

SECTION 15100 VALVES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes Requirements for general duty valves used in piping systems. Special duty valves are specified in applicable equipment or system sections where special valves are required.

1. Gate Valves: V-1, -4, -5, -59, & -6055.
2. Globe Valves: V-102, -115, -1107, -1118, -6032, & -6036.
3. Butterfly Valves: V-6199-1 & -6199-2, -6431, -6472, -6473, -6474, 6476, 6477, 6478, 6479, 6483 & -6489 & **-6489A**.
4. Ball Valves: V-1181 & **V-1181A**, -6168 & **V-6168A**, -6169, -6175, -6176, 6177, -6189, -6468, -6469 & 6470.
5. Check Valves: V-201, -204, 205, -1100, -1163, -1205, -1376 & -6115 & **-6115A**.
6. Angle Valves: V6050 & -6089.
7. Plug Valves: V402, -405, 406 & -6245.
8. Needle Valve (Gauge-cock): V-613.
9. Boiler Drain Valve (Hose Connection): V-6079.
10. Back-Flow -Preventing Valve (BFPV) assembly (Typical): V-301
11. Pressure Reducing Valve (PRV) (Typical): V-501
12. Excess Pressure Relief Valve (RV) : V-512.
13. Balancing Valves /Circuit Setters/ (Typical): V-701.

1.3 REFERENCES

A. Manufacturers' Standardization Society (MSS).

1. MSS SP-25-93, Standard Marking System for Valves, Fittings, Flanges, and Unions.

B. Engineering Standard (ES)

1. ES-4-18-2, ORNL Engineering Standard for Backflow Preventer Installation

1.4 SUBMITTALS

A. Submit for information the following for valves where Valve data sheets list manufacturer and model definitions.

1. Manufacturer's product data showing model number, dimensions, pressure and temperature rating, Cv or minimum port size, materials of construction, and end type.
- B. Test reports of tests as indicated on Valve data sheets.**
- C. Certificate of compliance as indicated on the Valve data sheets.**

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. See manufacturers listed on Valve data sheets attached and as indicated herein.

2.2 MATERIALS

- A. See materials listed on Valve data sheets attached and as indicated herein.

2.3 VALVE MARKING

- A. Provide valves marked by manufacturer per MSS SP-25.
- B. Provide valves requiring Factory Mutual Research or UL approval with Factory Mutual Research or UL markings in addition to MSS SP-25 markings.

2.4 VALVE TAGS

- A. Tag valves with stainless steel tag embossed with the Valve type number in 1/4-in.-high letters and numerals.
- B. Provide tags from AISI Type 304 stainless steel, .010 in. thick, 1 1/2 in.-diameter tag size with smooth edges. Provide a 3/16-in.-diameter attachment hole.
- C. Attach tag to valve using AISI Type 302 stainless steel beaded chain. Do not attach tags to hand-wheels, levers, or other parts of valves which would interfere with operation.

2.5 VALVE GASKETS AND PACKING

- A. Manufacturer's Standard Gaskets: Non-asbestos type.
- B. Manufacturer's Standard Stem Packing: Non-asbestos type.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install valves where handles are accessible.
- B. Install chain operated wheel for valves installed 6'-0" above finished floor or grade.

3.2 TESTING

- A. Perform valve testing as indicated on Valve data sheets.

3.3 CLEANING

- A. Clean valves as indicated on Valve data sheets.

VALVE, GATE, V-1

Material:

Body: Bronze, ASTM B62-93
or B61-93

Seat: Bronze, ASTM B62-93
or B61-93

Disc: Bronze, ASTM B62-93
or B61-93

Stem: Manufacturer's Standard
Bronze

Bonnet
Gasket: Manufacturer's Standard

Rating:

Primary: 125 psi at 353°F, minimum
Non-shock: 200 psi at 100°F, minimum

Characteristics:

Type: Gate
Ends: Screwed
Seat: Taper-Integral
Disc: Split or Solid Wedge
Stem: Rising
Screw: Inside
Wheel: Rising
Stem to Disc: T-Head, Slot

Bonnet Type: Screwed or Union

Stem Packing: Manufacturer's Standard

Conformance and Testing: MSS SP-80-87 Type 2

Manufacturer and Model:

1. Crane No. 428
2. Stockham Fig. B-100
3. Milwaukee 148

VALVE, GATE, V-4

Material:

Body: Cast Iron,
ASTM A126-93 Class B

Seat: Brass, ASTM B62-93 or
Bronze, ASTM B61-93

Disc: Solid, ASTM B61 or B62,
Rings, ASTM B61 or B62

Stem: Manufacturer's Standard
Brass or Bronze

Bonnet
Gasket: Manufacturer's Standard

Stem
Packing: Manufacturer's Standard

Conformance and Testing: MSS SP-70-90

Manufacturer and Model:

1. Crane No. 461
2. Stockham Fig. G-612
3. Milwaukee F2882

Rating:

Primary: 125 psi at 353°F, min.*
Non-shock: 150 psi at 100°F, min.**

Characteristics:

Type: Gate
Ends: Flanged plain face
Seat: Tapered inserted
Disc: Wedge solid or ring
inserted
Screw: Inside
Stem: Nonrising
Wheel: Nonrising
Stem to Disc: Threaded sleeve
Bonnet Type: Flanged plain face and
yoke

*Reduced pressure ratings for valves over 16 in. size.

**Reduced pressure ratings for valves over 30 in. size.

VALVE, GATE, V-5

Material:

Body: Cast Iron,
ASTM A126-93 Class B

Seat: Brass, ASTM B62-93 or
Bronze, ASTM B61-93

Disc: Brass, Bronze, or Cast
Iron with Brass Rings,
ASTM B62-93 or B61-93

Stem: Brass or Bronze,
Manufacturer's Standard

Bonnet
Gasket: Manufacturer's Standard

Stem
Packing: Manufacturer's Standard

Conformance and Testing: MSS SP-70-90

Manufacturer and Model:

1. Crane No. 46512
2. Stockham Fig. G-623
3. Milwaukee F2885

Minimum Acceptable Rating:

Primary: 125 psi at 353°F*
Non-shock: 175 psi at 100°F**

Characteristics:

Type: Gate
Ends: Flanged, Flat Face
Seat: Taper or Parallel
Inserted
Disc: Solid or Double
Stem: Rising
Screw: Outside
Wheel: Nonrising
Stem to Disc: T-Head Slot or Thread
and Pin

Bonnet Type: Flanged, Plain
Face and Yoke

*Reduced pressure rating to 100 psig stem for sizes 14 in. and larger.

**Reduced pressure rating to 150 psig W.O.G. for sizes larger than 12 in.

GATE VALVE, V-59

Material:

Body: Stainless Steel,
ASTM A351

Minimum Acceptable Rating:

Primary: 150 psi at 500°F
Non-shock: 230 psi at 100°F

Characteristics: Corrosion resistant

Seat: A-351 Stainless Steel
Packing: Teflon

Type: Gate
Ends: Flanged, Raised Face
(See Note 1).

