PRODUCT SPECIFICATION SHEET

OUTLET ENTRY COMBINED PRESSURE REDUCING & DESUPERHEATERING VALVES (PRDS)

INTRODUCTION

The Copes Vulcan Combined Reducing and Desuperheating valve is used to simultaneously reduce the pressure and temperature of steam or other gases. Designed with angle style construction, the high pressure, high temperature fluid enters through the main branch connection, is pressure reduced and desuperheated within the valve body and exits in its lower pressure and temperature state through the larger outlet connection.

Coolant for the purpose of desuperheating enters through a second branch connection on the valve body and is admitted to the vapour flow immediately following the pressure reducing process, thus making use of the high velocity and turbulent flow conditions to achieve rapid atomisation and absorption of the coolant.

The PRDS valve offers a compact solution for pressure reducing and desuperheating applications, combining both functions in a single valve configuration.

Typical applications include:

- Steam conditioning
- Process pressure and temperature control
- Turbine bypass systems
- Dump steam systems
- Steam vent systems.

DESCRIPTION

Reference to Figure 1 will show the basic construction of a PRDS valve. It will be observed from this illustration that the valve body is angle style, with a second smaller branch at 180 from the main branch for the coolant entry. The valve body incorporates a single web, which divides the body into a high-pressure inlet section and a low-pressure outlet section. The web is the location and anchor point for the valve trim, which consists of a balanced single seat throttling plug, seat, coolant shroud, piston guide and shank guide. The shank guide acts as the trim-retaining member, holding and sealing the coolant shroud by a tight screw thread and locking pin.

The piston guide screwed and secured into the valve body guides the plug through the stroking distance. In larger units, the plug is of the balanced variety. The plug is hollow to allow pressure equalization between the balancing chamber and the outlet section of the valve. This configuration is desirable due to the low operating loads required. Small and more economical actuators can therefore be selected.

Leakage can occur through the balancing feature, this can be minimized by fitting piston rings. However, if the piston rings are omitted then the leakage, which does occur, is sometimes desirable because it provides the downstream pipeline with a bleed of vapour, which warms the pipe and prevents condensation on the pipe wall when the valve initially opens.

The coolant shroud, and seat assembly create a coolant annulus. Coolant enters the annulus through the coolant branch and is distributed around the coolant shroud where it is introduced to the vapour flow through a continuous discharge ports. By providing complete shrouding of the coolant and vapour mixture through the body, the effects of thermal stress and temperature shock in the body material are minimized. The shank guide acts as a diffuser to subject the vapour and coolant mixture to a final pressure drop before leaving the valve and assures final mixing.

The trim used in the PRDS valve can be a plug throttle form, a specially ported cage, a single stage "Hush" trim or a multi-stage "Hush" trim. The latter two being selected where audible noise is to be controlled. The single stage and multi stage "Hush" trims are shown in Figure 2 and Figure 3 respectively.

All trim components enter the body through the special valve outlet flange, the dimensions for which are shown in Figure 4. Other outlet end connections such as RTJ type flanges can be accommodated.

The valve bonnet incorporates the gland assembly for sealing the valve stem where it exits the valve body, and in addition, provides a mounting platform for the valve actuator to give the motive force for repositioning the valve plug by means of the valve stem.

The PRDS valve can be supplied with a variety of actuators, including pneumatic spring opposed diaphragm, Pneumatic spring opposed or double acting piston, electro-mechanical or electro-hydraulic.

PRINCIPLE OF OPERATION

High pressure, high temperature vapour enters the PRDS valve through the branch inlet connection and passes into the chamber in the valve body surrounding the plug. With the valve in the closed position, the vapour is unable to go any further. Flow to the outlet side of the valve is prohibited by the plug contacting the seat. The piston rings in the balancing piston grooves limit the flow into the balancing chamber. As the plug moves away from the seat the vapour can begin to flow through the gap formed. The position of the plug to the seat will determine how much port area is exposed and how much flow can pass from the inlet side of the valve to the outlet side.

In passing through the restriction formed between the seat and plug, the vapour is throttled and its pressure reduced by the regulation of flow into the downstream system. As the vapour exits, its velocity will increase. In the vena contracta zone immediately downstream of the trim the vapour will achieve its highest velocity. It is at this point that the coolant enters the vapour flow, and the desuperheating process begins.

Coolant is admitted to the conditioning valve through the second branch connection on the body. The amount of coolant supplied to the PRDS is controlled by a coolant control valve whose degree of opening is governed by a signal from a downstream temperature controller. As the coolant enters the coolant branch it discharges into a coolant annulus. This annulus is provided with one or more small discharge ports that are arranged in close proximity to the vapour flow vena contracta. The purpose of this is to set up an aspirating effect on the coolant annulus as the discharging vapour passes by. The aspirating effect coupled with a slight pressure differential between the coolant and the vapour results in the coolant being drawn into the vapour flow in a region of low pressure and high velocity. This sudden drop in pressure and simultaneous increase in velocity are instrumental in causing the coolant to atomise into a fine mist. The highly turbulent mist is made up of minute particles of coolant with a greatly increased surface area, which is quickly absorbed by the vapour flow. The increased surface area created by the atomisation of the coolant assists the heat transfer process between the vapour and the coolant thus speeding up the absorption process.

The coolant shroud is extended below the coolant annulus area and contacts the shank guide; this arrangement was chosen to protect the valve body from impingement by the coolant as it mixes with the incoming vapour.

