OTHER PRECAUTIONS: Avoid prolonged contact. For industrial use only. Keep out of reach of children.

SECTION 9 — REGULATORY INFORMATION

TSCA (Toxic Substances Control Act) Status: Components of this product are listed on the TSCA Inventory.

Manufacturer Disclaimer: The data given here is based on current knowledge and experience. The purpose of this MSDS is to describe the products in terms of their safety requirements. The data does not signify any warranty with regard to the products' properties. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customer and the protection of the environment.