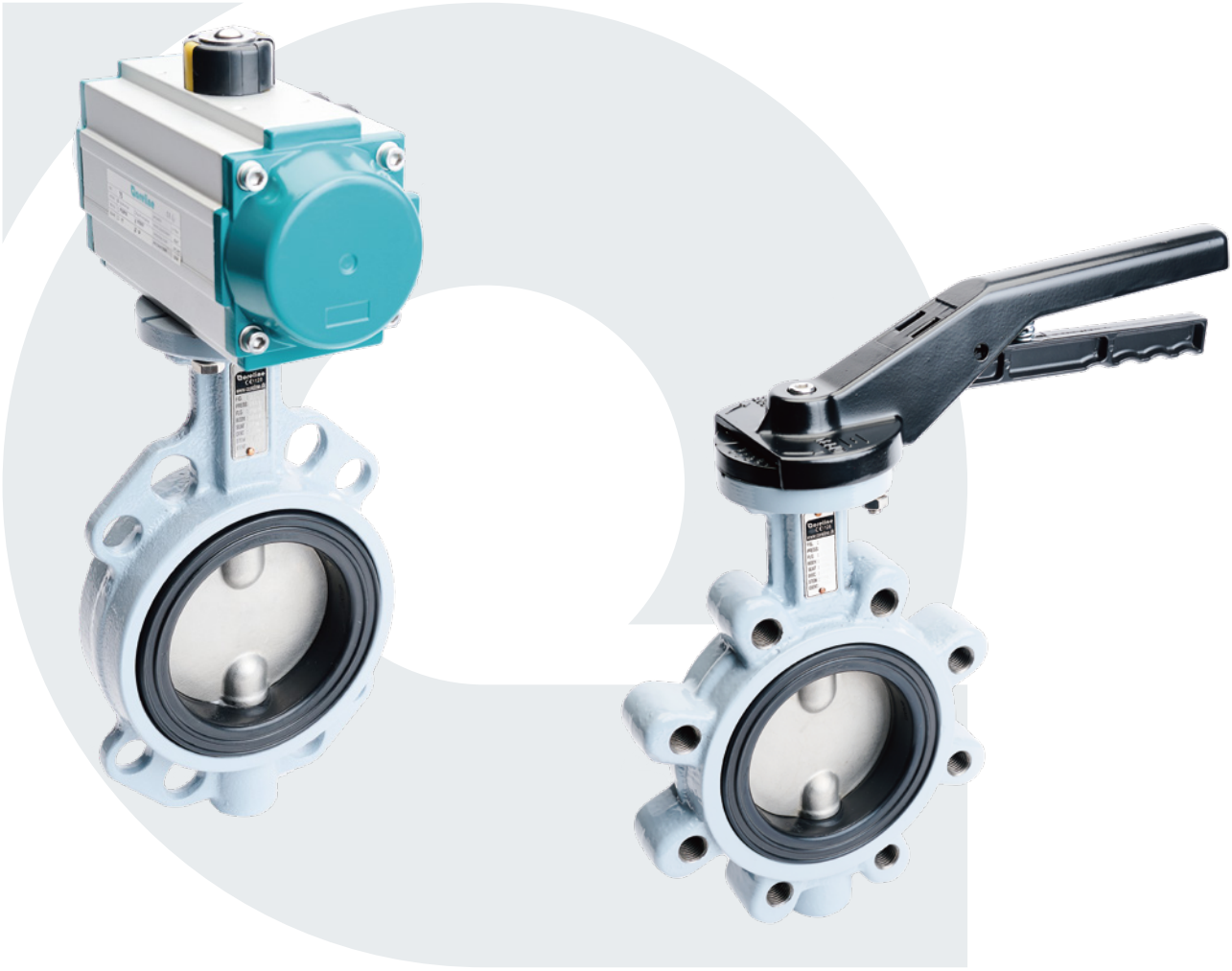
Coreline Installation-Operation-Maintenance Manual

