DATA SHEET

T 8212 EN

CERA1700 · Sliding Disk Valves with Ceramic Lining

Types SSC15, SSC22 and SSC30

CE

Application

Sliding disk valves with ceramic seal system and ceramic lining for on/off or throttling service in industrial applications.

Valve size	**DN 10 to 65 · NPS ⅜ to 2½**
Pressure rating	**PN 10 to 40 · Class 150 to 300**
Temperatures	**–10 to 310 °C**

Ceramic-lined and ceramic-sealed Types SSC15, SSC22 and SSC30 Sliding Disk Valves are used for industrial applications under extreme conditions. The valves have a long service life even with a high switching frequency. They can withstand intensive abrasion in the control position in cases where dead spaces in the valve are not permissible.

The principle of operation is based on three floating ceramic disks that seal each other. The middle disk moves in a linear motion. Various control characteristics can be achieved through the use of different bore geometries in the disk. The two outer disks are stationary. The springs are used for live-loading the seal system.

The valve body does not need to be made of special materials as the process medium only comes into contact with the ceramic parts and seals.

Versions

Standard version for temperatures ranging from –10 to +310 °C · Pressure rating PN 10 to 40/Class 150 and 300 Body made of stainless steel 1.4301 with flanges · With Type 3277 Pneumatic Actuator for integral positioner attachment (see Data Sheet ▶ T 8310-1)

- **Type SSC15** in valve sizes DN 10 to 40/NPS ⅜ to 1½
- **Type SSC22** in valve sizes DN 15 to 65/NPS ½ to 2½
- **Type SSC30** in valve sizes DN 25 to 65/NPS 1 to 2½

Further versions

- **High-temperature version** up to 450 °C
- **Light-weight version:** for on/off service only, without anti-wear liners
- **Material options** for seals as well as different ceramic materials
- With **packing**
- With **seal gas connection**

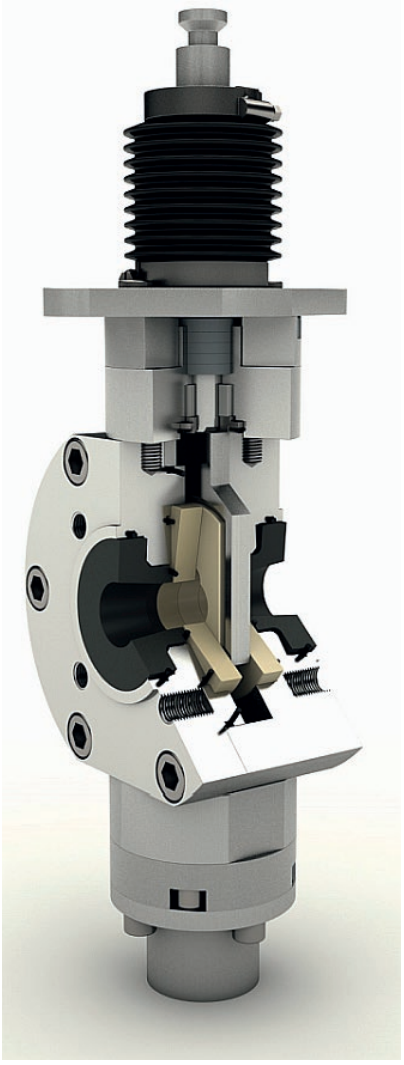

Fig. 1: *Series CERA1700 Sliding Disk Valve*

SAMSON AKTIENGESELLSCHAFT · Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507 · samson@samson.de · www.samson.de

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Why use ceramic valves?

Ceramic-lined valves are preferably used for corrosive media (possibly containing solid matter) or (very) abrasive media. Ceramic linings are particularly suitable to meet high temperature, pressure, abrasion or corrosion requirements where other linings, e.g. made of PTFE or PFA, reach their limits.

