

Swing Check Valve

ZRS

Type Series Booklet



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Type Series Booklet ZRS

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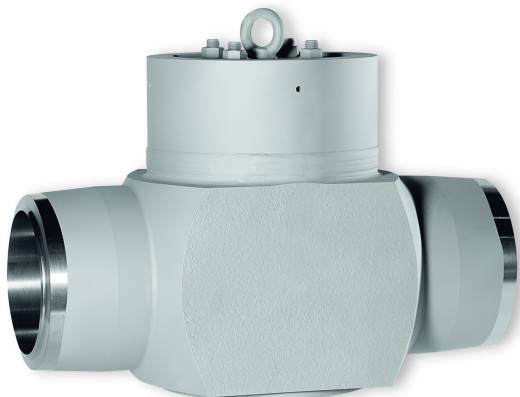
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Check Valves and Strainers

Swing Check Valves to DIN/EN

ZRS



Main applications

- Fossil-fuelled power stations
- Process engineering
- Boiler feed applications
- Boiler recirculation
- Chemical industry
- Petrochemical industry
- Sugar industry
- Paper industry / pulp industry
- Nuclear power stations

Fluids handled

- Water
- Steam
- Other non-aggressive fluids such as gas or oil on request.

Operating data

Table 1: Operating properties

Characteristic	Value
Design pressure [bar]	~ 600
Nominal size	DN 50/50-500/450
Max. permissible pressure [bar]	~ 600
Min. permissible temperature [°C]	≥ -10
Max. permissible temperature [°C]	≤ +650

Larger nominal sizes on request.

Selection as per pressure/temperature ratings (⇒ Page 6)

Valve body materials

Table 2: Overview of available materials

Material	Material number	Temperature limit
P 250 GH	1.0460	≤ 450 °C
15 NiCuMoNb 5	1.6368	≤ 450 °C
16 Mo 3	1.5415	≤ 530 °C
13 CrMo 4-5	1.7335	≤ 550 °C
10 CrMo 9-10/ 11 CrMo 9-10	1.7380/ 1.7383	≤ 570 °C
X 10 CrMoVNb 9-1	1.4903	≤ 650 °C
X 10 CrWMoVNb 9-2	1.4901	≤ 650 °C

Design details

Design

- Body made of forged steel
- Pressure seal design
- Internally mounted hinge pin
- Seat/disc interface made of wear-resistant and corrosion-proof Stellite

Variants

- Flanged ends
- Minimum flow nozzle
- Other butt weld end versions
- Inspections to technical codes such as TRD/TRB/AD2000 – German Steam Boiler / Pressure Vessel Regulations – or to customer specification

Product benefits

- Robust body made of billet-forged steel.
 - Very dense, homogenous and fine-grained microstructure. Extremely robust material able to withstand high stresses.
 - Ideal for very high pressures and temperatures.
 - Compared with cast bodies no risk of porosity and shrinkage cavities, excellent weldability.
- Added safety due to pressure seal design providing increased sealing to atmosphere: The higher the pressure in the body, the tighter the bonnet/cover joint. Very low risk of leakage, particularly at high pressures and temperatures. Compact design.
- Reliable, tight shut-off and service-friendly design due to flexibly mounted valve disc. Precise alignment of valve disc with body seat; valve disc is easy to replace.
- Hard-faced seat/disc interface made of wear-resistant and corrosion-proof Stellite for long service life and high functional reliability.

Product information

Product information as per Regulation No. 1907/2006 (REACH)

For information as per European chemicals regulation (EC) No. 1907/2006 (REACH) see <https://www.ksb.com/en-global/company/corporate-responsibility/reach>.

Product information as per Directive 2014/34/EU (ATEX)

The valves do not have a potential internal source of ignition and can be used in potentially explosive atmospheres, Group II, category 2 (zones 1+21) and category 3 (zone 2+22) to ATEX 2014/34/EU.

Product information as per Pressure Equipment Directive 2014/68/EU (PED)

The valves satisfy the safety requirements of Annex I of the European Pressure Equipment Directive 2014/68/EU (PED) for fluids in Groups 1 and 2.

Product information as per UK Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016

The valves do not have a potential internal source of ignition and can be used in accordance with the UK's Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016 in potentially explosive atmospheres, Group II, category 2 (zones 1+21) and category 3 (zone 2+22).