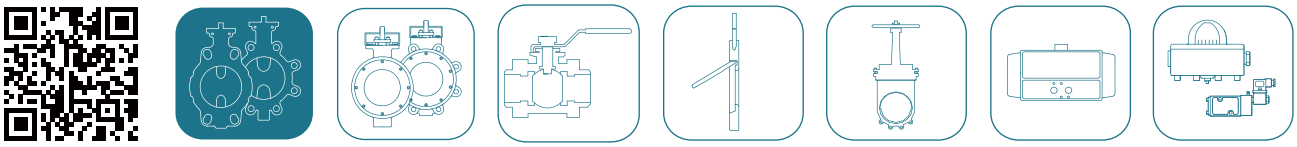
Rubber seat butterfly valve

Fig.223 : Wafer
Fig.224 : Lug



Introduction
Read and follow this manual carefully to ensure safe and reliable use. Improper installation or operation may cause damage or injury; the manufacturer or distributor cannot be held responsible.
Always check the latest technical datasheets and documentation to verify dimensions, materials, pressure/temperature ratings and application limits at www.coreline.dk .

Requirements for the maintenance staff
Personnel must be trained and qualified to assemble, operate and maintain the product safely, and follow all relevant safety standards and local regulations.



Transportation and storage

Valves must be well protected and gently transported to avoid scratches, damage and enviromental damage. Stock the valves indoors in dark and cool places to reduce rubber aging. Rubber is organic and lifetime will be reduced if exposed to light and warm ambient temperatures.
During the storage, the valve disc must be in the slightly open position with an angle between 5~10° (See Fig.1).

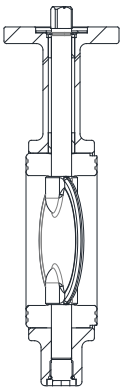


Fig.1

Precautions before installation

Before installing the valve, please read the instruction manual carefully, pay attention to the safety matters and precautions in the instruction manual before and during installation. Follow the instructions in the installation manual to help ensure that the valve can be installed quickly and correctly.

Inspection of valve

Although valve manufacturers will take certain steps to prevent shipping damage, such damage can still occur and can be discovered and notified before installation. Do not install valves that are known to be damaged during transportation and storage. Before installation, check and remove all transport stops, protective plugs or protection covers, and check the inside of the valve body to ensure that there are no foreign objects.

Confirmation of valve working conditions

Before installing the valve, check that the specification on the identification plate meets the requirements regarding pressure, temperature and media. The valve shall not be installed, in environment that may cause corrosion or damage to the valve.

Operation of valve

There is a small triangular shaped figure on the sealing surface of the seat from DN40 to DN300. This triangle indicates which way the disc has to enter the seat. The operation of the valves, therefor, either free stem, handle or gear operated, must follow the guidelines as shown below:
Turn the disc clockwise, towards the arrow (See Fig.2) to close the disc. Turn the disc anti-clockwise, towards the arrow to open. This is to achieve the lowest possible torque - and thus the longest possible lifetime (See Fig.3).
The best angle for a closed valve is 2°. The patented design of the liner make the valve tight at this angle and reduce torque and wear.
Though the valves are constructed to work as described above, Clockwise rotation can be applied without problems, if you take in to consideration that the torque in this case will increase.

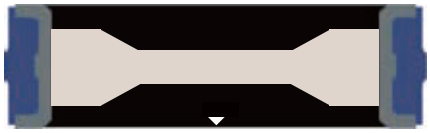


Fig.2

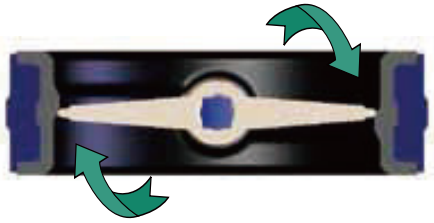


Fig.3 Turn clockwise 2° to close

For butterfly valves ≥ DN350, the valve can be operated with both clockwise and counterclockwise direction, and the recommended angle for a closed valve is 0°.

