Soft and Metal Seats

Soft Seats

A soft seat is used in applications requiring ANSI Class VI "bubble-tight" shutoff (ANSI B16.104, 1976-FCI 70-2). Its design consists of an elastomer insert sandwiched between a metal seat ring and retainer (see Figure 11-1). The assembled soft seat is completely interchangeable with the hard seat for a given size and pressure rating. Figure 11-2 shows the differential pressure and temperature limitations for Teflon, a common soft seat insert material.

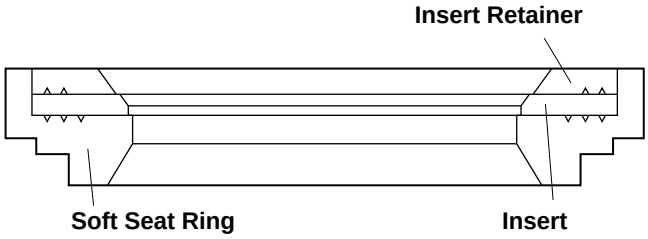

Figure 11-1: Soft Seat Design

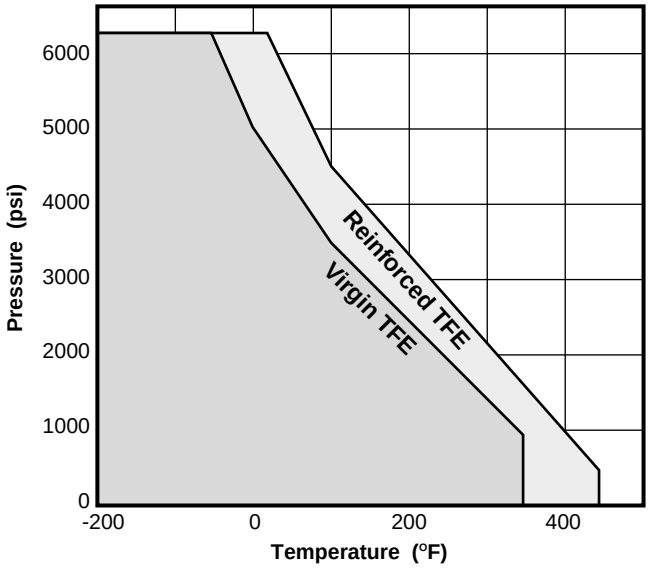

Figure 11-2: Teflon Soft Seat Pressure and Temperature Limits

Metal Seats

Class IV shutoff (ANSI B16.104, 1976-FCI 70-2) is the industry standard for metal seated valves. This class calls for maximum permissible seat leakage of 0.01% of rated valve capacity. All Valtek valves are seat leak tested after assembly and exhibit substantially lower leakage rates than called for by this class. This exceptional seat tightness is obtained by 1) a self-aligning seat ring (aligns with the plug during assembly) and 2) by increasing the seat loading through increased actuator thrust. See Table 11-I for available shutoff classes.

Table 11-I: Unbalanced Seat Leakage Classes per ANSI B16.104

NOTE: The required seat load (in pounds per inch of linear seating force) are included in parenthesis.

Standard		Optional
Metal Seat	Class IV 1/2 to 4-inch: (50) 6-inch and above: (75)	1 percent of Class IV 1/2 to 4-inch: (100) 6-inch and above: (150) Class V (1/2 to 10-inch only) 1/2 to 4-inch: (250) 6-inch and above: (400) Class VI (1/2 to 10-inch only)* 1/2 to 4-inch: (250) 6-inch and above: (400)
Soft Seat	Class VI** 1/2 to 4-inch: (50) 6-inch and	Class V 1/2 to 4-inch: (50) 6-inch and above: (100) above: (100)

* See explanation on page 11-2 or contact factory.
** Requires Teflon gaskets.

Note: Slightly higher pressures and temperatures (approximately 15 percent) can be achieved with filled TFE materials. Kel-F inserts can be used at cryogenic temperatures, at or below -200 degrees Fahrenheit with the same pressure limits as TFE above.