Product information as per UK Pressure Equipment (Safety) Regulations 2016

The valves satisfy the safety requirements of the UK Pressure Equipment (Safety) Regulations 2016 (PER) for fluids in Groups 1 and 2.

Related documents

Table 3: Information/documents

Document	Reference number
ZTS type series booklet (gate valves in pressure seal design)	7451.1
Operating manual	0570.81

Purchase order specifications

Please specify the following information in all enquiries or purchase orders:

1. Type
2. Nominal pressure
3. Nominal size
4. Operating pressure
5. Differential pressure
6. Operating temperature
7. Material
8. Fluid handled
9. Flow rate
10. Pipe connection
11. Variants
12. Reference number

Always indicate the original serial number and the year of construction when ordering spare parts.

Pressure/temperature ratings

Table 4: Permissible operating pressure [bar]¹⁾²⁾

Material	Subseries ¹⁾	[°C]																										
		20	100	150	200	250	300	350	400	425	450	475	500	510	520	530	540	550	560	570	580	590	600	610	620	630	640	650
P 250 GH 1.0460	C	212	202	181	161	141	126	105	85	76	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	D	323	308	277	246	215	192	161	130	115	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	426	407	366	325	284	254	213	172	152	132	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	521	496	446	397	347	310	260	210	186	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15NiCuMoNb5 1.6368	C	367	367	367	367	367	356	341	327	314	242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CS ⁴⁾	445	445	445	445	445	430	415	400	380	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	D ⁵⁾	558	558	558	558	558	539	518	498	476	374	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	738	738	738	738	738	711	685	658	629	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16 Mo 3 1.5415	C	268	237	214	192	177	151	147	141	140	136	134	94	66	52	42	-	-	-	-	-	-	-	-	-	-	-	-
	D	408	361	326	292	269	231	223	215	211	207	205	143	100	79	63	-	-	-	-	-	-	-	-	-	-	-	-
	E	539	478	432	386	356	304	294	284	279	275	269	189	132	104	83	-	-	-	-	-	-	-	-	-	-	-	-
	F	657	583	527	471	434	372	359	347	341	335	329	231	162	128	102	-	-	-	-	-	-	-	-	-	-	-	-
13 CrMo 4-5 1.7335	C	268	243	228	213	202	187	177	167	162	157	155	138	118	95	79	61	49	-	-	-	-	-	-	-	-	-	-
	D	408	369	346	323	308	284	269	254	246	238	235	211	178	145	119	93	75	-	-	-	-	-	-	-	-	-	-
	E	539	488	457	427	407	376	355	335	325	315	310	277	236	191	158	124	100	-	-	-	-	-	-	-	-	-	-
	F	657	596	558	521	496	459	434	409	397	385	378	341	288	233	193	151	121	-	-	-	-	-	-	-	-	-	-
10 CrMo 9-10 1.7380/ 11 CrMo 9-10 1.7383	C	268	248	232	217	213	202	187	177	173	167	162	136	119	104	91	79	69	58	51	-	-	-	-	-	-	-	-
	D	408	377	354	331	323	308	284	269	252	246	207	181	158	138	119	104	89	78	-	-	-	-	-	-	-	-	-
	E	539	498	467	437	427	407	376	355	345	335	325	275	239	210	183	158	138	117	103	-	-	-	-	-	-	-	-
	F	657	608	570	533	521	496	459	434	422	409	397	335	292	255	223	193	168	144	126	-	-	-	-	-	-	-	-
X10CrMoVNb9-1 1.4903	C	-	-	-	-	-	-	-	-	-	-	-	-	-	245	225	204	185	166	148	131	116	102	89	78	67	59	50
	D	-	-	-	-	-	-	-	-	-	-	-	-	-	324	296	270	244	214	195	174	154	135	117	103	87	77	67
	E	-	-	-	-	-	-	-	-	-	-	-	-	-	470	429	391	353	316	283	251	221	197	170	148	126	112	96
	F	-	-	-	-	-	-	-	-	-	-	-	-	-	514	472	428	387	347	311	275	244	215	186	162	139	122	105
X10CrWMoVNb9-2 1.4901	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	134	120	107	94	82	71	61	53	
	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	201	180	160	142	123	106	92	79	
	E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	262	234	208	184	160	138	120	103	
	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	314	281	250	221	192	166	144	121	

