Spraytech®
Systems (India) Pvt. Ltd.
The Flow Technologists

Pneumatic Globe Angle Control Valve For Pharmaceutical and Food & Beverage Industry, PID Sanitary Globe Control Valve

Nominal size	**DN 6 to 125**	**· NPS ¼ to 5 ANSI. 1/4" to 4"**
Maximum pressure	**16 bar**	**· 230 psi**
Medium temperature	**0 to 150 °C**	**· 32 to 300 °F**

Fig. 1: Valve. cast body with welding ends

Fig. 2:Valve. bar stock body with threaded connections.

Spraytech System's Globe valve provides a flow rangeability of 50:1 and carries the effect in controlling cavitation, flashing and the choking concept of the media. With its level of control the affect of start up conditions of the plant where shearing off the internal closing member in form of plug and seat of the trim section take place, Spraytech Systems own high density flow control plug which carries the special design to take care of all such critical start up and cavitation effect of the media help you solve a major cost effectiveness and reduce your major man hour usage and maintenance cost of the plan.

Following are the main features of Spraytech Systems Globe control valve

- The energy conservation of the plant
- High flow control rangeability
- High flow recovery and controllability factor
- Low maintenance driven design
- Usage from minus 196 deg cent till plus 550 deg cent application
- High density valve sealing gasket design for high and low temperature
- Used for special chemical sealing design concept in plant for all critical applications
- Modular concept thus introducing major plant design concept feasibility with reduce cost of manpower, maintenance
- Highly efficient build up design

Spraytech Systems Flow control effectively uses the closing member of plug falling or closing in on seat of the trim section of the valve and thus with its contour of

- Linear
- Modified equal percentage
- Equal percentage
- Quick opening

Enables a perfect control of the media effectively to the tune of desired level as per your requirements. Spraytech Systems Manufactures pneumatic actuator with multiple springs and a rolling diaphragm which helps in

- Linear hysteresis of control
- High life cycle of the diaphragm
- Less tension on spring and diaphragm
- Most linear travel record of plug movement

- Valve body free of dead space made of cast stainless steel
- Wetted sealing materials comply with FDA regulations

- Pneumatic Actuator and approved valve accessories (see also Table 1.2)
- Metal or soft-seated valve plug
- Easily detachable clamp connection between body and bonnet
- Suitable for cleaning-in-place (CIP)

PTFE bushings are used to seal body and bonnet as well as bonnet and plug stem. An additional steam line connection is available for stricter purity requirements.

The valves can be equipped with different accessories. directly attached positioners or positioners. solenoid valves and limit switches for attachment according to IEC 60534
NAMUR recommendation

Versions

Valves with welding ends for pipes according to DIN 11850. ISO 2037. BS 4825. AFNOR or JIS G 3447/3459 with internal surfaces turned to a ine inish and metal-seated plugs for medium temperatures between 0 and 150 °C (32 to 300 °F)

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Further versions

- **Polished valve body** (internal and/or external surfaces)
- **Threaded couplings** according to DIN 11887 or IDF
- **Clamp connection.** ISO 2852 T2. DIN 32676. BS 4825 or JIS G 3447/3459
- **Flanges** with smooth raised face. dimensions acc. to DIN EN 1092-1
- Valve plug with **soft seal**
- V-port plug
- Steam line connection
- Body material SS316L
- Bar stock body up to ON 40 with flanged-on bonnet

Principle of operation

The process medium flows through the valve in the direction indicated by the arrow in the flow-to-open direction.

A PTFE bushing (5.1) seals the actuator stem. An additional bushing (5.3) guides the plug stem to the outside (see Fig. 4 and Fig. 5). Additionally. a body and stem gasket (5.2) is used to seal the valve (see Fig. 3,file).

An optional steam or sterile fluid line connection (Fig. 5) for sterilization of the plug stem is available

The valve bonnet is fixed to the body by a clamp connection (5.4) to allow the entire bonnet to be easily detached from the body. The valve bonnet is langed onto the body using four bolts for versions with pressures above 16 bar as well with the special sealing system.

Mounting position

The valve must be installed in the upright position with the actuator on top. A valve installed with the valve outlet facing downwards does not guarantee drainage of the pipe.

Fail-safe position

Depending on how the springs are arranged in the pneumatic actuator the valve has two different fail-safe positions effective upon air supply failure:

Actuator stem extends (fail-close)
The valve closes when the supply air fails.

