PACIFIC VALVES

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PACIFIC VALVES® - Wedgeplug Brochure

CRANE

Energy Flow Solutions

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Wedgeplug Key Features and Typical Applications

Key Features & Benefits

❶ Simple construction with only three major parts

❷ Simple purge options

❸ Metal sealing surfaces

❹ Wedgetorque® operation

❺ Bi-directional sealing with double block-and-bleed capability

❻ Purge acts as secondary seal barrier for more reliable shutoff

❼ Wide seat area accommodates long term process damage and supports reliable isolation performance

Typical Applications

Petroleum Refining

Delayed Cokers
- Inlet/Transferline Isolation
- Overhead Isolation
- Module Isolation
- Heater Isolation

FCCU & RCCU
- Slurry/cycle Oil Pump Isolation
- Catalyst Withdraw & Addition
- 3rd Stage Cyclone Block
- Strainer Isolation
- Cat Fines Block Valves
- Fractionators Emergency Shutdown Valve
- Coker Pot Strainer

Asphalt Plants

Residue Reduction

Petrochemical

Ethylene/Steam Crackers
- Furnace Isolation
- Transferline Valves
- Decoke Valves
- Bypass Valves
- Strainer Isolation

MDI/MDA

Other
- Fossil Fuel Power Generation
- Fly Ash Handling

Coal Gasification

Wedgeplug Product Range

Making The Severe Routine

Wear is the enemy of all process valves which reduces the life cycle. Severe service processes accelerates this action aggressively further. The compressive interface of sealing elements with the introduction of severe processes attack machine finishes and tolerances which enables the valves ability to function. The Wedgeplug eliminates this action with frictionless operation between sealing elements. This extends the reliability of the valve for shutoff and repair costs for these extreme applications, thus offers the lowest cost of ownership.

- ASME Classes 150-1500.
- Temperature from cryogenic to 1650°F (900°C).
- Sizes ½ in (15 mm) through 36 in (900 mm).
- Plug port of reduced (70%, 90%) and full bore (100%).
- Designed to requirements of:
  - API 599
  - ASME B16.5 flanges
  - ASME B16.10 face to face
  - ASME B16.34
  - Flanged, threaded or butt-welded
- Fire tested to API Standard 607, API Standard 6FA and British Standard BS6755.
- Materials include WCB, CF8M, C5, C12, WC6, WC9, and Incoloy 800H.
- Special configurations and alloys available.

Design Features

1. **Wedgetorque operator lifts, rotates 90° and reseats plug on its protected seating surfaces. Positive mechanical thrust drives plug into body seats to ensure tight bi-directional line seal. Automatically compensates for wear and temperature changes. Automated operation easily accommodated.**

2. **Open-close position indicator. Limit switches for remote indication.**

3. **Large stuffing box accommodates all packing arrangements, including live-loaded design and lantern ring type for severe services.**

4. **Non-lubricated, tapered plug assures tight seal with low breakout torque. Constructed of hardened materials with optional hard facing.**

5. **Robust body with raised seating surfaces ground to mirror-like finish. Hard plug and body seat facings available. Body and plug seats protected from line media in open-close positions.**