Ceramic materials

The following ceramic materials are used for valve linings:

- Alumina (Al_2O_3)
- Zirconium dioxide (ZrO_2)
- Silicon carbide (SSiC)
- Silicon nitride (Si_3N_4)

The benefits and special features of ceramics include:

1. Corrosion resistance

The corrosion resistance of ceramics is significantly superior to other materials. Ceramics are fully resistant to most solvents. In most cases, alkaline solutions do not pose any difficulties. The ceramics used exhibit good resistance properties to most acids up to relatively high temperatures. However, there are various factors that need to be taken into account. For example, all oxide ceramics are not resistant to fluorides. Some ceramics, e.g. Yttria-partially-stabilized zirconia (Y-PSZ), react sensitively to steam, i.e. are hydrothermally unstable. It is essential to be aware that mixtures of reagents usually react differently than when handled separately.

2. Compression and flexural strength

In contrast to metal, the flexural, tensile and compression strength properties of ceramics vary significantly. While the compression strength of almost all dense ceramics is superior to that of metals, more attention must be paid especially to the tensile and flexural strength.

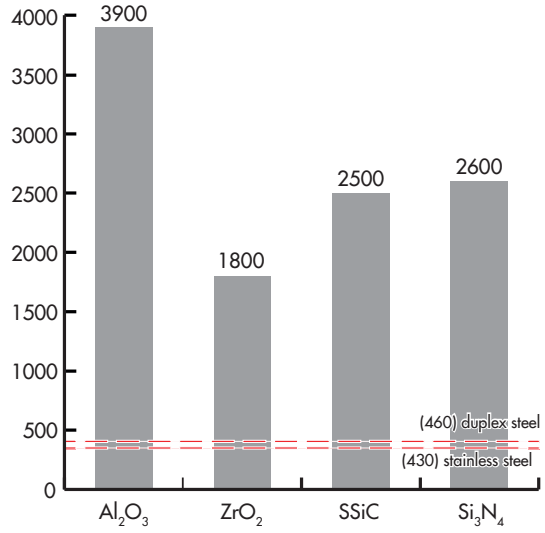


Fig. 2: *Compression strength in MPa*

The diagrams illustrate the difference between metals and ceramics even though comparing their strength properties is not clear-cut.

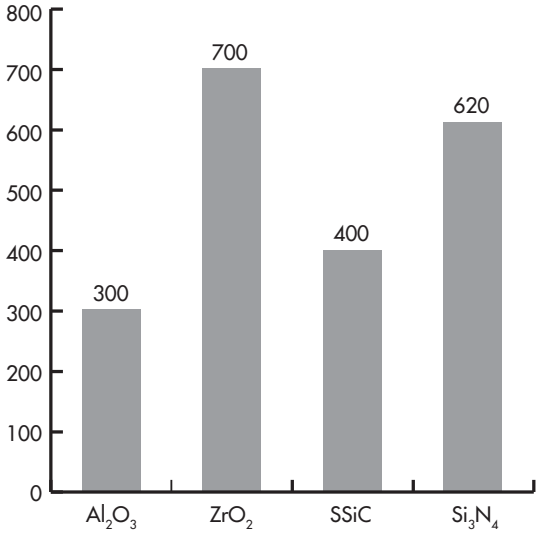


Fig. 3: *Flexural strength in MPa*

3. Density

Generally, ceramic valves are lighter than valves made of other materials. For example, ceramics are up to 78 % less dense than carbide metal and up to 60 % less dense than stainless steel.