Service and medium factor - Actuator Sizing

Service factor [SF]	Multiply by	Medium factor [MF]	Multiply by	Medium factor [MF]	Multiply by
ON/OFF operation	1.15	Lubricating liquid/gas	0.9	For dry service (Dry gas/air)	1.25
Modulating operation	1.25	Viscous Liquids, Molasses	1.3	Dirty air slurry, natural gas, dirty slurry	1.5-1.8
*) 2 cycle/day "NC"	1.15	Degreasing liquid	1.25	Lime water, chlorin gas,oxygen, powder	1.5-1.8
**) 1 cycle/week "NC"	1.5	Saturated steam	1.2	Hydrodynamic torque	NA

OBS: Butterfly valve torque is 100% by 0° to 6° angle and about 33% from 7° to 90° angle.
* Valve is completely closed and opened 2 times a day minimum.
** Valve is completely closed and opened only one time per week or longer.
Having a long period without maneuvering the valve, will increase the breakaway torque.

Installation direction of shaft

Most butterfly valves can be installed in any position, but the most common method is to mount the shaft in vertical direction with the activating upwards. However, if there is lot of dirt floating in bottom of pipeline, we recommend to mount the valve with horizontal shaft. Then you avoid massive dirt at the turning points, which is sealing to ambient (See Fig.4). Let the lower disc plate open in flow direction to avoid wear.

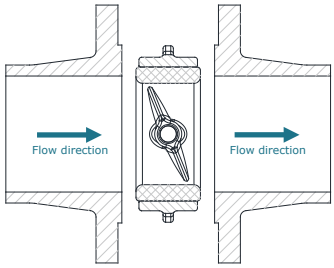


Fig.4

Pipe cleaning

Foreign matters in the pipeline may damage the sealing surface of the valve or prevent the movement of the butterfly disc, resulting in the valve not closing properly. In order to reduce the possibility of dangerous situations, all pipes need to be cleaned before installing the valve. Check that pipe dirt, metal chips, welding slag and other foreign objects have been removed. In addition, check the flange surface of the pipe to ensure that there is a smooth surface (If any cleaning proces after the valve is installed in pipeline, the disc has to be in open position and must not be activated before rinsing completed, to avoid damage of seat).

Valve installation

Welding operation must not be done nearby the butterfly valve, as welding drops can damage the seat.
Check if the flange inner diameter is too small, it may cause valve disc damaged or the valve cannot be operated (See Fig.6).
When installing a butterfly valve with rubber seat, there shall be no additional gasket on the flange surface. It is recommended that the flange installed with the butterfly valve meet the relevant standards.
Check that the pipes are in a straight line and the flanges are clean and parallel. Do not install the valve between two non-parallel flange faces(See Fig.7).
The distance between the flanges must correspond to the face to face dimension of the butterfly valve. If the flange gab is too small, there is risk of damaging the seat or body surface of the butterfly valve. If the opening is too large, it can cause leaking.

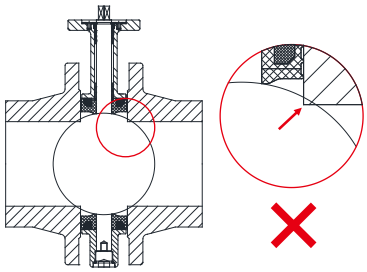


Fig.6

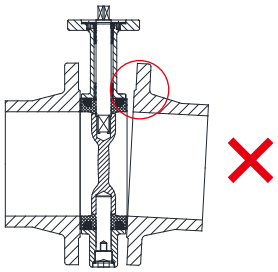


Fig.7

When the valve is carefully installed, the angle of the valve disc shall be within the face to face dimension (See Fig.8). Check that the flange covers the area of the seat and the valve is in line with the pipes. Then tighten the bolt on the flange by hand (Fig.8). Carefully open and close the valve to check that the disc centralizes and the disc does not touch the flange. With the disc in the open position, tighten crosswise with a wrench (See Fig.9 + Fig.10).
After the installation of the valve, enough space must be reserved around the valve, so that there is enough operation space during the inspection and maintenance.