Actuator stem retracts (fail-open)
The valve opens when the supply air fails.

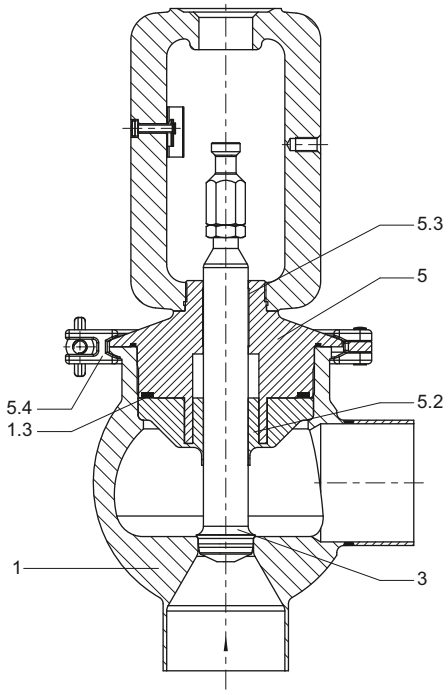

Fig. 3: Valve. bar stock body according

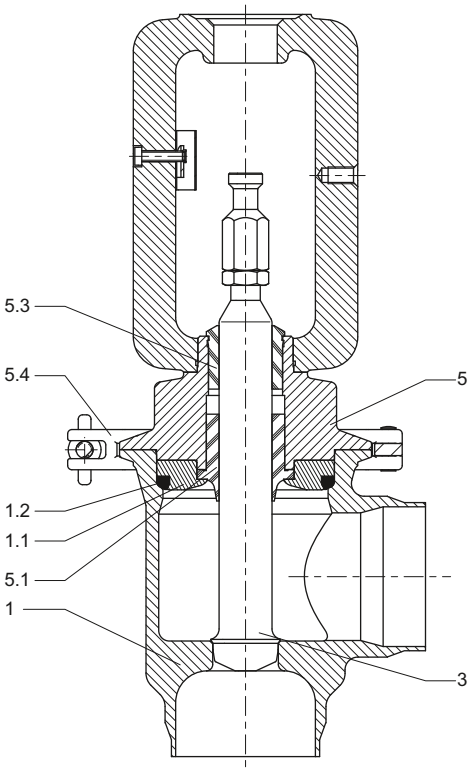

Fig. 4: Valve. cast body

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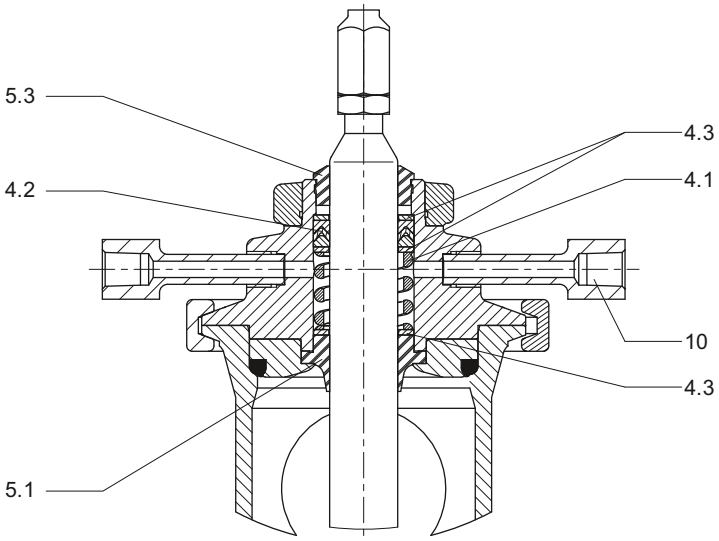

Fig. 5:Valve, bar stock body

Legend for Fig. 3 to Fig. 6

1	Valve body
1.1	Centering ring
1.2	Body gasket
1.3	Compensating ring
3	Plug
4.1	Spring
4.2	PTFE V-ring packing
4.3	Washer
5	Valve bonnet with yoke
5.1	Stem seal
5.2	Body and stem seal
5.3	Plug stem guide/guide bushing
5.4	Clamp connection
10	Nipple
11	Metal centering sleeve
12	EPDM O ring
13	Hard-chrome-plated plug stem