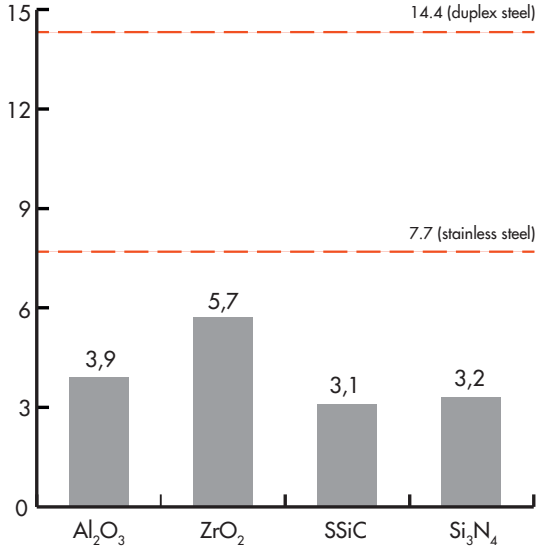


Fig. 4: *Density in g/cm³*

4. Hardness and wear resistance

The wear resistance of components considerably depends on the type of stress they are exposed to. Ceramics are much harder and better wear-resistance properties than metals. Frequently, a combination of different kinds of wear, such as abrasion, high velocity erosion, impact wear and cavitation, arise which ceramic components usually endure much better in comparison to metal components. Direct impact loads must be dealt with on a case-by-case basis.

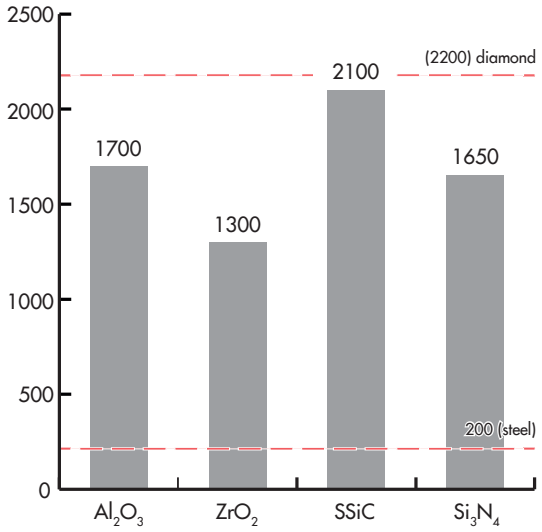


Fig. 5: *Vickers hardness 1 in GPa*

5. Thermal shock resistance

The thermal shock resistance is is more relevant than the maximum service temperature. Ceramic components maintain their shape, material strength and physical properties even at very high temperatures. The thermal shock resistance significantly depends on the shape of the component and not just the material. Simple shapes, such as pipes, are more rugged than parts with greatly varying wall thicknesses.

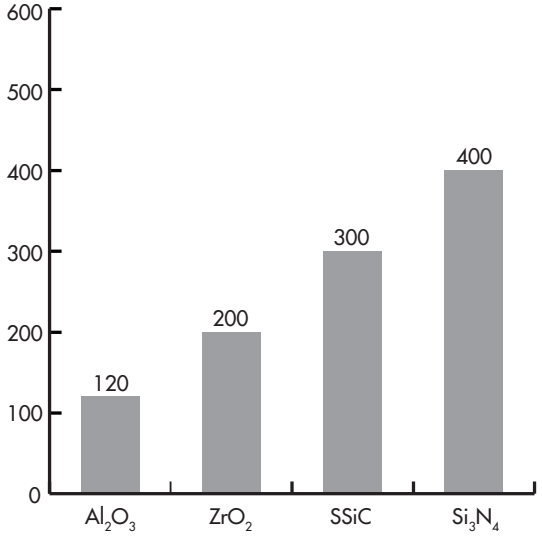


Fig. 6: *Thermal shock resistance ΔT in °C*

TA Luft packing

The current TA Luft regulations impose stringent fugitive emission limits for valve stem sealing. The TA Luft packing sets cover almost all applications and are suitable for use in new valves or for retrofitting existing valves.

The packing sets guarantee the leakage rates specified in the VDI directives over the entire temperature range. In precise terms, the sealing system must demonstrate a leakage rate of $10^{-4}\ \frac{mbar \times l}{s \times m}$ at a temperature of 250 °C or a leakage rate of $10^{-2}\ \frac{mbar \times l}{s \times m}$ above this temperature. The packing is live loaded in these applications to ensure continuous compression of the packing. The live loading system is designed and adjusted based on the operating temperature and operating pressure.