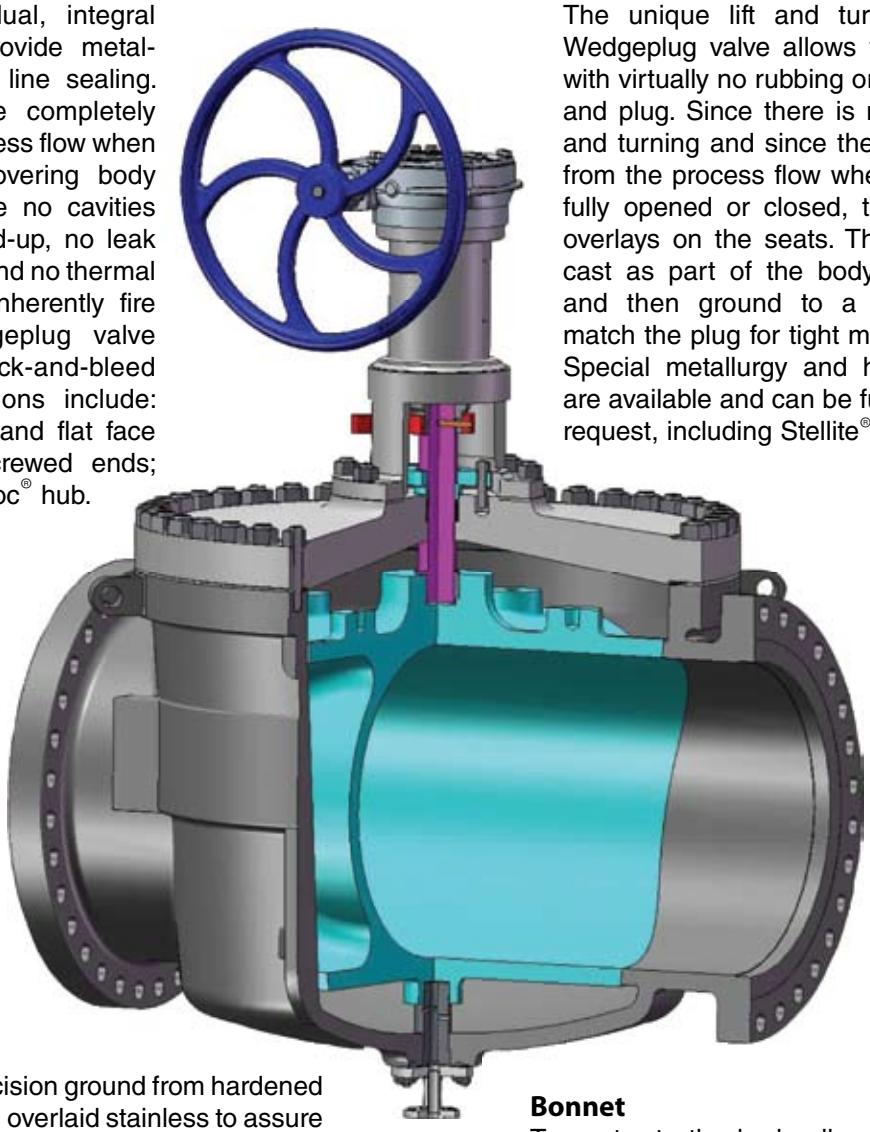
6. **Integrally cast body ribs, running parallel and perpendicular to the pipe axis, impart additional strength for high pressure conditions, thermal and pipe loads.**

7. **Seven body bosses provide purge, flush, drain or bypass connections. (Purge/flush shown.) Bottom boss is furnished with standard pipe threads.**

(plug detail)

Design Simplicity

Body
The body features dual, integral metal seats which provide metal-to-metal, bi-directional line sealing. The raised seats are completely protected from the process flow when fully open or plug covering body seat closed. There are no cavities to permit process build-up, no leak paths behind the seat and no thermal expansion problems. Inherently fire safe, a single Wedgeplug valve provides double block-and-bleed service. End connections include: raised face, ring joint and flat face flanges; butt weld; screwed ends; socket weld; and Grayloc® hub.



Seats
The unique lift and turn operation of the Wedgeplug valve allows the valve to operate with virtually no rubbing or contact of the seats and plug. Since there is no contact during lift and turning and since the seats are protected from the process flow when the valve is either fully opened or closed, there is no need for overlays on the seats. The seats are integral cast as part of the body and are machined and then ground to a mirror-like finish to match the plug for tight metal to metal sealing. Special metallurgy and hard facing surfaces are available and can be furnished to customer request, including Stellite® and Ultimet®.

Plug
The tapered plug is precision ground from hardened high alloy material or an overlaid stainless to assure a tight seal and easy operation. The hardened or overlaid surfaces resist damage from the most severe service during operation of the valve for years of predictable service.

The optional Q-plug provides full port flow along with less weight and easier maintenance. Other enhancements include trunnion mounting to eliminate side loads for prolonged seat life; tangential purge; and heavy-duty mounting yoke design.

Bonnet
Top entry to the body allows in-line disassembly and repairability. Plug-stem-yoke-actuator can be removed as a single unit for inspection, cleaning and repair. This is a significant cost and maintenance benefit, especially for valve sizes 12 in (300 mm) and larger.

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®Stellite is a registered trademark of Deloro Stellite, Inc.
®Ultimet is a registered trademark of Haynes International, Inc.

