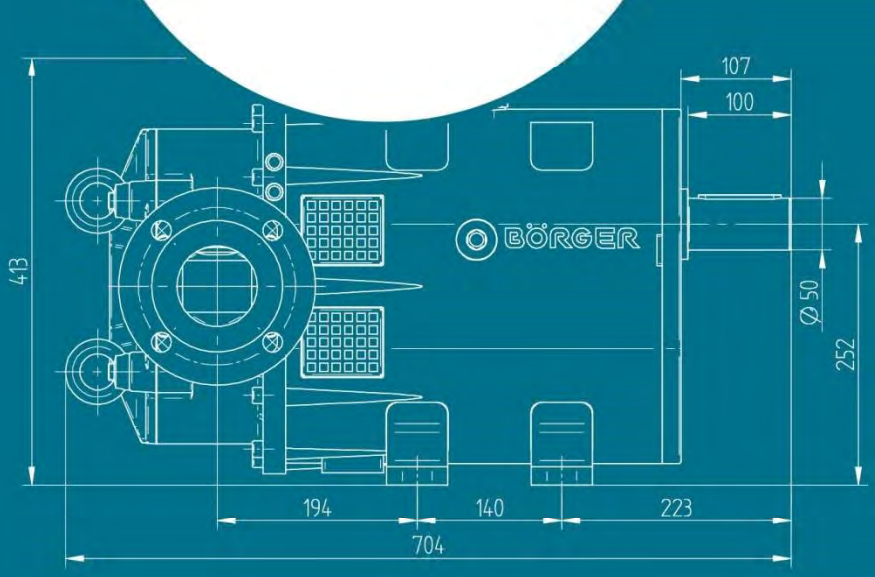
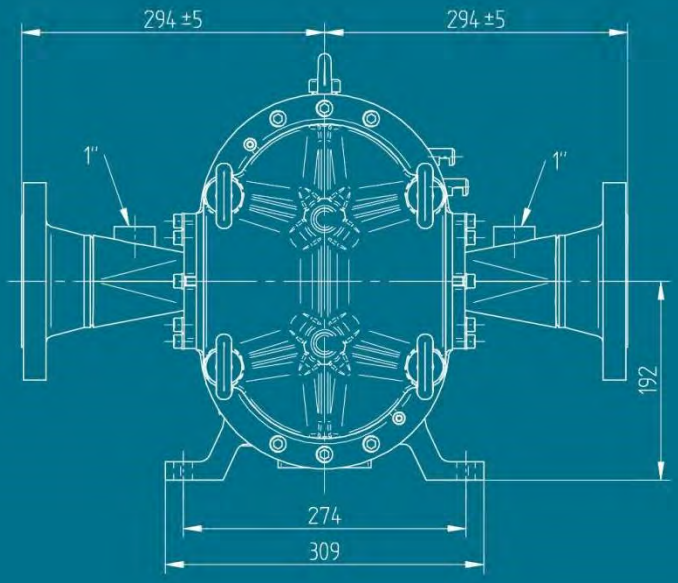
BÖRGER®

EXCELLENCE – MADE TO LAST

TECHNICAL PRODUCT INFORMATION





Rotary Lobe Pump
***ONIX**line* BJ, BL

Contents:

1.0 General information

The ONIXline Rotary Lobe Pump was developed using the most advanced flow simulation technology and decades of experience in the construction of rotary lobe pumps and in the application of the BLUEline Rotary Lobe Pump.

The ONIXline pump stands for gentle, practically pulsation-free pumping with maximized efficiency. The large sealing chamber permits the use of different sealing systems.

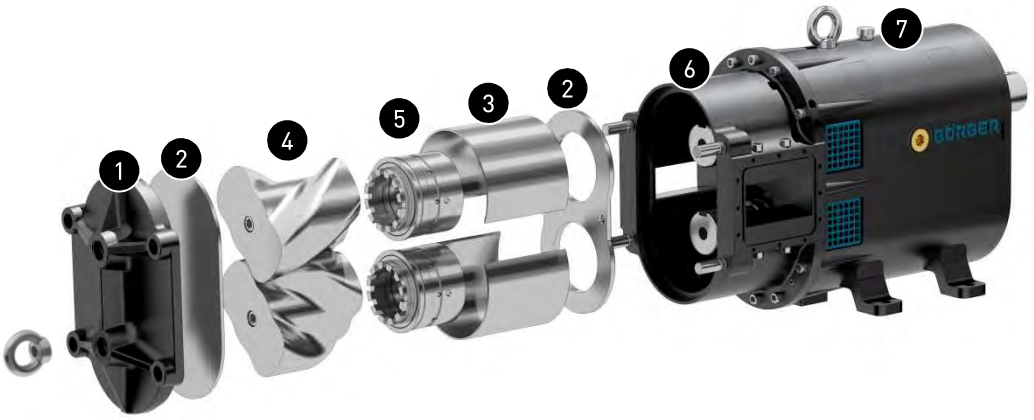
1.1 Operating principle and flow direction

The ONIXline Rotary Lobe Pump is a self-priming, valveless positive displacement pump. The synchronized rotation of the rotors creates a vacuum on the suction side of the pump. This vacuum draws the liquid into the pump chamber.

The medium is pumped into the pressure area due to the rotation of the rotors. If the direction of rotation is changed, the flow is reversed.

1.2 Design of the ONIXline rotary lobe pump

1. Quick-release cover
2. Casing protection plates
3. Casing liners (optional)
4. Rotors
5. Mechanical seal
6. Pump casing
7. Gear unit/gear casing



Quick-release cover
The casing is closed off by a quick-release cover which is fastened with four ring nuts. This permits fast and easy access to the interior of the pump. Maintenance work and replacements of wear parts can be performed once the quick-release cover has been removed. Removing the pump is not required. At Börger, we call this principle MIP (Maintenance in Place), since the pump can be maintained locally.

Casing protection
Upon request, the pump casing can be equipped with radial and/or axial casing protection. Casing protection is available in a range of different materials.

