Technical Recommendations for Choke Valve Specifications

Reference:

Technical Recommendations for Choke Valve Specifications

1.0 Choke Body Design

1.1 Valve body shall be angle type.

1.2 Flow direction shall be flow-to-close (flow over the plug).

1.3 The internal transition from the valve trim to the valve outlet shall be a smooth taper (venturi type) with an included angle of no greater than 40°.

1.4 Where environmental concerns have been identified, redundant seals shall be provided for pressure boundary and steam so as to prevent leakage of fluid to atmosphere.

2.0 Choke Trim Design

2.1 Choke trim shall be cage type. The plug shall reside and move inside the throttling cage(s). External sleeve type chokes are not acceptable.

2.2 The plug shall be solid tungsten carbide. Tungsten carbide tipped plugs are not acceptable.

2.3 Plugs with metering holes for flow are not acceptable. The cage shall be the throttling device.

2.4 Balanced plug types are acceptable in order to reduce required actuator forces. Trim designs with two balance seals (“double balanced” plugs) contain an additional failure point and are not acceptable.

2.5 The stem shall be inconel 718.

2.6 The entire cage (or cages) shall be made of tungsten carbide. All stages in multi-stage designs shall be made of tungsten carbide.

2.7 The seat ring shall be made of tungsten carbide. The tungsten carbide may be shrink fitted into an inconel 718 housing, provided all surfaces exposed to the flowing fluid are tungsten carbide.

2.8 The cage shall be held under compression from the bonnet bolting. Trim designs with components threaded internally into the body are not acceptable.

2.9 In order to minimize choke trim erosion, the choke trim should provide one discrete pressure drop stage per approximately every 400 psi (28 BAR) pressure drop across the choke. Choke trim shall also have sufficient stages to meet the applicable noise requirements.

2.10 Kinetic energy of the fluid exiting the cage and through the seat bore shall not exceed 1030 kPA for tungsten carbide trim.

2.11 In order to minimize the potential of blockage, flow passages through the choke trim shall be at least 6 mm. wide. Square or rectangular passages are preferred.

2.12 Pressure reducing element shall incorporate labyrinth style passages with constantly expanding flow passages, which shall be separate and discrete so as to prevent flow or pressure from combining between passages.

2.13 Choke trim shall be capable of withstanding an impact of 400 joules or greater and, after such an event, shall be capable of safely modulating so as to prevent over-pressurization of downstream system.

3.0 Noise

3.1 Vendor shall submit predicted noise calculations. These calculations shall conform to I.E.C. 60534-8.3 “Control Valve Aerodynamic Noise Prediction Method” and the requirements of this section.

3.2 Predicted noise levels shall have a tolerance of +0 / -5 dBA.

3.3 Vendor shall calculate noise per I.E.C. 60534-8.3 using only the gas component of the flow stream as shown on the data sheets.

3.4 Vendor may take a deduction from the result of the calculation in 3.2 based on the liquid component in the fluid stream. The table below depicts the maximum deduction allowable.

% by weight of liquids	Allowable deduction from gas only aerodynamic noise calculation
1-2%	2 dBA
3-5%	4 dBA
6-10%	7 dBA
11-15%	10 dBA
16-20%	14 dBA
21-25%	20 dBA
> 25%	25 dBA