- 1 The valves are suitable for temperatures down to -10 °C.
- 2 The test pressure is defined in accordance with the provisions of the technical codes PED 2014/68/EU, DIN EN 12516-2 and EN 12266-1.
- 3 The subseries defines the maximum operating pressure possible for the respective temperature. The gate valve is designed and marked for the actual design data specified in the purchase order.
- 4 Weights, dimensions and differential pressures on request.
- 5 Special design subseries CD on request. Depending on the nominal size, permissible operating pressures up to the maximum pressure and temperature of subseries D are possible (however, with restrictions regarding the differential pressure for subseries D).

Materials

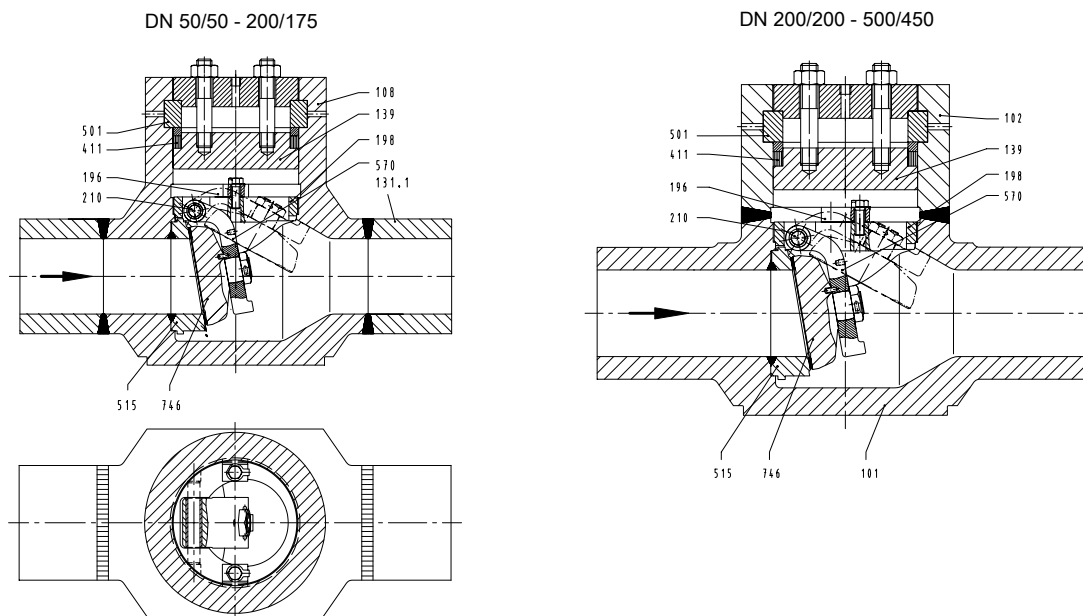


Fig. 1: Sectional drawings of ZRS

Table 5: Parts list

Part No.	Description	Materials for operating temperatures [°C] up to						
		450		530	550	570	600	650
101	Lower body section	P 250 GH 1.0460	15NiCuMoNb5 1.6368	16 Mo 3 1.5415	13 CrMo 4-5 1.7335	10 CrMo 9-10 1.7380/ 11 CrMo 9-10 1.7383	X10CrMoVNb 9-1 1.4903 X10CrWMoVNb 9-2 1.4901	
102	Upper body section							
108	Main body							
131.1	Connection branch							
139	Bonnet	10 CrMo 9-10 1.7380/ 11 CrMo 9-10 1.7383		10 CrMo 9-10 1.7380/ 11 CrMo 9-10 1.7383				
501 ⁶⁾	Segmental ring							
746 ⁶⁾	Valve disc Hard-facing	1.7380 NP	1.6368 H21	1.7380 NP			1.4903 H21	
515	Seat ring Hard-facing	13 CrMo 4-5 1.7335 H21	1.6368 H6	13 CrMo 4-5 1.7335 H21		10 CrMo 9-10 1.7380 H6/ 11 CrMo 9-10 1.7383 H6	1.4903 H6	
196	Locking plate	13 CrMo 4-5 1.7335 10 CrMo 9-10 1.7380/ 11 CrMo 9-10 1.7383					X10CrMoVNb 9-1 1.4903	
198	Plate	13 CrMo 4-5 1.7335 10 CrMo 9-10 1.7380/ 11 CrMo 9-10 1.7383					X10CrMoVNb 9-1 1.4903	
210 ⁶⁾	Hinge pin	X39CrMo17-1 1.4122					X20CrMoV11-1 1.4922	
411.1 ⁶⁾	Joint ring	Pure graphite						
570 ⁶⁾	Hanger arm	13 CrMo 4-5 1.7335 10 CrMo 9-10 1.7380/ 11 CrMo 9-10 1.7383					X10CrMoVNb 9-1 1.4903	