Rotors
The ONIXline pump is equipped with single-piece rotors. The dual-lobe metal rotors (helical or screw design) are available in a range of different materials (see chapter 2.1).

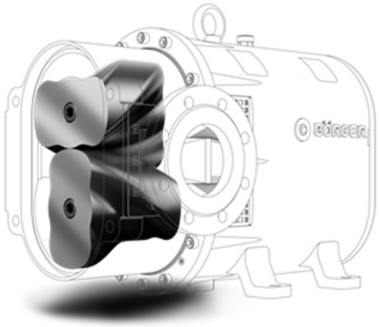
Intermediate chamber
The pump chamber and gear unit are separated by an open intermediate chamber. Protection plates at the side protect the intermediate chamber against unauthorized access. Optionally, the intermediate chamber can be closed.

Mechanical seals
The large seal chamber permits installation of different sealing systems (see chapter 3.2). For maximum safety, each Börger seal contains an integrated quench or barrier pressure buffer.

Pump casing
The pump casing is made of a cast piece (single-component block design) with precise tolerances for all sizes. It is available in various high-quality materials or with surfaces finished by means of thin-layer techniques. (See chapter 2.1)

Timing gear
The solid shafts are guided with high precision by a double-row cylinder bearing and a pre-tensioned tapered roller bearing. The design ensures that the gear unit is completely separated from the pump chamber. This makes a disassembly of the gear unit for maintenance work inside the pump chamber unnecessary.

1.3 Special features of the ONIXline Rotary Lobe Pump

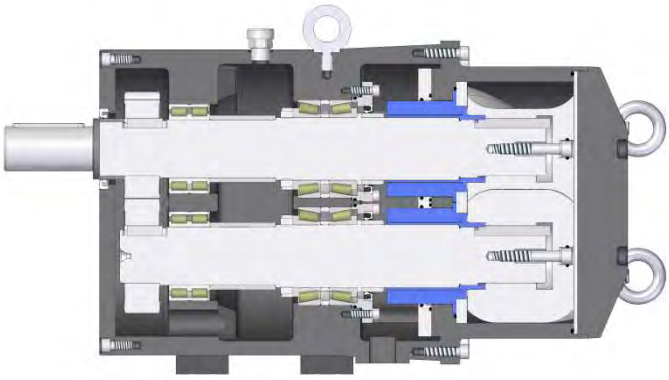


Rotors

The "perfect" rotor was designed using a simulation software.

The large sealing surfaces and the 90° screw profile allow improved fluid dynamics with low pulsation.

The rotor combines pressure stability, smooth running performance and prevention of cavitation, thus offering superior performance and maximum efficiency.



Flexible seal chamber

The large-volume seal chamber (blue) provides space for nearly all common sealing systems.

The pump casing is equipped with integrated porting. A sealing circulation system can be connected via this porting. (See chapter 3.3)

Alternatively, the porting can be used for seal flushing or barrier pressurization.

Flow-optimized inlet and outlet openings

Smooth, rounded inlet and outlet openings at the pump casing guarantee conveyance with hardly any pulsation even with high pressures.

Due to the new rotors and the geometry of the casing, the flow speed of the medium is reduced; this leads to an even acceleration of the medium within the pump and gentle and nearly turbulence-free conveyance of the medium.

2.0 Material selection and performance data

2.1 Material selection

The wetted parts of the pump are available in a range of material qualities:

Component	Material variants	Note
Shafts	• Steel for quenching and tempering 1.7225 (DIN EN 10027) (AISI 4140) • Stainless steel 1.4404 (DIN EN 10027) (AISI 316L)	Cylindrical drive shaft, hollow shaft with straight-sided splines, hollow shaft with involute splines, profile according to DIN 5480, DIN 5482
Lip seals	• FPM/NBR, steel 1.3505 (DIN EN 10027) (AISI 52100) • FPM/NBR, stainless steel 1.4034 (DIN EN 10027) (AISI 420)	
Gear casing	• Gray cast iron 0.6025 (DIN EN 10027) (ASTM A48-40B) • Gray cast iron Black Protection	Single-component block design
Pump casing	• Gray cast iron 0.6025 (DIN EN 10027) (ASTM A48-40B) • Steel casting 1.6220 (DIN EN 10027) (ASTM A356) • Gray cast iron Black Protection • Steel casting Black Protection • Stainless steel 1.4409 (DIN EN 10027) (ASTM A743) • Duplex 1.4517 (DIN EN 10027) (ASTM A890) • Hastelloy®	Single-component block design
Casing protection plates	• Steel for quenching and tempering 1.7225 (DIN EN 10027) (AISI 4140) • Stainless steel 1.4571 (DIN EN 10027) (AISI 316Ti) • Manganese steel 1.8714 (DIN EN 10027) (AISI 4140) • Stainless steel 1.4539 (DIN EN 10027) (AISI 904L) • Hastelloy®	
Casing liners	• Stainless steel 1.4571 (DIN EN 10027) (AISI 316Ti) • Manganese steel 1.8714 (DIN EN 10027) (AISI 4140) • Stainless steel 1.4539 (DIN EN 10027) (AISI 904L)	
Seal – Metal components	• Stainless steel 1.4404 (DIN EN 10027) (AISI 316L) • Stainless steel 1.4539 (DIN EN 10027) (AISI 904L) • Hastelloy®	
Seal – Sealing washers	• Duronit • Silicon carbide (SiSiC) • Tungsten carbide (TC)	
Rotors	• Stainless steel 1.4404 (DIN EN 10027) (AISI 316L) • Steel for quenching and tempering 1.7225 (DIN EN 10027) (AISI 4137/4140) • Stainless steel 1.4539 (DIN EN 10027) (AISI 904L) • Hastelloy®	• Primus, dual-lobe, screw profile • Certus, dual-lobe, linear profile • One-part rotors
O-rings	• Nitrile butadiene rubber (NBR) • Ethylene propylene diene rubber (EPDM) • Fluorinated rubber (FKM) • Tetrafluoroethylene/propylene rubber (FEPM) • Perfluorinated rubber (FFKM)	
Pipe connectors	• 1.0038 galvanized • 1.0038 black • 1.0038 painted • 1.4301 • 1.4571/1.4404 • 1.4462	

Further material variants available upon request.

