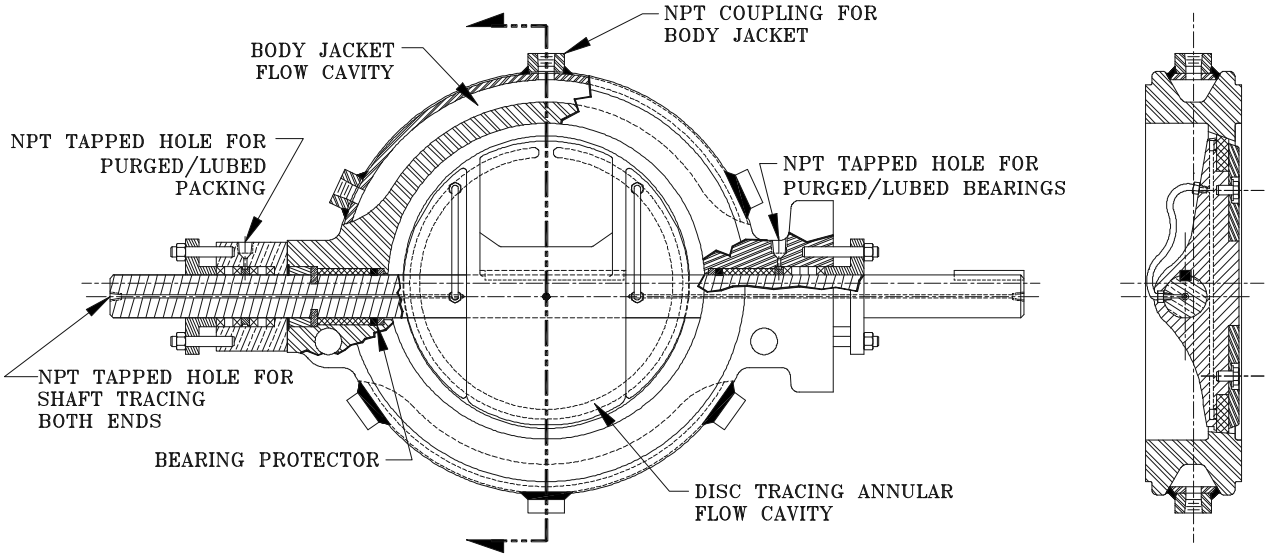
# JACKETED BODY, TRACED SHAFT, TRACED DISC, PURGED/LUBRICATED BEARINGS & PACKING and PURGED SEAT & SEAL

TECHNICAL BULLETIN 105

**General:** The TRICENTRIC® high performance standard butterfly valve can be modified to handle specific difficult services such as sulfur recovery, sulfur tail gas, catalyst laden gas streams and saturated liquids. These applications may demand that the valve body, disc and/or shaft be heated (or cooled) to prevent media freezing or fluid crystallization in the valve sealing and bearing areas. Build-up of media contaminants or catalyst in the valve bearing areas or on the valve sealing areas in specific applications can also be avoided using bearing flushing and/or seat flushing options. The use of these options are application specific and often based on service experience and therefore must be evaluated on an individual basis. The following option details provide general construction and application guidelines.




**Jacketed Body:** The TRICENTRIC® butterfly valve is designed to incorporate a body jacket to heat or cool the valve body, seat and bearing areas. The jacket consists of a plate welded around the valve body creating heating chambers through which fluid is passed. The jacketed design is available for double flanged, lugged wafer and plain wafer body styles.

- **HEATING/COOLING FLUID** - The recommended standard heating fluid is clean saturated steam at 150 PSIG maximum. Various other thermal fluids may be used for heating/cooling including oil, glycol and nitrogen. Contact supplier for all non-standard thermal fluid applications.

- **DESIGN** - All TRICENTRIC® jackets are registered as a pressure vessel with the Alberta Boiler Safety Association, registration # OCO765-2. The jacket consists of an integrally fabricated design welded to the valve body creating a separate pressure vessel around the body wall up to the body necks. Jacket vessel design conditions are 10 bar/150 PSIG at 200˚C /392˚F unless otherwise specified. Jacket vessel design and dimensions are in accordance with ASME Boiler and Pressure Vessel Code - Section VIII, Div. 1, Subsection A, UG-27 and Appendix 9. Jacket vessel design and dimensions allow for full clearance of standard cap screws or studs and nuts as applicable to body style.

- **MANUFACTURE** -Jacket vessel material for A216 Gr. WCB valve body is A516 or equal and A240 type 316 or equal for A351 Gr. CF8M body material. Welding is performed under an ABSA (Alberta Boiler Safety Association) registered quality system by qualified welders using qualified welding procedures. NDE examination is performed on all jackets to ensure quality of weld joint and fit up.

- **TESTING** - All jackets are hydrostatically tested to 1.5 times the design pressure (225 PSIG) for three (3) minutes with no visible leakage unless otherwise specified.

- **CONNECTIONS** - TRICENTRIC® jacketed valves are manufactured as a standard with 3000 lb. NPT couplings as shown. Other sizes and connection types are available including flanged, socket weld, J.O.E., etc. All jacket couplings are shipped with plugs to ensure the jacket vessel is not contaminated with water or dirt.