The shank guide acts as a diffuser plate and serves two purposes: Firstly, the diffuser takes some of the pressure drop away from the valve trim, thus reducing the pressure drop across this item. This together with the fact that the diffuser plate contains a large number of drilled holes that breaks the vapour flow down into many small flow streams results in a lower noise level being generated as a result of the pressure reducing function. Secondly the diffuser plate subjects the vapour and coolant mixture to a pressure drop before it leaves the PRDS valve which is instrumental in providing complete absorption of the coolant by the vapour as it leaves the valve, ensuring that there is no risk of thermal shock to the downstream piping. This enables pipe bends to be fitted close to the valve outlet and avoids the need for thermal liners to be used in the outlet piping.

On all sizes except the 1 x 2, the valve can also be provided with single and multi stage pressure profiling trim options. In the single stage option (see Figure 2), the seat is extended as a cage to shroud the plug, a large number of holes drilled in the cage provide a diffused area that becomes larger as the valve opens. In the multi stage option (see Figure 3), a similar cage assembly consisting of multiple cylinders, which have large numbers of drilled holes that are offset to create a series of tortuous paths, each containing a number of restriction and expansion regions through which the vapour has to pass. These tortuous paths are designed to break the overall pressure drop down in stages while at the same time controlling the velocity of the vapour to a level that will not give rise to excessive noise levels. This feature can also be used to enhance the pressure reducing function and to create a lower exit pressure from the cage where it may be required to use a low-pressure coolant source.

The plug in the PRDS valve is of balanced construction having a hollow centre that communicates the pressure in the valve outlet chamber to the balancing chamber behind the plug. This feature also prevents a build up of pressure behind the plug in the event of any leakage passed the piston rings on the balancing piston of the plug. The only exception to this is the 1 x 2, which has an unbalanced plug with a small unbalanced area.

DESIGN

The pressure retaining parts are designed in accordance with the requirements of ASME B16.34 1996. Other relevant standards are:

- ASME B16.5 1996
- ASME B16.25 1997
- ANSI / FCI 70-2 1991
- ASME Section VIII, Division 1 1989 + 1991 Addenda

SIZES

The PRDS valve is available in 5 standard sizes, the outlet being twice the size of the inlet to allow for expansion of the vapour at the lower pressure.

Sizes: 1 x 2 2 x 4 3 x 6 4 x 8 6 x 12

NOTE: Larger sizes utilizing a similar design can also be provided. Units larger than 6" x 12" typically have fabricated bodies and branches to suit customer specific requirements. However, the operating concept remains similar to that described in this specification.

PRESSURE RATINGS

The design of the valve allows the use of the pressure temperature ratings shown in ASME B16.34. Table 1 shows the range of ratings available for each of the PRDS valve sizes.

MATERIALS OF CONSTRUCTION

The valve can be manufactured from any material to meet specific design requirements. However, standard materials are available:

Body and Bonnet Options

Body

Carbon steel to ASTM A216 Grade WCB (applications up to 800° F)
Chrome moly steel to ASTM A217 Grade WC6 (applications up to 1000° F)
Chrome moly steel to ASTM A217 Grade WC9 (applications up to 1050° F)

Bonnet

Bonnets will be supplied in the same materials as the valve body or in a forged version as follows:

Carbon steel to ASTM A105 (applications up to 800° F)
Chrome moly steel to ASTM A182 F11 (applications up to 1000° F)
Chrome moly steel to ASTM A182 F22 (applications up to 1050° F)

Bonnet Studs and Nuts

The standard body to bonnet stud and nut material are:

For applications up through 800° F: (For WCB body)

Studs - ASTM A193, Grade B7
Nuts - ASTM A194, Grade 2H

For applications over 800° F t0 1050° F in low alloy steel (WC6 and WC9)

Studs - ASTM A193, Grade B16
Nuts - ASTM A194, Grade 4

Packing Followers Studs and Nuts

The packing follower stud and nut materials for temperatures up to 1050° F are:

Studs - ASTM A193 Gr. B8T
Nuts - ASTM Gr. 8M

Plug, Piston guide, Shank guide and Cylinder assembly (Cylinder trim option)

BS 970 420 S37 Hardened to Rockwell C 38-43 for applications below 800° F and pressure drops less than 2000psi. Hardened and nitrided for applications above 800° F and pressure drops greater than 2000psi.

Seat (Plug throttle option)	:	ZERON 25
Piston Rings	:	ASTM A439-D3 outer ring, l 17-4 pH inner ring.
Stem	:	BS 970 431S29 for applications up to 850° F. ASTM A276 Type 316 Condition B, Chrome plated for applications above 850F
Gaskets	:	304/316 SS spiral winding with graphite filler.

ORIENTATION

The outlet entry pressure reducing and desuperheating station can be installed in any orientation.

TRIM INSTALLATION

The trim is of the screwed in design; access to the valve internals is via the outlet flange. If it is intended to leave the valve in the line during maintenance, then provision should be made to remove a sufficient length of outlet piping to give access to the valve for inspection and to permit removal of the internals. The recommended minimum length of removable piping is 2 feet.

PLUG AND STEM CONNECTION

The stem is connected to the plug by a tapered junction. The tapered junction provides accurate alignment between the plug and stem. Protection from unscrewing is provided by pinning the plug and stem together after they have been assembled.

SHUT OFF CHARACTERISTICS

The trim is single seated, metal-to-metal. A seat leakage of ANSI FCI 70-2 Class IV is achievable with trims fitted with piston rings. ANSI FCI 70-2 Class II is the standard leakage rate when the piston rings are omitted. However, Class III is also achievable. All trims fitted to the 1 x 2 PRDS are non-balanced and a Class IV seat leakage can be achieved without the need for piston rings.