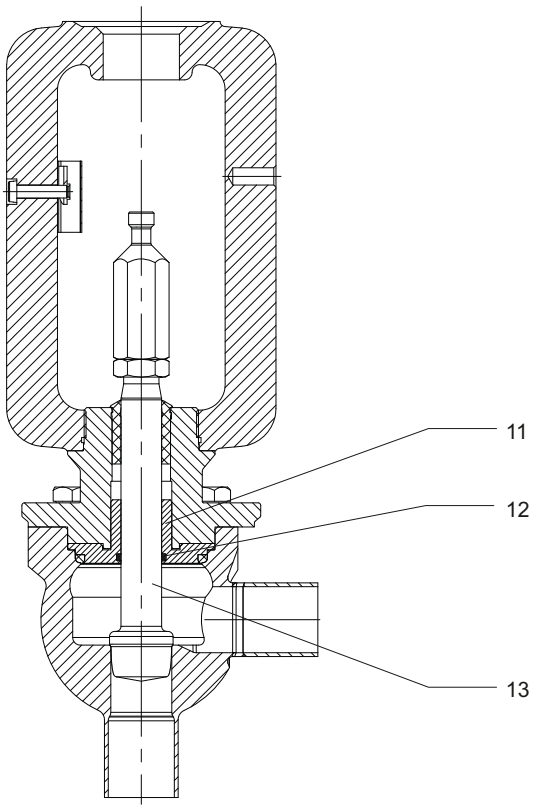

Fig. 6: Valve, version with special sealing system for media that crystallize or tend to form deposits

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Table 1.1

Body version[1)]		Casting	Bar stock
Nominal size		DN 25 to 100(NPS1 to 4)	DN6 to125 (NPS ¼ to 5)
Maximum pressure		16 bar (230 psi) with restrictions according to Table 1.2	
Connections		According to Table 1.2	
Seat/plug seal		Metal seal · Soft seal (not compliant with 3A regulations)	
Characteristic		Equal percentage or linear	
Rangeability		50:1 up to DN 50 (NPS 2) · 30:1 for DN 65 (NPS 2½) and larger	
Permissible medium temperature (restrictions according to Table 1.2)		0 to 150 °C (32 to 300 °F)	
Leakage class according to IEC 60534-4	Metal seal	IV	
	Soft seal	VI	VI
Peak-to-valley height and surface finish	External	Glass bead blasted	
		R_a ≤ 0.6 µm · Polished	
	Internal	Ra ≤ 0.8 µm · Fine machine finish	
		R_a ≤ 0.6 µm · Polished	
		R_a ≤ 0.4 µm · Satin finish	
		Ra ≤ 0.4 µm · Mirror finish	

Table 1.2 End connections. maximum pressures

Connection	Standard	Valve sizes DN/NPS	Max. operating pressure in bar or psi at a medium temperature of 0 to 20 °C (32 to 68 °F)	150 °C (300 °F)
Welding ends	DIN 11866 Series A (DIN 11850 Series 2)	DN 15 to 125	16 bar	14 bar
	DIN 11866 Series B	OD 10.2 to 139.7	16 bar	14 bar
	DIN 11866 Series C ASME BPE	NPS ¼ to 4	230 psi	175 psi
	ISO 2037	DN 10 to 100	16 bar	14 bar
	JIS G 3447	NPS 1 to 4	16 bar	14 bar
	JIS G 3459	NPS ⅛ to 5	16 bar	14 bar
Threaded couplings	DIN 11864-1 Form A, Series A and DIN 11887 Series 1	DN 10 to 100	16 bar	14 bar
	DIN 11864-1 Form A, Series B	OD 13.5 to 88.9	16 bar	14 bar
	DIN 11864-1 Form A, Series C	NPS ½ to 4	230 psi	175 psi
	DIN 11887 connection A, Series 1	DN 10 to 125	16 bar	14 bar
	ISO 2853 (IDF)	NPS 1 to 4	90 psi	68 psi
	SMS 1146	DN 25 to 100	6 bar	5.5 bar

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Specifications of Spraytech Systems globe control valve