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|---|---|---|
| 3" to 6" | 3/8" NPT | 4 couplings per jacket |
| 8" | ½" NPT | 4 couplings per jacket |

- **INSTALLATION** - Jacketed valves should be installed with the shaft horizontal to reduce particulate build-up in the lower bearing area as well as allowing for condensate drainage in the standard connection of the jacket. TRICENTRIC® jacketed valves should be insulated to reduce heat loss and increase jacketing efficiency. Typical recommended jacket connection for horizontal and vertical stem installation is shown below:

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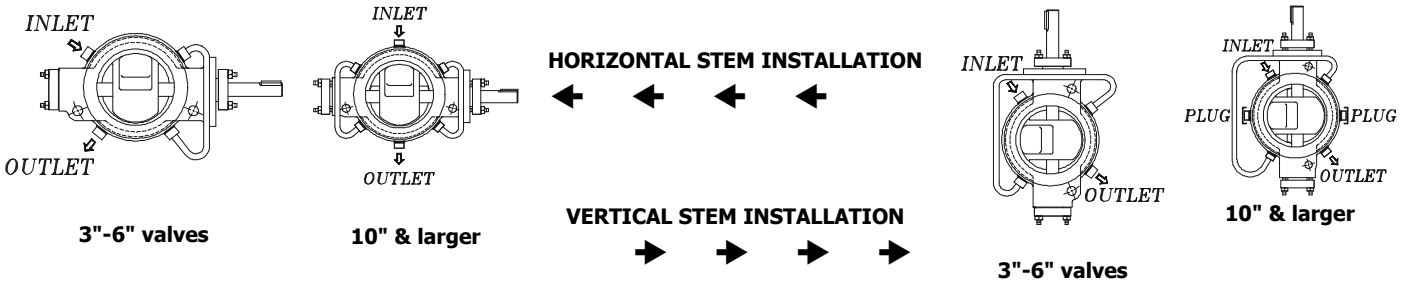


**Traced Shaft:** The TRICENTRIC® standard butterfly valve can readily be modified to incorporate a traced shaft allowing thermal fluid to flow directly through the shaft to fully heat/cool the bearing areas. This option is applicable to all valve styles and reduces the tendency for solidification or media precipitation in the bearing areas, that could cause stem *sticking* or actuation torque increases.

- **HEATING/COOLING FLUID**- as per jacketed body
- **DESIGN** - The traced shaft option consists of a hollow valve shaft which allows thermal fluid to flow completely through the entire shaft. Upper and lower stuffing boxes are incorporated to allow shaft penetration through the valve pressure envelope.
- **TESTING** - All traced shafts are hydrostatically treated under body shell test conditions at 1.5 times the body full ANSI rating for a minimum of three (3) minutes with no visible leakage allowed unless otherwise specified.
- **CONNECTIONS** - TRICENTRIC® traced shaft option is manufactured as a standard with female NPT threads in each end of the shaft to allow thermal fluid connection with sizes as noted. Traced shaft end threads are shipped with plugs to ensure the flow passage is not contaminated with water or dirt.

| | |
|---|---|
| 3" to 8" | 1/8 - 27 NPT |
| 10" - 12" | 1/4 - 18 NPT |

- **INSTALLATION** - Traced shaft valves should be installed with the shaft horizontal to reduce particulate build-up in the lower bearing area. Thermal fluid connections at each end of the shaft shall have a swivel type connector installed. When the installation is automated, consideration must be made for thermal fluid connection entry through the actuator to the top of the shaft. Standard gear operators are supplied with an indicator plate clearance hole to allow thermal fluid connection.

**Traced Disc:** As per traced shaft but with the addition of a flow passage around the disc circumference. This heats the disc assembly and seal, reducing media build-up on the surface of the disc and seal that can alter the flow control characteristics or prevent opening and closing of the valve.

- **HEATING/COOLING FLUID**- as per jacketed body
- **DESIGN** - As per traced shaft but with the addition of an integrally fabricated flow passage around the disc circumference. Disc tracing passage design conditions are equal to the body full ANSI rating.
- **MANUFACTURE** - As per jacketed body.
- **TESTING, CONNECTIONS & INSTALLATION** - As per traced shaft

**Purged / Lubricated Bearing and/or Packing:** The TRICENTRIC® standard butterfly valve can be readily modified to incorporate a purged bearing or purged packing option for protection against media build-up or abrasion in the bearing or packing areas, as applicable, as a result of vertical shaft installation, interruption of thermal fluid to the body jacket or traced shaft; or highly abrasive media particulate entrainment.

- **PURGING FLUID** - Steam, nitrogen or any other clean process compatible fluid can be used.
- **DESIGN** - The purged bearing design incorporates a fluid passage through the body to a lantern ring between the packing and bearing. This fluid passage in combination with bearing protectors flushes any media or contaminants from the bearing areas to maintain proper bearing operation and minimize actuated torque requirements. The purged packing design is as per the purged bearing design except the placement of the purge passage and lantern ring is at the mid-location of the packing in the stuffing box. The bearing protectors minimize purge fluid consumption and requires purge fluid pressurization only minimally higher than line pressure. Purge pressure is recommended at line pressure plus zero to five percent.
- **CONNECTIONS** -Standard purge connection size is 1/8 NPT for all valve sizes and pressure classes. All purge connections are shipped with metal plugs equivalent to body material to ensure inadvertent leakage on valve installation in pressurized line without connection to purge ports.

**Purged Seat & Seal:** The TRICENTRIC® standard butterfly valve can be modified to incorporate a seat and seal purging option that allows injection of steam or other media compatible fluid into the seat and seal area to clean or remove any build-up that may occur in certain gas streams. Contact Score-TRICENTRIC® Engineering for application specific details.

Bulletin contents may change at any time without notice.

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