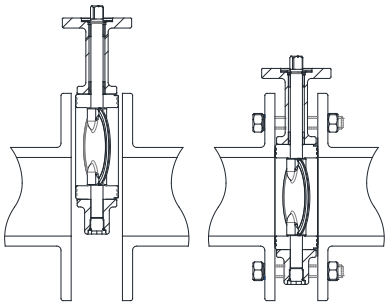


Fig.8

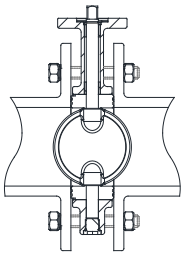


Fig.9

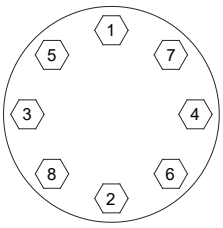


Fig.10

Important: Fig.224 Lug butterfly valve installation

The valve has vulcanized seat on back up-ring. This gives many advantages, but the seat is floating in the body. For Fig.223 Wafer version, the valve will be automatically centered, but Fig.224 Lug butterfly valve must be mounted according to below description.

Follow Fig.11 about procedures to fasten flange bolts for Fig.224 butterfly valve. The valve will be in right position and be tight in general afterwards(See Fig.12). Due to a Coreline patent, our Fig.224 Lug butterfly valve can be used as end of pipe valve. Ensure that the flow arrow direction on valve mounting flange is in accordance with the flow direction of medium.

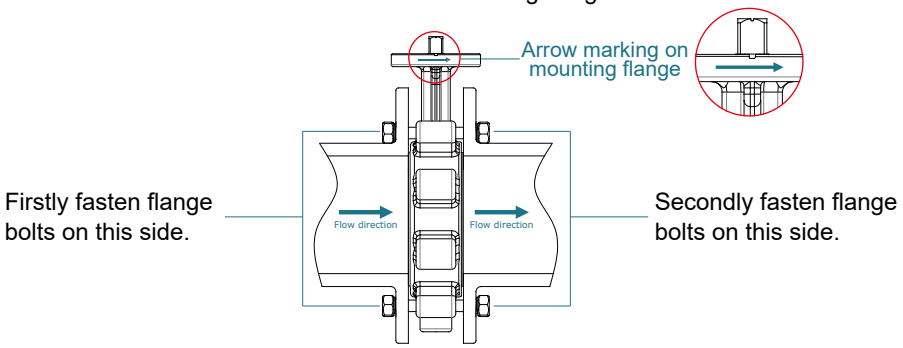


Fig.11

It is important to follow procedures showing in Fig.11, otherwise there might be problem as showed in Fig.13.

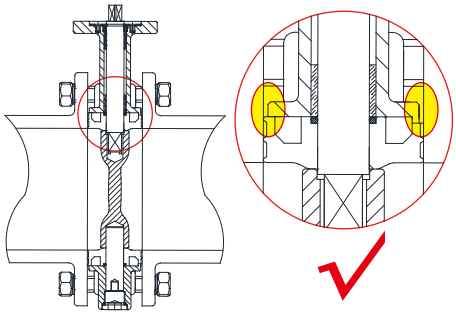


Fig.12

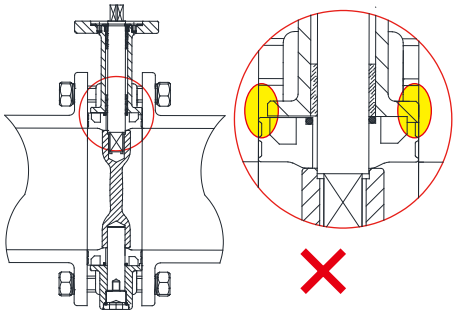


Fig.13

After the valve is aligned with the pipeline, then gently tighten the bolts, and finally tighten them in a staggered order as showed in Fig.10, taken 8 bolts as an example. Correct tightening can avoid uneven valve pressing force, prevent leakage, and also help to avoid flange damage.

Fasteners used during the installation should comply with the laws, regulations and standards of the relevant countries. Those which do not meet the requirements of the relevant regulations are strictly prohibited to use for the installation. When tightening the flange bolts and nuts, a reasonable torque should be used according to the relevant regulations. The following table lists the torque values for reference.