Table 1.3

Material of construction for body	SS316L
Size	½", 1", 1 1/2", 2", 2 1/2", 3", 4"
Rating of valve	150#,300#
Pressure rating	From full vaccum till 20 bar
Temperature rating	Minus 196 till plus 125 deg cent
Material of construction for trim	SS316L
Design	Globe angle
Plug	V skirted anti cavitation trim, parabolic plug, balanced plug
Seat	Screwed in seat, welded seat
Bonnet	Square bonnet, yoke bonnet design, extended bonnet design
Extension bonnet	Forged construction bonnet design depending on small and large extension bonnet depending on temperature and pressure rating
Bellows sealing bonnet	With multifunction bellows sealing for critical application applicable from minus 196 till plus 125 deg cent
Sealing gland packing	PTFE sealing V ring packing versions 5 ring, 7 ring sealing rings for maximum sealing versions available for rating till $10^{(-6)}$m bar ltr / sec
Plug and seat leakage class sealing	Class IV, Class VI sealing tightness is available
Leakage class for trim	Is achieved by metal / metal version with special design plug, with special design PTFE soft seal for low temp and upto 120 deg cent
Guide bushing MOC	SS316L
Actuator	Multi spring actuator, with rolling diaphragm concept, with SS316 actuator cover with anticorossion powder coated
Actuator diaphragm	Nitrile Butyl Rubber, Ethylene Propylene Dimonomer
Valve end connection	Screwed, NPT or BSP connections, but welded, socket welded, flanged end connections both ANSI and DIN std
Heating jacket and cooling jacket	Available for all sizes as applicable till 300#X , jacketing for valve body and bonnet design
Base construction design	Forgings and castings
Special test versions	NACE, Radiography level -1, 2, 3 std available, helium leak tested version till $10^{(-6)}$ mbarltr/sec
Trim hardening versions	All hardening versions with stelliting version available

Table 1.4

Connection	Standard	Valve sizes DN/NPS	Max. operating pressure in bar or psi at a medium temperature of 0 to 20 °C (32 to 68 °F)	150 °C (300 °F)
Clamp connections	DIN 11864-3 Form A, Series A	DN 10 to 100	16 bar	14 bar
	DIN 11864-3 Form A, Series B	OD 13.5 to 88.9	16 bar	14 bar
	DIN 11864-3 Form A, Series C	NPS ½ to 4	230 psi	175 psi
	DIN 32676 Series A	DN 6 to 125	DN 6 to 50: 16 bar DN 65 to 125: 10 bar	14 bar 9 bar
	DIN 32676 Series B	OD 10.2 to 139.7	NPS 10.2 to 60.3: 16 bar NPS 72.1 to 139.7: 10 bar	14 bar 9 bar
	DIN 32676 Series C	NPS ¼ to 4	NPS ¼ to 2: 230 psi NPS 2½ to 4: 150 psi	175 psi 114 psi
	ISO 2852	DN 10 to 125	DN 10 to 50: 16 bar DN 65 to 125: 10 bar	14 bar 9 bar
	ASME BPE	NPS ¼ to 4	NPS ¼ to 2: 230 psi NPS 2½ to 4: 150 psi	175 psi 114 psi
	BS 4825 Part 3	NPS 1 to 4	NPS 1 to 2: 16 bar NPS 2½ to 4: 14 bar	14 bar 9 bar
	OSS for pipes acc. to JIS G 3447	NPS 1 to 4	NPS 1 to 2: 230 psi NPS 2½ to 4: 150 psi	175 psi 114 psi
	OSS for pipes acc. to JIS G 3459	NPS⅛ to 5	NPS⅛ to 2: 230 psi NPS 2½ to 5: 150 psi	175 psi 114 psi
Flanges with smooth raised face. however with $R_a \leq 0.8$	DIN 11864-2 Form A, Series A	DN 10 to 125	16 bar	14 bar
	DIN 11864-2 Form A, Series B	OD 13.5 to 114.3	16 bar	14 bar
	DIN 11864-2 Form A, Series C	NPS ½ to 4	230 psi	175 psi

Table 1.5 Materials

		DIN	ANSI
Body version with lathed seat	Casting	Cast stainless steel 1.4409	CF3M
	Bar stock	1.4404 · 1.4462 [1] · 1.4539 [1]	316L
Bonnet		1.4404 · 1.4462 [1] · 1.4539 [1]	316L
Plug		1.4404 · 1.4462 [1] · 1.4539 [1]	316L
Centering ring		1.4404 · 1.4462 [1] · 1.4539 [1]	316L
Clamp		1.4306	304L
Body and stem seal [2]		Pure PTFE	
Guide bushing [2]		Pure PTFE for DN 50 (NPS 2) and smaller PTFE-jacketed stainless steel for DN 65 (NPS 2½) and larger	