2.2 Performance data

The ONIXline Rotary Lobe Pump is available in four sizes.

ONIXline pump type	Displacement [gpr (L/rev.)]	Speed [rpm]		Flow rate [gpm (m³/h)]		Free ball passage [inch (mm)]
		Min	Max	Min	Max	
BJ 090	0.24 (0.9)	1	800	0.2 (0.05)	190.2 (43.2)	1.18 (30)
BJ 140	0.37 (1.4)	1	800	0.4 (0.08)	295.9 (67.2)	1.18 (30)
BL 190	0.50 (1.9)	1	800	0.5 (0.11)	401.5 (91.2)	1.50 (38)
BL 280	0.74 (2.8)	1	800	0.7 (0,17)	591.7 (134.4)	1.50 (38)

ONIXline pump type	Max. pressure (MADP) [psi (bar)]	Max. temperature [°F (°C)]	Max. viscosity [mPas]	Design pressure (MAWP) [psi (bar)]	Design temperature [°F (°C)]	Nozzle loads [NM]
BJ 090	232.1 (16)	392 (200)	250,000	435 (30)	482 (250)	12.600
BJ 140	188.5 (13)	392 (200)	250,000	348 (24)	482 (250)	12.600
BL 190	232.1 (16)	392 (200)	250,000	435 (30)	482 (250)	12.600
BL 280	188.5 (13)	392 (200)	250,000	348 (24)	482 (250)	12.600

NPSH values

	ONIXline Pump type	Speed [rpm]							
		100	200	300	400	500	600	700	800
NPSH-r [inch (m)]	BJ 090	23.6 (0.6)	47.2 (1.2)	70.9 (1.8)	94.5 (2.4)	118.1 [3.0]	137.8 (3.5)	161.4 (4.1)	185.0 (4.7)
	BJ 140	23.6 (0.6)	47.2 (1.2)	70.9 (1.8)	94.5 (2.4)	118.1 [3.0]	141.7 [3.6]	165.3 (4.2)	189.0 (4.8)
	BL 190	23.6 (0.6)	47.2 (1.2)	74.8 (1.9)	98.4 (2.5)	126.0 (3.2)	149.6 (3.8)	173.2 (4.4)	186.8 (5.0)
	BL 280	23.6 (0.6)	47.2 (1.2)	74.8 (1.9)	98.4 (2.5)	126.0 (3.2)	149.6 (3.8)	173.2 (4.4)	186.8 (5.0)

3.0 Pump details

3.1 Rotors

At the heart of the pump are the rotors. Depending on the operating requirements, either Primus screw rotors or Certus linear rotors are installed. The dual-lobe metal rotors were developed by means of the most advanced flow simulation technology and ensure gentle, practically pulsation-free pumping with maximized efficiency. The rotors are available in a range of different materials to ensure resistance to the different pumped media. (See table in chapter 2.1.)

Primus

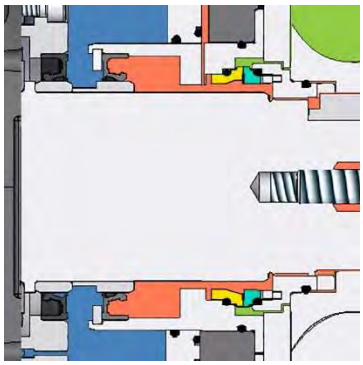
Certus

3.2 Shaft seal to the pump chamber

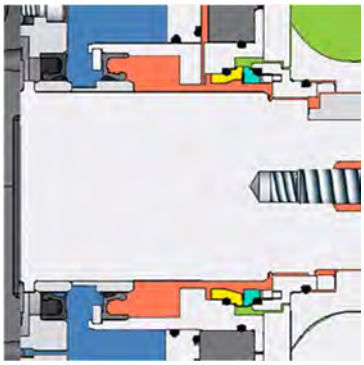
The seal chamber of the pump is designed in such a way that different sealing systems can be installed. The seals can be quickly accessed through the pump chamber without removing the pump and are easy to maintain.

Please find below some examples of Börger mechanical seal systems. Information about further seal solutions is available upon request. Seals from other manufacturers may also be eligible for use.

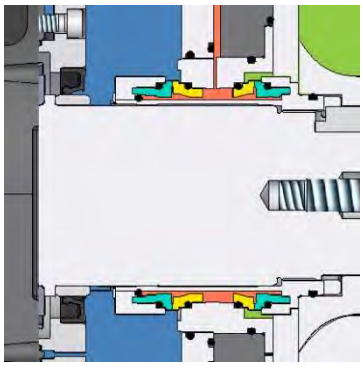
FC Classic
- Single-acting mechanical seal
- Cartridge unit
- Integrated quench chamber
- Without pressure
- Max. differential pressure: 174.05 psi (12 bar)



FC Select
- Single-acting mechanical seal
- Cartridge unit
- Integrated barrier chamber
- Pressurization up to 87 psi (6 bar)
- Max. differential pressure: 72.5 psi (5 bar)



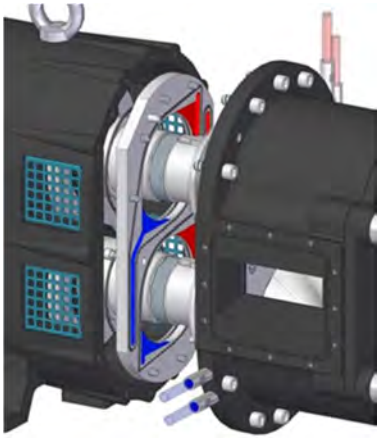
DA Protect
- Double-acting mechanical seal
- Cartridge unit
- Integrated barrier chamber
- Pressurization up to 246.6 psi (17 bar)
- Max. differential pressure: 232.1 psi (16 bar)