Disc: A-351 Stainless Steel

Seat: Taper, Inserted Rings
Disc: Solid Wedge, Tapered

Stem: Stainless Steel
A-276 Type 304, or 316

Stem: Rising
Screw: Outside
Wheel: Non-rising
Stem to Disc: T-Head Slot

Bonnet: Stainless Steel
Gasket: Manufacturer's Standard
Non-asbestos

Bonnet Type: Flanged, Plain Face
or M&F, Split or
Solid Yoke

Yoke Bushing: Brass B-16

Conformance and Testing: API 600-91

Manufacturer and Model:

- 1.. Stockham 15-OZF, Bolted Bonnet OS&Y Flexible disc.
2. Crane No. 47XUF
3. Velan F0064

VALVE, GATE, V-6055
(Lock Shield and Key)

Material:

Body: Bronze, ASTM B62-93 or
B61-93

Seat: Bronze, ASTM B62 or B61

Disc: Bronze,
Manufacturer's Standard

Stem: Bronze,
Manufacturer's Standard

Bonnet
Gasket: Manufacturer's Standard

Stem
Packing: Manufacturer's Standard

Minimum Acceptable Rating:

Primary: 125 psi at 353°F
Non-shock: 200 psi at 100°F

Characteristics:

Type: Gate
Ends: Screwed
Seat: Tapered
Disc: Split or Solid
Stem: Rising
Screw: Inside
Stem to Disc: T-Head Slot
Bonnet Type: Screwed or Union
Operator: Lock Shield and Key

Conformance and Testing: MSS SP-80-87

Manufacturer and Model:

1. Nibco T-111-L
2. Stockham B-100LSK

VALVE, GLOBE, V-102

Material:

Minimum Acceptable Rating:

Body: Cast Iron,
ASTM A126-93 Class B

Primary: 125 psi at 553°F
Non-shock: 200 psi at 100°F

Seat: Brass, ASTM B62-93 or
Bronze, ASTM B61-93

Type: Globe
Ends: Flanged plain face

Disc: Brass, Bronze, or Cast
Iron with Brass or
Bronze Rings,
ASTM B62-93 or B61-93

Seat: Plug, Inserted
Disc: Plug, Type
Stem: Rising
Screw: Outside

Stem: Brass or Bronze
Manufacturer's Standard

Wheel: Rising
Stem to Disc: Upset Stem
Bonnet Type: Flanged, Plain
Face, Yoke

Bonnet
Gasket: Manufacturer's Standard

Stem
Packing: Manufacturer's Standard

Conformance and Testing: MSS SP-85-94

VALVE, GLOBE, V-115

Material:

Body: Forged Steel,
ASTM A105-94

Seat: Forged Steel,
ASTM A105

Disc: 11½% to 14%
Chrome Steel

Stem: 11½% to 14%
Chrome Steel

Bonnet
Gasket: Manufacturer's Standard

Stem
Packing: Manufacturer's Standard

Minimum Acceptable Rating:

Primary: 5000 psi at 450°F

Characteristics:

Type: Globe
Ends: Screwed
Seat: Integral

Disc: Plug
Stem: Rising
Screw: Inside

Wheel: Rising
Stem to Disc: Integral
Bonnet Type: Screwed

VALVE, GLOBE, V-1107

Material:

Body:) Bar Stock,
Seat:) AISI Type 316 Stainless Steel
Disc:)
Stem:)

Minimum Acceptable Rating:

Primary: 600 psi at 400°F
Non-shock: 3,000 psi at 150°F
Proof Test: 4500 psi

Bonnet
Gasket: Teflon (TFE)

Stem:
Packing: Teflon (TFE)

Characteristics:

Type: Globe
Ends: Screwed
Seat: Plug, Integral
Disc: Plug
Stem: Rising
Screw: Inside
Wheel: Rising
Stem to Disc: Integral
Bonnet Type: Screwed

GLOBE VALVE, V-1118

Material:

Body, Seat, and Disc: Wrought or Cast Stainless Steel, AISI Type 316 or Alloy Casting Institute (ACI) Corrosion-Resistant Type CF8M

Bolts & Nuts: Nongalling 18-8 Stainless Steel

Bonnet Gaskets: TFE (See Note 1)

Minimum Acceptable Rating:

Primary: 150 psi at 500°F
Non-shock: 230 psi at 100°F

Characteristics:

Type: Globe
Ends: Flanged (See Note 1).
Seat: Tapered Integral
Disc: Plug Type
Stem: Rising
Screw: Outside
Wheel: Rising
Stem to Disc: Lock Nut and Pin
Bonnet Type: Bolted

Conformance and Testing: MSS SP-42-90

GLOBE VALVE, V-6032

Material:

Body: Stainless Steel,
AISI Type 304L or 316L

Seat: Stainless Steel,
AISI Type 304L or 316L

Disc: Stainless Steel,
AISI Type 304 or 316

Stem: Stainless Steel,
AISI Type 304 or 316

Bolts & Nuts: Nongalling 18-8
Stainless Steel

Bonnet Gasket: TFE

Stem Packing: TFE

Conformance and Testing: MSS SP-42-90

Minimum Acceptable Rating:

Primary: 150 psi at 500°F
Non-shock: 275 psi at 100°F

Characteristics:

Type: Globe
Ends: Socket Weld
Seat: Plug, Integral (See Note 1)
Disc: Plug Type
Stem: Rising*
Screw: Outside
Wheel: Rising
Stem to Disc: Upset Stem
Bonnet Type: Flanged, Male and Female

*Rising stem and nonrising wheel acceptable 2-in. size only.

GLOBE VALVE, V-6036

Material:

Body: Bronze or Brass,
ASTM B61-93 or B62-93

Seat: Bronze or Brass
ASTM B61-93 or B62-93

Disc: Manufacturer's Standard

Stem: Bronze or Brass
Manufacturer's Standard

Bonnet

Gasket: Ground Joint

Minimum Acceptable Rating:

Primary: 150 psi at 366°F
Non-shock: 300 psi at 100°F

Characteristics:

Type:	Globe
Ends:	Screwed
Seat:	Integral
Disc:	Renewable Composition
Stem:	Rising
Screw:	Inside
Wheel:	Rising
Stem to Disc:	Upset Stem
Bonnet Type:	Union

Steam Packing: Manufacturer's Standard

Conformance and Testing: MSS SP-80-87

Manufacturer and Model:

1. Crane No. 7TF
2. Stockham B-22T
3. Milwaukee 590

BUTTERFLY VALVE, (NARROW LAYING LENGTH)
V-6199-1 & V-6199-2 (Insulation extension)

Conformance and Testing: AWWA C504-94, Class 150B, MSS SP-67-90, API 609-91.

Material:		Minimum Acceptable Rating:	
Body:	Cast Iron, ASTM A126-93 Class B	150 psi at 180°F	
Seat:	Buna N, Rated for 0°F to 180°F	Characteristics:	
Disc:	Ni-Resist Cast Iron, ASTM A436-86 (92)	Sizes:	2 in. to 24 in.
Stem:	Stainless Steel, AISI Type 300 Series	Type:	Butterfly
		Ends:	Wafer for installation between 150 lb flanges
		Seat:	Renewable
		Body:	With stop rings
		Operator:	Manual as shown below

Valve size (in.)	Minimum acceptable Cv	Minimum clearance for insulation thickness of in. (V-6199-2)	Laying length (in.)	Minimum acceptable stem diameter (in)
2	60	2	1 3/4	-
2 1/2	120	2	1 7/8	-
3	280	2	1 7/8	-
4	475	2 1/2	2 1/8	1/2
5	1,100	2 1/2	2 1/4	5/8
6	1,530	2 1/2	2 1/4	1
8	2,800	2 1/2	2 1/2	1 1/8
10	5,000	2 1/2	2 11/16	1 3/8
12	7,000	2 1/2	3 3/16	1 1/2
14	8,500	3	3 3/16	1 3/4
16	11,000	3	3 1/4	2
18	14,250	3	4	2 1/4
20	17,500	3	5 3/32	2 1/2
24	24,500	3	6 3/32	3

TYPE VALVE OPERATOR		
Valve size	V-6199-1	V-6199-2
2 in. to 6 in.	Manual padlockable lever and notched throttling plate	Manual padlockable lever with notched throttling plate and insulation extension.
8 in. to 24 in.	Enclosed Weatherproof Screw or Gear Operator	Enclosed weatherproof screw or gear operator with insulation extension.