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K_{VS} Coeficients and associated nominal sizes

Table 1.6 Standard

K_{VS}		0.1	0.16*	0.25	0.4*	0.63	1.0*	1.6	2.5*	4	6.3	10	16	25	40	60	80	100	160	200
C_V		0.12	0.2*	0.3	0.5*	0.75	1.2*	2	3*	5	7.5	12	20	30	47	70	95	120	190	240
Seat Ø	mm	6						12			24		31	38	48	63	80		100	110
Travel	mm	15																30		
ANSI	NPS																			
½	½	•	•	•	•	•	•	•	•	•										
¾	¾	•	•	•	•	•	•	•	•	•										
1	1	•	•	•	•	•	•	•	•	•	•	•								
1¼	1¼							•		•	•	•	•							
1½	1½									•	•	•	•	•						
2	2										•	•	•	•	•					
2½	2½													•	•	•				
3	3													•	•	•	•			
4	4																	•	•	

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The process medium flows through the valve in the direction indicated by the arrow. The position of the valve plug determines the cross-sectional area of flow between the seat and plug.

Depending on how the compression springs are arranged in the actuator the control valve has two different fail-safe positions that become effective

when the supply air fails:

Actuator stem extends (FA): The actuator springs close the valve when the supply air fails.

Actuator stem retracts (FE): The actuator springs open the valve when the supply air fails.

Spraytech Systems in process automation in the chemical, petrochemical, power Food Beverage & Pharma refinery industry have developed designs to suit the most such critical applications. The resulting products define the industry standard in many applications.

Spraytech Systems high definition actuator selection criteria:

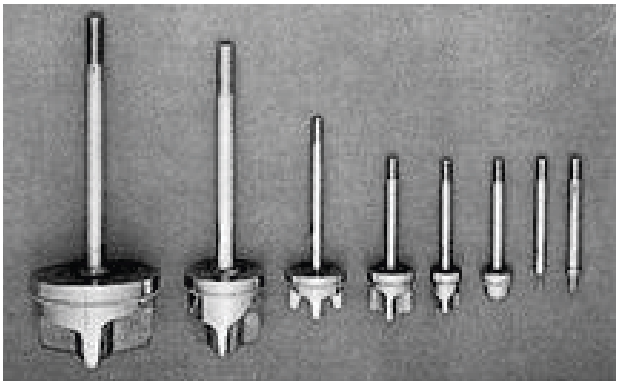
Table 1.7

Actuator model	SCT1				
	SCT11	SCT12	SCT13		
Actuator, actuation torque kN	0.48	0.96	1.44		
Travel in mm	15	15	15		
Air supply in kg/cm²g	1.4	2.4	3.2		
Shut off pr in kg/cm²g	15	24	33		
Actuator model	SCT2				
	SCT21	SCT22	SCT23	SCT24	SCT25
Actuator actuation torque kN	0.7	1.4	2.1	4.9	7.35

Application

As a main manufacturer of process Instruments, we provide a comprehensive product range for all chemical processes from light and heavy-duty valves in modular design made of all common materials and exotic alloys according to DIN, ANSI to high-pressure valves complying with important company standards. Forged bodies, live-loaded packings, metal bellows, pressure-balanced plugs, heating jackets as well as corrosion-resistant, low-noise and low-wear valve trims are included in our product portfolio for this field.

We also provide solutions for highly specialized tasks, such as cryogenic applications, aseptic processes and tank blanketing.



High profile plugs with v skirt for low noise control and high controllability

Table 1.8

Travel	15	15	15	15	15
Air supply in kg/cm²g	1.4	2.4	3.2	2.5	3.5
Shut off pr in kg/cm²g	20	31	42	48	55
Actuator model	SCT3				
	SCT31	SCT32	SCT33	SCT34	SCT35
Actuator actuation torque kN	1.4	2.8	4.2	9.8	14.7
Travel	15	15	15	30	30
Air supply in kg/cm²g	1.4	2.4	3.2	2.5	3.5
Shutoff pr in kg/cm²g	26	39	50	60	70

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Spraytech Systems Globe control valves and its complete engineering application available design