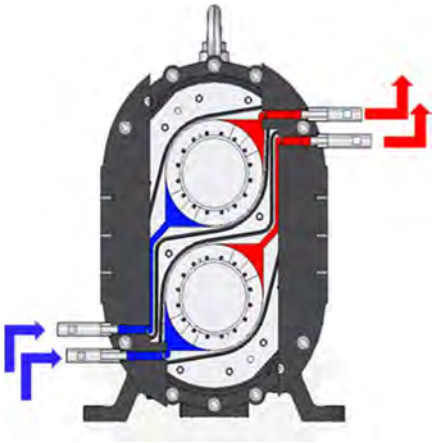


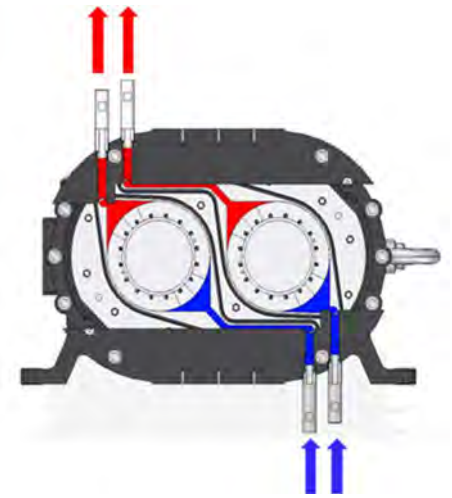
Key:
- Atmosphere
- Quench/barrier fluid
- Pumped medium
- Seal face
- Counter ring

3.3 Connections for circulation lines

The pump casing is equipped with integrated porting for the seals to permit connecting a circulation system.







3.4 Barrier pressure supply options

The barrier pressure fluid supply for the Select seal (single-acting mechanical seal) and the Protect seal (double-acting mechanical seal) can be ensured via a thermosiphon vessel. The required barrier pressure of > 14.50 psi **(1 bar)** above the working pressure to be sealed is generated by applying gas pressure (nitrogen cylinder) or compressed air (compressor).

Natural convection circulation
Barrier pressure circulation is achieved by the thermosiphon principle. The heated, specifically lighter barrier fluid rises from the seal chamber through the return line into the pressure vessel, is cooled and sinks as the specifically heavier barrier fluid through the feed line back into the sealing chamber.

Forced circulation
If the natural convection circulation is not adequate due to operating conditions, forced circulation can be effected by means of an optional circulation pump.

Max. barrier pressure – Overview:

ONIXline FC Select pump type	max. barrier pressure at 400 rpm [psi (bar)]	max. barrier pressure at 800 rpm [psi (bar)]
BJ 090	87.02 (6.0)	43.51 (3.0)
BJ 140	87.02 (6.0)	43.51 (3.0)
BL 190	87.02 (6.0)	43.51 (3.0)
BL 280	87.02 (6.0)	43.51 (3.0)

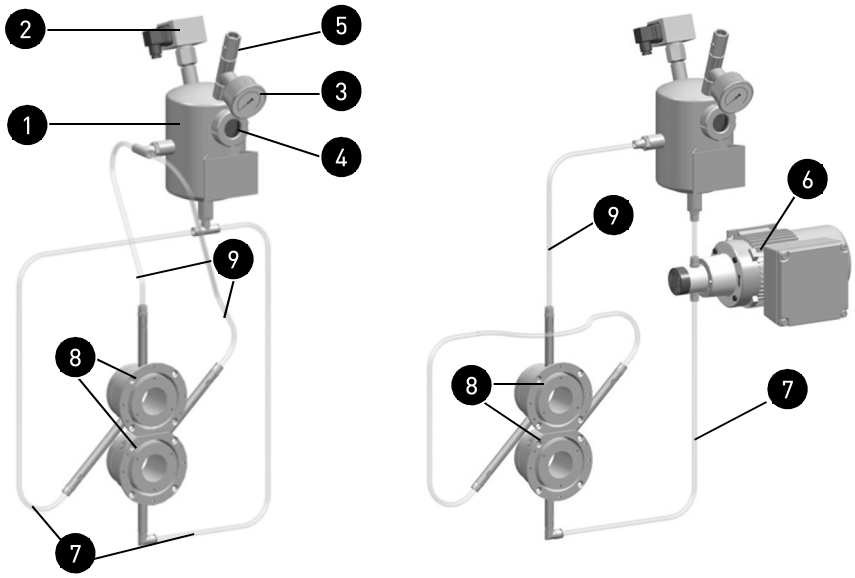
ONIXline DA Protect pump type	max. barrier pressure at 400 rpm [psi (bar)]	max. barrier pressure at 800 rpm [psi (bar)]
BJ 090	246.56 (17.0)	246.56 (17.0)
BJ 140	203.05 (14.0)	203.05 (14.0)
BL 190	246.56 (17.0)	246.56 (17.0)
BL 280	203.05 (14.0)	203.05 (14.0)

The connections for the barrier pressure system integrated into the ONIXline pump can also be used for flushing or quenching the seals.