BUTTERFLY VALVE, V-6431

Material:		Minimum Acceptable Rating (Non-shock):	
Body:	Cast Iron, ASTM A126-93 Class B or ASTM A48-94a Class 40	3 through 12 in. - 200 psi 14 through 72 in. - 150 psi at 180°F	
Seat:	Buna N, Rated for 0°F to 180°F	Characteristics:	
Disc:	Ni-resist Cast Iron, ASTM A436-86 (92) Type I or II	Type: Butterfly Ends: Flanged Seat: Bonded, Vulcanized, or Mechanically Held with Screws	
Stem:	Stainless Steel, AISI Type 300 Series	Operator: AWWA Standard Gear Type with 2-in. Square Drive Nut /Small Link Lever	
Stem Seal:	O-Ring, Buna N		

Conformance and Testing: AWWA C504-94 Class 150B, furnish certificate of compliance

Shaft diameter shall comply with the following:

Dimensions in inches:

<u>Size</u> <u>(in.) diam (in.)</u>	<u>Shaft</u> <u>short body (in.)</u>	<u>Laying length</u> <u>(in.)</u>
3	1/2	5
4	5/8	5
6	1	5
8	1 1/8	6
10	1 3/8	8
12	1 1/2	8
14	1 3/4	8
16	2	8
18	2 1/4	8
20	2 1/2	8
24	3	8
30	3 1/2	12
36	4	12

Cv = Flow Coefficient: Defined as Flow rate (GPM) of 60°F water with 1.0 psi pressure drop across valve

Manufacturer:

1. Muller
2. Milwaukee
3. Jamesbury

BUTTERFLY VALVE, V-6472

Material:

Body: Bronze

Seat: Viton

Disc: AISI Type 302 Stainless Steel

Stem: AISI Type 304 Stainless Steel

Stem &

Body

Seals: Viton

Minimum Acceptable Rating:

Primary: 175 psi at -30°F to 350°F

Non-shock: 400 psi at 100°F

Characteristics:

Type: Butterfly

Ends: Screw

Seat: Ring Type

Disc: Dual

Operator: Handle

Stem to Disc: Welded

Bonnet Type: Integral

Stem Seal: Independent Stem Seal

Adjustment: Adjustment Nut

Conformance and Testing: UL or Factory Mutual Research for 175-psi fuel gas service.

Manufacturer and Model:

1. Milwaukee BB2-100

BUTTERFLY VALVE, V-6473

Material:

Body: Bronze

Seat: Viton

Disc: AISI Type 302 Stainless Steel

Stem: AISI Type 304 Stainless Steel

Stem
and Body
Seals: Viton

Minimum Acceptable Rating:

Primary: 175 psi at -30 to 350°F
Non-shock: 400 psi at 100°F

Characteristics:

Type:	Butterfly
Ends:	Screw
Seat:	Ring Type
Disc:	Dual
Operator:	Handle
Stem to Disc:	Welded
Bonnet Type:	Integral

Conformance and Testing: UL or Factory Mutual Research for 175-psi fire protection service.

Manufacturer and Model:

1. Milwaukee BB-FP

BUTTERFLY VALVES, V-6474

Material:

Body: Bronze

Seat: Viton

Disc: AISI Type 302 Stainless Steel

Stem: AISI Type 304 Stainless Steel

Stem
and Body

Seals: Viton

Minimum Acceptable Rating:

Primary: 175 psi at -30°F to 350°F

Non-shock: 400 psi at 100°F

Characteristics:

Type: Butterfly

Ends: Screw

Seat: Ring Type

Disc: Dual

Operator: Handle

Stem to Disc: Welded

Bonnet Type: Integral

Stem Seal: Independent Stem Seal

Adjustment: Adjustment Nut

Stem

Extension: 2 1/4

Conformance and Testing: UL or Factory Mutual Research for 175-psi fuel gas service.

Manufacturer and Model:

1. Milwaukee BB2-104

BUTTERFLY VALVE, GROOVED, V-6476

Material:

Minimum Acceptable Rating:

Body: PPS Coated Ductile Iron, ASTM A-536 14 through 24 in. - 175 psi
(see seal for temperature range)

Seat: PPS coated

Seal: EPDM, for water and oil free air service form -30F to +230F
Nitrile, for oil and air with oil vapors service from -20F to +180F

Disc: PPS coated DI, ASTM A-536

Characteristics:

Type:

Butterfly

Ends:

Grooved

Seal:

Mechanically held with stainless steel screws

Stem: Stainless Steel 17-4 PH

Operator:

Gear Type

Dimensions in inches:

Size (in.) diam (in.)	Min. acceptable Cv at full open	Laying length (in.)
14	9360	7.00
16	12400	7.00
18	15900	8.00
20	19800	8.50
24	28900	10.00

Manufacturer:

1. Victaulic - Series 709

BUTTERFLY VALVE, GROOVED, V-6477

Material:

Minimum Acceptable Rating:

Body: Stainless Steel, 2 through 12 in. - 300 psi
Grade CF8M Stainless Steel (see disc seal for temperature range)
ASTM A351, A743 AND A744

Disc Seal: EPDM, for water and oil free air
service form -30F to +230F
Nitrile, for oil and air with oil vapors
service from -20F to +180F
Fluoroelastomer, for oil and air
with oil vapors service above +180F
to +300F

Disc: Stainless Steel,
Grade CF8M Stainless Steel
ASTM A351, A743 AND A744

Characteristics:
Type: Butterfly
Ends: Grooved
Operator: Lever Lock or
Gear Type

Stem: 316 Stainless Steel

Dimensions in inches:

Size (in.) diam (in.)	Min. acceptable Cv at full open	Laying length (in.)
3	250	3.77
4	600	4.64
6	1400	5.88
8	3400	5.32

Manufacturer:

1. Victaulic – Series 763

BUTTERFLY VALVE, GROOVED, V-6478

Material:

Body: Bronze per CDA-836,
(85-5-5-5)

Minimum Acceptable Rating:

2-1/2 through 6 in. - 300 psi
(see disc coating for temperature range)

Upper
Bearing: Naval Brass
Lower
Trunion: Naval Brass

Upper Bearing/Lower Trunion Seals: Same as Disc Coating

Disc: Rubber encapsulated DI,
ASTM A-395 Grade 65-45-15
Or ASTM A-536 Grade 65-45-12

Characteristics:

Type: Butterfly
Ends: Grooved
Operator: Lever Handle or
Gear Type

Disc Coating: EPDM, for water and oil free air
service from -30F to +230F
Nitrile, for oil and air with oil vapors
service from -20F to +180F

Dimensions in inches:

Size (in.) diam (in.)	Min. acceptable Cv at full open	Laying length (in.)
2-1/2	325	3.77
3	480	3.77
4	600	4.63
5	1150	5.88
6	1850	5.88

Manufacturer:

1. Victaulic – Series 608

BUTTERFLY VALVE, GROOVED, V-6479

Material:		Minimum Acceptable Rating:	
Body:	PPS Coated Ductile Iron, ASTM A-536	14 through 24 in. - 300 psi (see seal for temperature range)	
Seat:	PPS coated		
Seal:	EPDM, for water and oil free air service form -30F to +230F Nitrile, for oil and air with oil vapors service from -20F to +180F		
Disc:	PPS coated DI, ASTM A-536	Characteristics:	
		Type:	Butterfly
		Ends:	Grooved
Stem:	Stainless Steel 17-4 PH	Seal:	Mechanically held with stainless steel screws
		Operator:	Gear Type

Dimensions in inches:

Size (in.) diam (in.)	Min. acceptable Cv at full open	Laying length (in.)
14	9360	7.00
16	12400	7.00
18	15900	8.00
20	19800	8.50
24	28900	10.00

Manufacturer:

1. Victaulic – Series 706

BUTTERFLY VALVE, GROOVED, V-6483

Material:

Minimum Acceptable Rating:

Body: PPS coated Ductile Iron, 2 through 12 in. - 300 psi
ASTM A-395 Grade 65-45-15 (see disc coating for temperature range)
or ASTM A-536
Grade 65-45-12

Upper Bearing: Naval Brass
Lower Trunion: Naval Brass

Upper Bearing/Lower Trunion Seals: Same as Disc Coating

Characteristics:

Disc:	Rubber encapsulated DI, ASTM A-395 Grade 65-45-15 Or ASTM A-536 Grade 65-45-12	Type:	Butterfly
		Ends:	Grooved
		Operator:	Lever Handle or Gear Type

Disc Coating: EPDM, for water and oil free air
service form -30F to +230F
Silicone, for dry air services
up to + 350F
Nitrile, for oil and air with oil vapors
service from -20F to +180F
Fluoroelastomer, for oil and air
with oil vapors service above +180F
to +300F

Conformance and Testing: Seat tested to MSS-SP-67

Dimensions in inches:

Size (in.) diam (in.)	Min. acceptable Cv at full open	Laying length (in.)
2	115	3.21
2-1/2	325	3.77
3	482	3.77
4	600	4.63
6	1850	5.88
8	3400	5.33
10	5750	6.40
12	8300	6.50

Manufacturer:

1. Victaulic - Vic-300

BUTTERFLY VALVE, HIGH PERFORMANCE V-6489 or V-6489A

Material:		Minimum Acceptable Rating:	
Body:	Stainless Steel ASTM A351-94, Grade CF8M	150 psi at 375°F	
Seat:	Teflon, Type TFE or RTFE (See note below for Special Target Bldg. applications !).	Characteristics:	
Disc:	Cast Stainless Steel	Sizes:	3 in. to 24 in.
Stem:	Stainless Steel AISI Type 300 Series or 17-4 Ph	Type:	Butterfly
		Ends:	Wafer for Installation Between 150 lb. Welding Neck Flanges,
		Seat:	Renewable
		Operator:	3-in. thru 6-in. Notched Lever 8 in. and Above Enclosed Gear

Conformance and Testing: MSS SP-68-88, API 609-91

NOTE: For the Target Building PCE/SCE/HOG/BDCE piping systems, butterfly valve V-6489A shall be used which shall be fitted with Ethylene Propylene Diene Monomer (EPDM) seal.

Valve size Inches	Minimum acceptable Cv	Clearance for Insulation thickness in inches	Laying length inches
3	210	2	1.88
4	450	2 1/2	2.12
6	1,100	2 1/2	2.25
8	2,060	2 1/2	2.50
10	3,270	2 1/2	2.81
12	4,680	2 1/2	3.19
14	6,500	3	3.62
16	8,600	3	4.00
18	10,750	3	4.50
20	13,600	3	5.00
24	20,000	3	6.06

*Sizes are MSS-SP-68 valve body dimensions for Class 150. Tolerance/variance for these sizes not to exceed ± 0.13 in.

BALL VALVE, V-1181 or V-1181A

Materials:

Body, Ball,
and Stem: AISI Type 316
 Stainless Steel

Bolts and AISI Type 300

Nuts: Series Non-galling
 Stainless Steel

*External
Parts: AISI Type 300 Series
 Stainless Steel

Seats and
Seals: Teflon, Type TFE

See Note 1 below for special valve seat & seal requirements for valve V-1181A used in the following areas:

1. For Hot Off Gas (HOG Spec. 15895) exhaust, Low Level Liquid Waste (LLLW) and for CA (15146) piping systems, in the Target Building.
2. Similarly for CHW (15106 to Fan-coil units), DI water (15104) and CA (15112) piping systems in the LINAC & RING Tunnels.

Minimum Acceptable Rating:

Primary: 150 psi at 375°F
Non-shock: 600 psi at 100°F

Characteristics:

Type: Ball
Ends: Flanged (see Note 1).
Seat: Ring Type
Disc: Ball
Operation: 1/2-6-in. Wrench
 8-12-in. Gear
Stem to Ball: Slot

Dimensions in inches:

<u>Size</u> <u>inch</u>	<u>Minimum</u> <u>Port Size</u>
1/2	3/8
3/4	1/2
1	3/4
1 1/2	1
2	1 1/2
3	2
4	3
6	4
8	5 11/16
10	7
12	8

Seals - Adjustable, self-compensating for temperature variance of 300° through 5,000 close, open, close operating cycles. Nut or adjustment below handle to maintain stem seal when handle is removed.

Note 1: For V-1181A Ball Valves provide with seat, seal and cavity filled materials made of radiation resistant polymer referred herein as: “Ultra High Molecular Weight Polyethylene” (UHMWPE). End connections shall be welded.

*Except wrench and gear operator.

BALL VALVE, V-6168 & V-6168A

Material:

Body: Carbon Steel,
ASTM A105-94;
ASTM A181-94 Class 70; or
ASTM A216-93 Grade WCB

Ball: AISI Type 316 Stainless Steel

Stem: AISI Type 316 Stainless Steel

Seats,
Gaskets
& Stem
Seal:

Reinforced TFE
**See Note 1 below for
chilled water valve
requirements in LINAC
Tunnel !**

Minimum Acceptable Rating:

Primary: 150 psi at 180°F
Non-shock: 300 psi at 100°F

Characteristics:

Type:	Ball
Ends:	Screwed
Seat:	Ring Type
Disc:	Ball Type
Operator:	Handle
Steam to Disc:	Slot
Stem Seal:	Adjustable

Ball and stem shall be grounded to body.

Qualification Test:

100 psi air, no evidence of bubbles
when pressured and held for 10 min
under water.

<u>Size</u>	<u>Minimum Cv value</u>
1/4	8
3/8	8
1/2	8
3/4	12
1	32
1 1/4	46
1 1/2	82
2	120

Note 1: For V-1168A Ball Valves in LINAC Tunnel, shall be equipped with seat, seal and cavity filled materials made of radiation resistant polymer referred herein as: “**Ultra High Molecular Weight Polyethylene**” (UHMWPE). End connections shall be welded.