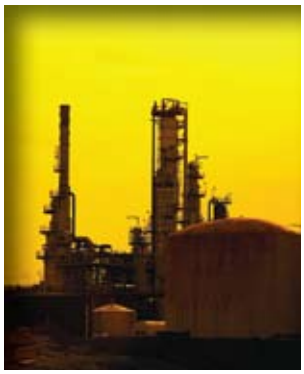
Overview

Hard Seating Surfaces

Hard facings on the plug and body seats are not required due to the unique, non-contact turning motion of the Wedgeplug and can be furnished to customer request. The hardened metal plugs are then machined to a mirror-like finish for tight sealing and low torque. Wedgeplug valves with hard facings are recommended for high temperature corrosive and erosive steam and oil or oil vapor services.

A Choice of Seats

Metal seated valves are recommended for extremely high or low temperatures and in abrasive media. Special metallurgy and hard facing surfaces are available.



Bonnet, Stem and Seal Options

- Extended bonnets for cryogenic service.
- Heat dissipating fins for temperatures > 1000°F (535°C).
- Trunnion mounts handle high differential pressures and prevent side loading.
- Packing and gland assembly with two-piece ball and socket-type joints assures alignment and proper packing compression without stem binding. Standard packing is Grafoil®. A wide variety of packing configurations are available.

Purging and Flushing (see illustration page 8)

The unique lift/rotated seat action of the Wedgeplug valve provides for the most efficient use of purge steam in the industry. Unlike other designs that require a continuous flow of purge steam, the Wedgeplug valve shuts off purge steam flow in the full open and full closed position, saving many times the price of the valve in wasted purge steam flow over the life of the valve.

Seven boss locations per ASME B16.34 can be tapped for introduction of purge or flushing media, typically air, nitrogen, steam or flush oil. By supplying a higher pressure than the media line pressure to the purge/flushing line inlets, the seating surfaces are flushed clean by pushing particulate matter back into the line during cycling.

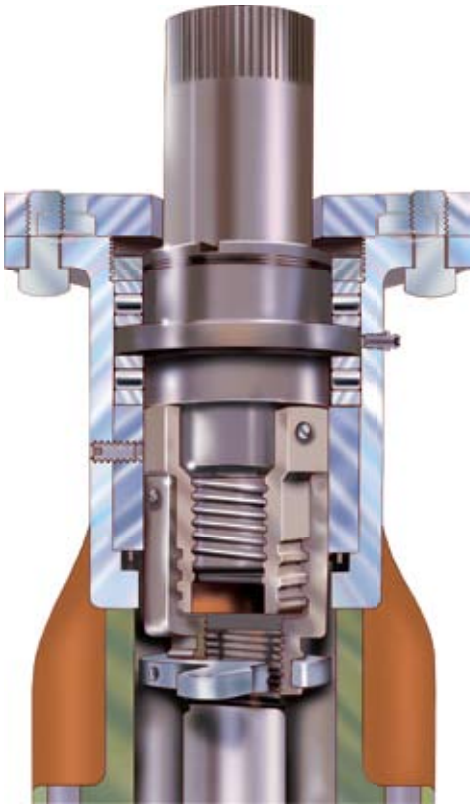
Steam Jacketing

Steam jacketed valves are available to handle highly viscous media such as tars and pitches. They may be obtained in ASME Class 150 and 300, sizes 1 ½ in (40 mm) thru 10 in (250 mm).

Simple Automation

Wedgetorque operators are standard equipment. Providing optimum torque seating, they ensure tight bi-directional sealing while compensating for seat wear and process temperature variations. They allow easy manual operation and simple automation with electric, pneumatic or hydraulic actuators.

Enhance Valve Performance



Wedgetorque Operators

All Wedgeplug valves are supplied with Wedgetorque operators to ensure optimum torque seating, providing the following features and benefits.

- The Wedgetorque lifts the non-lubricated plug and rotates it 90°, reseating it as torque is transmitted to the operating screw.
- The Wedgetorque provides positive seating from mechanical thrust, ensuring tight sealing of upstream and downstream seats.
- Automatic compensation for wear and process temperature variations.
- The Wedgetorque is manufactured and stocked in several group sizes for a full range of Wedgeplug valves.
- Originally supplied Wedgeplug valves with screw-type operators, can be easily refurbished with new yokes and Wedgetorque operators.

Enhance Performance & Extend Valve Life

To provide consistent seating performance and prolonged valve life, it is recommended that you purge and flush your Pacific Wedgeplug valve each time it is operated.
By purging and flushing, you can:

- Clean the seating surfaces, helping to deter damage caused from solids traveling in the process stream.
- Create a third dynamic seal in the valve, in addition to the upstream and downstream seats, by introducing the purge media.
- Use the purge media to create a safety blanket, thus eliminating escape paths for the process media.