Available packing sets to meet TA Luft requirements:

BuraTAL® T3 9650/T3	
Temperature range	–10 to +250 °C
Pressure	63 bar
Chemical resistance	pH value: 1 to 13

BuraTAL® T3 9650/T1	
Temperature range	–40 to +280 °C
Pressure	40 bar
Chemical resistance	pH value: 1 to 14

BuraTAL® HT 9650/HT	
Temperature range	–200 to +400 °C
Pressure	300 bar
Chemical resistance	pH value: 1 to 13

Valtec® 7250	
Temperature range	–200 to +280 °C
Pressure	30 bar
Chemical resistance	pH value: 1 to 14

Table 1: *Technical data*

Series CERA1700 Sliding Disk Valves				
		Type SSC15	**Type SSC22**	**Type SSC30**
Valve size	DN	10 to 40	15 to 65	25 to 65
	NPS	⅜ to 1½	½ to 2½	1 to 2½
Pressure rating [1]	PN	10 to 40		
	Class	150 and 300		
Flange end connections	DIN	See DIN EN 1092-1		
	ANSI	ASME B16.5		
Face-to-face dimensions		EN 558-1, series 47 [2]		
Temperature ranges [3]	Seal type 1	–10 to +180 °C (Viton®)		
	Seal type 2	–10 to +260 °C (Kalrez® 6375)		
	Seal type 3	–10 to +310 °C (Kalrez® 7075)		
Characteristic		Equal percentage or linear		
Bore geometry of sliding disk		Round or V-shaped		
Leakage class	EN 60534-4	I and VI		
Compliance		CE		
Type 3277 Pneumatic Actuator		**▶ T 8310-1**		
Type 3273 Side-mounted Handwheel for Type 3277 Pneumatic Actuator		▶ T 8312		

1) Other pressure ratings on request
2) Other face-to-face dimensions possible on request through the use of an adapter
3) High-temperature version up to 450 °C on request

Table 2: *Materials* · • Standard version; o Special version/option

Series CERA1700 Sliding Disk Valves	
Body	• 1.4301 o 1.4571
Sliding disk	• Al_2O_3 o SSiC, o ZrO_2
Washer	• Al_2O_3 o SSiC, o ZrO_2, o SSiC-DLC
Yoke	• 1.4301 o 1.4571
Anti-wear sleeve	• SSiC o Al_2O_3
O-rings	• Seal type 1 o DS-Typ 2, o DS-Typ 3
Bolts, nuts	• A2-/A4-70
Bearing bushing	• PTFE/carbon
Packing	• Graphite o Packing, o TA Luft
Type 3277 Pneumatic Actuator	**▶ T 8310-1**