VELOCITY LIMIT

If a noise limit has been specified, the outlet velocity should be limited to one-third sonic. Caution should also be taken when sizing the downstream diffuser plate as a critical pressure drop taken across the diffuser plate could become a noise generator in its own right.

MINIMUM SUPERHEAT

The unit can maintain final temperature down to 10° F above saturation.

ACCURACY

The pressure control tolerance is within ±2 psi of the set point.
The temperature control tolerance is within ±5° F of the set point.

COOLANT PRESSURE

When a plug throttle type trim is used, the coolant pressure required at the PRDS coolant inlet must be equal to or greater than the backpressure provided by the diffuser. When a ported cage trim or any of the single stage and multi stage noise reduction trims are provided, the coolant pressure should be greater than 25 psi higher than the backpressure provided by the diffuser.

In all cases an additional allowance of at least 25 psi should be made for the pressure differential across the coolant control valve.

PRESSURE SENSING LOCATION

The pressure sensing point can be at a minimum distance of 5 feet from the outlet flange. Ideally however, this should be positioned at the point of usage of the vapour, the PRDS valve will then compensate for any line losses.

TEMPERATURE SENSING LOCATION

The temperature-sensing element should be located downstream of the valve at the point where dry superheated fluid exists. The widely ranging conditions of the PRDS make it difficult to pick an exact location. In order to provide stable control and minimum time delays (response between the coolant valve and temperature-sensing element), the recommended location of the temperature sensing point is between 13 and 20 feet from the outlet of the PRDS valve.

RANGEABLILITY

Table 2 shows the maximum available CV values for plug throttle trims. Accurate control of vapour pressure and temperature is possible from 100% to 12% of full load.

Table 3, Table 4, Table 5 and Table 6 show maximum and minimum controllable Cv values for single stage and multi stage "Hush" trim options.

TRIM CHARACTERISTIC

All plug throttle trim designs have a modified parabolic characteristic with exception to the 1 x 2 PRDS options, which have linear characteristics. All single stage and multi stage "Hush" trims have a characteristic, which is close to linear. PRDS ported cages are non-standard equipment. However, ported trims can be profiled to give any characteristic that is required.

LINE INSTALLATION

A typical PRDS installation schematic diagram is shown in Figure 5.

The unit can be installed in any orientation, however for ease of maintenance it is recommended that the valve be installed with the outlet flow direction vertically upward, or in any horizontal position. The pipework should be in accordance with good piping practice with a minimum straigth length of 2 feet, which ideally should be arranged as a removable section to give access to the PRDS internals. This removable section should couple with the PRDS with a flat face flange or raised face that matches the PRDS outlet flange.

Any bend following the PRDS outlet should have a minimum pipe bend radius of 1.5 times the pipe diameter.

An expansion piece to reduce fluid velocity downstream of the unit may be required directly at the outlet. The final pipe diameter should be calculated to give an acceptable pipe velocity relative to the downstream pressure conditions.

To provide the best temperature control, it is good practice to locate the coolant control valve at a lower elevation than the PRDS coolant inlet. This configuration will ensure that the coolant line remains full under light load conditions.

A non-return valve should be installed between the coolant control valve and the PRDS and an isolated drain point included between the non-return valve and the PRDS.

THERMAL LINER

A shroud is standard in each unit to protect the body from any coolant impingement. No thermal liner is required in the downstream pipe.

DIFFUSER

All plug throttle trims are supplied with a shank guide to guide the plug through the valve stroke. A range of diffuser shank guides are shown in Table 7, these should be fitted in the following instances:

- When the noise produced by the trim is too high.
- When the velocity at the PRDS outlet is too high.
- When the orientation of the PRDS is such that the outlet is vertically downward
- When the Cv of the PRDS trim is too large and an excessively short stroke would otherwise result.

All single stage and multi-stage trims are fitted with standard diffuser plates to amid missing. The range of diffuser plates is shown in Table 8.

END CONNECTIONS

Except for the class 2500 inlet that has a butt weld connection as standard, all end connections are flanged to ASME B16.5. The exception to this is the special outlet flange raised face dimensions, which are shown in Figure 4. Coolant flanges are rated to suit the outlet flange; the standard coolant branch sizes are shown in Table 9.

An option for supplying butt weld ends at the inlet and coolant branches is available.

CAPACITIES

Refer to Table 2 to Table 8 for trim and diffuser plate capacities. The capacity of multi stage "Hush" trims is dependent on the number of trim sleeves that are employed to attenuate audible noise to an acceptable level. These trims are custom engineered to meet specific conditions.

ACTUATION

The valve is designed to accept COPES-VULCAN, INC. diaphragm and piston actuators which a screwed yoke-mounting feature. The stem sizes and actuator mounting diameters are shown in Table 10.