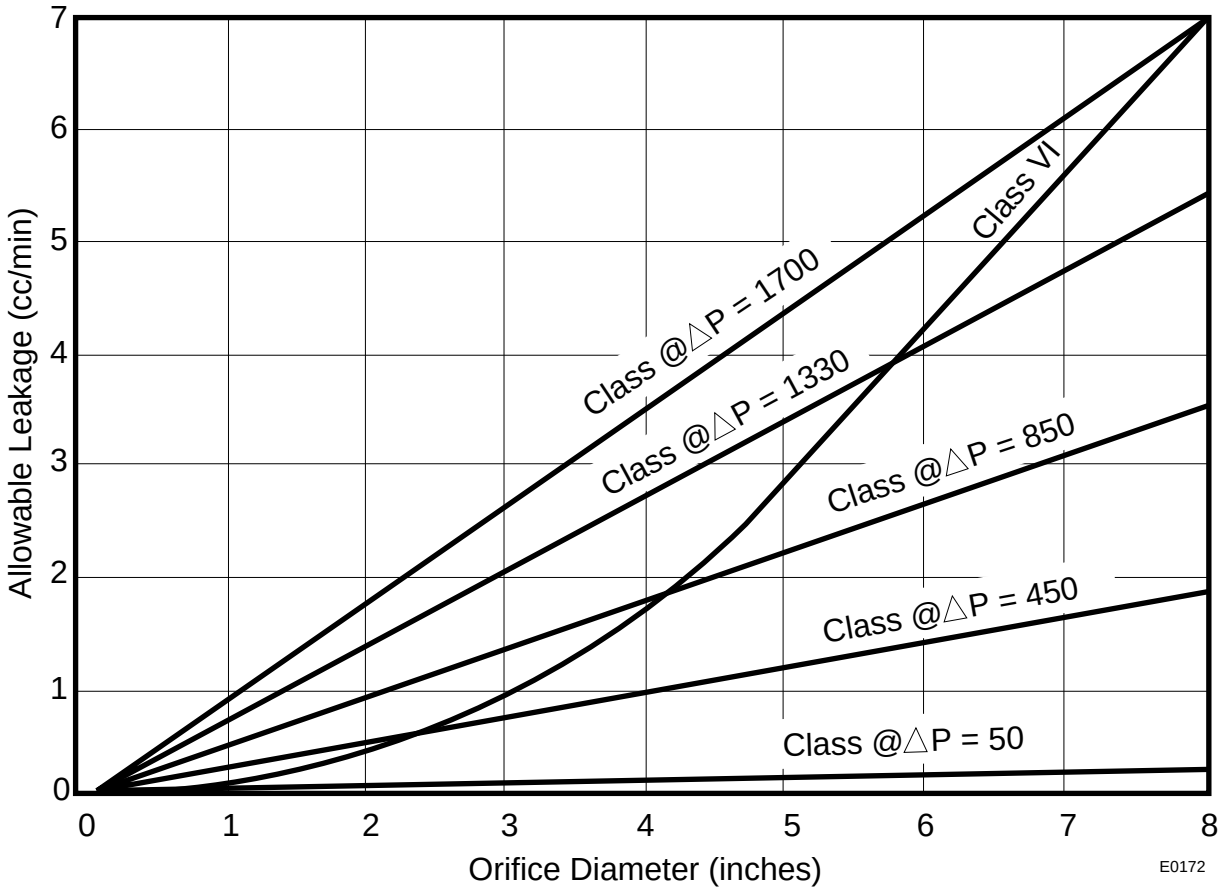

Figure 11-3: Class V and VI Leakage Versus Orifice Diameter

Class V Versus Class VI

Due to the common belief that Class VI shutoff is more stringent than Class V under all circumstances, the following should be noted:

Class V allowable leakage is defined as .0005 cc per minute per inch of orifice diameter per psi differential. Therefore, allowable leakage increases with orifice diameter and differential pressure.

Class VI allowable leakage is independent of pressure differential and is only a function of orifice diameter. For large orifice diameters or small pressure drops, Class VI shutoff can be less stringent than Class V. For example, refer to Figure 11-3. For an orifice diameter of 4 inches and a 450 psi pressure differential, Class VI allows nearly twice the leakage as Class V.

This above information is important because it shows that Class VI shutoff can be obtained with metal seats. It is not true that Class VI shutoff cannot be obtained in high temperature service simply because a soft seat cannot be used. Keep in mind that seat loading must be increased to 250 to 400 lbs. per linear inch of seating force to obtain the Class VI shutoff.