⁶ Recommended spare parts

Variants

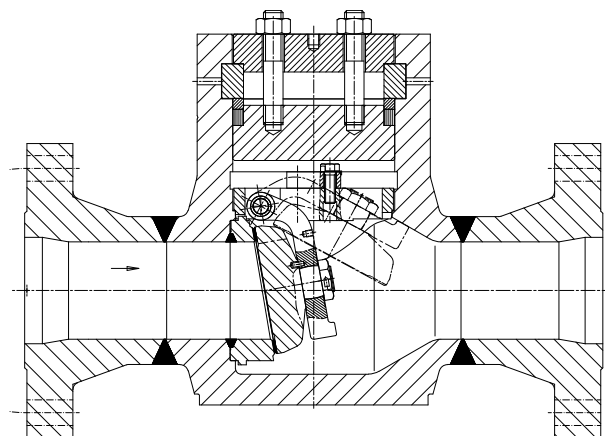
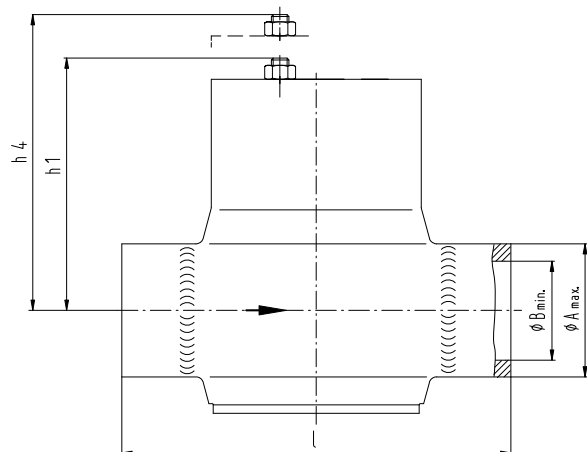
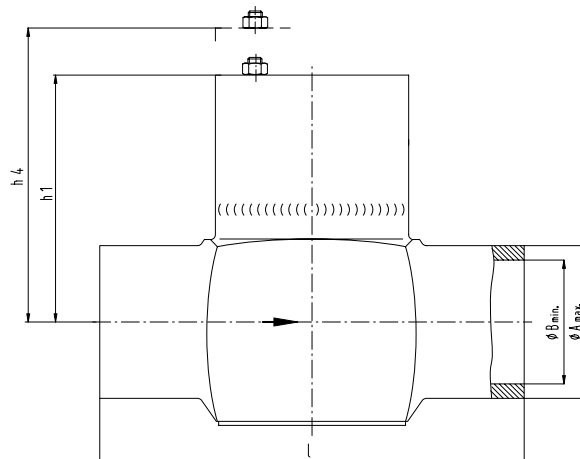


Fig. 2: Model with flanged ends

Dimensions and weights



≤ DN/S 200/175



≥ DN/S 200/200

Table 6: Dimensions [mm] and weights [kg]