DIMENSIONS

The fitting dimensions for the standard range of PRDS valves is shown in Figure 5, Figure 6, Figure 7 and Figure 8

FIGURE 1

TYPICAL LAYOUT, PLUG THROTTLE TRIM

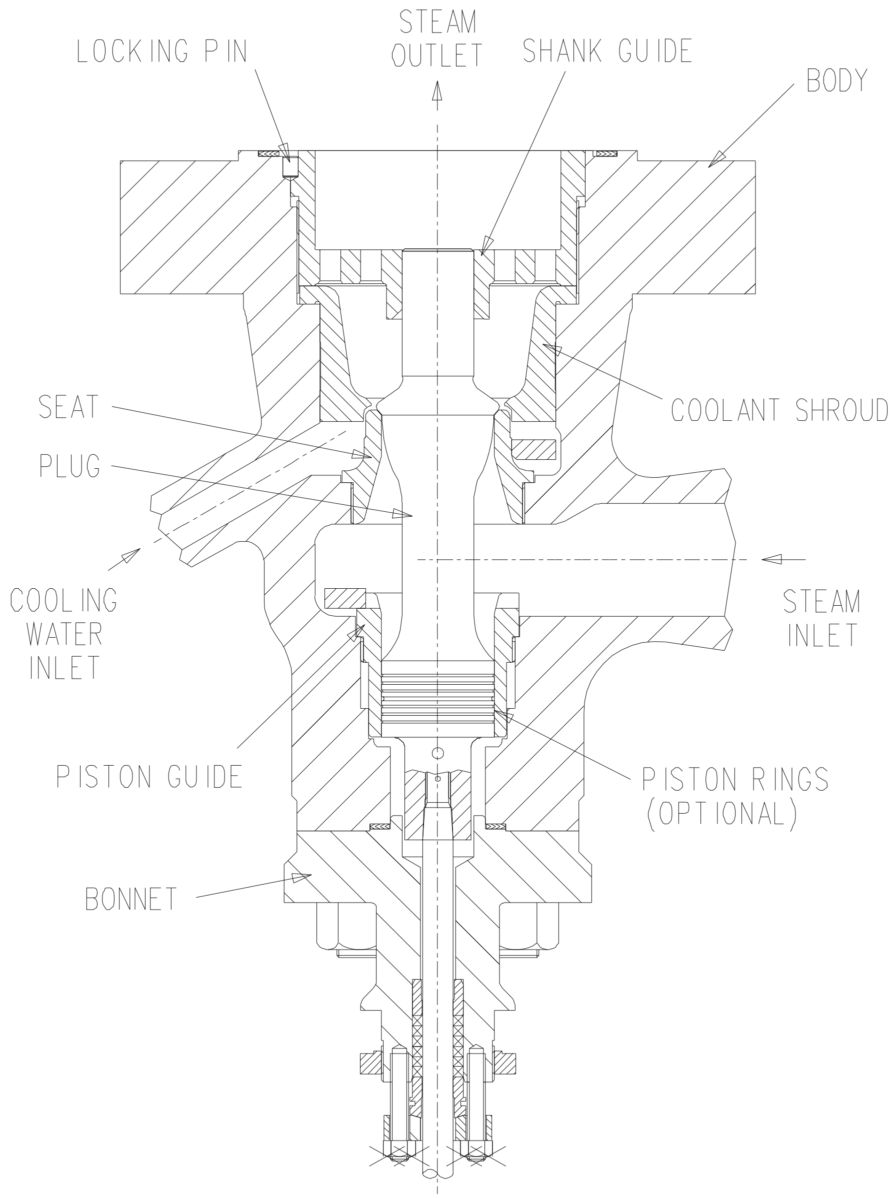


FIGURE 2

