

**MODEL****EX**

## WAFER STYLE KNIFE GATE VALVE

The **EX** model knife gate is an uni-directional wafer valve designed for general industrial service applications. The design of the body and seat assures non-clogging shut off on suspended solids in industries such as:

- Pulp and Paper
- Wastewater treatment plants
- Food and Beverage
- Mining
- Power plants
- Chemical plants
- Bulk handling
- etc.

**Sizes:** DN 50 to DN 1200 (larger diameters on request)

**Working pressure:**

DN 50 to DN 250:	10 kg/cm <sup>2</sup>
DN 300 to DN 400:	6 kg/cm <sup>2</sup>
DN 450:	5 kg/cm <sup>2</sup>
DN 500 to DN 600:	4 kg/cm <sup>2</sup>
DN 700 to DN 1200:	2 kg/cm <sup>2</sup>

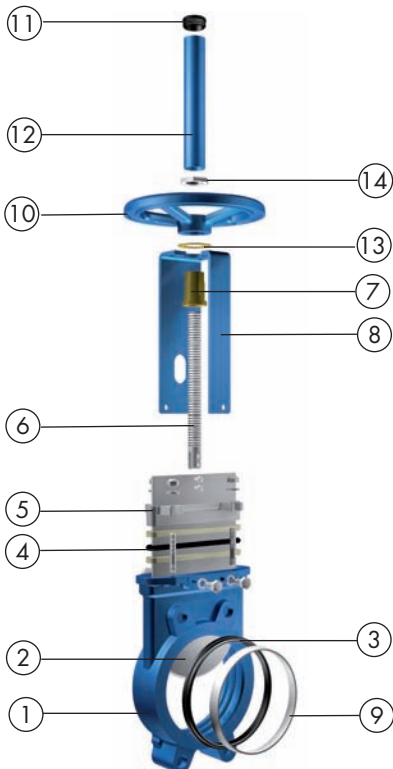
**Standard flange connection:** DIN PN 10 and ANSI B16.5 (class 150)

**Note:** other flange connections are available on request such as:

DIN PN 6	DIN PN 16	DIN PN 25
BS "D" and "E"p	ANSI 125	

**Directives:** DIR 2006/42/CE (MACHINES)  
 DIR 97/23/CE (PED) Fluid: Group 1(b), 2 (Cat. I, mod. A)  
 DIR 94/9/CE (ATEX)

All valves are tested prior to shipping in accordance with the standard developed by the Quality Control Department at ORBINOX.



### STANDARD PARTS LIST

Part:	Cast Iron:	Stainless Steel:
1- Body	GJL250 (GG25)	CF8M
2- Gate	AISI 304	AISI 316
3- Seat	Metal/Metal or EPDM	
4- Packing	PTFE Impreg. Synth. Fibre (With a EPDM o-ring)	
5- Gland Follower	Aluminium (DN 50 to DN 300) or Ductile Iron (DN 350 a DN 1000)	CF8M
6- Stem	AISI 430	
7- Stem nut	Brass	
8- Yoke	Epoxy-coated Carbon Steel	
9- "A" ring	AISI 304	AISI 316
10- Handwheel	$\phi \leq 310$ : Ductile Iron / $\phi \geq 410$ : GJL 250 (GG25)	
11- Cap	Plastic	
12- Stem Protector	Epoxy-coated Carbon Steel	
13- Friction Washer	Brass	
14- Nut	Zinc Plated Carbon Steel	

## DESIGN FEATURES

### BODY:

Wafer style cast **monoblock** with raised face, with reinforced ribs in larger diameters for extra body strength.

Internal cast-in gate wedges and guides allows for tighter shut-off.

Full port design for greater flow capacity and minimal pressure drop.

Internal design avoids any build up of solids that would prevent valve from closing.

### GATE:

Stainless steel gate as standard.

Gate is polished on both sides to avoid jamming and seat damage.

Bottom of the gate edge is machined to a bevel to cut through solids for a tighter seal in the closed position. On request: thickness and/or material of the gate can be changed for higher pressure requirement.

### SEAT: (resilient)

Unique design that mechanically locks the seat in the internal of the valve body with a stainless steel retainer ring.

Standard EPDM also available in different materials such as Viton, PTFE, etc.

### PACKING:

Long-life packing with several layers of braided fibre plus an EPDM o-ring, with an easy access packing gland ensuring a tight seal.

Long-life braided packing is available in a wide range of materials.

### STEM:

The standard stainless steel stem offers a long corrosion resistant life.

For rising stem handwheel actuators only, a stem protector is provided for additional protection against dust while the valve is in the open position.

### ACTUATORS:

All actuators supplied by **ORBINOX** are interchangeable, and supplied with an standard mounting kit to allow for installation on site.

### YOKE or ACTUATOR SUPPORT:

Made of EPOXY coated steel (stainless steel available on request).

Compact design makes it extremely robust even under the most severe conditions.

### EPOXY COATING:

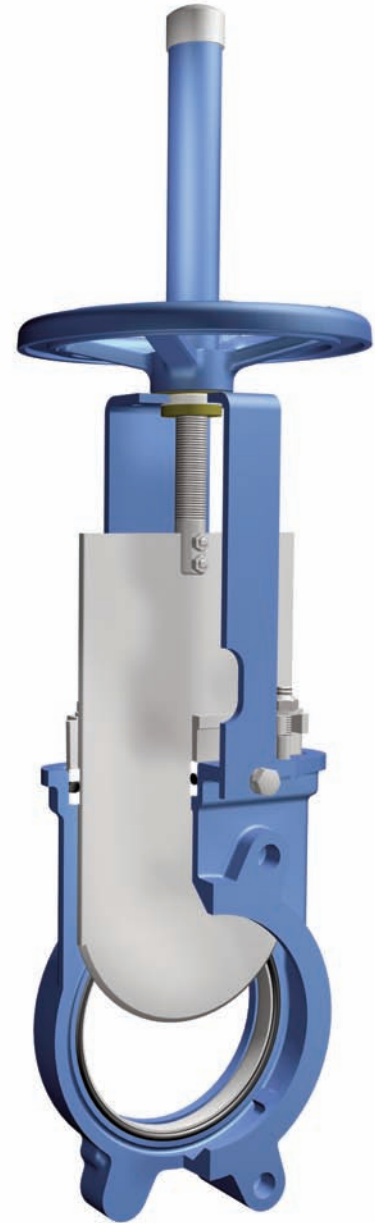
The epoxy coating on all **ORBINOX** cast iron and carbon steel valve bodies and components is electrostatically applied making the valves to be corrosion resistant with a high quality finished surface.

The **ORBINOX** standard colour is RAL-5015 **blue**.