BALL VALVE, V-6169

Material:

Body: Carbon Steel,
ASTM A216-93 Grade WCB

Seats &
Seals: RTFE

Ball: AISI Type 316 Stainless Steel

Stem: AISI Type 316 Stainless Steel

Stem
Seal: RTFE

Minimum Acceptable Rating:

Primary: 150 psi at 180°F
Non-shock: 300 psi at 100°F

Characteristics:

Type: Ball
Ends: Flanged, Raised Face
Seat: Ring Type
Disc: Ball Type
Stem to Disc: Slot
Stem to Seal: Adjustable

Operator:

3 in. Handle
4 to 10 in. Weather Resistant
Gear Operator,
Crank Handle

Dimensions are in inches:

<u>Size</u>	<u>Minimum Cv value</u>
3	240
4	680
6	1,000
8	2,000
10	3,150

Service: Low Pressure Gas

Qualification Test:

100 psi air, no evidence of
bubbles when pressurized and
held for 10 min under water.

VALVE, BALL, V-6175

Material:

Body: ASTM A182-94c or A351-94
Grade CF8M or CF3M
Ball: ASTM A276-94b, AISI Type 316
Stainless Steel
Stem: ASTM A276, AISI Type 316
Stainless Steel

Ends: ASTM A182, A276, or A351
Grade CF3M (AISI Type 316L
Stainless Steel)

Bolts
& Nuts: AISI Type 300 series
non-galling Stainless
Steel

Handle
& Other
External
Parts: AISI Type 300 Series
Stainless Steel

Seats,
Gaskets
& Stem
Seal: >15% Glass Micro-sphere
filled PTFE

Minimum Acceptable Rating:

Primary: 150 psig at 375°F
Non-shock: 600 psig at 100°F

Characteristics:

Type: Ball
Construction: 3 Piece
Ends: Socket Weld
Seat: Ring Type
Disc: Ball Type
Operation: Hand Lever, 90° Travel
with stop
Stem to Ball: Slot
Port: Full
Adjusting Nut: Under handle to permit
removal of handle
during operation.

Stem Seals - Adjustable for temperature
variance of 300° F thru 5000 close, open,
close operating cycles. Nut or
adjustment below handle to maintain stem
seal when handle is removed.

Part Identification - All metal parts
shall be stamped with the manufacturer's
code for identification of the material.

Body, seats, seals and disc to be
renewable without removing pipe ends
from the line.

Wetted Parts: Pickled and Passivated
for hot acid service.

BALL VALVE, V-6176

<p>Material:</p> <p>Body: ASTM A182-94c or ASTM A351-94 Grade CF3 or Grade CF3M; AISI Type 304L or Type 316L Stainless Steel</p> <p>Ball: ASTM A276-94b, AISI Type 316 Stainless Steel (Use no silicone lubricants)</p> <p>Stem: ASTM A276, AISI Type 316 Stainless Steel</p> <p>Ends: ASTM A182, A276, or A479 Grade F; Forged or bar-type AISI Type 304L or 316L Stainless Steel</p> <p>Bolts & Nuts: AISI Type 300 Series non-galling Stainless Steel</p> <p>Handle & Other External Parts: AISI Type 300 Series Stainless Steel stem</p> <p>Seats, Gaskets, & Stem Seal: 15% Glass Microsphere Filled PTFE</p> <p>Manufacturer & Model: Worcester 5966R-BW4 Cooper Figure 4151BW</p>	<p>Minimum Acceptable Rating:</p> <p>Primary: 150 psig at 375°F Non-shock: 600 psig at 100°F</p> <p>Characteristics:</p> <p>Type: Ball (Solid-parallel bore)</p> <p>Construction: Three Piece</p> <p>Ends: Butt weld (Schedule 40S), ANSI B16.25-92</p> <p>Seat: Ring Type</p> <p>Disc: Ball Type</p> <p>Operation: Hand Lever, 90° Travel, with stop</p> <p>Stem to Ball: Slot (Blow-out proof)</p> <p>Port: Full</p> <p>Adjusting Nut: Below handle to maintain seal when handle is removed.</p> <p>Stem Seals: Assembled seal load of 1500 ± 200 psi, adjustable for temperature variance of 300°F through 5000 operating cycles (close, open, close).</p> <p>Part Identification: Stamp metal parts with manufacturer's code for material identification.</p> <p>Body, seats, seals, and disc to be renewable without removing pipe ends from line.</p> <p>Wetted Parts: Pickled and Passivated for hot acid service.</p>
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BALL VALVE, PRESSFIT V-6177

Material:

Body: Stainless Steel,
CF8M

Ball: Stainless Steel,
CF8M

Stem: Stainless Steel,
Type 316

Seats: PTFE

Stem
Packing: TFE

Extended
Ends: Stainless steel (plain end for PressFit)

O-ring
Seals: (The following are included with the
PressFit couplings required to install the valve
and are shown here for temperature range information)

EPDM, for water and oil free air
service from -30F to +230F
Nitrile, for oil and air with oil vapors
service from -20F to +180F
Fluoroelastomer, for oil and air
with oil vapors service above +180F
to +300F

Minimum Acceptable Rating:

1/2 through 2 in. - 300 psi
(see o-ring seals for temperature range)

Characteristics:

Type:	Ball
Ends:	PressFit
Disc:	Ball Type
Operator:	Handle

<u>Size</u>	<u>Min. acceptable Cv at full open</u>
1/2	10
3/4	25
1	35
1 1/4	46
1 1/2	80
2	110

Manufacturer:

1. Victaulic – Series 569 (use with style 597 coupling)

BALL VALVE, V-6189

Material:

Body: Carbon Steel,
ASTM A216-93 Grade WCB

Seat: Teflon, Type TFE

Ball: Carbon Steel, Hard
Chrome Plated

Stem: Carbon Steel

Stem
Seal: Teflon, Type TFE

Minimum Acceptable Rating:

Primary: 150 psi at 375°F
Non-shock: 275 psi at 100°F

Characteristics:

Type: Ball (fire safe)
Ends: Flanged, Raised Face
Seat: Ring Type
Disc: Ball Type
Operator: Handle or Gear*
Stem to Disc: Slot
Stem Seal: Separate Adjusting Nut
Under Handle

Dimensions in inches:

<u>Size</u>	<u>Min. port diam</u>	<u>Min. C_v value</u>	<u>Size</u>	<u>Min. port diam</u>	<u>Min. C_v value</u>
1/2	7/16	8	8	5 11/16	2000
3/4	9/16	12	10	7 3/8	3150
1	13/16	32	12	9 1/2	5200
1 1/4	1	46	14	10 1/2	7100
1 1/2	1 1/4	82	16	12	11000
2	1 1/2	120			
3	2 1/2	350			
4	3 1/4	775			
6	4 3/8	1000			

Conformance and Testing: UL listed for LP gas shutoff

*Gear operator required above 6 in.

*Gear operator required above 6 in.

BALL VALVE, V-6468

Material:

Minimum Acceptable Rating:

Body: Bronze, ASTM B62-93 Primary: 100 psi at 400°F
Non-shock: 400 psi at 100°F

Seat: Glass-Filled TFE

Characteristics:

Ball: AISI Type 316 Stainless Steel

Type: Ball
Ends: Screw
Seat: Ring Type
Disc: Ball Type
Operator: Handle
Stem to Disc: Slot
Bonnet Type: Screwed or Integral
Stem Seal: Independent Stem Seal
Adjustment: Adjustment Nut
Stem Extension: 2 1/4 in.
Lockable handle as an option.

