

## GENERAL DESCRIPTION

# Double-Flap Sluice from singold



- Globally unique, sophisticated flap mechanism
- No friction or shear forces on the seal
- The flap swings completely out of the product flow
- Bearings and joints are positioned outside the product flow
- Suitable for all conceivable bulk materials for complete discharge
- Virtually wear-free even with highly abrasive materials

## 1 APPLICATION

The **singold Double Flap Sluice (DKS)** is suitable for all bulk solids and solid-liquid mixtures. It can convey bulk solids gravimetrically (by gravity) to different pressure levels, and it allows for the mechanical separation of pressure chambers from each other.

Typical areas of application for the double-flap sluice are:

- Conveying bulk materials to a different pressure level
  - o e.g. when discharging from cyclones or extraction systems, etc.
- Feeding and discharging products or bulk materials in batches
  - o e.g. in cement and glass production.
- Feeding bulk materials into other processes or systems in batches
  - o e.g. feeding or discharging in incineration or biogas plants.

Fluidised bulk material (e.g. cement) generates pressure due to the height of the bulk material and therefore cannot be conveyed through conveyers or screws.

## 2 COMPARISON WITH CELLULAR WHEEL SLUICE

The Double-Flap Sluice has several advantages over the Cellular Wheel Sluice:

- Can be used at high temperatures.
- Can convey large particle sizes.
- Can overcome high differential pressures.
- Large flow rates possible.
- The Double-Flap Sluice will not block.
- It suffers hardly any wear.
- Extraneous air due to gap losses is negligible.



Fig. 1: singold Double-Flap Sluice DKS200E

## 3 SCHEMATIC DESIGN AND FUNCTIONAL PRINCIPLE OF THE SINGOLD DOUBLE-FLAP SLUICE

The functional sequence of the double-flap sluice is shown below in Fig. 2.

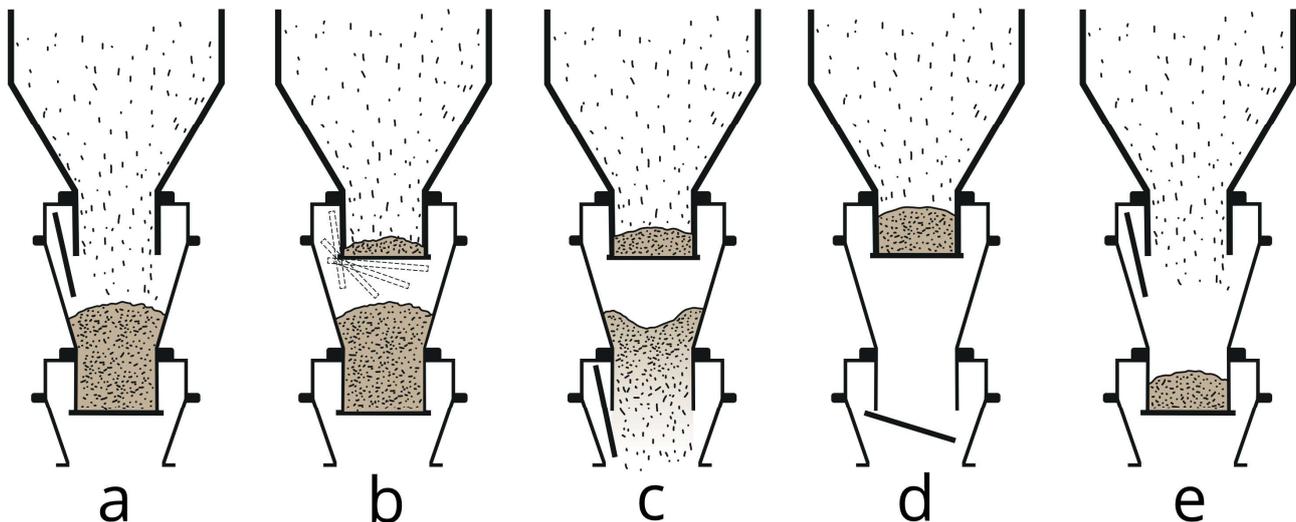


Fig 2: Schematic representation of the function of the Double-Flap Sluice

- a) Basic position: Lower flap closed, upper flap open. Conveying to the lower flap until the desired volume is reached.
- b) Upper flap is closed. For systems with pressure differences between discharge and feed – equalise the pressure.
- c) Open lower flap and discharge product or feed to further production process. Close the lower flap.
- d) For systems with pressure differences between discharge and feed – equalise the pressure again.
- e) Open the upper flap. Double flap is back in home position – lower flap closed, upper flap open.