Nominal size/seat diameter (DN / S) ⁷⁾	I				Butt weld ends, unmachined					h ₁				h ₄ ⁸⁾				[kg] ⁹⁾					
					ØA _{max.}		ØB _{min.}																
	Subseries																						
C	D	E	F	C	D	E	F	C, D, E, F	C	D	E	F	C	D	E	F	C	D	E	F			
50/50	250	250	250	250	75	75	85	85	45	155	160	160	160	230	235	245	245	22	30	34	42		
65/50	340	400	400	400	85	90	95	95	45	155	160	160	160	230	235	245	245	24	34	38	46		
65/65	340	400	400	400	85	102	120	120	60	170	210	210	210	255	310	320	320	32	40	48	67		
80/65	380	450	450	450	102	120	130	130	60	170	210	210	210	255	310	320	320	34	42	50	70		
80/80	380	450	450	450	102	110	120	130	70	185	185	185	200	285	295	305	330	44	62	80	110		
100/80	430	520	520	520	120	120	130	140	70	185	185	185	200	285	295	305	330	46	65	85	125		
100/100	430	520	520	520	120	140	150	160	90	205	230	230	245	325	350	380	405	60	80	120	160		
125/100	500	600	600	600	145	155	160	180	90	205	230	230	245	325	350	380	405	63	85	130	170		
125/125	500	600	600	600	155	175	185	195	110	235	260	260	280	390	435	445	475	90	140	200	245		
150/125	550	700	700	700	175	190	195	210	110	235	260	260	280	390	435	445	475	94	150	210	260		
150/150	550	700	700	700	180	200	215	225	135	265	315	315	330	445	515	530	555	125	195	235	365		
175/150	600	800	800	800	200	210	220	240	135	265	315	315	330	445	515	530	555	130	205	240	385		
200/150	650	800	800	800	225	250	260	290	135	265	315	315	330	445	515	530	555	137	210	250	395		
175/175	600	800	800	800	200	230	250	270	155	295	315	330	360	495	545	580	630	180	295	350	480		
200/175	650	800	800	800	230	245	260	290	155	295	315	330	360	495	545	580	630	190	315	375	510		
200/200	700	800	900	1050	260	295	290	310	180	340	410	450	480	600	685	740	790	255	380	¹⁰⁾	¹⁰⁾		
250/200	700	900	900	1050	275	330	350	375	180	340	410	450	480	600	685	740	790	280	405	¹⁰⁾	¹⁰⁾		
250/250	850	950	1050	1150	300	330	350	375	225	365	415	490	500	640	745	780	810	405	660	¹⁰⁾	¹⁰⁾		
300/250	850	950	1050	1150	360	410	425	440	225	365	415	490	500	640	745	780	810	445	705	¹⁰⁾	¹⁰⁾		
300/300	950	1150	1250	1350	380	410	425	440	275	430	520	560	590	790	930	985	1030	685	1300	¹⁰⁾	¹⁰⁾		
350/300	950	1150	1250	1350	410	470	500	520	275	430	520	560	590	790	930	985	1030	720	1360	¹⁰⁾	¹⁰⁾		
350/350	1050	1350	1450	1550	430	480	500	520	320	510	625	660	690	940	1105	1160	1210	¹⁰⁾	¹⁰⁾	¹⁰⁾	¹⁰⁾		
400/350	1050	1350	1450	1550	460	535	565	595	320	510	625	660	690	940	1105	1160	1210	¹⁰⁾	¹⁰⁾	¹⁰⁾	¹⁰⁾		
400/400	1200	1550	1650	1750	475	565	565	595	365	600	725	785	815	1075	1290	1350	1410	¹⁰⁾	¹⁰⁾	¹⁰⁾	¹⁰⁾		
450/400	1200	1550	1650	1750	515	600	640	670	365	600	725	785	815	1075	1290	1350	1410	¹⁰⁾	¹⁰⁾	¹⁰⁾	¹⁰⁾		
450/450	1350	1750	1850	1950	530	600	640	670	410	640	790	850	900	1170	1390	1490	1570	¹⁰⁾	¹⁰⁾	¹⁰⁾	¹⁰⁾		
500/450	1350	1750	1850	1950	585	600	640	670	410	640	790	850	900	1170	1390	1490	1570	¹⁰⁾	¹⁰⁾	¹⁰⁾	¹⁰⁾		

Mating dimensions

Dimensions of butt weld ends and weld groove form to customer's specification, but only within dimensions A_{max.} and B_{min.}

Special dimensions on request.

⁷⁾ Larger nominal sizes on request.

⁸⁾ Vertical clearance for removal

⁹⁾ Weights may vary with special designs/variants.

¹⁰⁾ On request



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