Table 3: *K_{VS} and C_V coefficients and associated nominal sizes*

		Type	SSC15										SSC22				SSC30			
		Travel mm	20				12/20		20		17		27		22/27		27		29/35	
Valve size		Bore geometry mm	Ø5 x 18		Ø7 x 18		Ø10 Ø10 x 18		Ø13 x 18		Ø15		Ø15 x 25		Ø20 Ø20 x 25		Ø25		Ø27 Ø27 x 32	
DN	NPS	Sliding disk	K_{VS}	C_V	K_{VS}	C_V	K_{VS}	C_V	K_{VS}	C_V	K_{VS}	C_V	K_{VS}	C_V	K_{VS}	C_V	K_{VS}	C_V	K_{VS}	C_V
10	⅜	V-shaped	1.3	1.5	3.2	3.7	5.4	6.3	–	–	–	–	–	–	–	–	–	–	–	–
		Round																		
15	½	V-shaped	1.1	1.3	2.5	2.9	6.6	7.7	11.7	13.7	14.6	17.0	14.6	17.0	–	–	–	–	–	–
		Round																		
20	¾	V-shaped	0.9	1.1	2.3	2.7	5.9	6.9	10.3	12.0	15.4	18.0	15.4	18.0	28.0	32.7	43.8	51.0	–	–
		Round																		
25	1	V-shaped	1.0	1.2	2.2	2.6	5.2	6.1	9.0	10.5	14.5	16.9	14.5	16.9	34.7	40.5	54.2	63.3	38.0	44.3
		Round																		
32	1¼	V-shaped	0.7	0.8	1.8	2.1	4.9	5.7	7.9	9.2	13.0	15.2	13.0	15.2	27.3	31.9	42.7	49.8	66.5	77.6
		Round																		
40	1½	V-shaped	–	–	1.6	1.9	4.8	5.6	7.7	9.0	11.9	13.9	11.9	13.9	22.8	26.6	35.6	41.6	56.5	65.9
		Round																		
50	2	V-shaped	–	–	–	–	–	–	–	–	–	–	10.7	12.5	19.7	23.0	30.8	35.9	50.8	59.3
		Round																		
65	2½	V-shaped	–	–	–	–	–	–	–	–	–	–	8.0	9.3	19.0	22.2	29.7	34.6	49.0	57.3
		Round																		
Actuating forces																				
Force required by valve		kN	5.4		4.0		4.0		4.0		4.0		5.4		3.8		4.4		4.4	
Linear force of Type 3277 Pneumatic Actuator		kN	9.9 to 17.7																	

Bench ranges of Type 3277 Pneumatic Actuator (▶ T 8310-1)