## 4 OVERVIEW OF DIFFERENT TYPES OF DOUBLE-FLAP SLUICES

### 4.1 Standard versions DKS E (simple version) and DKS A (reinforced version)

Our simple basic versions are available with the following specifications:

- With or without shaft seals, depending on requirements (V-ring, O-ring or shaft seal ring).
- Flap and flange seals available in various designs and materials.
- Temperatures of up to 160 °C and up to 300 °C possible.
- Possible materials: galvanised steel, primed steel, stainless steel, heat-resistant or other steels.
- Drive possible as compressed air cylinder, geared motor and manual drive.

#### 4.1.1 Simple version for bulk solids up to approx. 0.35 bar closing pressure DKS E

- Type E Double-Flap Sluices are suitable for standard applications with closing pressures from 0.346 to 0.52 bar.

Closing forces are specified below as pressure on the nominal area:

- o DKS150E: 0.426 bar
- o DKS200E: 0.357 bar
- o DKS250E: 0.520 bar
- o DKS300E: 0.361 bar
- o DKS400E: 0.346 bar
- o DKS500E: 0.490 bar

#### 4.1.2 Reinforced version for special applications up to approx. 1 bar closing pressure DKS A

- Type A Double-Flap Sluices are suitable for special applications with closing pressures from 0.99 to 1.02 bar.
- Closing forces are specified below as pressure on the nominal area:
  - o DKS100A: 1.02 bar
  - o DKS150A: 0.99 bar
  - o DKS200A: 1.00 bar
  - o DKS300A: 1.00 bar
  - o DKS400A: 1.00 bar
  - o DKS500A: 1.00 bar

### 4.2 Special version for converter dedusting in the metallurgical industry DKS T

- The reinforced version T (T=Thyssen) as a solid and durable device has been specially developed for the metallurgical industry.
- The type T double-flap sluices are used for what is known as converter dedusting.
- Here, great importance was given to airtightness from the outside in order to prevent chemical reactions of the dust with the air.
- Closing forces are specified below as pressure on the nominal area:
  - o DKS400T: 0.5 bar
  - o DKS500T: 0,5 bar
- Maximum temperature of 350 °C.

### 4.3 Special designs and variants available on request

Only the standard versions regularly purchased from us are listed above. The Double-Flap Sluices can be supplied in many materials, nominal diameters, pressure, temperature and design variants. For example, sieve, filter, heating and cooling surfaces can also be provided to simplify the process plant.

Below are some examples of special designs that have already been realised:

- Centralised grease lubrication.
- Cooled or heated surfaces.
- Internal limit switches to directly query flap position.
- Position-controlled flap shutter with wear-resistant coated insert and wear-resistant coated flap.
- Ground flap and flat sealing surface on the insert for metal-to-metal process sealing flap closure.



Fig. 3: Double-Flap Sluice DKS200E with radial shaft seal



Fig. 4: Double-Flap Sluice DKS400A for 350 °C with radiation protection for cylinder, wired to IP65 terminal box