3.5 Börger thermosiphon systems

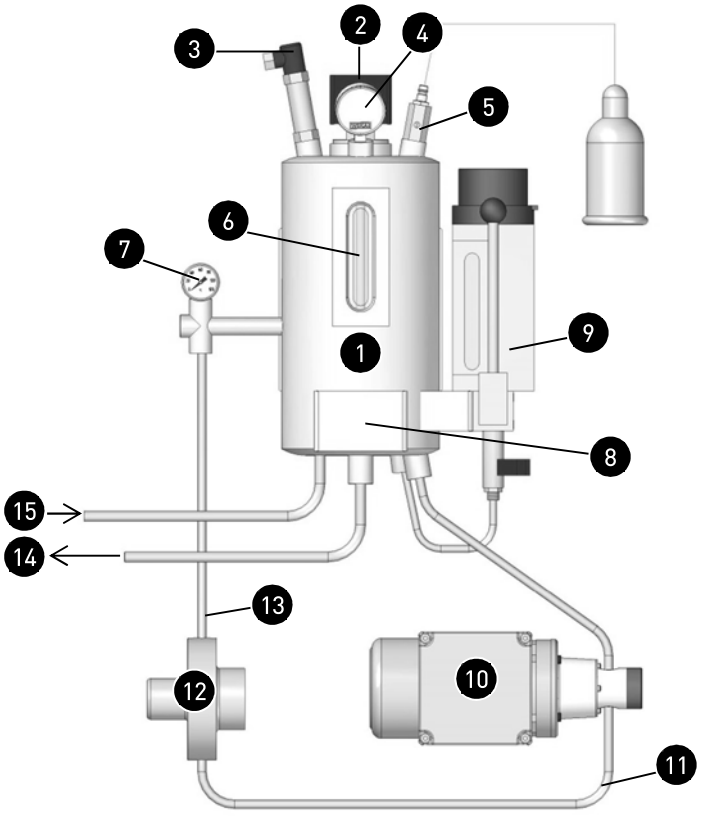
Börger offers two thermosiphon systems

TS-Basic



Key:
1. Pressure vessel
2. Pressure switch
3. Pressure meter (pressure gauge)
4. Level indicator (sight glass)
5. Ball valve
6. Circulation pump (optional)
7. Feed line to the mechanical seal
8. Mechanical seal
9. Return line to the pressure vessel

TS Thermosiphon system

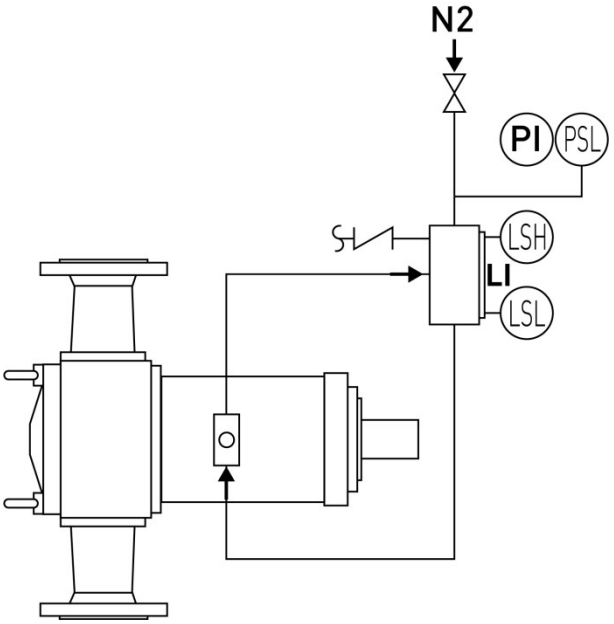


Key:
1. Pressure vessel/thermosiphon vessel
2. Level switch (magnetic float switch, optional)
3. Pressure switch
4. Pressure meter (pressure gauge)
5. Ball valve for pressure relief and external pressure supply
6. Sight glass fill level control
7. Thermometer (temperature gauge, optional)
8. Nameplate
9. Hand pump/refill unit (optional)
10. Circulation pump (optional)
11. Feed line
12. Mechanical seal
13. Return line
14. Coolant outlet
15. Coolant inlet

SIDE NOTE:

API 682 duct plans (excerpt)

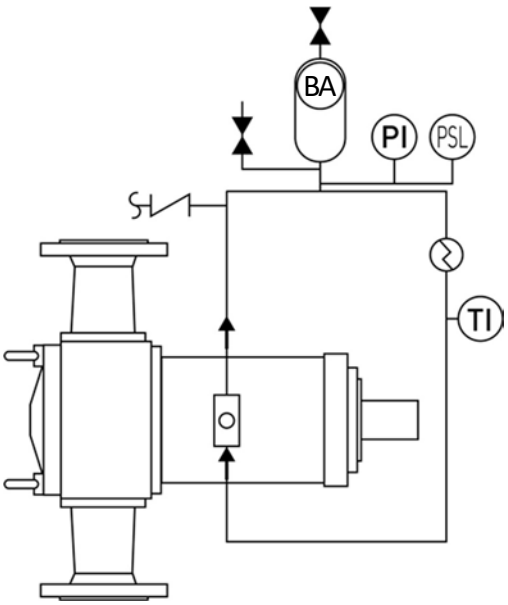
Plan 53 A (Thermosiphon system)



Plan 53 A uses an external storage container in order to provide barrier fluid for pressurizing the seals. Pressure is created by means of a gas.

Key:
LSH = Level switch high
LSL = Level switch low
PI = Pressure indicator
PSL = Pressure switch low
N2 = Nitrogen

Plan 53 B (Bladder accumulator system)



Plan 53 B (previously 53) uses a pressure accumulator. This keeps the pressure gas separate from the barrier fluid. The heat exchanger inside the circulation circuit cools the barrier fluid.

Key:
PI = Pressure indicator
PSL = Pressure switch low
TI= Temperature indicator
BA = Bladder accumulator

3.6 Drive options

Different motors can be used for driving the ONIXline Rotary Lobe Pump.

- Electric motor
- Combustion motor
- Hydraulic motor
- PTO shaft
- Compressed air motor

4.0 Guideline-compliant design

4.1 ATEX-compliant design

Upon request, the ONIXline Rotary Lobe Pump can be supplied with an ATEX-compliant design. The maximum medium temperature at which ONIXline Rotary Lobe Pumps can be used within the ATEX range (int/ext) is 302 °F (150 °C).