Bolt strength grade			4.6	5.6	6.8	8.8	10.9	12.9
Yield Strength(N/mm2)			240	300	480	640	900	1080
Nominal Diameter of bolt (mm)	6	Tightening torque (N·M)	4-5	5-7	7-9	9-12	13-16	16-21
	8		10-12	12-15	17-23	22-30	30-36	38-51
	10		20-25	25-32	33-45	45-59	65-78	75-100
	12		36-45	45-55	58-78	78-104	110-130	131-175
	14		55-70	70-90	93-124	124-165	180-201	209-278
	16		90-110	110-140	145-193	193-257	280-330	326-434
	18		120-150	150-190	199-264	264-354	380-450	448-597
	20		170-210	210-270	282-376	376-502	540-650	635-847
	22		230-290	290-350	374-512	512-683	740-880	864-1152
	24		300-377	370-450	488-650	651-868	940-1120	1098-1464
	27		450-530	550-700	714-952	952-1269	1400-1650	1606-2142
	30		540-680	680-850	969-1293	1293-1723	1700-2000	2181-2908
	33		670-880	825-1100	1319-1759	1759-2345	2473-3298	2968-3958
	36		900-1100	1120-1400	1694-2259	2259-3012	2800-3350	3812-5082
	39		928-1237	1160-1546	1559-2079	2923-3898	4111-5481	4933-6577

After installation

Ensure that the pipeline will not bent due to weight or other force. The pipeline shall not generate pipeline stress and transmit pipeline stress to the valve.
The valve installation, including accessories (handle, gearbox, actuator etc.), cannot be used to withstand external forces, for instance as support point or lifting devices.
After the valve is installed, it should be able to open and close smoothly. There should be no jamming during the valve switching process.
The valve opens when the valve shaft rotates counterclockwise, and closes when it rotates clockwise.
Before commissioning the system, the pipeline and the valve should be subjected to a hydrostatic test to check whether there is leakage. The system can be commissioned only after the test has passed.

Additional information

The valve has a patent, with two holes underneith the mounting flange (See Fig.14). Here you can hang user's manual or project code.