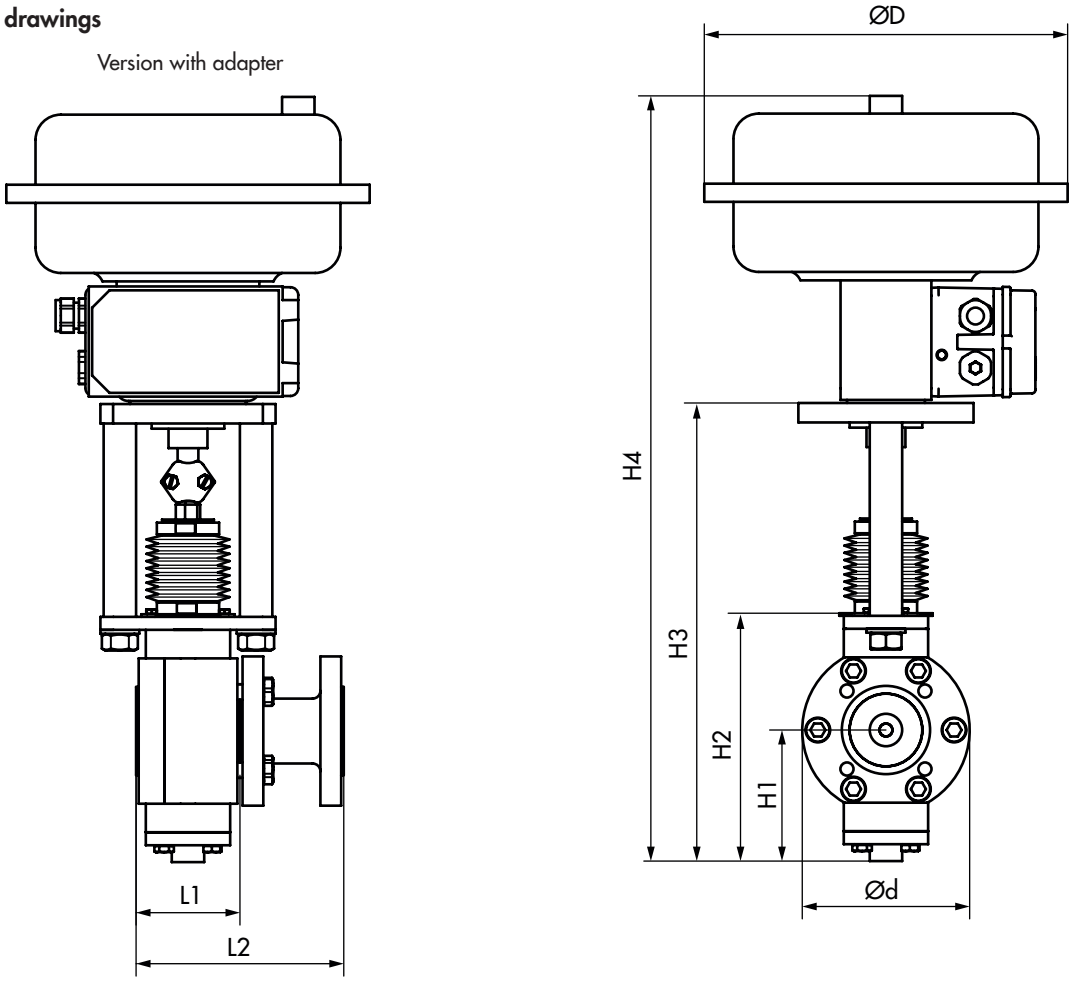
Table 4: *Dimensions and weights*

			DN	10	15	20	25	32	40	50	65
			NPS	⅜	½	¾	1	1¼	1½	2	2½
Type SSC15 with Type 3277 Actuator											
Height	H1	mm		101				111		–	–
	H2	mm		191				211			
	H3	mm		353				373			
	H4	mm		Depends on the size of the mounted Type 3277 Actuator (▶ T 8310-1)							
Diameter	Ød	mm		129				149			
	ØD	mm		Depends on the size of the mounted Type 3277 Actuator (▶ T 8310-1)							
Face-to-face dimensions	L1	mm		75 [1]	75 [1]	75	80	90	100		
	L2	mm		130	130	150	160	180	200		
Weight	Without actuator	kg		11.5							
	With actuator	kg		Depends on the size of the mounted Type 3277 Actuator (▶ T 8310-1)							
Type SSC22 with Type 3277 Actuator											
Height	H1	mm			118						
	H2	mm			218						
	H3	mm			380						
	H4	mm			Depends on the size of the mounted Type 3277 Actuator (▶ T 8310-1)						
Diameter	Ød	mm			149						
	ØD	mm		–	Depends on the size of the mounted Type 3277 Actuator (▶ T 8310-1)						
Face-to-face dimensions	L1	mm			75 [1]	75	80	90	100	110	130
	L2	mm			130	150	160	180	200	230	290
Weight	Without actuator	kg			13.5						
	With actuator	kg			Depends on the size of the mounted Type 3277 Actuator (▶ T 8310-1)						
Type SSC30 with Type 3277 Actuator											
Height	H1	mm				150					
	H2	mm				274					
	H3	mm				436					
	H4	mm				Depends on the size of the mounted Type 3277 Actuator (▶ T 8310-1)					
Diameter	Ød	mm				195					
	ØD	mm		–	–	Depends on the size of the mounted Type 3277 Actuator (▶ T 8310-1)					
Face-to-face dimensions	L1	mm				75	80	90	100	110	130
	L2	mm				150	160	180	200	230	290
Weight	Without actuator	kg				28					
	With actuator	kg				Depends on the size of the mounted Type 3277 Actuator (▶ T 8310-1)					

[1] Not included in the standard (EN 558-1, series 47)

Dimensional drawings

Version with adapter



Types SSC15, SSC22 and SSC30 Sliding Disk Valves with Type 3277 Actuator (355v2 cm²)

Ordering text

Criteria	Value
Valve size	DN/NPS …
Pressure rating	PN …
Temperature range	
Materials	See Table 1 on page 4.
Bore geometry of sliding disk	Round/V-shaped
Characteristic	Equal percentage, linear or on/off
Process medium	
Max. flow rate	in kg/h or m^3/h
Pressure	p1 and p2 in bar
Actuator	Type 3277 (Data Sheet ▶ T 8310-1)
Fail-safe position	Actuator stem extends (FA)/actuator stem retracts (FE)