### GATE SAFETY PROTECTION:

**ORBINOX** automated valves are provided with gate guards in accordance with EU Safety Standards.

The design feature prevents any objects from being caught accidentally while the gate is moving.



## OTHER OPTIONS

### Bonnet (Fig.1):

Assures tight sealing to atmosphere for using with hazardous gas or fluids.  
Reduces packing maintenance.

### V-port:

60 degree and pentagonal port design.  
Selection depends on type of fluid control desired.

### Flush ports (Fig.2):

Allow for cleaning of solids trapped within the body cavities that can obstruct the flow or prevent the valve from closing.  
Purging can be made with air, steam, liquids, etc. depending on the process.

### Other materials of construction:

Special alloys such as AISI 317, 254SMO, Hastelloys, Titanium, etc.

### Fabricated valves:

**ORBINOX** is equipped for in house fabrication of special valves.  
Depending on the design, diameter, pressures, construction material, etc.

### EXT (full lug design):

Modified version of the EX model with full lug design for end of line applications.  
Standard flange connection from DIN PN 10, ANSI 150, to AS "D".  
Sizes available up to DN 600.

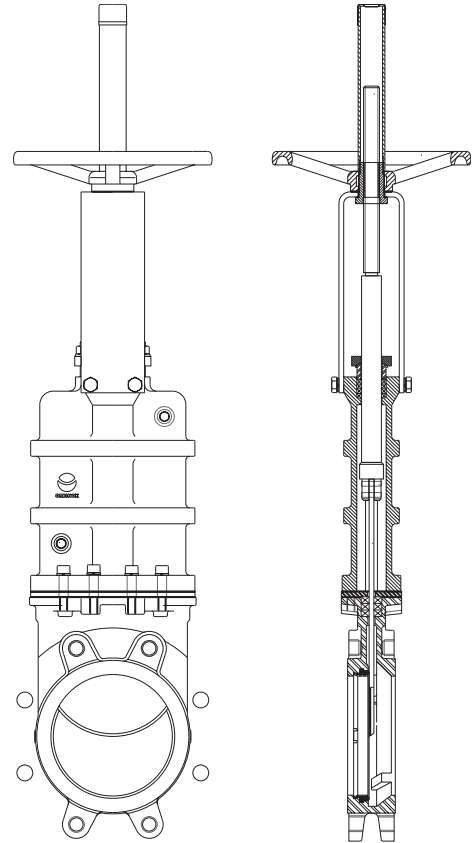


Fig.1

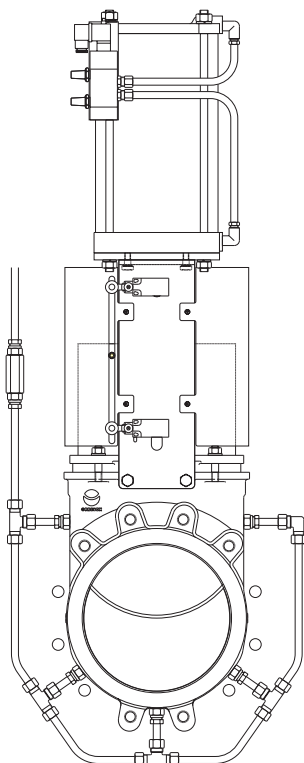


Fig.2

## SURFACE TREATMENTS

Valve components can be protected or coated for a longer life expectancy, depending on the application and the service conditions.

At **ORBINOX** we can offer treatments and coatings for the valve components to improve the properties against **abrasion** (Stellite, Polyurethane...), **corrosion** (Halar, Rilsan, Galvanised...) and **adherence** (Polishing, PTFE...).

## ATEX



Please contact our Orbinox representative for info and availability. Some considerations:

- Hand operated EX valves have been subjected to an ignition risk assessment according to DIN EN 13463: 1-5 and they are out the scope of application of ATEX Directive. Therefore hand operated valves are suitable for ALL ATEX zones.
- Electrical, pneumatical and hydraulically operated valves must be subjected to a conformity assesment of their own and also of the whole unit valve-actuator to get EC Type Approval to Directive 94/9.

We recommend consultation with our technical department.

**ACTUATOR TYPES**

**Manual:**

- Handwheel (rising & non-rising stem)
- Chainwheel
- Lever
- Bevel Gear
- Other (square nut...)

**Automatic:**

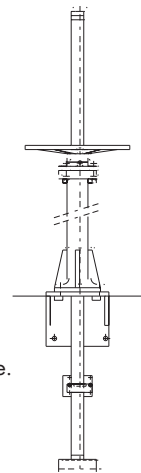
- Electric
- Pneumatic
- Hydraulic

All actuators supplied by ORBINOX are interchangeable.

**Accessories:**

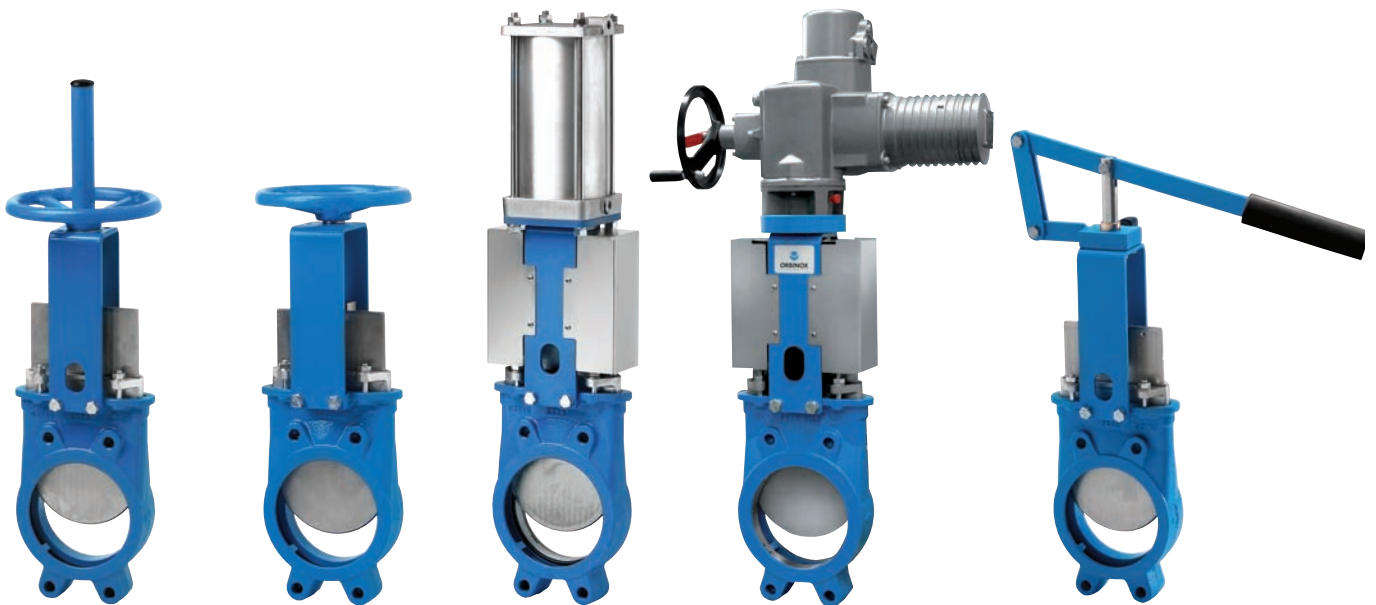
- Mechanical Stops
- Actuator manual override
- Positioners
- Proximity Switches
- Stem extensions

- Locking device
- Solenoid valves
- Limit Switches
- Floor stands



Wide range of valve extensions available.