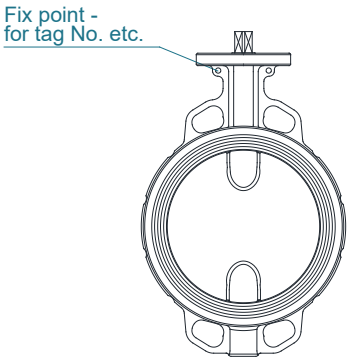


Fig.14

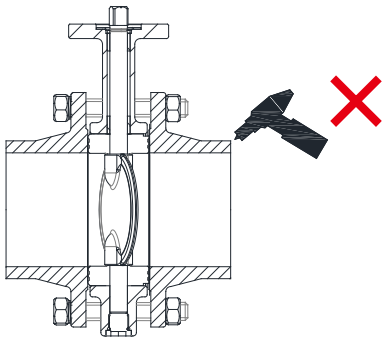


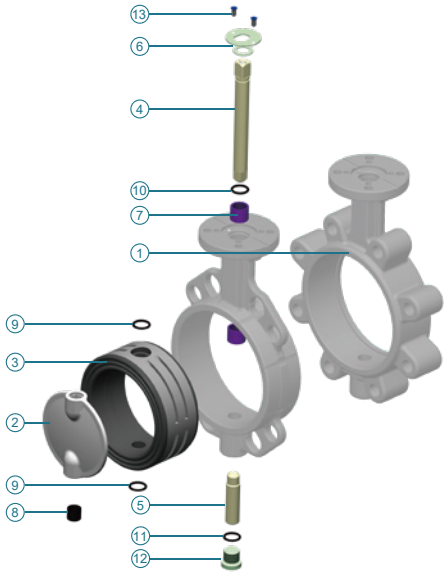
Fig.15

Use and maintenance

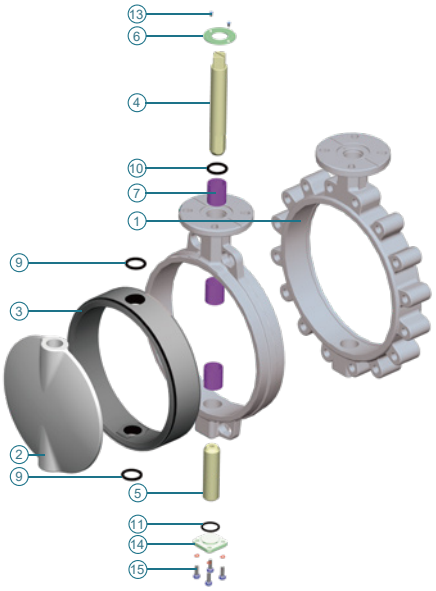
The use of the valve shall be carried out in accordance with the instruction manual, and shall not exceed the design parameters. The operator must go through on-the-job training to understand the basic operationprinciple of the valve. Prevent incorrect opening and closing of valves. The operator should clearly understand the role of each valve and its position in the process pipeline to prevent misuse. It should be ensured that the valve can be opened and closed at least twice within a week to prevent the valve from being stuck due to long-term inactivity. After the valve has been installed, welding and other operations on the pipeline are not allowed (Fig.15).
Valves should be inspected regularly, at least every three months, or in accordance with the corresponding laws and regulations, or on-site process conditions to set the frequency of maintenance. Regularly check the valve connections for looseness and tighten in time. Check whether the valve leaks or malfunctions. If leaks or malfunctions occur, the valves and pipelines should be repaired in time on the premise of ensuring safety.
If there is an actuator, attention should be paid to the actuator and its connecting mechanism during valve maintenance. Maintenance should be carried out according to the instruction manual of the actuator.

Material part list of the valve

DN40-DN300



DN350-DN2000



No.	Part name	Material	Specification	No.	Part name	Material
1	Body	Ductile iron	EN 1563 EN-GJS-400-15	4/5	Stem	SS420
		Low-Temperature ductile Iron	GB/T 32247 QT400-18L (-40℃)			SS431
		Stainless steel	ASTM A351 CF8M [1)]			SS316
2	Disc	Stainless steel	ASTM A351 CF8			17-4PH
			ASTM A351 CF8M			2507
			ASTM A351 CF3M			2205
		Alloy steel	2507 (UNS S32750 / EN 1.4410)	6	Preventing plate	SS201
			2205 (UNS S32205 / EN 1.4462)			SS316
			Hastelloy C-276 (UNS N10276 / EN 2.4819)	7	Body bearing	RPTFE with graphite
		Aluminium bronze	C95800	8	Disc bearing	SS+PTFE
		Ductile iron	Halar or Nylon coated	9	O-ring [4)]	Same as seat
3	Seat [2)]	EPDM-H	-20℃~+125℃	10	Weather seal	NBR
		EPDM-H FDA/EU1935 (Black)	-20℃~+125℃	11	Anti-dust seal	NBR
		EPDM FDA (White)	-20℃~+85℃	12	Plug	Steel galvanized
		NBR (Eq. Nitrile)	-15℃~+85℃	13	Screw	SS304
		X-NBR (Wear resistant)	-15℃~+85℃			SS316
		HNBR	-30℃~+150℃	14	Bottom cover	Same as body
		Hi-NBR (For oil sludge)	-15℃~+100℃	15	Bolt	SS304
		FPM (Eq. FKM, Viton)	-15℃~+150℃			SS316
		FEPM (For steam)	-15℃~+150℃			
		Natural rubber	-30℃~+80℃			
		Silicone rubber (No steam)	-20℃~+150℃			
		Silicone rubber (For steam)	-20℃~+120℃			
		PTFE [3)]	-15℃~+150℃			

Notes:

1) Only available for Fig.223 DN40-DN300.
2) Rubber seat with hard UPR backup.
3) Available with EPDM and FPM backup. Temperauture range depends on backup material.
4) Not applicable for sizes ≥ DN700.
5) The above temperature range for the valve seats are provided as reference for general working conditions. Please note that the actual applications may vary due to the different media, pressure etc. in the pipeline.
6) Contact Coreline for other materials or special requirements.

Troubleshooting

The relevant safety regulations must be observed when troubleshooting.