Possible ATEX zones

External:

EX marking	Prerequisites
II 2G Ex h IIA T3 Gb (ext)	Standard ATEX design of the pump, with T3 motor
II 2G Ex h IIB T3 Gb (ext)	Standard ATEX design of the pump, with T3 motor
II 2G Ex h IIC T3 Gb (ext)	Standard ATEX design of the pump, with T3 motor, paint layer thickness < 200µm
II 2G Ex h IIA T4 Gb (ext)	Standard ATEX design of the pump, with T4 motor
II 2G Ex h IIB T4 Gb (ext)	Standard ATEX design of the pump, with T4 motor
II 2G Ex h IIC T4 Gb (ext)	Standard ATEX design of the pump, with T4 motor, paint layer thickness < 200µm
II 2D Ex h IIIB T135°C Db	for dust atmospheres

Internal:

EX marking	Prerequisites
II 2G Ex h IIB T3 Gb (int)	Rubber coating with discharging properties (NBR, FKM, PFA), stainless steel rotor possible
II 2G Ex h IIB T4 Gb (int)	Rubber coating with discharging properties (NBR, FKM, PFA), stainless steel rotor possible

Pressure limits for ATEX-compliant designs
The maximum speed for ATEX-compliant designs is 800 rpm.
The following pressure limits must be observed:

ONIXline BJ 090

Max. speed [rpm]	Max. pressure in psi [bar] with steel or stainless steel rotors		
	FC Classic*	FC Select	DA Protect
100	203.0 (14.0)	72.5 (5.0)	217.6 (15.0)
200	203.0 (14.0)	72.5 (5.0)	217.6 (15.0)
300	203.0 (14.0)	72.5 (5.0)	217.6 (15.0)
400	203.0 (14.0)	72.5 (5.0)	217.6 (15.0)
500	203.0 (14.0)	-	217.6 (15.0)
600	203.0 (14.0)	-	217.6 (15.0)
700	203.0 (14.0)	-	217.6 (15.0)
800	203.0 (14.0)	-	217.6 (15.0)

ONIXline BJ 140

Max. speed [rpm]	Max. pressure in psi [bar] with steel or stainless steel rotors		
	FC Classic*	FC Select	DA Protect
100	159,5 [11]	72.5 (5.0)	159.5 (11.0)
200	159,5 [11]	72.5 (5.0)	159.5 (11.0)
300	159,5 [11]	72.5 (5.0)	159.5 (11.0)
400	159,5 [11]	72.5 (5.0)	159.5 (11.0)
500	159,5 [11]	-	159.5 (11.0)
600	159,5 [11]	-	159.5 (11.0)
700	159,5 [11]	-	159.5 (11.0)
800	159,5 [11]	-	159.5 (11.0)

ONIXline BL 190

Max. speed [rpm]	Max. pressure in psi [bar] with steel or stainless steel rotors		
	FC Classic*	FC Select	DA Protect
100	203.0 (14.0)	72.5 (5.0)	217.6 (15.0)
200	203.0 (14.0)	72.5 (5.0)	217.6 (15.0)
300	203.0 (14.0)	72.5 (5.0)	217.6 (15.0)
400	203.0 (14.0)	72.5 (5.0)	217.6 (15.0)
500	203.0 (14.0)	-	217.6 (15.0)
600	203.0 (14.0)	-	217.6 (15.0)
700	203.0 (14.0)	-	217.6 (15.0)
800	203.0 (14.0)	-	217.6 (15.0)

ONIXline BL 280

Max. speed [rpm]	Max. pressure in psi [bar] with steel or stainless steel rotors		
	FC Classic*	FC Select	DA Protect
100	159,5 [11]	72.5 (5.0)	159.5 (11.0)
200	159,5 [11]	72.5 (5.0)	159.5 (11.0)
300	159,5 [11]	72.5 (5.0)	159.5 (11.0)
400	159,5 [11]	72.5 (5.0)	159.5 (11.0)
500	159,5 [11]	-	159.5 (11.0)
600	159,5 [11]	-	159.5 (11.0)
700	159,5 [11]	-	159.5 (11.0)
800	159,5 [11]	-	159.5 (11.0)

For designs with casing liners, the max. pressure is 87.02 psi (6 bar).

In the Classic version, a fill level monitoring device of the barrier buffer (e.g. sight glass) must be installed.

* When using the FC Classic an external quench container must be installed for a speed of 400 rpm or higher.

4.2 TA Luft (Technical instructions on air quality control)

Upon request, the ONIXline Rotary Lobe Pump can be supplied as a technically tight pump in compliance with German TA Luft requirements (Technical Instructions on Air Quality Control). This requires the pump to be configured in a Select or Protect design. Select seals must be pressurized with barrier pressure. Börger TSS-Basic or TSS thermosiphon systems can be used. Protect seals must be monitored. (e.g. fill level sensor or pressure monitoring device)

4.3 API and NACE

For the application of pumps in the oil/gas and petrochemical industry, very often requirements according to the American Petroleum Institute (API) and the National Association of Corrosion Engineers (NACE) must be complied with. The ONIXline pump can be designed in compliance with

- API 676 for positive displacement pumps
- API 682 for seal types and the corresponding supply systems
- Materials requirements according to NACE 0175 + 0103

depending on the requirements.

4.4 Directives for conveying food

For the conveyance of food various directives and regulations apply.

The ONIXline rotary lobe pump is designed in compliance with

- Directive (EC) No. 1935/2004
- FDA §177.2600 (US Food and Drug Administration)
- UK WRAS Approval

upon request.

A design compliant with other guidelines is possible upon request.

5.0 Accessories

5.1 Heater jacket

The heater jacket is configured and installed instead of the standard pump casing. It heats the pump chamber and prevents the pumped medium from cooling down. The heater jacket is heated by means of hot water, hot steam or thermal oil. The maximum temperature is 200 °C (392 °F), the maximum pressure is 12 bar (174.05 psi). Alternatively, the heater jacket can be used for cooling the pump chamber. Coolant must be used in this case.

5.2 Heater cover

ONIXline Rotary Lobe Pumps can additionally be equipped with a heater cover. It is installed instead of the quick-release cover at the pump and heats up the pump chamber. The heater cover is heated by means of hot water, hot steam or thermal oil. The maximum temperature is 392 °F (200 °C). With the water or thermal oil version, the max. pressure is 29 psi (2 bar). The max. pressure with the heater cover for hot steam is 174.05 psi (12 bar). The heater cover can also be used for cooling the pump chamber. Coolant must be used in this case. A combination of heater jacket and heater cover is possible.

5.3 Overpressure protection

Pressure monitoring device
Exceeding the permissible maximum pressure can cause damage to parts of the rotary lobe pump or other components. Pressure switches / pressure monitoring devices offer protection against damage caused by overpressure. They are used to switch off the rotary lobe pump or system automatically when a preset pressure is exceeded, or to carry out other measures for reducing the pressure. Various designs are available.