Please consult our technical department.



**Standard Handwheel (Rising Stem) Handwheel (Non Rising Stem)**

**Pneumatic Cylinder**

**Electric**

**Lever**

## TEMPERATURE CHART

SEAT / SEALS			PACKING		
Material	Max.Temp.(°C)	Applications	Material	Max. Temp. (°C)	pH
Metal/Metal	>250	High temp. Low tightness.	Dry cotton (AS)	50	6 - 8
EPDM (E)	120	Acids and non mineral oils.	PTFE impregn. synth. fibre (ST)	240	2 - 13
Nitrile (N)	120	Resistance to petroleum products.	Braided PTFE (TH)	260	0 - 14
Viton (V)	200	General chemical service. High temperature.	Graphited (GR)	600	0 - 14
Silicone (S)	250	Food service. / High temperature.	Ceramic fibre (FC)	1200	—
PTFE (T)	250	Corrosion resistance.	NOTE: all types include an elastomere O-ring (same material as seal), excluding TH, GR and FC.		

More details and other materials under request.

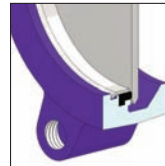
## SEAT TYPES



### METAL / METAL

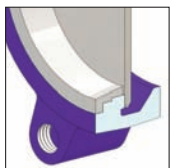
For applications with:

- High temperature
- High density media application
- When full tightness is not required



### RESILIENT, TYPE "A"

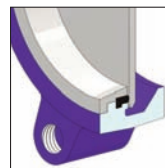
- Standard resilient seat.
- Temperature limitations according to seat material selected. Consult the above chart or our technical department for more information.
- Replaceable seat retainer ring.



### TYPE "B" SEAT (metal/metal)

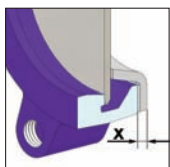
For applications with:

- High temperature
- High density media application
- When full tightness is not required
- Replaceable design without dismantling the valve



### TYPE "B" SEAT (resilient)

- Temperature limitations according to seat material selected. Consult the above chart or our technical department for more information.
- Replaceable and reinforced seat ring available in different materials such as: stainless steel, CA15, Ni Hard,...



### DEFLECTION CONE "C"

- Deflects the media away from any internal exposed parts of the valve such as gate guides, seat, etc.
- Different types of material available such as AISI 316 stainless, CA15, Ni-Hard, etc.

Face to face dimension increase:

DN 50 to DN 250 X = 9mm

DN 300 to DN 600 X = 12mm

Larger diameters on request.

**VALVE EXTENSIONS**

The extension on a valve allows the operator to open or close the valve from a distance. Different types of extensions can be used depending on the application and the distance from the gate to the actuator.

**1.- Floor stand.**

Mainly used to facilitate the operator in opening and closing the valve at normal operating level.

Required dimensions:

**H1:** distance from centre line of the pipe to the base of the floor.

**d1:** (wall bracket) distance from the wall to the face of the connecting flange.

**Notes:**

**a-** Any type of actuator can be mounted on the floor stand such as Handwheel, Gear, Electric, etc.

**b-** A wall bracket (detail A) is recommended at every 1.5m. This prevents any deviation or buckling of the extension rod.

**c-** Standard construction of the floor stand is cast iron or carbon steel. Other materials are available on request. (Fig. 1)

**d-** A position indicator (optional) can be installed for easy visibility of the percentage of opening of the valve.

**e-** Possibility of construction of floor stand supports. (Fig. 2)

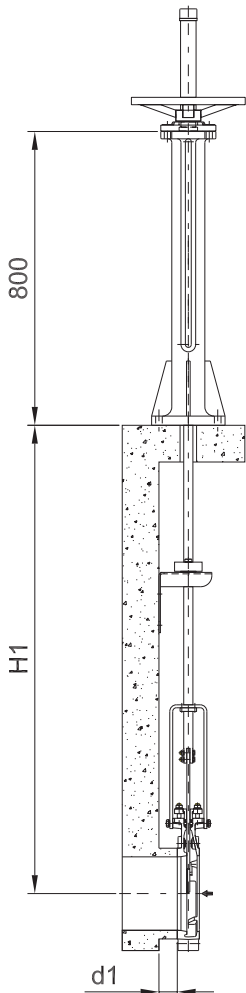
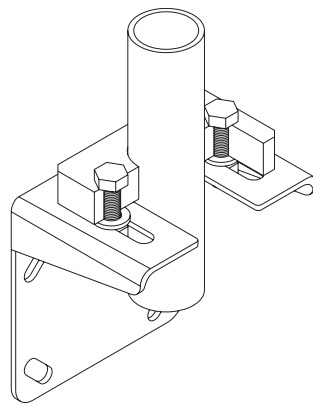


Fig. 1



Detail A.

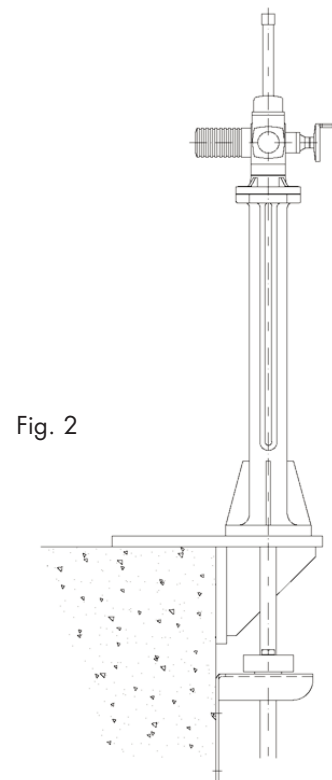
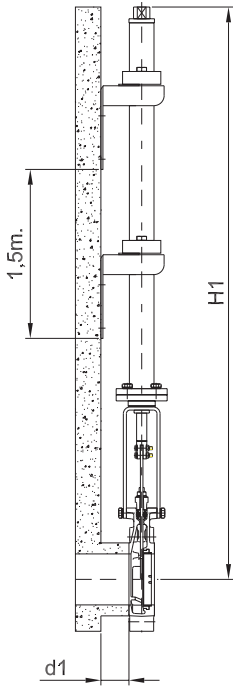