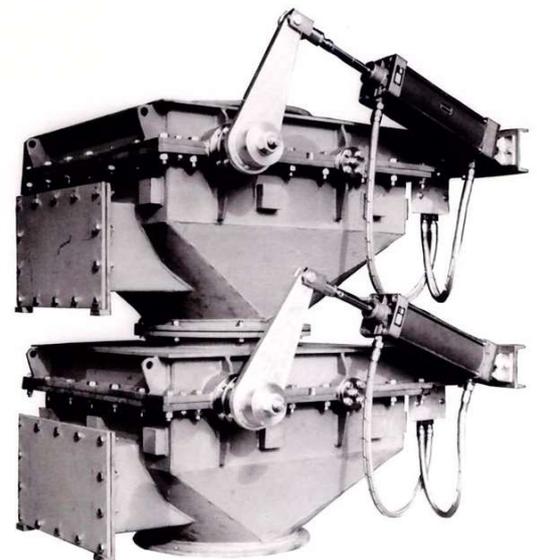
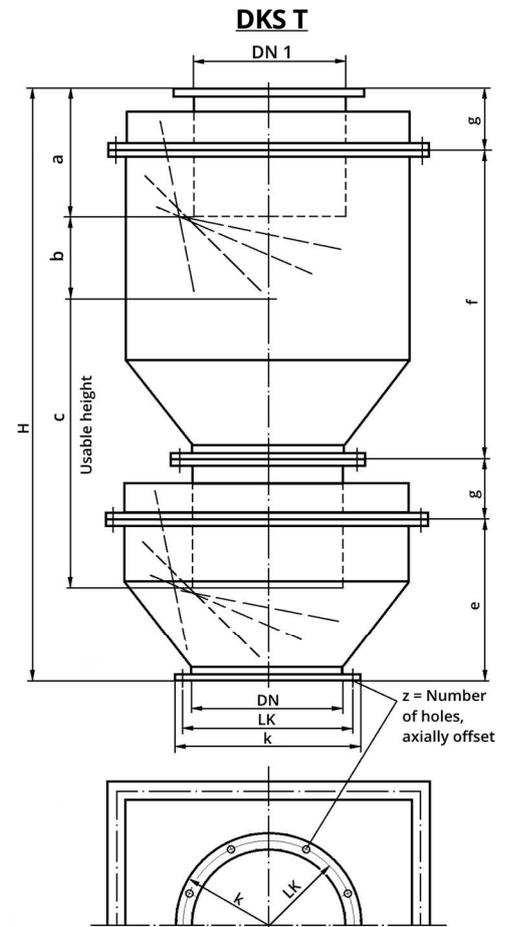
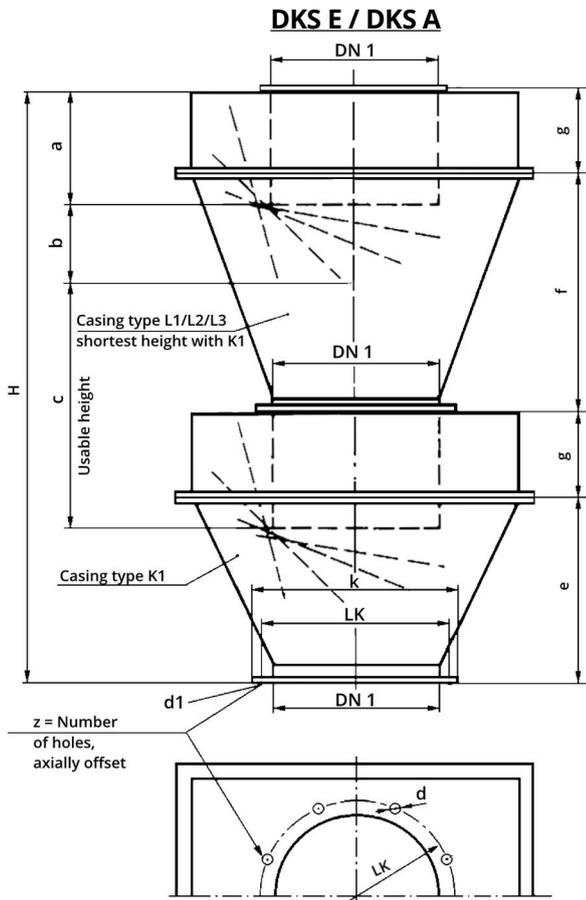


Fig. 5: Double-Flap Sluice DKS500T

## 5 TECHNICAL DATA FOR DOUBLE-FLAP SLUICES E, A AND T

SUBJECT TO ALTERATIONS!