Pressure relief valve with bypass
By using a bypass with pressure relief valve (safety valve), it is possible to close the pressure line completely for a short period without switching off the pump. While the pressure line is closed, the pump delivers the medium back to the suction side through the opened pressure relief valve. When the pressure decreases, the pressure relief valve closes and operation can be continued without delay.

A Börger Variocap is currently not available for ONIXline pumps.

5.4 Dry run protection

Long dry run periods (i.e. operation without pumped medium) should be avoided. In processes in which dry running cannot be fully excluded, e.g. when containers are emptied using the rotary lobe pump, dry run protection by means of a level sensor is recommended.

Vibration limit switch
Vibration sensors measure the fill level inside the pipe and a specific control unit shuts down the rotary lobe pump if the fill level falls below a pre-set value.

5.5 Excess temperature

When the temperature inside the pump chamber rises to a pre-set value due to the process, a specific control unit shuts down the rotary lobe pump/system in order to prevent a dry run of the rotary lobe pump.

6.0 Designs

6.1 Stationary, mobile or submerged

Due to its compact design, the ONIXline Rotary Lobe Pump is suitable for stationary, mobile or submersible installations.

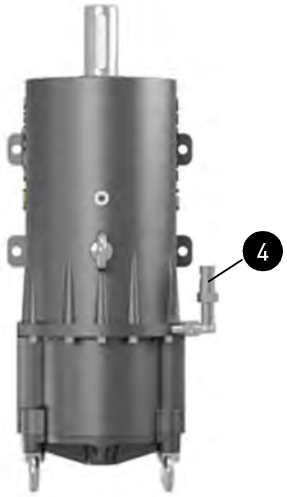
6.2 Installation options

Depending on the mounting position, the position of the oil sight glass, the fill hole as well as the drain hole for the gear unit can vary.

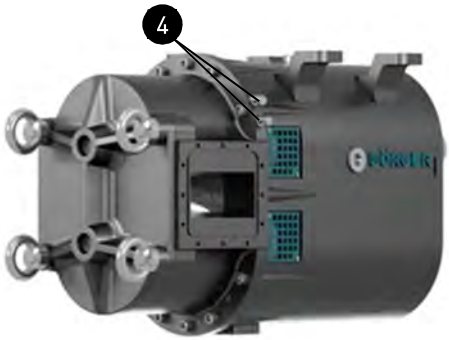
Key:
1. Oil level check for gear unit
2. Oil drain for gear unit
3. Fill hole for gear unit, with breather system
4. Fill holes for mechanical seals, with breathers

M1
Standing pump, feet at bottom, horizontal shafts

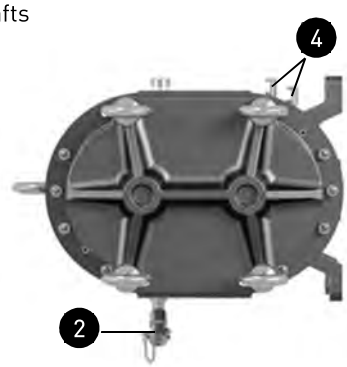
M2
Vertical pump, pump cover at bottom, feet at side, vertical shafts, drive shaft pointing upwards

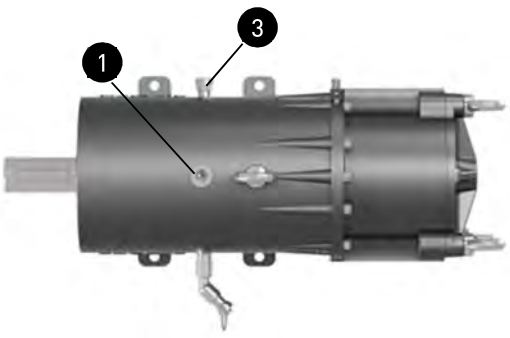


M3
Pump standing, feet upwards, horizontal shafts



Anlalog to M5 and M6
Pump turned 90° to the left, feet optional to the left or right, horizontal shafts





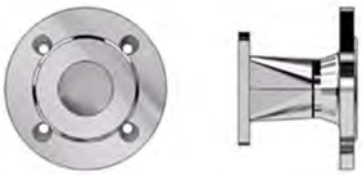
6.3 Pipe connectors

Börger rotary lobe pumps are usually equipped with pipe connections which are specifically adapted to the installation situation. The pipe connectors are manufactured with different connector options as ordered, e.g.:

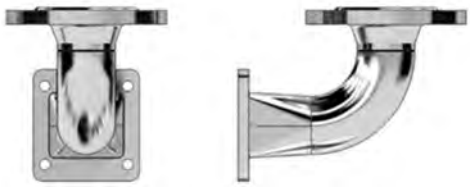
- DIN EN flange / DIN flange
- ANSI/ASME flange
- Quarter turn coupling
- Quick-release coupling, e.g. Perrot, female adapter (optional male)
- Dairy screw connection, etc.

Pipe connections can be equipped with optional fittings, e.g. screw socket G½" or G 1" for the connection of pressure gauges, shut-off devices or breather systems. Please find examples for possible designs below. (Possible materials see chapter 2.3)

Design 1: Standard

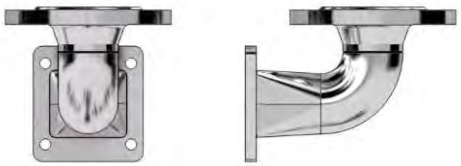


Design 2: 90° bend, S3, facing upwards (downwards)

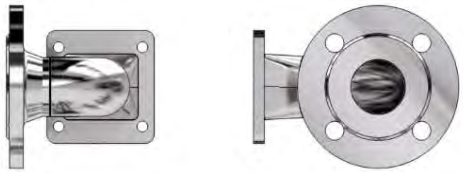


Design 3: 90° bend, S3, front (back)