TYPICAL LAYOUT, SINGLE STAGE "HUSH" TRIM

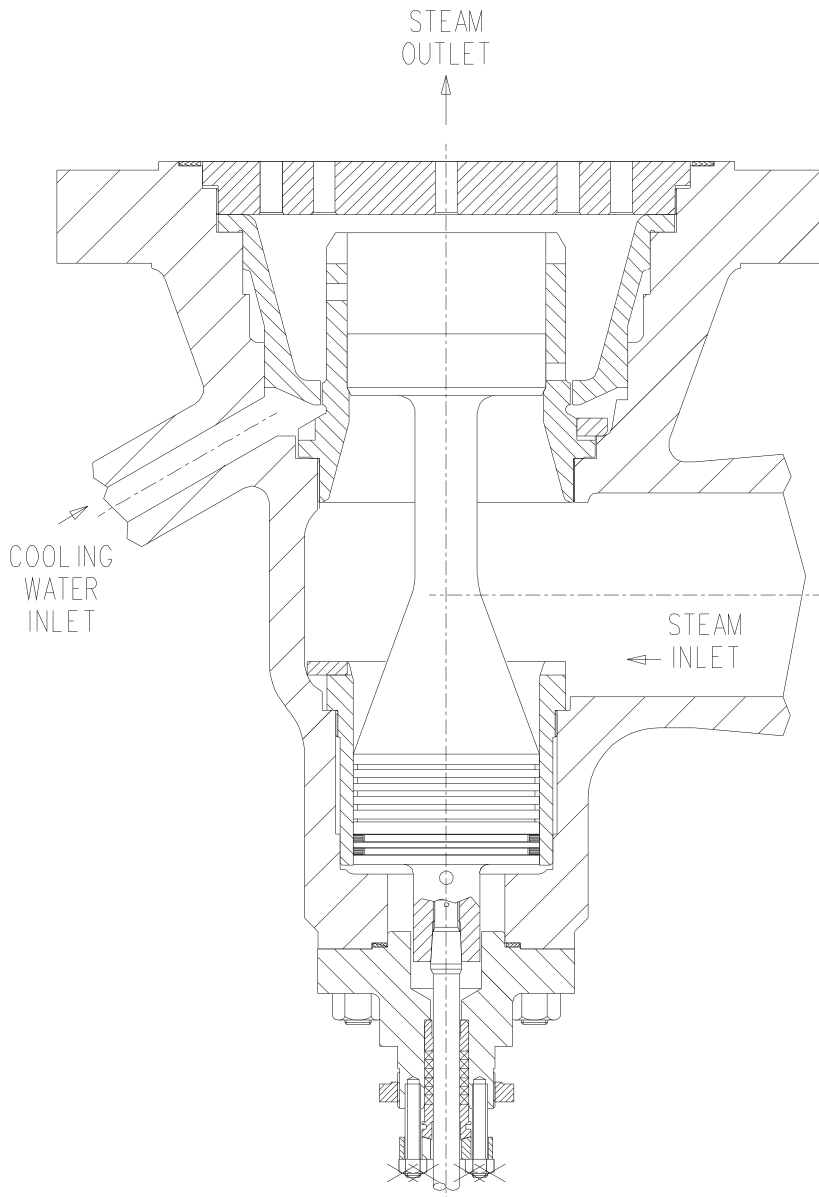


FIGURE 3

TYPICAL LAYOUT, MULTI STAGE "HUSH" TRIM

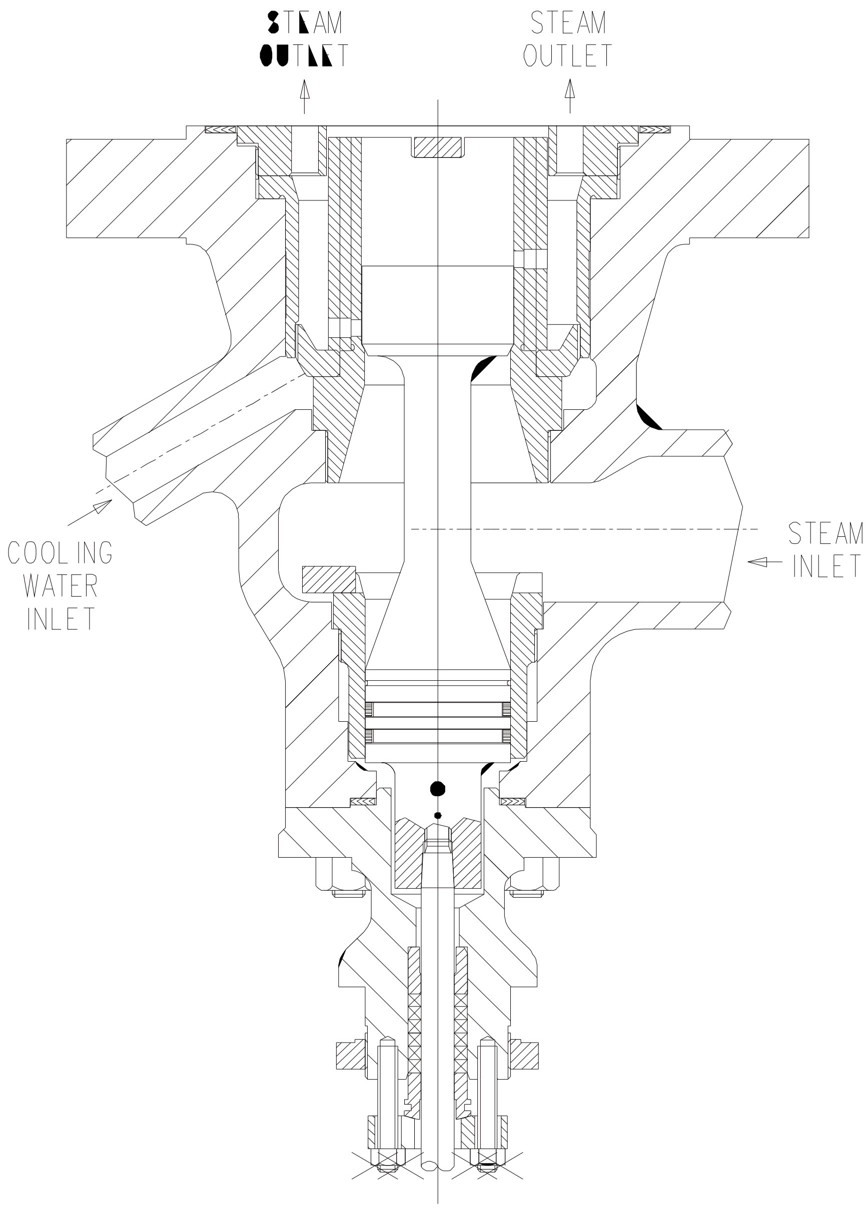
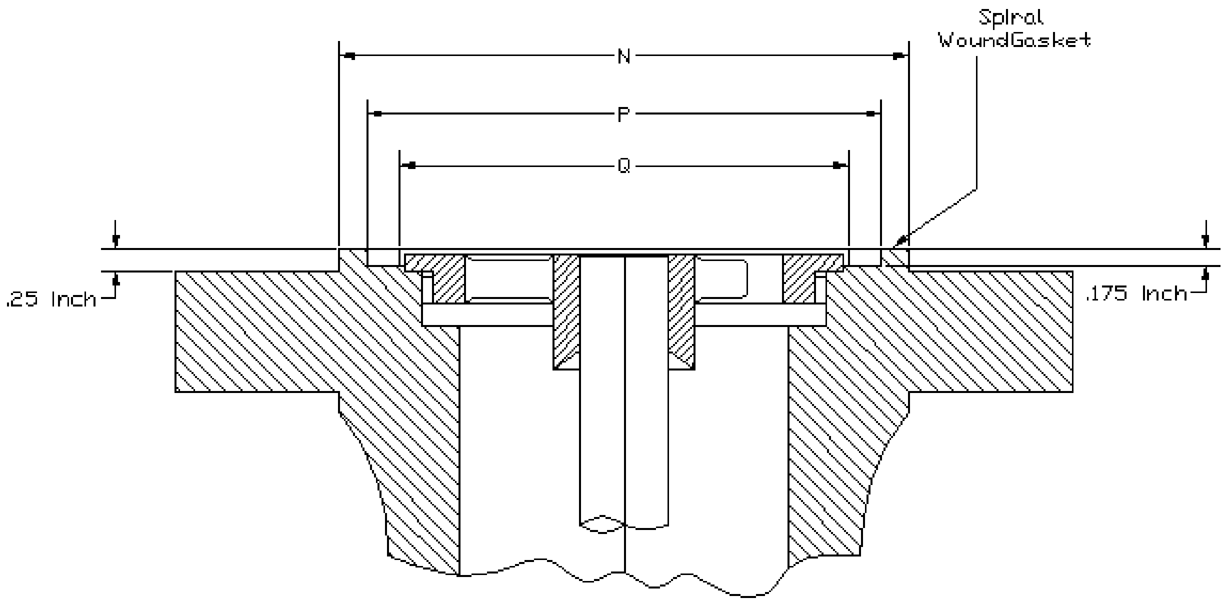