Fig. 2

**STANDARD PARTS LIST**

Part:	Material:
Spindle	AISI 303
Stem	AISI 304
Wall bracket	Carbon Steel - Epoxy coated
Slider	Nylon
Floor stand	Cast Iron - Epoxy coated

**2.- Tube**



- Stem and yoke assembly remains in its original position.
- Handwheel is replaced by a tube, which rotates when operating the valve.
- Stem rises and lowers within the tube.
- Ideal for surface box operation, valve can be operated with a T-bar and a square nut.
- Required dimensions:

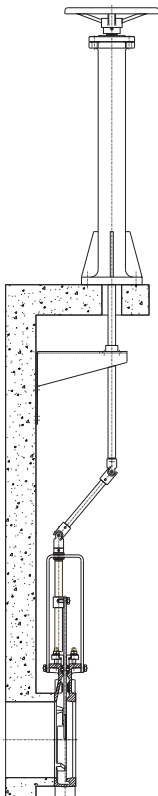
**H1:** distance from centre line of the pipe to the base of the floor.

**d1:** (wall bracket) distance from the wall to the face of the connecting flange.

**Notes:**

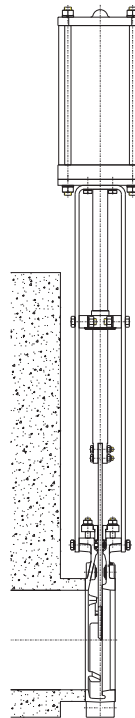
1. Handwheel or square nut operated only.
2. A wall bracket (detail A) is recommended at every 1.5m. This prevents any deviation or buckling of the extension rod.
3. Standard construction of the extension is carbon steel epoxy coated. Other materials are available on request.

**3 - Universal joint**



- Universal joints are installed between the rod extensions where a straight alignment is not available. Please contact our technical department for more information.

**4 - Extended support plates**

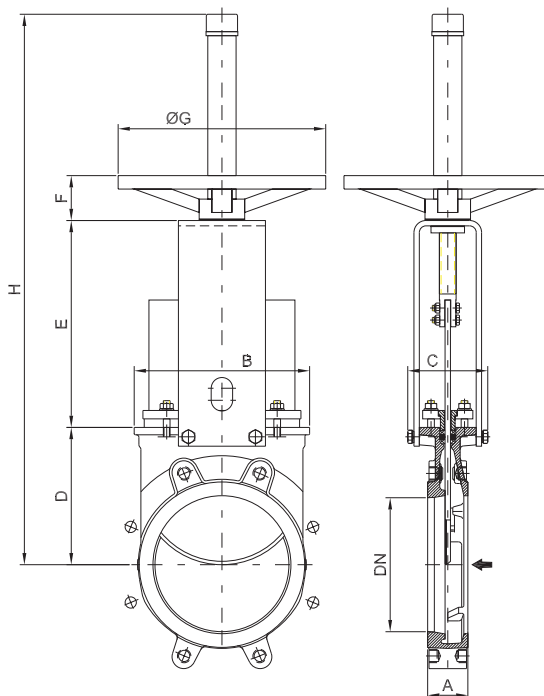


- Ideal where long extensions are not required.
- Guide bearing is installed at the mid point to prevent any deflection of the rod.

Please consult our technical department.

**HANDWHEEL (rising stem)**

- Standard handwheel actuator.
- Consists of:
  - Handwheel: Epoxy coated Cast Iron
  - Stem
  - Stem nut
  - Stem protector
- Available from DN 50 to DN 1000
- Options:
  - Locking Device
  - Extensions

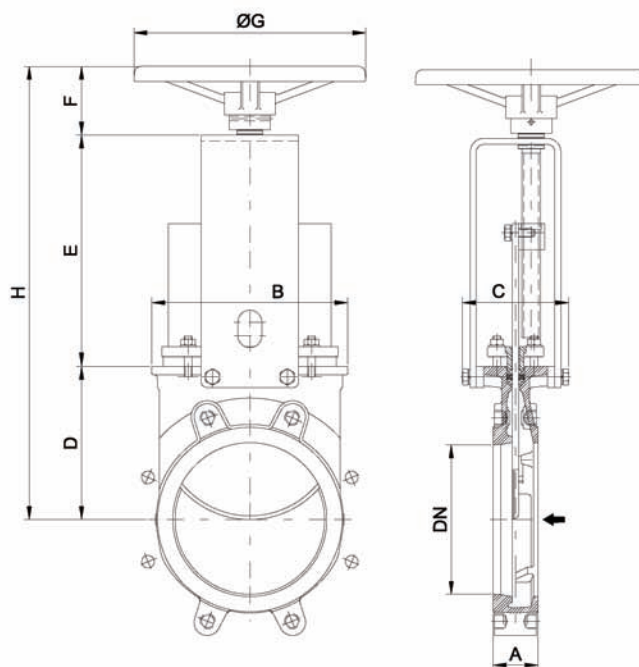


DN	A	B	C	D	E	F	ØG	H	Weight (kg.)
50	40	119	100	105	129	47	225	420	7
65	40	134	100	115	146	47	225	450	8
80	50	149	100	124	162	47	225	475	9
100	50	169	100	140	187	47	225	520	11
125	50	180	100	150	211	47	225	600	15
150	60	210	100	175	237	47	225	652	18
200	60	262	119	205	309	67	310	822	30
250	70	318	122	250	364	67	310	1022	44
300	70	372	122	300	414	67	310	1122	58
350	96	431	197	338	486	66	410	1323	96
400	100	486	197	392	536	66	410	1427	124
450	106	540	201	432	588	66	550	1594	168
500	110	602	201	485	648	66	550	1707	192
600	110	708	201	590	748	66	550	2022	245
700	110	834	380	686	890	74	800	2778	405
750	110	884	380	760	945	74	800	2900	455
800	110	1015	320	791	989	74	800	2980	512
900	110	1040	320	895	1118	74	800	3215	680
1000	110	1146	320	975	1220	74	800	3400	865



