## Cryogenic ASME Class High Performance Butterfly Valve Specification

### Valve Type:
Bray/McCannalok Cryogenic High Performance Valve or Equal

### Body:
Shall be one-piece wafer or lug.

- Body extensions (bonnet) shall be provided at a minimum vapor column length in accordance with ISO 28921-1, unless otherwise specified. The length of the extension (bonnet) shall be sufficient to maintain the stem packing at a temperature high enough to permit operation within the temperature range of the packing material.
- Body material shall be ASTM A351 Grade CF8M with Impact Testing at -320°F (-196°C).
- Flange hole drilling shall be in accordance with ASME B16.5, or other international flange standard as specified.
- Minimum body wall thickness complies with the requirements of ASME B16.34.
- Equipped with an externally adjustable stem packing system that allows packing adjustment without removing the actuator.
- Packing gland bolts shall be designed so that the bolt stresses shall not exceed one-third of the minimum ultimate tensile strength of the bolt.
- Internal over-travel stop shall be provided to prevent over-travel of the disc and potential seat damage.
- Valves shall be capable of operation with the extended body at or above 45° above the horizontal position.

### Disc:
Disc shall be ASTM A351 Grade CF8M with Impact Testing at -320°F (-196°C) and the disc edge shall be hand polished.

### Stem:
Shall be one-piece design.

- The stem shall be sized in such a way that it will be able to transfer the required torque and thrust to the valve and fully seat and unseat the closing element against the full rated pressure.
- The stem material shall be made of XM-19 high strength, impact resistant stainless steel capable of meeting 27J impact test requirements at -320°F (-196°C).
- The stem shall be designed so that, if failure of the shaft to disc connection or of the shaft occurs, no portion of the shaft can be ejected from the valve as a result of internal pressure.
- Disc-to-stem connection shall be an internal connection design with no possible leak paths in the disc-to-stem connection. External disc-to-stem connections such as disc screws or pins are not allowed.

### Seat:
Seat shall be Polar™.

- Seat design and material shall be suitable for -320°F (-196°C) cryogenic application, with ability to self-adjust for temperature changes from -320°F (-196°C) to +100°F (+38°C).
- Seat retainer shall be full-faced and firmly attached by bolts located outside the sealing area.
- The seat assembly shall be locked in the body recess by the full-faced retainer.
- The seat shall be field replaceable.
- Seat, Bearings and packing shall be certified by a 3rd party independent testing laboratory for Liquid Oxygen Service under specific operating conditions.

### Testing:
Valve shall comply with the cryogenic testing acceptance criteria of 15% of BS6364 when tested at 80 psig (5.5 barg) and full rated pressure at -320°F (-196°C).

- Valve shall comply with the cryogenic testing acceptance criteria of 1/3 of ISO28921-1 when tested at 80 psig (5.5 barg) and full rated pressure at -320°F (-196°C).
- Valve shall have documented ability to shutoff at -320°F (-196°C) while meeting the leakage testing standards listed above after 5000 cycles.
- Valve shall be ambient tested for zero leakage shut-off per API 598 requirements.
- Must be PED CE certified.

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