Another benefit inherent in the Wedgeplug design is that the purge media is only consumed when the valve is being opened or closed. This greatly reduces the overall consumption of purge media and the subsequent removal from the process stream.

Guidelines for Purging and Flushing

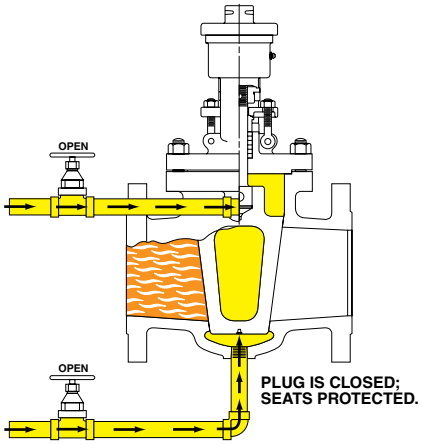
Purge and flush Pacific Wedgeplug valves using steam, air, nitrogen or process compatible liquids following these parameters to enhance valve performance.

- Steam purge must be applied at 25 PSIG min/50 PSIG max above process line pressure.
- Air or nitrogen purge must be applied at 25 PSIG min/50 PSIG max above process line pressure.
- Liquid purge must be applied at 5 PSIG min/10 PSIG max above process line pressure.

To ensure maximum benefit, follow the guidelines below when establishing purging and flushing procedures.

- Purge media should be compatible with process media.
- Systems temperature and purge temperature should be similar.
- Supply lines should have no restrictions (orifices) with-out prior consultation of Pacific Wedgeplug.
- Supply header should be sized for adequate volume.
- Pressure and temperature gauges should be placed in critical areas to monitor purge media.
- Steam purge lines should be as short as possible to prevent condensate build-up.

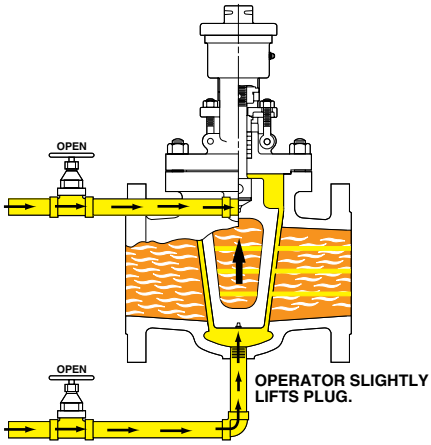
Illustrated Purging Process



In this picture, the valve is in the closed, seated position with the seats protected. The line media is colored and the purge/flush media is shaded yellow.

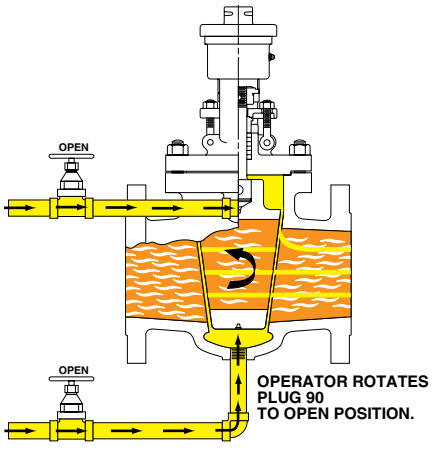
With the valve, we have three sealing elements:

- The upstream primary mechanical seal of the plug against the body.
- The internal static purge, i.e., steam seal.
- The downstream secondary mechanical seal of the plug against the body.



The plug is slightly lifted (approximately ¼ to ½ inch) causing a high velocity flushing action of the line media from the seat areas.

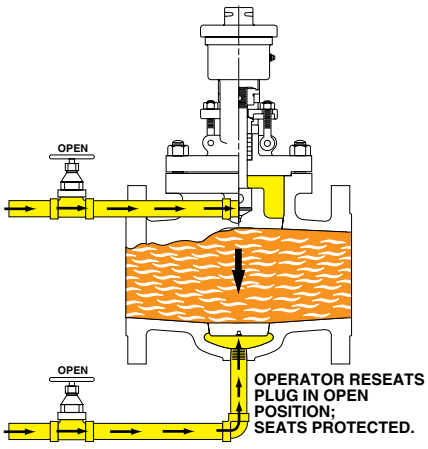
- The flushing action is achieved as the compressed purge media is released to become the flush media when the plug unseats.
- As the valve rotates 90 degrees between open and closed, the particulate matter is flushed back into the process.
- The additional benefit of lifting the plug is the low friction and low torque required to cycle the valve.