**HANDWHEEL (non-rising stem)**

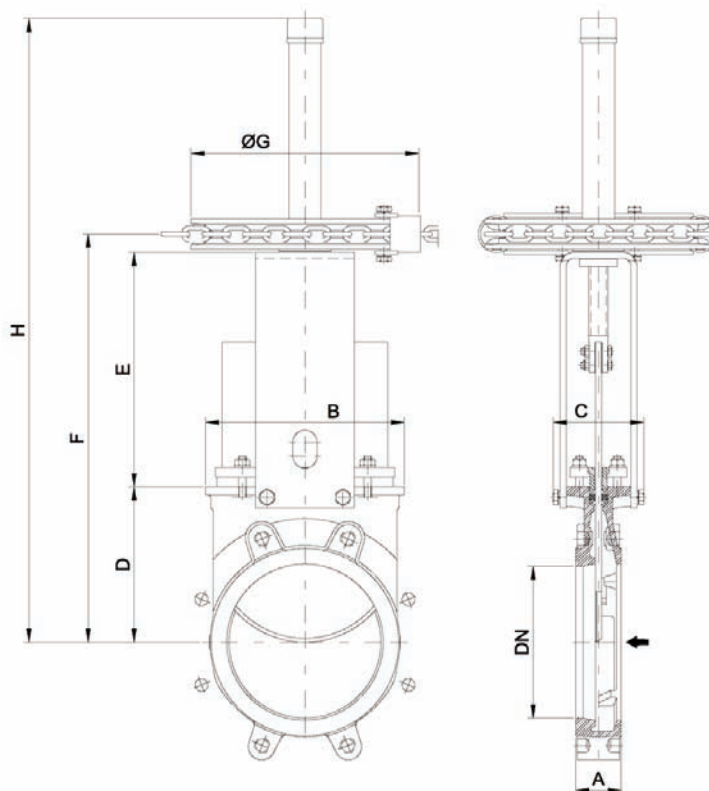
- Recommended for installation where space is limited.
- Consists of:
  - Handwheel: Epoxy coated Cast Iron
  - Stem
  - Yoke bushing
  - Stem nut fixed to the gate
- Available from DN 50 to DN 1000
- Options:
  - Locking Device
  - Extension
  - Square Nut Drive



DN	A	B	C	D	E	F	ØG	H
50	40	119	125	105	132	78	225	315
65	40	134	125	115	149	78	225	342
80	50	149	125	124	165	78	225	367
100	50	169	125	140	190	78	225	408
125	50	180	125	150	214	78	225	442
150	60	210	125	175	240	78	225	493
200	60	262	142	205	305	92	310	602
250	70	318	142	250	360	92	310	702
300	70	372	142	300	410	92	310	802
350	96	431	197	338	487	110	410	935
400	100	486	197	392	537	110	410	1039
450	106	540	201	432	589	111	550	1132
500	110	602	201	485	649	111	550	1245
600	110	708	201	590	748	111	550	1449
700	110	834	380	686	900	151	800	1737
750	110	884	380	760	945	151	800	1856
800	110	1015	320	791	997	151	800	1939
900	110	1040	320	895	1128	151	800	2174
1000	110	1150	320	975	1255	151	800	2381

## CHAINWHEEL

- Recommended for elevated installations.
- Consists of:
  - Chainwheel: Epoxy coated Cast Iron
  - Stem
  - Stem nut
  - Stem protector
- Available from DN 50 to DN 600
- Options (on request):
  - Locking Device
  - Extension
  - Non-rising Stem



DN	A	B	C	D	E	F	ØG	H
50	40	119	100	105	129	253	225	420
65	40	134	100	115	146	280	225	450
80	50	149	100	124	162	305	225	475
100	50	169	100	140	187	347	225	520
125	50	180	100	150	211	380	225	600
150	60	210	100	175	237	431	225	652
200	60	262	119	205	309	538	300	822
250	70	318	122	250	364	638	300	1022
300	70	372	122	300	414	738	300	1122
350	96	431	197	338	486	856	454	1323
400	100	486	197	392	536	960	454	1427
450	106	540	201	432	588	1052	454	1594
500	110	602	201	485	648	1165	454	1707
600	110	708	201	590	748	1370	454	2022

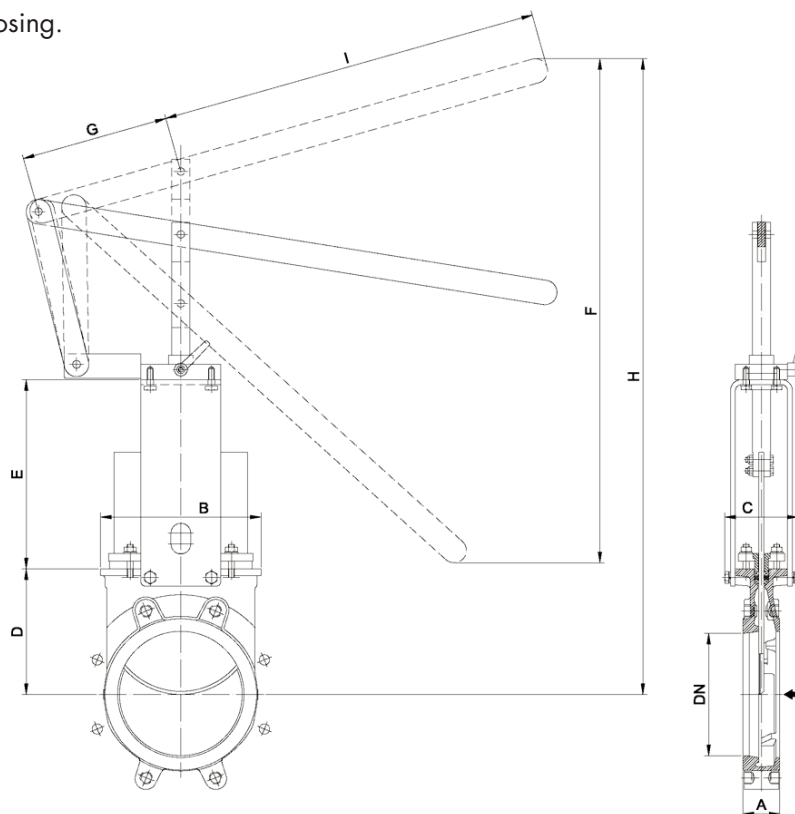
**LEVER**

- Recommended for quick opening and closing.