Table 1.9

Sizes	½"	¾"	1"	1½"	2"	2½"	3"	4"
Available kv value in m3/hr (flow coefficient value)	0.1, 0.16, 0.25, 0.4, 0.63, 1, 1.6,2.5, 4	0.1, 0.16, 0.25, 0.4, 0.63, 1, 1.6, 2.5, 4, 6.3	0.1, 0.16, 0.25, 0.4, 0.63, 1, 1.6, 2.5, 4, 6.3, 10	0.1, 0.16, 0.25, 0.4, 0.63, 1, 1.6, 2.5, 4, 6.3, 10, 16, 25	0.1, 0.16, 0.25, 0.4, 0.63, 1, 1.6,0.4, 2.5, 4, 6.3, 10, 16, 25, 35, 40	0.1, 0.16, 0.25, 0.4, 0.63, 1, 1.6, 2.5, 4, 6.3, 10, 16, 25, 35, 40	0.1, 0.16, 0.25, 0.4, 0.63, 1, 1.6, 2.5, 4, 6.3,10,16, 25, 35, 40, 63, 80	63, 80,100, 160
Pressure rating available Temperature rating available	Full vaccum till plus 20 bar g minus 196 till 125 deg cent	Full vaccum till plus 20 bar g minus 196 till 125 deg cent	Full vaccum till plus 20 bar g minus 196 till 125 deg cent	Full vaccum till plus 20 bar g minus 196 till 125 deg cent	Full vaccum till plus 20 bar g minus 196 till 125 deg cent	Full vaccum till plus 20 bar g minus 196 till 125 deg cent	Full vaccum till plus 20 bar g minus 196 till 125 deg cent	Full vaccum till plus 20 bar g minus 196 till 125 deg cent
Valve stem travel in mm	15	15	15	15	15	15	15,30	30
Flow range ability	50:1	50:1	50:1	50:1	50:1	50:1	50:1	50:1
Extension bonnet design available version	Both short and long extension version	Both short and long extension version	Both short and long extension version	Both short and long extension version	Both short and long extension version	Both short and long extension version	Both short and long extension version	Both short and long extension version
Max pr shut off for actuator available based on 150# rating	22 bar	22 bar	22 bar	22 bar	22 bar	22 bar	22 bar	22 bar
Face to face as per 150#	184mm	188mm	193mm	225mm	260mm	280mm	312mm	360mm
Actuator phase with available air supply controlling the max shut off pressure, depending on design of Kv	SCT-1, SCT-2, SCT3 with air supply of 1.2 till 4 bar and pressure shut off till 52 bar	SCT-1, SCT-2, SCT3 with air supply of 1.2 till 4 bar and pressure shut off till 52 bar	SCT-1, SCT-2, SCT3 with air supply of 1.2 till 4 bar and pressure shut off till 52 bar	SCT-1, SCT-2, SCT3 with air supply of 1.2 till 4 bar and pressure shut off till 52 bar	SCT-1, SCT-2, SCT3 with air supply of 1.2 till 4 bar and pressure shut off till 52 bar	SCT-1, SCT-2, SCT3, SCT 4 with air supply of 1.2 till 4 bar and pressure shut off till	SCT-1, SCT-2, SCT3, SCT-4 with air supply of 1.2 till 4 bar and pressure shut off till 40 bar 52 bar	SCT3, SCT4 with air supply of 1.2 till 4 bar and pressure shut off till 40 bar

Spraytech Systems actuator model versus Kv value and the shut off pressure, applicable for seat leakage class IV and class VI

Table 1.10

Kv value in m3/hr	0.1	0.16	0.25	0.4	0.63	1	1.6	2.5	4	6.3	10	16	25	35	40	63	80	160
Actuator model applicable	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT2, SCT3, SCT1	SCT3,
Seat bore in mm	2	3	3	5	5	8	8	8	10	12	24	26	38	46	50	65	80	100
Valve stem dia in mm	3	3	3	3	3	6	6	6	6	10	10	10	10	10	10	12	12	16
Max shutoff pr in bar g available w r t to kv value	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Max available air supply in bar g for actuator	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Valve travel in mm	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	30	30	30
Actuator spring travel in mm	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	30	30	30
Actuator stem dia in mm	3	3	3	3	3	6	6	6	6	10	10	10	10	10	10	12	12	16