Problem	Possible cause	Corrective measures
No flow	Flange dust caps were not removed	Remove dust caps
Little flow	Valve not completely open	Open valve completely
	Piping system clogged	Check piping system
Valve is impossible or difficult to open or close	Service conditions (e.g. medium, temperature) outside permissible limits.	Replace valve
		Consult supplier
	Power failure	Check power supply.
	Wrong direction of rotation	Turn in correct direction (anti-clockwise for opening)
	Fouling of the disc and/or seat	Remove fouling on the disc and/or seat
Valve leaking	Valve not properly closed	Close valve properly or readjust limit switch/stop screw
	Seat damaged by foreign particles	Replace valve or seat
	Medium contaminated	Clean valve and install dirt screen
Valve with locking device can not be opened	Locking device tightened	Slacken locking device

General warning

The installation, use and maintenance of the valve must comply with relevant laws and regulations. The installation, use and maintenance of the valve must be carried out under the environment of safety regulations, and the pipeline engineer must meet the production process and use requirements on site when selecting the valve. Before purchasing the valve, the purchaser is obliged to clearly inform the valve manufacturer of the working conditions of the valve. If the user fails to install, maintain and use the valve according to the regulations and requirements, the user shall bear the consequences.

Chart for medium resistance

Liner	Suitable for	Unsuitable for
EPDM	Water, steam, alcohol, glycol, caustic soda, ozone,food products, glycerine, milk, oxygen, air, saturated salt, iron chloride, gelatine, dry hydrogen sulphide, potassium chloride, sodium, magnesium chloride	Mineral oil, chlorine compounds, ketones, acetyl, chloride, asphalt, bromine, butane, butyl, petrol, diesel oil, acid, fish oil, freon, chlorine, natural gas, exhaust gas, nitric acid
NBR	Mineral oil, grease, air, seawater, gas, boric acid, aluminium chloride, ammonia gas, citric acid, diesel oil, fish oil, petrol, gelatine, glycerine, magnesium chloride, lactic acid, linseed oil, natural gas	Ozone, acetone, aniline, chlorine dioxide, chromic acid, phenol, ethyl acetate, freon 21+22+23, hot nitric acid, styrene, hydrogen sulphide, isopropyl acetate, oxygen, sulphuric acid
NATURAL RUBBER	Abrasive medium, aluminium chloride, sugar beet fluid, boric acid, potassium chloride, citric acid, magnesium chloride, ferritic nitrate, formic acid, gelatine, sugar, glycerine, lactic acid, nitrogen	Steam, aniline, asphalt, butadiene, diesel oil, ethane, ethyl acetate, hydraulic oil, hydrochloric acid, linseed oil, methane, mineral oil, oxygen, styrene, soyabean oil, turpentine
HYPALON	Mineral, organic and inorganic chemicals, air, oxygen, fish oil, glycerine, citric acid, ozone, sodium solphate	Ammonia, diesel oil, grease, ketone, methyl, phenol, propyl, bromine, nitric acid, tar, urea, varnish, lectine
SILICONE	Food products, ammonia gas, barium, boric acid, potassium, bisulphite, citric acid, copper cyanide, glycerine, nitrogen, lactic acid	Steam and hot water (max. 100º C), asphalt, diesel oil, ethane, freon, ethyl chloride, methane, nitric acid, olive oil, propane, turpentine
FPM	Oil, mineral acid, grease, phosphorus, tannic acid, gelatine, glycol, oxygen, slaked lime, carbon acid, natural gas, pulp, salt, sugar, sulphur	Hot water, steam, ketone, ammonia gas, acetone, formaldehyde, cellulose acetate, freon, urea, ethanoic acid, methyl
FPM-B	Acid, alkali, amine hot water, steam	Gasoline, naphtha, hydrocarbon solvent, chlorine solvent
PTFE	Almost available for all medium applications	None

The content or parameters are indicative and can be changed without any notice.

Coreline
The contents of this catalogue are confidential and proprietary to Coreline, we reserve the right to change the specifications without any notice.

CORELINE LTD.
Add: No.4 Wangjiang Road, Muqiao Town, Zhengpugang New District, 238200 Hexian, Ma'anshan City, Anhui Province, China
Http: // www.coreline.dk
E-mail : mail@coreline.cn