- Consists of:

- Lever
- Stem
- Yoke sleeve
- Lever lock

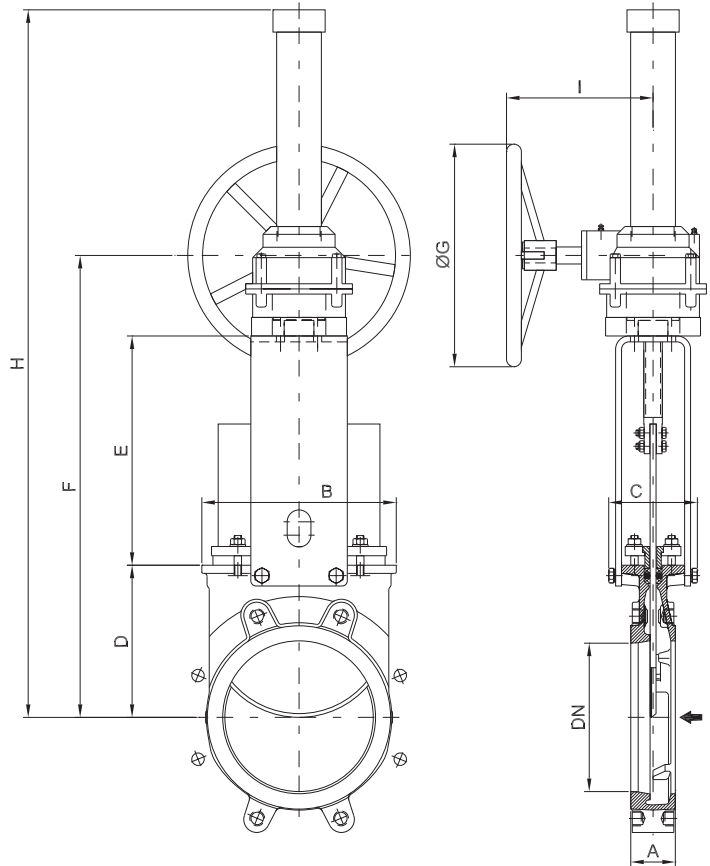
- Available from DN 50 to DN 300



DN	A	B	C	D	E	F	G	H	I
50	40	119	100	105	129	256	150	408	315
65	40	134	100	115	146	259	150	435	315
80	50	149	100	124	162	307	150	509	315
100	50	169	100	140	187	439	150	637	415
125	50	180	100	150	211	529	150	755	415
150	60	210	100	175	237	620	150	895	415
200	60	262	119	205	309	822	235	1038	620
250	70	318	122	250	364	995	235	1307	620
300	70	372	122	300	414	1166	235	1578	620

**GEAR**

- Recommended for valves larger than DN 350 and working pressures greater than 3.5 kg/cm<sup>2</sup>
- Consists of:
  - Stem
  - Yoke
  - Bevel Gear Actuator with Handwheel (Standard Ratio 4:1)
- Available from DN 200 to DN1200
- Options:
  - Locking device
  - Extension
  - Chainwheel
  - Non-rising stem



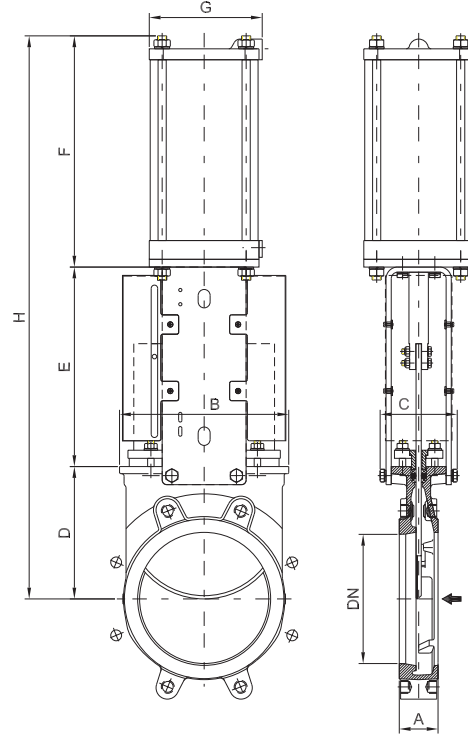
DN	A	B	C	D	E	F	ØG	H	I
200	60	262	119	205	309	584	300	994	200
250	70	318	122	250	364	684	300	1094	200
300	70	372	122	300	414	784	300	1194	200
350	96	431	197	338	472	857	450	1657	262
400	100	486	197	392	522	961	450	1761	262
450	106	540	201	432	574	1053	450	1853	262
500	110	602	201	485	634	1166	450	1966	262
600	110	708	201	590	734	1371	450	2171	262
700	110	834	380	686	890	1623	450	2423	262
750	110	884	380	760	945	1755	450	2555	262
800	110	1015	320	791	993	1886	450	2926	260
900	110	1040	320	895	1123	2120	650	3160	288
1000	110	1146	320	975	1220	2302	650	3342	288
1200	150	1390	450	1037	1522	2695	850	3935	365

**PNEUMATIC CYLINDER**

• The standard pneumatic actuator (double acting on-off cylinder) consists of:

- DN 50-250: Aluminum barrels
- DN ≥ 300: Composite barrels
- Aluminum end caps
- Stainless steel (AISI 304) piston rod
- Nitrile coated steel piston

- Available from DN 50 to DN 1000
- Supply Pressure: minimum 3.5 kg/cm<sup>2</sup> - maximum 10 kg/cm<sup>2</sup>  
Actuator designed with 6kg/cm<sup>2</sup> air supply
- For valves installed in a horizontal position, we recommend U-type support plates and/or actuator support.
- Options:
  - Hard anodized jacket and covers
  - Over / Undersized cylinder
  - Stainless steel jacket and covers
  - Manual override
  - Fail safe system (Page EX-14)
  - Travel stops
- Instrumentation (on request):
  - Positioners
  - Solenoid valves
  - Flow regulators
  - Air preparation units



DN	A	B	C	D	E	F	G	H	Weight (kg.)	Standard Cyl	Connect.
50	40	119	100	105	129	178	115	412	9	C100/62	1/4" G
65	40	134	100	115	146	193	115	454	10	C100/77	1/4" G
80	50	149	100	124	162	211	115	497	11	C100/95	1/4" G
100	50	169	100	140	187	231	115	558	14	C100/115	1/4" G
125	50	180	100	150	211	271	140	632	20	C125/143	1/4" G
150	60	210	100	175	237	296	140	708	25	C125/168	1/4" G
200	60	262	119	205	309	358	175	872	44	C160/220	1/4" G
250	70	318	122	250	364	428	220	1042	67	C200/270	3/8" G
300	70	372	122	300	414	478	220	1192	82	C200/320	3/8" G
350	96	431	197	338	500	549	277	1387	135	C250/375	3/8" G
400	100	486	197	392	550	599	277	1541	165	C250/425	3/8" G
450	106	540	270	432	598	680	382	1710	220	C300/475	1/2" G
500	110	602	270	485	658	730	382	1873	280	C300/525	1/2" G
600	110	708	270	590	758	830	382	2178	330	C300/625	1/2" G
700	110	834	380	686	875	985	444	2546	520	C350/730	3/4" G
750	110	884	380	760	930	1035	444	2725	585	C350/780	3/4" G
800	110	1015	320	791	974	1085	444	2850	650	C350/830	3/4" G
900	110	1040	320	895	1105	1202	515	3202	850	C400/930	3/4" G
1000	110	1146	320	975	1217	1296	515	3488	1060	C400/1030	3/4" G