### 5.1 Double-Flap Sluice DKS E

Type	c							f						H						Cycle volume [L]						Cycle time [s]						Conveying capacity [m³/h]							
DN1	a	b	K1	L1	L2	L4	L6	e	K1	L1	L2	L4	L6	g	K1	L1	L2	L4	L6	LK	d	z	k	d1	K1	L1	L2	L4	L6	K1	L1	L2	L4	L6	K1	L1	L2	L4	L6
DKS150E	111	80	170	215	330	465	560	150	150	195	310	445	540	100	500	545	660	785	910	190	M8	4	210	9	2,5	3,4	6,7	13,5	20,2	14	14	16	19	22	0,66	0,85	1,52	2,51	3,21
DKS200E	145	100	250	295	4660	660	820	240	240	285	450	660	820	110	700	745	910	1120	1280	250	M8	4	270	9	6,5	8,0	16,2	32,2	48,3	15	16	18	22	26	1,31	1,81	3,19	5,15	6,48
DKS250E	209	120	270	365	565	810	990	210	210	305	505	750	930	180	780	875	1075	1320	1500	300	M8	8	320	9	10,9	15,8	31,4	62,9	94,3	16	17	19	25	30	2,52	3,35	5,79	9,13	11,30
DKS300E	212	150	340	425	670	1000	1255	340	340	425	670	1000	1255	150	980	1065	1310	1640	1895	350	M10	8	370	12	19,9	27,1	54,0	108	163	17	18	21	27	34	4,05	5,36	9,16	14,22	17,41
DKS400E	284	190	400	565	885	1305	1625	380	380	545	865	1285	1605	220	1200	1365	1685	2105	2425	450	M10	8	480	12	40,6	64,3	128	256	384	20	20	24	32	40	8,06	11,58	19,31	29,00	34,82
DKS500E	450	230	510	725	1115	1595	1955	315	315	530	920	1400	1760	415	1460	1675	2065	2545	2905	570	M12	12	600	14	81,2	126	250	500	751	21	22	27	36	46	13,86	20,28	33,30	49,04	58,22

### 5.2 Double-Flap Sluice DKS A

Type	c							f						H						Cycle volume [L]						Cycle time [s]						Conveying capacity [m³/h]							
DN1	a	b	K1	L1	L2	L4	L6	e	K1	L1	L2	L4	L6	g	K1	L1	L2	L4	L6	LK	d	z	k	d1	K1	L1	L2	L4	L6	K1	L1	L2	L4	L6	K1	L1	L2	L4	L6
DKS100A	87	62	123	143	213	298	373	105	105	125	195	280	355	80	370	390	460	545	620	150	M8	8	170	9	0,8	1,0	2,0	3,9	6,0	12	12	13	16	18	0,24	0,296	0,53	0,88	1,17
DKS150A	145	90	220	-	330	420	515	170	170	-	280	370	465	140	620	-	730	820	915	220	M12	8	250	14	3,41	-	6,8	13,5	20,3	14	-	16	20	22	0,66	-	1,50	2,48	3,28
DKS200A	168	122	243	288	438	623	813	190	190	235	385	570	730	175	730	775	925	1110	1270	270	M12	8	300	14	6,3	8,0	15,9	31,9	47,7	15	15	17	22	26	1,53	1,89	3,30	5,30	6,63
DKS300A	270	160	330	440	655	915	1140	235	235	345	560	820	1045	255	980	1090	1305	1565	1790	370	M12	8	400	14	19,5	27,0	54,0	108	162	17	18	21	27	33	4,05	5,34	9,13	14,19	17,55
DKS400A	300	215	420	565	810	1110	1555	335	335	475	775	1145	1470	300	1270	1410	1710	2080	2405	470	M12	12	500	14	43,1	64,0	128	256	384	19	20	24	32	40	8,34	11,58	19,31	29,00	34,82
DKS500A	405	285	555	705	1090	1560	1970	430	430	580	965	1435	1845	410	1680	1830	2215	2685	3095	570	M12	16	600	14	91,1	125	250	501	751	20	22	27	36	46	16,05	20,70	33,87	49,65	57,79

### 5.3 Double-Flap Sluice DKS T

Type	c							f						H						Cycle volume [L]						Cycle time [s]						Conveying capacity [m³/h]						
DN1	a	b	KT	L1	L2	L4	L6	e	KT	L1	L2	L4	L6	g	KT	L1	L2	L4	L6	LK	d	z	k	KT	L1	L2	L4	L6	KT	L1	L2	L4	L6	KT	L1	L2	L4	L6
DKS400T	344	216	384	569	784	1109	1364	440	440	625	840	1165	1420	160	1200	1385	1600	1925	2180	450	14	8	500	38,6	64,4	127	257	383	18	19	24	32	40	7,59	11,65	19,13	29,09	34,73
DKS500T	403	267	463	703	983	1413	1783	555	555	795	1075	1505	1895	175	1460	1700	1980	2410	2800	580	18	16	620	72	125	250	499	709	20	22	27	36	44	13,16	20,74	33,83	49,49	57,49