As the plug rotates, the flush is continuously fed through the two purge/flush feed lines.

Two points to note:

- The purge/flush lines should never be turned off unless the valve is to be maintained or removed from the line.
- Careful sizing of the steam manifold (assuming that steam is the purge/flush medium of choice) is critical as well as the trapping and insulation of the steam lines.



The plug is seated in the open position with the seats once again protected.

- Seating of the plug automatically stops the flushing process and the purging is resumed, creating a purge seal or barrier.

Product/Market Overview

Effective and Versatile

Crane's Pacific Wedgeplug non-lubricated metal seated plug valves were born more than 80 years ago to address valving problems associated with catalyst cracking service. Today, they are found readily in hot, dirty and severe applications throughout the refinery, including delayed coking, ethylene cracking, asphalt production and residue reduction.

Performance Advantages

Compared with alternative valve designs, Pacific Wedgeplug provides superior protection from: erosion damage; solids build-up on sealing surfaces and in cavities; residual freeze up which can prevent operation and cause leakage due to packing wear.

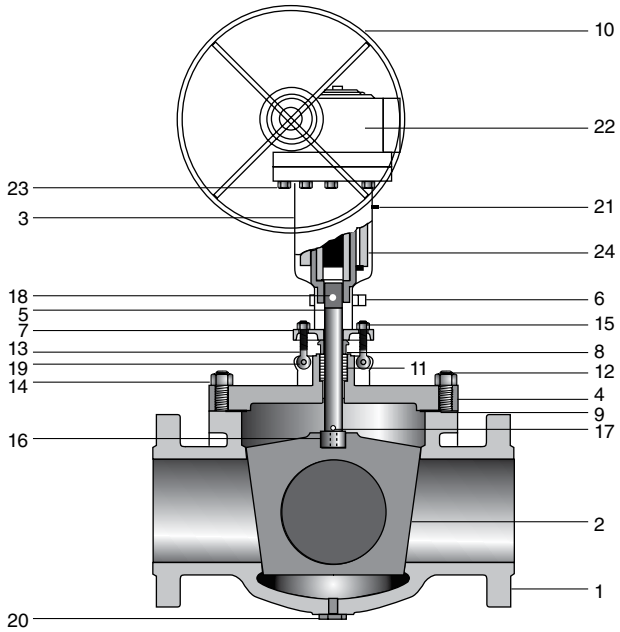
Specifically, Pacific Wedgeplug features:

- Simple design with only three major components.
- Easy low torque operation with Wedgetorque™ lift, rotate, reseat design preventing seat wear.
- In-line repair, a significant operating and maintenance cost saving benefit.

Quality Assured

Pacific Wedgeplug valves are designed to ASME B16.34, API Standard 599 and API Standard 600, latest edition, where applicable. Testing is to API Standard 598, latest edition. Special hydrostatic testing and non-destructive examinations are available.

Materials of Construction



Note:
Pacific Wedgeplug intent is to show *typical* materials of construction. Materials are subject to change without notice and without obligations. Other material and combinations are available.

Carbon Steel

ITEM	DESCRIPTION	ASTM SPEC
1	Body with optional hardfacing	A-216 Grade WCB
2	Plug (Hardened)	A-217 Grade C12
3	Yoke	Carbon Steel
4	Bonnet	A-216 Grade WCB
5	Stem	A-276 Type 410
6	Position Indicator	Steel
7	Pkg. Gland Flg.	A-216 Grade WCB
8	Pkg. Gland	A-395 Ductile
9	Gasket Bonnet	Steel
10	Handwheel	Steel
11	*Packing	Graphoil
12	Bonnet Stud	A-193 Grade B7
13	Eyebolts	A-307 Grade A
14	Nut, Bonnet Stud	A-194 Grade 2H
15	Nut, Packing Gland Flange	A-563 Grade A
16	Plug Key	A-276 Type 410
17	Plug Key Retainer	A-276 Type 410
18	Keeper Pin, Indicator	Steel
19	Keeper Pin, Eyebolt	Steel
20	Pipe Plug	Carbon Steel
21	Lubricating Fitting	Steel
22	Gear Housing (AUMA)	
23	Cap Screw, Gear Housing	A-307 Grade A
24	Wedgetorque™ Operator	