Stem: Bronze

Stem & Body: Glass-Filled TFE

Seals:

Union Seal: Viton "O" Ring

Dimensions in inches:

<u>Size</u>	<u>Minimum C_v rating</u>
1/4	7
3/8	7
1/2	7
3/4	11
1	25
1 1/4	42
1 1/2	70
2	108

Manufacturer: SVF Flow Controls, Inc., Worchester Controls, Wilkins, Watt Industries, Whitey Co.

BALL VALVE, V-6469

Material:

Body: Bronze, ASTM B62-93

Seat: Glass-Filled TFE

Ball: AISI Type 316 Stainless Steel

Stem: Bronze

Stem & Body: Glass-Filled TFE

Seals:

Union Seal: Viton
"O" Ring

Minimum Acceptable Rating:

Primary: 100 psi at 400°F
Non-shock: 400 psi at 100°F

Characteristics:

Type: Ball
Ends: Soldered
Seat: Ring Type
Disc: Ball Type
Operator: Handle
Stem to Disc: Slot
Bonnet Type: Screwed or Integral
Stem Seal: Independent Stem Seal
Adjustment: Adjustment Nut
Stem Extension: 2 1/4 in.
Lockable handle as an option.

Dimensions in inches:

<u>Size</u>	<u>Minimum C_v rating</u>
1/4	7
3/8	7
1/2	7
3/4	11
1	25
1 1/4	42
1 1/2	70
2	108

Manufacturer: SVF Flow Controls, Inc., Worchester Controls, Wilkins, Watt Industries, Whitey Co.

BALL VALVE, PRESSFIT V-6470

Material:

Body: Forged Brass,
ASTM B-16

Ball: Brass ASTM B-16,
chrome plated

Stem: Brass ASTM B-16,
chrome plated

Seats
& Stem

Seal: TFE

PressFit

Ends: Cold drawn
austenitic stainless
steel

O-ring

Seals: EPDM, for water and oil free air
service from -30F to +230F
Nitrile, for oil and air with oil vapors
service from -20F to +180F
Fluoroelastomer, for oil and air
with oil vapors service above +180F
to +300F

Minimum Acceptable Rating:

1/2 through 2 in. - 300 psi
(see o-ring seals for temperature range)

Characteristics:

Type:	Ball
Ends:	PressFit
Disc:	Ball Type
Operator:	Handle
Optional:	Lockable Handle

<u>Size</u>	<u>Min. acceptable Cv at full open</u>
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1/2	26
3/4	25
1	37
1 1/4	50
1 1/2	87
2	110

Manufacturer:

1. Victaulic – Series 589

CHECK VALVE, V-201

Material:

Body: Brass, ASTM B62-93 or
Bronze, ASTM B61-93

Seat: Brass, ASTM B62-93 or
Bronze, ASTM B61-93

Disc: Brass, ASTM B62-93 or
Bronze, ASTM B61-93

Bonnet
Gasket: Manufacturer's Standard

Rating:

Primary: 125 psi at 353°F, min.
Non-shock: 200 psi at 100°F, min.

Characteristics:

Type: Swing Check
Ends: Screwed

Seat: Flat Integral
Disc: Flat Face Integral or
Separable Hinge

Position: Horizontal and
Vertical Upward
Bonnet Type: Screwed Cap

C_v of valve shall meet the minimum requirements listed below.

Valve Size	C _v (Gal/min/PSI pressure drop) Min.
1/4	1.8
3/8	3.5
1/2	6.0
3/4	10.0
1	18
1 1/4	32
1 1/2	43
2	72
2 1/2	106
3	176

Conformance and Testing: MSS SP-80-87

Manufacturer and Model:

1. Crane No. 37
2. Stockham B-319
3. Milwaukee 509

CHECK VALVE, V-204

Material:

Body: Cast Iron,
ASTM A126-93 Class B

Seat: Brass, ASTM B62-93 or
Bronze, ASTM B61-93

Disc: Brass, ASTM B62-93 or
Bronze, ASTM B61-93 or
Cast Iron with Brass

Rings

Bonnet

Gasket: Manufacturer's Standard

Rating:

Primary: 125 psi at 353°F, min.
Non-shock: 150 psi at 100°F, min.

Characteristics:

Type: Swing Check
Ends: Flanged, F&D 125 lb

Seat: Flat, Solid, or
Inserted Rings
Disc: Flat Face, Separable
Hinge

Position: Horizontal and
Vertical Upward

Bonnet Type: Flanged, Plain Face

C_v of valve shall meet the minimum requirements listed below.

Valve Size	C _v (Gal/min/PSI pressure drop) Min.
2	70
2 1/2	100
3	160
4	300
6	715
8	1270
10	2030
12	2930
14	3600
16	4790
18	6120
20	7790
24	11300

Conformance and Testing: MSS SP-85-94

Manufacturer and Model:

1. Crane No. 373
2. Stockham G-931
3. Milwaukee F2974

CHECK VALVE, GROOVED, V-205

Material:

Minimum Acceptable Rating:

Body: Ductile Iron, ASTM A536
PPS coated or painted
black enamel

2-1/2 through 14 in. - 300 psi
(see disc seal for temperature range)

Disc Seal
or coating: EPDM, for water and oil free air
service form -30F to +230F
Nitrile, for oil and air with oil vapors
service from -20F to +180F
Fluoroelastomer, for oil and air
with oil vapors service above +180F
to +300F

Disc: Aluminum bronze or
Ductile iron, ASTM A-536

Characteristics:

Type: Check
Ends: Grooved
Seat: Machined surface
PPS coated or
welded on nickel
Position: Horizontal and
Vertical Upward

Shaft &
Springs: Type 316 Stainless Steel

Valve
Size Min. acceptable
 Cv at full open

2 1/2	140
3	250
4	390
5	700
6	1000
8	1800
10	3000
12	4200
14	4300

Manufacturer:

1. Victaulic - Series 716

CHECK VALVE, V-1100

Material:

Body,
Seat,
Disc, &
Hinged
Pin: Wrought or Cast
Stainless Steel,
AISI Type 316 or
Alloy Casting Institute
(ACI) Corrosion
Resistant Type CF8M

Bolts &
Nuts: Non-galling 18-8
Stainless Steel

Bonnet
Gasket: TFE

Minimum Acceptable Rating:

Primary: 150 psi at 500 °F
Non-shock: 230 psi at 100°F

Characteristics:

Type: Swing Check
Ends: Flanged, Raised Face
Seat: Flat, Integral or
Inserted Ring
Disc: Flat Face Separable
Hinge
Position: Horizontal and Upward
Bonnet Type: Bolted

* 1/2 in. through 1 1/2-in. split body acceptable.