FIGURE 4

SPECIAL OUTLET FLANGE DIMENSIONS



Class Rating		1 x 2	2 x 4	3 x 6	4 x 8	6 x 12
600	N	4.25	6.88	9.50	11.88	16.25
	P	3.81	6.12	8.75	10.62	15.06
	Q	3.06	5.31	7.62	9.31	13.88
900	N	-	7.12	9.50	12.12	16.50
	P	-	6.12	8.75	10.62	14.91
	Q	-	5.31	7.62	9.31	13.44
1500	N	4.88	7.62	9.75	12.50	17.25
	P	3.81	6.12	8.75	10.62	14.91
	Q	3.06	5.31	7.62	9.31	13.44

Flange drillings are per ASME B16.5 1996
Note: All class 2500 PRDS bodies have class 900 outlet flanges as standard. Class 1500 or class 2500 flanges can be accommodated if appropriate.

TABLE 1

AVAILABLE PRESSURE - TEMPERATURE RATINGS

The following P-T rating refer to those shown in ASME B16.34
Note: All standard class 2500 PRDS bodies have class 900 outlet flanges.

Available	P/T ratings			
Size	600	900	1500	2500
1 x 2	●	-	●	
2 x 4	●	●	●	●
3 x 6	●	●	●	●
4 x 8	●	●	●	●
6 x 12	●	●	●	●

TABLE 2

CV FACTOR CHART FOR STANDARD PRDS PLUG THROTTLE TRIMS

Plug Throttle trim	1 x 2	2 x 4	3 x 6	4 x 8	6 x 12
Minor	2	10	-	-	-
Mini	4	19	35	94	139
Reduced	7	34	68	137	263
Standard	10	45	103	180	397
Full	15	50	126	224	502
Stroke	0.75”	1.50”	1.50”	2.00”	2.50”
Characteristic	Linear	Modified Parabolic	Modified Parabolic	Modified Parabolic	Modified Parabolic

TABLE 3

CV FACTOR CHART FOR STANDARD SINGLE STAGE “HUSH” TRIMS

SSH trim Stroke	2 x 4	3 x 6	4 x 8	6 x 12
1.00”	14	31	62	
1.00”	29	66	89	
1.50”	35	85	124	214
2.00”			145	274
2.50”				312
3.00”				337
Min.Controllable Cv	0.7	1.7	2.9	6.7
Characteristic	Linear	Linear	Linear	Linear
Unbalanced area	0.380 in²	0.552 in²	0.700 in²	1.040 in²

TABLE 4

CV FACTOR CHART FOR STANDARD 3 X 6 PRDS MULTI STAGE “HUSH” TRIMS

Trim Stroke	2 Stage	3 Stage	4 Stage
1.00”	26	18	9
1.50”	49	33	
Min.Controllable Cv	1.0	0.7	0.2
Characteristic	Linear	Linear	Linear
Unbalanced area	0.55 in²	0.45 in²	0.37 in²

TABLE 5

CV FACTOR CHART FOR STANDARD 4 X 8 PRDS MULTI STAGE “HUSH” TRIMS

Trim Stroke	2 Stage	3 Stage	4 Stage	5 Stage
1.00”	24	19	13	9
1.50”	52	36	25	16
2.00”	80	52	36	24
2.50”	120		47	31
Min.Controllable Cv	2.4	1.5	0.9	0.6
Characteristic	Linear	Linear	Linear	Linear
Unbalanced area	0.70 in²	0.60 in²	0.53 in²	0.45 in²

TABLE 6

CV FACTOR CHART FOR STANDARD 6 X 12 PRDS MULTI STAGE "HUSH" TRIMS

Trim Stroke	2 Stage	3 Stage	4 Stage	5 Stage	6 Stage	7 Stage
1.00"	27	26	22	16	12	8
1.50"	69	56	45	31	22	15
2.00"	118	91	67	46	32	21
2.50"	159	121	90	61	41	28
3.00"	208	152	112	76	51	34
3.50"		182	135	91	61	41
4.00"			158	106	71	47
Min.Controllable Cv	4.1	3.6	3.1	2.1	1.4	0.9
Characteristic	Linear	Linear	Linear	Linear	Linear	Linear
Unbalanced area	1.04 in^2	1.04 in^2	6.61 in^2	0.87 in^2	1.57 in^2	0.70 in^2