Reserves the right to change specifications without notice

OBX 02/13 Revision 3

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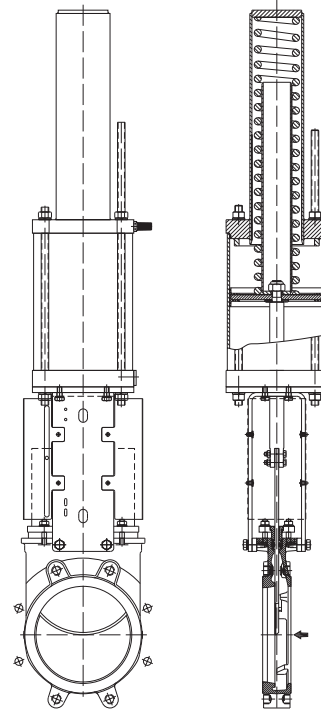
EX-13

ORBINOX CANADA, ORBINOX USA, ORBINOX BRAZIL, ORBINOX SPAIN, ORBINOX UK, ORBINOX FRANCE, ORBINOX GERMANY, ORBINOX INDIA, ORBINOX CHINA, ORBINOX S.E.A.

**FAIL SAFE SYSTEM**

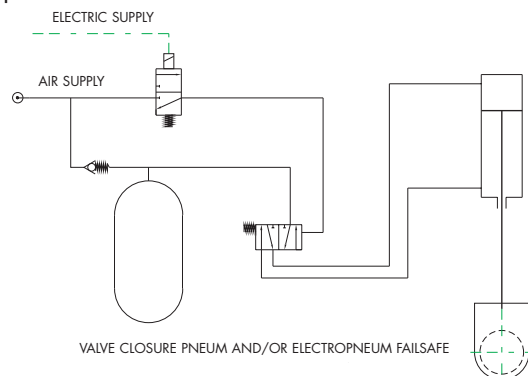
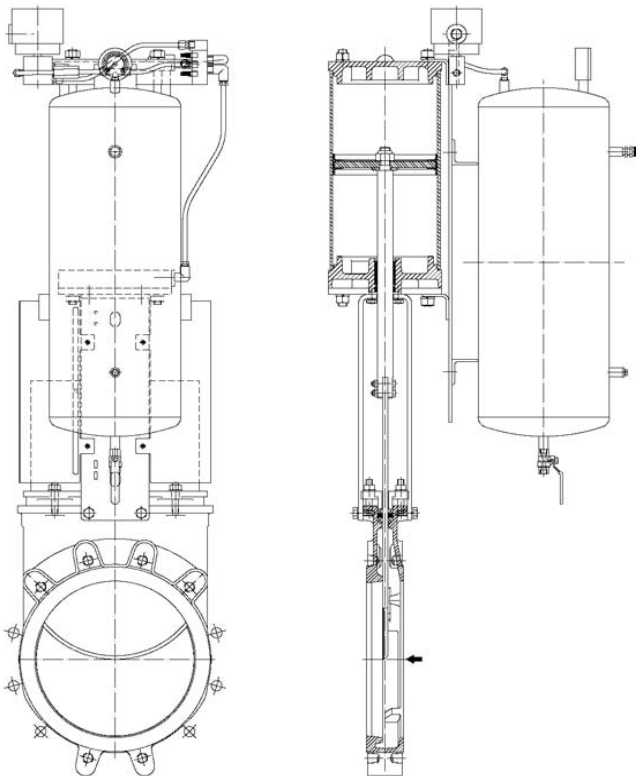
**SINGLE ACTING / SPRING RETURN**

- This actuator (single acting cylinder) consists of:
  - Aluminium jacket and covers
  - Ductile Iron or carbon steel spring cap
  - Steel spring
  - Stainless Steel (AISI 304) piston rod
  - Nitrile coated steel piston
- Available from DN 50 to DN 200
- Supply pressure: minimum 5 kg/cm<sup>2</sup> - maximum 10 kg/cm<sup>2</sup>
- Options:
  - Fail open
  - Fail close



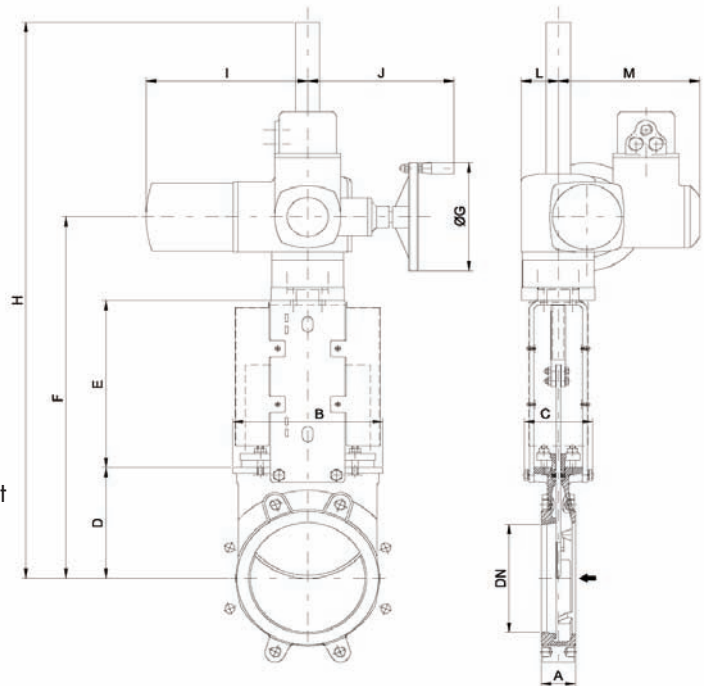
**SINGLE ACTING / VOLUME TANK**

- For size DN250 and bigger safety system consists on: double acting pneumatic cylinder, volume tank and all the necessary elements according to the available options (solenoid valve, spool valve,...)
- Available for all diameters
- Supply Pressure: Minimum 3.5kg/cm<sup>2</sup>  
Maximum 10 kg/cm<sup>2</sup>
- Options:
  - 1- Pneumatic Failsafe
  - 2- Pneumatic or Electric Failsafe
- Option 2:



**ELECTRIC ACTUATOR**

- Consists of:
  - Electric actuator
  - Rising stem
  - Motor support yoke flange  
(Acc. to ISO 5210 / DIN 3338)
- The standard electric motor is equipped with:
  - Manual emergency operation
  - Limit switches (open/closed)
  - Torque switches
- Available from DN 50 to DN 1200
- Wide range of types and marks available to meet customer's needs.
- Option:
  - Non rising stem