CHECK VALVE, V-1163

Material:

Body: Bronze, ASTM B62-93

Seat: Bronze
Manufacturer's Standard

Disc: Bronze
Manufacturer's Standard

Minimum Acceptable Rating:

Primary: 125 psi at 500°F
Non-shock: 200 psi at 100°F

Characteristics:

Type: Swing Check
Ends: Solder
Seat: Integral
Disc: Swivel
Position: Horizontal and
Vertical Upward
Bonnet Type: Screwed Cap

Conformance and Testing: MSS SP-80-87

CHECK VALVE, V-1205

Material:

Body: Steel, ASTM A216-93
Grade WCB

Seat: 11½% to 14%
Cr Steel

Disc: 11½% to 14%
Cr Steel

Bonnet
Gasket: Manufacturer's Standard

Minimum Acceptable Rating:

Primary: 150 psi at 500°F
Non-shock: 275 psi at 100°F

Characteristics:

Type: Swing Check
Ends: Butt Weld
Seat: Flat Faced Insert
Disc: Flat Face Separable
Hinge
Position: Horizontal and
Vertical Upward
Bonnet: Bolted

Conformance and Testing: API 600-91

CHECK VALVE, V-1376

Material:

Body: Cast Iron, ASTM A126-93
Class B

Seals: Buna N

Plates: AISI Type 316 Stainless
Steel or Aluminum Bronze,
ASTM B148-93a
Alloy 952 or 85% Copper Cast
Iron with Bronze Rings

Pins &
Springs: AISI Type 316 Stainless Steel

Rating:

Primary: 200 psi at 150°F, min.
Non-shock: 150 psi at 100°F, min.
2 in. through 12 in. - 250 psi at 100°F

Characteristics:

Type: Wafer Check
Ends: Flanged, F&D 125 lb.
Seat: Flat, Solid or
Inserted Rings
Disc: Flat Face, Separable
Hinge
Position: Horizontal and
Vertical Upward

<u>Valve Size</u>	<u>C_v (Gal/min/PSI pressure drop) Min.</u>
2	27
2 1/2	100
3	200
4	330
6	875
8	1250
10	2500
12	3500
14	4200
16	6600
18	8960
20	11000
24	21700

CHECK VALVE, SWING, V-6115

Material:

Body: Stainless Steel, AISI
Type 304L or 316L
Seat: Stainless Steel, AISI
Type 304L or 316L
Disc: Teflon, TFE
Disc/guide: Stainless Steel, AISI
Type 304 or 316
Holder: Stainless Steel, AISI
Type 304 or 316
Gasket: Teflon, TFE

Minimum Acceptable Rating:

Primary: 150 psi at 500°F
Non-shock: 225 psi at 100°F

Characteristics:

Type: Swing Check
Body: Split or One Piece
Ends: Socket Weld
Seat: Flat Integral
Disc: Separable Hinge
Piston: Horizontal or Vertical
Bonnet Type: Flanged, Male or
Female

CHECK VALVE, GUIDED DISC TYPE V-6116

Material:

Body: Stainless Steel, AISI
Type 304L or 316L
Seat: Stainless Steel, AISI
Type 304L or 316L
Disc: Teflon, TFE (see Note 1)
Disc/guide: Stainless Steel, AISI
Type 304 or 316
(see Note 1)
Holder: Stainless Steel, AISI
Type 304 or 316
Gasket: Teflon, TFE (see Note 1)

Minimum Acceptable Rating:

Primary: 150 psi at 500°F
Non-shock: 225 psi at 100°F

Characteristics:

Type: Swing Check (see Note 1)
Body: Split or One Piece
Ends: Socket Weld
Seat: Flat Integral
Disc: Separable Hinge (see Note 1)
Piston: Horizontal or Vertical
Bonnet Type: Flanged, Male or
Female

NOTE. 1

For the Low Level Liquid Waste (LLLW) and Compressed Air (CA) piping systems in various beam Tunnels where check valves may be exposed to low level radiation, seat design & seal materials shall be made of radiation resistant polymer referred herein as: "Ultra High Molecular Weight Polyethylene" (UHMWPE). Check valve design shall be of a full-flow "guided-disc" type (similar to Watts Model 600-Z3) and shall be designated herein as valve V-6116.

ANGLE VALVE, V-6050

Material:

Body: Cast Iron,
ASTM A126-93 Class B

Seat: Bronze,
ASTM B61-93 or B62-93

Disc: Bronze or Cast Iron
with Bronze Rings,
ASTM B61-93 or B62-93

Stem: Bronze
Manufacturer's Standard

Minimum Acceptable Rating:

Primary: 125 psi at 353°F
Non-shock: 200 psi at 100°F

Characteristics:

Type: Angle
Ends: Flanged, Flat Face
Seat: Plug, Inserted
Disc: Plug Type
Stem: Rising
Screw: Outside
Wheel: Rising
Stem to Disc: Upset Stem
Bonnet: Bolted

Bonnet Gasket: Manufacturer's Standard

Stem Packing: Manufacturer's Standard

Cv and/or L/D flow coefficient of valve shall meet the minimum requirements listed below.

Valve size	Flow coefficient
	(L/D 200) Cv
2	40
2 1/2	60
3	110
4	200
6	550
8	1000
10	1800
12	2700
14	3300

Conformance and Testing: MSS SP-85-94

ANGLE VALVE, V-6089

Material:

Body: Brass, ASTM B62-93 or
Bronze, ASTM B61-93

Seat: Brass, ASTM B62-93 or
Bronze, ASTM B61-93

Disc: Composition

Stem: Brass or Bronze
Manufacturer's Standard

Bonnet
Gasket: Manufacturer's Standard

Stem
Packing: Manufacturer's Standard

Minimum Acceptable Rating:

Primary: 150 psi at 300°F
Non-shock: 300 psi at 100°F

Characteristics:

Type: Angle
Ends: Screwed
Seat: Integral
Disc: Flat Insert
Stem: Rising
Screw: Inside
Wheel: Rising
Stem to Disc: Upset Stem
Bonnet: Union or Screwed

Conformance and Testing: MSS SP-80-87

PLUG VALVE, V-402

Material:

Body: Cast Iron,
Bonnet: ASTM A126-93 Class B
Plug-Stem:

Bonnet
Gasket: Manufacturer's Standard

Stem
Packing: Manufacturer's Standard

Lubricant: Resistant to Acids,
Alkalies, Alcohols,
Aqueous Solution and
Steam

Minimum Acceptable Rating:

Non-shock: 175 psi at 150°F

Characteristics:

Type: Plug, Short Pattern
Ends: Flanged, Plain Face

Seat: Tapered, Integral
Plug: Tapered
Operator: Wrench
Stem to Plug: Integral
Bonnet: Bolted

<u>Valve Size</u>	<u>C_v (Gal/min/PSI pressure drop) Min.</u>
1	54
1 1/4	96
1 1/2	137
2	195
2 1/2	288
3	424
4	572

PLUG VALVE, V-405

Material:

Body: Cast Iron,
Bonnet: ASTM A126-93 Class B
Plug-Stem:

Bonnet
Gasket: Manufacturer's Standard

Stem
Packing: Manufacturer's Standard

Lubricant: Resistant to Acids,
Alkalies, Alcohols,
Aqueous Solutions and
Steam

Minimum Acceptable Rating:

Primary: 125 psi at 350°F
Non-shock: 200 psi at 100°F

Characteristics:

Type:	Plug
Ends:	Screwed
Seat:	Tapered, Integral
Plug:	Tapered
Operator:	Wrench
Stem to Plug:	Integral
Gland:	Screwed
Bonnet:	Bolted

PLUG VALVE, GROOVED STYLE, V-406

Material:

Body: Ductile Iron,
ASTM A-536

Upper/Lower
Bearing: Stainless Steel

Seal: Same as Plug Coating

Minimum Acceptable Rating:

3 through 12 in. - 175 psi
14 through 18 in. - 150 psi
(see plug coating for temperature range)

Characteristics:

Plug: Rubber encapsulated DI,
ASTM A-536

Type: Plug
Ends: Grooved
Seat: Welded
Operator: Lever Handle or
Gear Type

Plug Coating: EPDM, for water and oil free air
service form -30F to +230F
Nitrile, for oil and air with oil vapors
service from -20F to +180F

Dimensions in inches:

Size (in.) diam (in.)	Min. acceptable Cv at full open	Laying length (in.)
3	600	8.00
4	1040	9.00
6	2100	10.50
8	3850	11.50
10	5500	13.00
12	8400	14.00
14	12000	17.00
16	15000	17.75
18	19000	19.50

Manufacturer:

1. Victaulic – Series 377 (*for sizes 3" to 12" use style 307 transition coupling)

PLUG VALVE, V-6245

Material:

Body: Stainless Steel, AISI
Type 316

Seat: Inserted Teflon (TFE)
Unfilled Sleeve

Plug: Stainless Steel, AISI
Type 316

Stem: Stainless Steel, AISI
Type 316

Bonnet
Gasket: Teflon (TFE) Unfilled

Stem
Seal: Diaphragm, Teflon (TFE)

Thrust
Disc: Teflon (TFE) Unfilled

Minimum Acceptable Rating:

Primary: 1 psig to 150 psig at 400°F
Non-shock: 275 psig at 100°F

Characteristics:

Type: Plug (Packless-nonlubricated)
Ends: Flanged, 1/16-in. Raised

Seat: Face, ANSI 16.5-88, Class 150
Disc: Inserted Teflon Sleeve
Stem: Tapered Plug
Operator: Non-rising
Wrench (1/2 in. through 3 in.)

Enclosed Gear (4 in, 6 in, 8 in)

Stem to Disc:

Bonnet: Integral
Flanged with plug
adjustment screws

Service:

Part Removal: Nitric Acid
Through bonnet opening

NEEDLE VALVE, GAUGE COCK, V-613

Material:

Body: Stainless Steel,
ASTM A351-94
Grade CF-8M

Seat: Stainless Steel, AISI Type 316

Disc: Stainless Steel, AISI Type 316
Stem: Stainless Steel, AISI Type 316

Bonnet
Gasket: Manufacturer's Standard

Stem
Packing: Manufacturer's Standard

Minimum Acceptable Rating:

Non-shock: 300 psi at 450°F

Characteristics:

Type: Gauge Cock
Ends: Male Screwed,
ANSI B1.20.1-83

Seat: Plug Integral
Disc: Plug Type
Stem: Rising
Screw: Inside
Wheel: Rising
Stem to Disc: Integral
Bonnet: Screwed
Inlet End: Plug with Ball Valve for
Automatic Shutoff.
Drain Plug: Required

BOILER DRAIN VALVE (HOSE CONNECTION), V-6079

Material:

Minimum Acceptable Rating:

Body: Brass, ASTM B62-93 or
Red Brass with 10%
Zinc

Primary: 125 psi at 200°F
Non-shock: 200 psi at 70°F

Seat: Brass, ASTM B62-93 or
Red Brass with 10%
Zinc

Characteristics:

Type: Boiler Drain
Ends: Screwed
Seat: Integral
Stem: Rising
Screw: Inside
Wheel: Rising
Stem to Disc: Integral
Bonnet Type: Screwed with
separate adjustable
packing gland

Disc: Manufacturer's Standard

Disc
Insert: Buna N (rated for 250°F)

Stem: Manufacturer's Standard

Stem
Packing: Manufacturer's Standard

Ream valves with 1/2-in. MSPS inlets for 1/2-in. nominal (5/8 in. OD) copper tubing.

Minimum port size:

<u>Valve size</u>	<u>Port size min</u>
1/2	1/2 in.
3/4	1/2 in.

BACK-FLOW PREVENTING VALVE (BFPV) ASSEMBLY (TYPICAL): V-301

1. General: Back-Flow Preventing Valve (BFPV) assemblies shall be of the reduced pressure type with test cocks, two check valves and automatically operating pressure differential relief valve located between the two check valves. BFPV assembly shall be approved by University of California (UC) "Foundation of Cross-connection Control & Hydraulic Research" (FCCHR). Manufacturer must be included on the latest Listing of "Approved Reverse Pressure Backflow Prevention Devices," and installation shall comply with Engineering Standard ES-4.18-2.
2. The relief valve and the relief valve discharge port shall be low enough to drain the intermediate chamber to a level below the supply line inlet.
3. All moving parts and trim shall be made of corrosion resistant materials.
4. Assembly shall include two non-rising stem gate (or optional ball valves for smaller sizes) valves.
 5. Replaceable bronze seats
 6. Epoxy coated Strainer
 7. Modular check assemblies with center stem guiding.

Acceptable Manufacturers: FEBCO (No substitutions)

Reduced Pressure BFPV assembly shall be:

from sizes ½" to 2": FEBCO, Model No. 860

2½" and larger: FEBCO, Model No. 880/880V

PRESSURE REDUCING VALVE (PRV) (TYPICAL): V-501

1. General: General service make-up water pressure reducing valve shall be ASME rated, adjustable in one (1) PSI increments from approximately from 5 to 100 PSI, -20 to 400 °F.
 2. 2 ½" and smaller shall be constructed with bronze body, cast-stainless steel diaphragm, spring and threaded connections.
 3. 3" and larger valves shall be constructed with a cast iron body and cast-stainless steel diaphragm, spring and flanged connections.
 4. Non asbestos gaskets.
5. Manufacturers: Honeywell, C.M Bailey, Cashco, or Amtrol.

EXCESS PRESSURE RELIEF VALVE (RV): V-512

- A. General: Pressure Relief (By-pass) Valve shall be a hydraulically operated, globe-style, pilot controlled modulating valve. Such valve is designed to provide protection for the system, against high-pressure surges when control valves close, or pumps shut down. The valve shall be capable to open fast and close slowly as the relief valve dissipated the excess pressure.
- B. Materials: Match compatible materials with the system in which this valve is required.
1. Body: ASTM A-536 Ductile Iron (B16.42 ANSI Std.)
ASTM B-62 Bronze (B16.42 ANSI Std.)
TYPE 304 Stainless Steel (B16.5 ANSI Std.)
 - a. Disc Retainer, Diaphragm, and Washer:
Cast Iron, Bronze, or Stainless Steel
 - b. Trim: Disc. Guide Seat and Cover, Bearing:
Bronze Std. (Stainless Steel optional)
 - c. Disc: Buna N Rubber
 - d. Diaphragm: Nylon reinforced Buna N Rubber
 - e. Stem, Nuts, Spring: Stainless Steel

Manufacturer / Model No: CLA-VAL, Model 50-01 / 650-01 or approved equal

BALANCING VALVES / CIRCUIT SETTERS (TYPICAL): V-701

1. General: Valve assembly shall be rated for 300 psig at 250 °F. Balancing valve shall be complete with differential pressure readouts ports across the valve seat area fitted with internal EPT inserts and check valves.
 2. 2 1/2" and smaller shall be constructed with bronze body and brass ball with glass and carbon filled TFE seat rings, threaded connections.
 3. 3" and larger valves shall be constructed with a cast iron body and brass valve, wafer, flanged or grooved connections.
 4. 1/4" NPT tapped drain and purge port.
 5. Memory stop feature.
 6. Calibrated name plate.
7. Manufacturers: Flow Control Industries Inc., Bell & Gossett, AutoFlow or Tour & Anderson.

END OF SECTION 15100