TABLE 7

AVAILABLE DIFFUSER SHANK GUIDES FOR INSTALLATION WITH PLUG THROTTLE TRIMS

2 x 4 Cv	3 x 6 Cv	4 x 8 Cv	6 x 12 Cv
196	449	960	1724
95	236	471	869
83	212	424	797
71	188	377	725
59	165	330	652
47	141	283	580
35	118	236	507
24	94	188	435
12	71	141	362
	47	94	290
	24	47	218
			145
			73

TABLE 8

AVAILABLE DIFFUSER PLATES FOR INSTALLATION WITH SINGLE STAGE AND MULTI STAGE HUSH TRIMS

2 x 4 Cv	3 x 6 Cv	4 x 8 Cv	6 x 12 Cv
196	449	960	1724
95	236	471	869
83	212	424	797
71	188	377	725
59	165	330	652
47	141	283	580
35	118	236	507
24	94	188	435
12	71	141	362
	47	94	290
	24	47	218
			145
			73

TABLE 9

COOLANT BRANCH SIZES

PRDS Size	Coolant Flange Size
1 x 2	0.50”
2 x 4	1.00”
3 x 6	1.00”
4 x 8	1.50”
6 x 12	1.50”

Note: The coolant flange rating will be the same as the outlet flange

TABLE 10

ACTUATOR MOUNTING DIAMETERS AND STEM SIZES

	1 x 2		2 x 4		3 x 6		4 x 8		6 x 12	
Class Rating	Mtg. dia.	Stem dia.	Mtg. dia.	Stem dia.	Mtg. dia.	Stem dia.	Mtg. dia.	Stem dia.	Mtg. dia.	Stem dia.
600	2.25”	0.50”	2.75”	0.62”	2.75”	0.75”	2.75”	0.75”	2.75”	0.75”
900	-	-	2.75”	0.62”	2.75”	0.75”	2.75”	0.75”	3.56”	0.88”
1500	2.25”	0.50”	2.75”	0.62”	2.75”	0.75”	2.75”	0.75”	3.56”	0.88”
2500			2.75”	0.62”	2.75”	0.75”	2.75”	0.75”	3.56”	0.88”

TABLE 11

AVAILABLE SLOTTED SEATS FOR INSTALLATION WITH SINGLE STAGE HUSH TRIMS

2 x 4	3 x 6	4 x 8	6 x 12
Cv	Cv	Cv	Cv
0.47	0.47	0.47	0.47
0.94	0.94	0.94	0.94
1.41	1.41	1.41	1.41
1.90	1.90	1.90	1.90
2.35	2.35	2.35	2.35
2.80	2.80	2.80	2.80
3.75	3.75	3.75	3.75
4.70	4.70	4.70	4.70
5.65	5.65	5.65	5.65
7.50	7.50	7.50	7.50
	9.40	9.40	9.40
		11.28	11.28
			14.10
			16.92

FIGURE 5

SCHEMATIC INSTALLATION OF A PRDS VALVE AND THE SUPPORTING SYSTEM

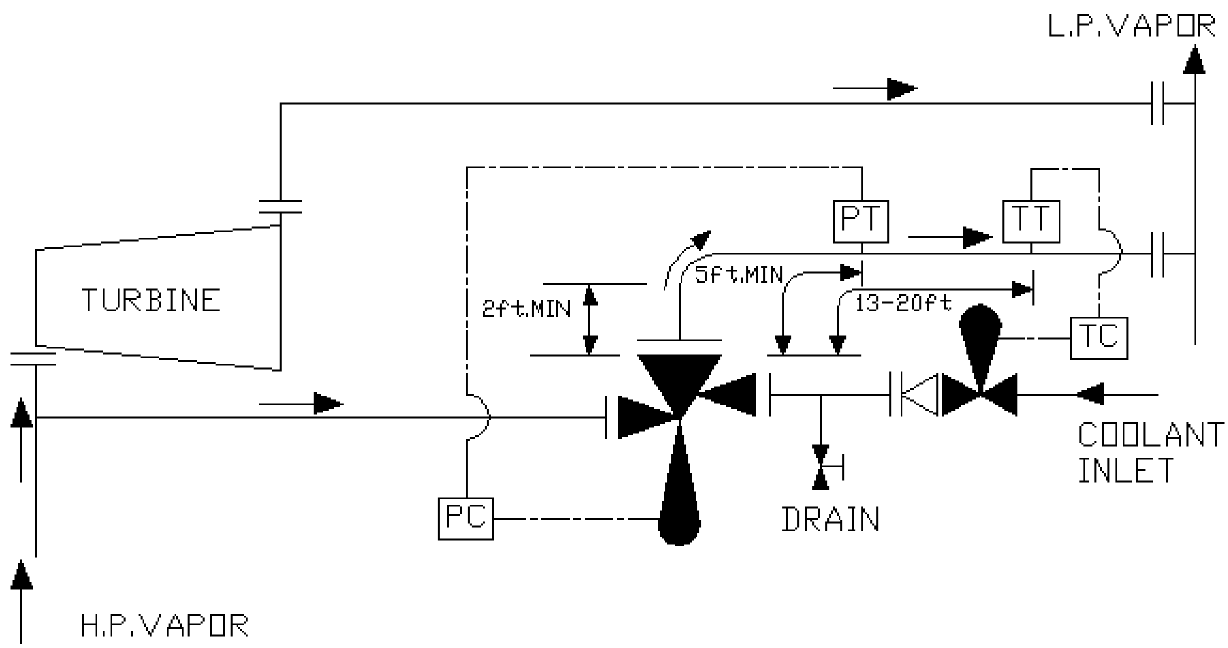
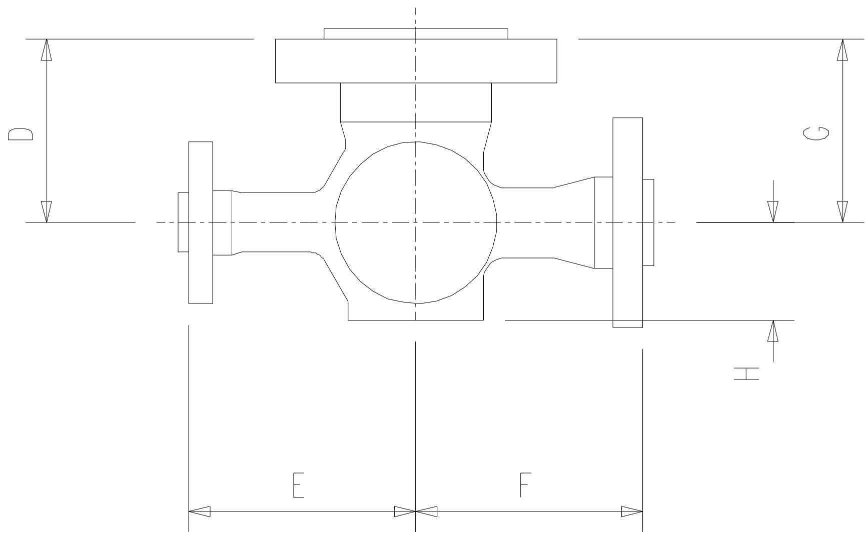


