Inquiry: Is there an acceptable alternative method for the design and construction of ASME B16.34 Standard, Special, Limited, and Intermediate Pressure Class flanged, threaded, welding or combination end two-pressure-zone valve bodies, including pressure relief valve bodies with their primary high pressure inlet side and secondary low pressure outlet side, that may have a different size (NPS/DN) for inlet and outlet connection?

Reply: Yes, providing the following rules are met for design and construction of the two-pressure-zone valve body:

1. The rules for valve bodies of B16.34 (1) apply except as modified by the following requirements of this Case. For this Case the primary pressure zone shall be the high-pressure zone of the body and the secondary pressure zone shall be the low-pressure zone of the body.

2. The Pressure Class rating requirements of the valve body may have a different Pressure Class rating for the primary pressure zone and secondary pressure zone of the valve body.

3. The valve body may have a different inlet NPS (DN) and outlet NPS (DN) including the inlet and outlet type of joint (examples: a flanged inlet and welding outlet, welding inlet and flanged outlet, or threaded inlet and flanged outlet).

4. The primary pressure zone pressure class shall be used to satisfy the primary pressure zone construction details. The secondary pressure zone pressure class shall be used to satisfy the secondary pressure zone construction details.

5. The rating temperature of the valve body for the primary pressure zone shall be the service temperature specified or experienced by the primary pressure zone of the valve body. The rating temperature of the secondary pressure zone shall be the temperature specified or experienced by the secondary pressure zone of the valve body.

6. For the valve body the minimum wall thickness (t_m) shall be determined for both the primary and the secondary pressure zones of the valve body. The wall thickness determination of the primary pressure zone side shall be based on the pressure class of the primary side. The wall thickness determination of the secondary pressure zone side shall be based on the pressure class of the secondary side.

7. For the valve body an inside diameter “d” shall be determined per paragraph 6.1.2 for both the primary pressure zone and the secondary pressure zone. The applicable inside diameter “d” values shall be used to determine the minimum wall thickness (t_m) of the primary pressure zone and the secondary pressure zone of the valve body based on the primary and secondary pressure zone pressure class per the requirements of paragraph 6.1.1. The separation wall thickness between the primary and secondary pressure zones shall be transitioned gradually.

8. The valve body neck shall have a minimum wall thickness (t’) determination per paragraph 6.1.3 corresponding to the applicable pressure zone pressure class and body neck inside diameter (d’). The Designer shall take into account the primary pressure zone hydrostatic test pressure (see 12) when designing the valve closure and metal thickness of the seat and adjacent area that separates the primary pressure zone from the secondary pressure zone.

9. The valve body end joint dimensions shall be applicable to the pressure zone pressure class rating and paragraph 6.2 requirements. Table 4 requirements applies for threaded and socket-welding end wall thickness.
(10) The valve body end-to-end or face-to-face dimensions shall be manufacturer’s standard.

(11) Valve body bonnet and body joints shall meet paragraph 6.4 rules applicable to the pressure zone pressure class rating.

(12) For the type line valve, the primary pressure zone of the valve body shall be tested to a minimum hydrostatic test pressure of 1.5 x the Pressure Class 100°F (38°C) rating and the secondary pressure zone of the valve body shall be tested to a minimum hydrostatic test pressure of 1.5 x the Pressure Class 100°F (38°C) rating in accordance with requirements of paragraph 7.1. The closure tests shall be at 1.1 x the Pressure Class 100°F (38°C) rating of the primary side in accordance with paragraph 7.2. The secondary pressure zone shall be positively isolated from the hydrostatic test pressure of the primary pressure zone if the pressure class of the primary zone exceeds that of the secondary zone. Test duration for the primary and secondary pressure zone of the valve body shall be per Para. 7.1.2, based on the larger NPS (DN) of the outlet or inlet.

(13) For the type pressure relief valve body, the hydrostatic shell and closure testing shall be in accordance with the requirements of the applicable ASME B&PV Section Code.

(14) For a pressure relief valve body the body and nameplate markings shall be in accordance with the requirements of the applicable ASME B&PV Section Code.

(15) For the type line valve, valve marking shall be as follows:
(a) Both the primary pressure zone Pressure Class and the secondary pressure zone Pressure Class ratings shall be marked on the valve body (example: 600 x 300).
(b) The primary/secondary side size NPS (DN) shall be shown on the valve body.
(c) The primary and secondary pressure zone pressure rating @ 100°F shall be shown on the nameplate.
(d) The nameplate shall include this B16 Case number and conformance mark “B16” for Standard Class, “B16 SPL” for Special Class, or “B16 LTD” for Limited Class.

NOTE:
(1) B16.34 paragraph and table reference in this B16 Case is to B16.34-2013 edition. This B16 Case may be used with other B16.34 editions provided the requirements, including the reference paragraphs and table, are reconciled with the B16.34-2013 requirements.