316 Stainless

ITEM	ASTM SPEC
1	A-351 Grade CF8M
2	Stellite
3	Carbon Steel
4	A-351 Grade CF8M
5	A-276 Type 316
6	Steel
7	A-216 Grade WCB
8	A-395 Ductile
9	A-276 Type 316
10	Steel
11	Graphoil
12	A-193 Grade B8M
13	A-307 Grade A
14	A-194 Grade 8M
15	A-563 Grade A
16	A-276 Type 316
17	A-276 Type 316
18	Steel
19	Steel
20	A-276 Type 316
21	Steel
22	
23	A-307 Grade A
24	

5Cr (A-217 C5)

ITEM	ASTM SPEC
1	A-217 Grade C5
2	A-217 Grade C12
3	Carbon Steel
4	A-217 Grade C5
5	A-276 Type 410
6	Steel
7	A-216 Grade WCB
8	A-395 Ductile
9	A-276 Type 410
10	Steel
11	Graphoil
12	A-193 Grade B16
13	A-307 Grade A
14	A-194 Grade 4
15	A-563 Grade A
16	A-276 Type 410
17	A-276 Type 410
18	Steel
19	Steel
20	A-276 Type 410
21	Steel
22	
23	A-307 Grade A
24	

9Cr (A-217 C12)

ITEM	ASTM SPEC
1	A-217 Grade C12
2	A-217 Grade C12
3	Carbon Steel
4	A-217 Grade C12
5	A-276 Type 410
6	Steel
7	A-216 Grade WCB
8	A-395 Ductile
9	A-276 Type 410
10	Steel
11	Graphoil
12	A-193 Grade B16
13	A-193 Grade B7
14	A-194 Grade 4
15	A-563 Grade A
16	A-276 Type 410
17	A-276 Type 410
18	Steel
19	Steel
20	A-276 Type 410
21	Steel
22	
23	A-307 Grade A
24	

**Standard packing is recommended for most applications to 850°F (455°C). However, in certain applications it may be necessary to use special high temperature packing. Please consult factory when ordering.*

PACIFIC VALVES WEDGEPLUG DATA SHEET

Phone: 562-426-2531 • Fax: 562-595-9717 • Email: pvsales@craneenergy.com

	Purchase Order No.				Customer:		
	Customer Inquiry No.	Rev.	Date:		End User:		
	Pacific Quote No.	Rev.	Date		Project Name:		
	Pacific Sales Order No.				Location:		
1	GENERAL	Item No.		37	OPERATOR	Manual Operator	
2		Tag No.		38		Actuator Type	
3		Quantity		39		Manufacturer/Model	
4		Valve Type	Wedgeplug	40		Op. Stem Turns to Open	
5		Stem Orientation		41		Cycle Time	
6		Flange Size		42		Power Supply Available	
7		Flange Rating		43		Frequency of Operation	
8				44		Elec. Housing Standard	
9				45		Accessories	
10	SERVICE CONDITIONS	Application		46			
11		Design Pressure		47			
12		Design Temperature		48			
13		Design Shut-off Pressure		49			
14		Normal Pressure		50	OPTIONS	O-Seal (Teflon® Seats)	
15		Normal Temperature		51		Steam Jacket	
16		Normal Shut-off Pressure		52		Extended Bonnet w/Fins	
17		Media		53		Chain Wheel	
18		Valve Cv		54		Live Loaded Packing	
19		Solids Present		55		NDE Requirement	
20		Additional Info		56		NACE (MR-01-75)	
21				57		Other	
22				58			
23	BODY / TRIM	Nom. Body Size		59	PURGE	Purge Pressure	
24		Pressure Class		60		Purge Media	
25		Valve Port Size		61		Connection Type	
26		Body/Bonnet Mat.		62		Purge Size	
27		End Conn. Type		63		No. of Purge	
28		End Conn. Size		64		Location	☐A ☐B ☐C ☐D ☐E ☐F
29		Integral Seat Mat.		65			☐G ☐T
30		Plug (Hardened)		66	MISC.	Approximate Weight	
31		Stem Material		67		End-to-End Dimensions	
32		Stem Packing		68		Other	
33		Trunnion Mounted		69			
34				70			
35				71			
36				72			
73	**PV FIGURE NO.**						

Notes / Special Instructions:

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85	Prepared By:	Rev:	Date:	Signature:

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