FIGURE 6

OUTLINE DRAWING FOR CLASS 600, 900 AND 1500 PRDS VALVES

1 x 2 PRDS

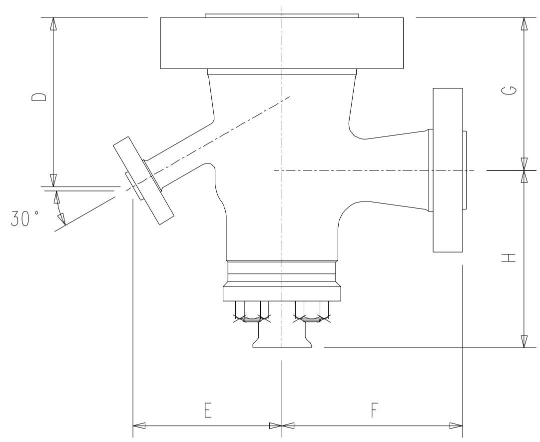


Dimension	Class Rating	1 x 2
	600	4.50
D	1500	6.00
	600	5.50
E	1500	7.00
	600	5.50
F	1500	7.00
	600	4.50
G	1500	6.00
	600	2.44
H	1500	2.50

FIGURE 7

OUTLINE DRAWING FOR CLASS 600, 900 AND 1500 PRDS VALVES

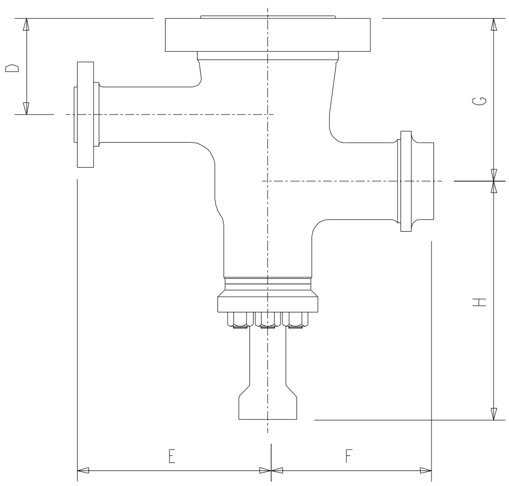
2 x 4 to 6 x 12 PRDS



Dimension	Class Rating	2 x 4	3 x 6	4 x 8	6 x 12
	600	7.25	8.00	10.50	11.12
D	900	-	11.06	12.88	15.12
	1500	8.38	11.06	14.00	16.88
	600	6.69	8.25	9.50	11.75
E	900	-	9.50	9.81	11.75
	1500	7.62	9.50	9.81	11.75
	600	7.62	9.50	10.00	14.12
F	900	-	11.75	10.75	18.00
	1500	8.62	11.75	10.75	18.00
	600	6.75	7.62	10.50	12.25
G	900	-	10.00	12.88	16.25
	1500	7.38	10.00	14.00	18.00
	600	10.94	11.56	12.81	18.00
H	900	-	15.56	16.81	22.81
	1500	13.56	15.56	16.81	22.81

FIGURE 8

OUTLINE DRAWING FOR CLASS 2500 PRDS VALVES



CLASS 900 OUTLET FLANGE

Dimension	2 x 4	3 x 6	4 x 8	6 x 12
D	8.00	7.38	8.00	8.62
E	12.00	16.00	17.50	18.00
F	12.00	12.00	15.00	18.75
G	12.00	12.00	14.00	16.25
H	18.50	19.56	20.56	23.81

CLASS 1500 OUTLET FLANGE

Dimension	2 x 4	3 x 6	4 x 8	6 x 12
D	8.00	8.38	9.12	10.38
E	12.00	16.00	17.50	18.00
F	12.00	12.00	15.00	18.75
G	12.00	13.00	15.12	18.00
H	18.50	19.56	20.56	23.81

Note: Inlet butt weld end is standard on all class 2500 PRDS valves.