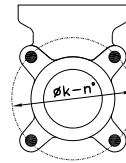


DN	A	B	C	D	E	F	ØG	H	I	J	L	M	stem Ø x pitch	Torque(Nm)
50	40	119	100	105	129	377	160	547	265	249	62	237	20 x 4	10
65	40	134	100	115	146	404	160	574	265	249	62	237	20 x 4	10
80	50	149	100	124	162	429	160	599	265	249	62	237	20 x 4	10
100	50	169	100	140	187	470	160	640	265	249	62	237	20 x 4	10
125	50	180	100	150	211	504	160	674	265	249	62	237	20 x 4	15
150	60	210	100	175	237	555	160	1055	265	249	62	237	20 x 4	20
200	60	262	122	205	309	669	200	1169	265	249	62	237	24 x 5	30
250	70	318	122	250	364	769	200	1269	265	249	62	237	24 x 5	45
300	70	372	122	300	414	869	200	1369	265	249	62	237	24 x 5	40
350	96	431	197	338	472	940	200	1440	282	256	65	247	36 x 6	70
400	100	486	197	392	552	1044	200	1544	282	256	65	247	36 x 6	90
450	106	540	270	432	610	1172	200	1672	282	256	65	247	36 x 6	110
500	110	602	270	485	670	1280	200	1780	282	256	90	247	36 x 6	95
600	110	708	270	590	800	1565	315	2065	385	329	90	285	36 x 6	140
700	110	834	380	686	900	1763	315	2846	385	329	90	285	40 x 7	120
750	110	884	380	760	945	1882	315	2965	385	329	90	285	40 x 7	140
800	110	1015	320	791	980	1948	315	3031	385	329	90	285	50 x 8	180
900	110	1040	320	895	1087	2157	400	3240	385	332	90	285	50 x 8	220
1000	110	1146	320	975	1200	2350	400	3431	385	332	90	285	50 x 8	300
1200	150	1390	450	1037	1485	2732	500	4137	510	355	115	310	60 x 9	480

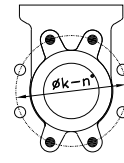
**FLANGE AND BOLTING DETAILS**

**EN 1092-2 PN10**

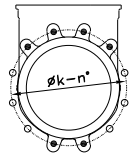
DN	K	n°	M	T			
50	125	4	M-16	11	4	---	---
65	145	4	M-16	11	4	---	---
80	160	8	M-16	11	4	---	4
100	180	8	M-16	11	4	---	4
125	210	8	M-16	11	4	---	4
150	240	8	M-20	14	4	---	4
200	295	8	M-20	14	4	---	4
250	350	12	M-20	18	6	---	6
300	400	12	M-20	18	6	---	6
350	460	16	M-20	22	6	4	6
400	515	16	M-24	24	6	4	6
450	565	20	M-24	24	8	6	6
500	620	20	M-24	24	8	6	6
600	725	20	M-27	24	8	6	6
700	840	24	M-27	20	10	6	8
800	950	24	M-30	20	10	6	8
900	1050	28	M-30	20	12	8	8
1000	1160	28	M-33	20	12	8	8
1200	1380	32	M-36	30	22	6	4



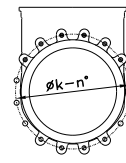
DN 50-65



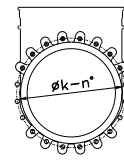
DN 80-200



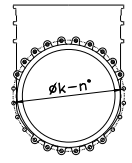
DN 250-300



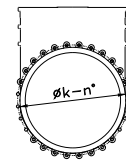
DN 350-400



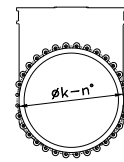
DN 450-600



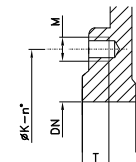
DN 700-800



DN 900-1000



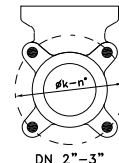
DN 1200



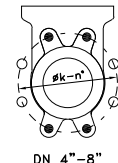
- BLIND TAPPED HOLES
- TAPPED THROUGH
- THROUGH HOLED

**ANSI B16.5, class 150(\*)**

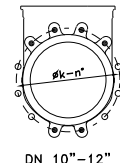
DN	K	n°	M	T			
2"	4 3/4"	4	5/8" UNC	3/8"	4	---	---
2 1/2"	5 1/2"	4	5/8" UNC	3/8"	4	---	---
3"	6"	4	5/8" UNC	3/8"	4	---	---
4"	7 1/2"	8	5/8" UNC	3/8"	4	---	4
5"	8 1/2"	8	3/4" UNC	3/8"	4	---	4
6"	9 1/2"	8	3/4" UNC	1/2"	4	---	4
8"	11 3/4"	8	3/4" UNC	1/2"	4	---	4
10"	14 1/4"	12	7/8" UNC	3/4"	6	---	6
12"	17"	12	7/8" UNC	3/4"	6	---	6
14"	18 3/4"	12	1" UNC	7/8"	4	4	4
16"	21 1/4"	16	1" UNC	1"	6	4	6
18"	22 3/4"	16	1 1/8" UNC	1"	6	4	6
20"	25"	20	1 1/8" UNC	1"	8	6	6
24"	29 1/2"	20	1 1/4" UNC	1"	8	6	6
28"	34"	28	1 1/4" UNC	3/4"	12	6	10
30"	36"	28	1 1/4" UNC	3/4"	12	8	8
32"	38 1/2"	28	1 1/2" UNC	3/4"	12	8	8
36"	42 3/4"	32	1 1/2" UNC	3/4"	14	8	10
40"	47 1/4"	36	1 1/2" UNC	3/4"	14	12	10
48"	56"	44	1 1/2" UNC	1 3/16"	26	10	8



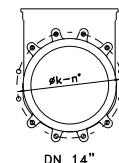
DN 2"-3"



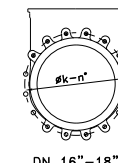
DN 4"-8"



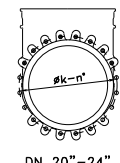
DN 10"-12"



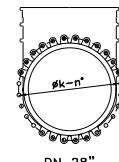
DN 14"



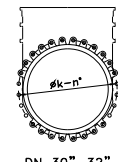
DN 16"-18"



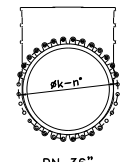
DN 20"-24"



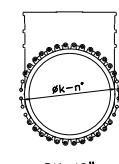
DN 28"



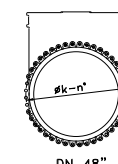
DN 30"-32"



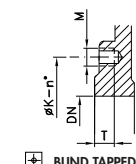
DN 36"



DN 40"



DN 48"



- BLIND TAPPED HOLES
- TAPPED THROUGH
- THROUGH HOLED

(\*) From DN 24", acc. to MSS SP 44 (class 150)