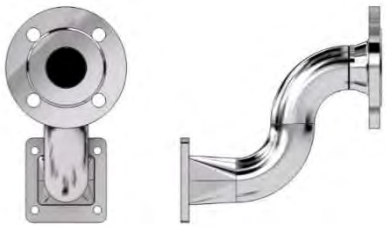
Design 4: 90° bend, S2, facing upwards (downwards)



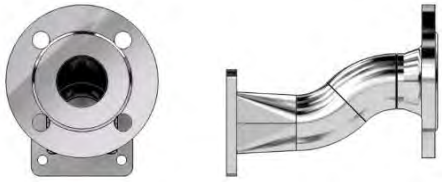
Design 5: 90° bend, S2, front (back)



Design 6: Gooseneck, 2 x 90°, S3



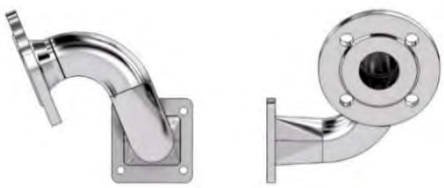
Design 7: Gooseneck, 2 x 45°, S3



Design 8: with adapter

Design 9: Gooseneck, 2 x 90°, S3, front

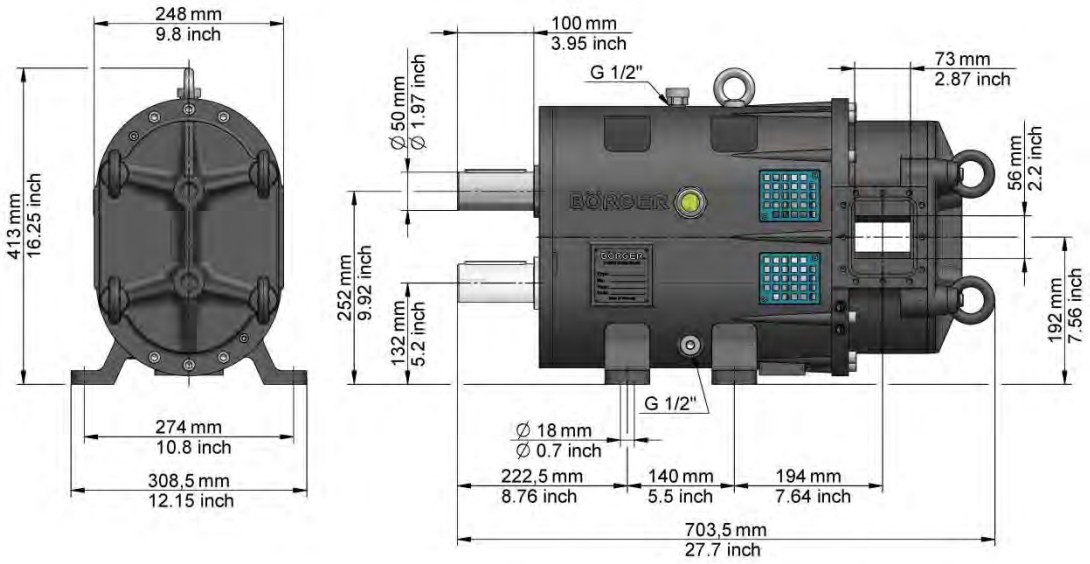
Design 10: with 22.5° inclination



6.4 Dimensions and weight

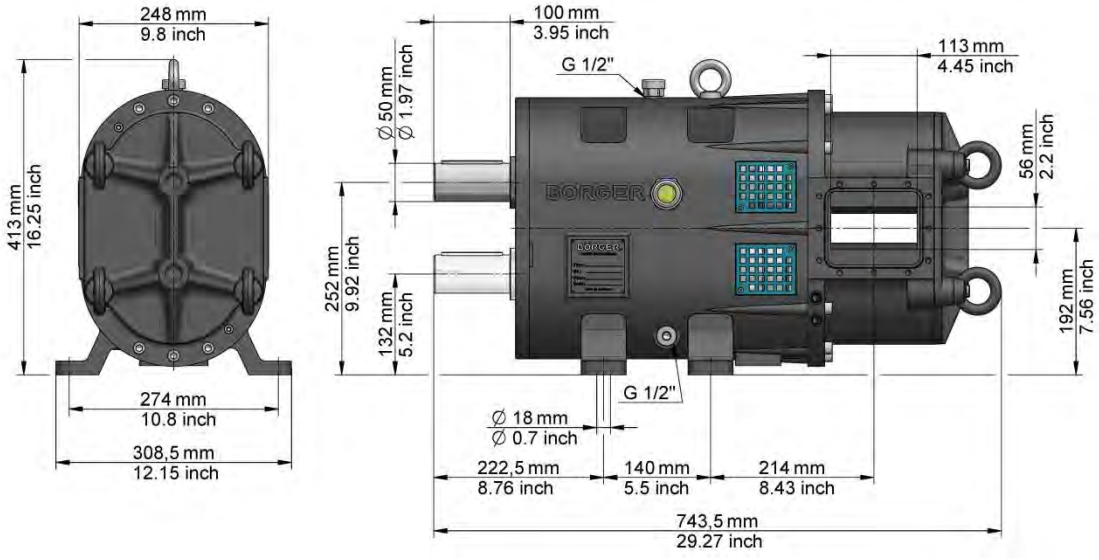
These are just some of the available designs. Information about further solutions is available upon request. The dimensions and weights correspond to the technical standard at the time of printing. We reserve the right to make changes in individual cases.

BJ 090 – Pump dimensions



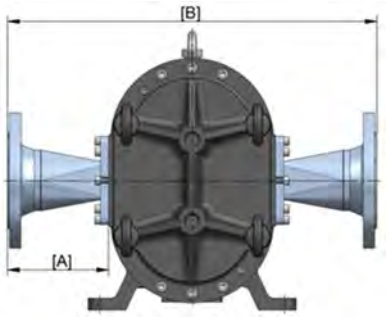
Weight: 405.65 lbs (184 kg)

BJ 140 – Pump dimensions



Weight: 421.08 lbs (191 kg)

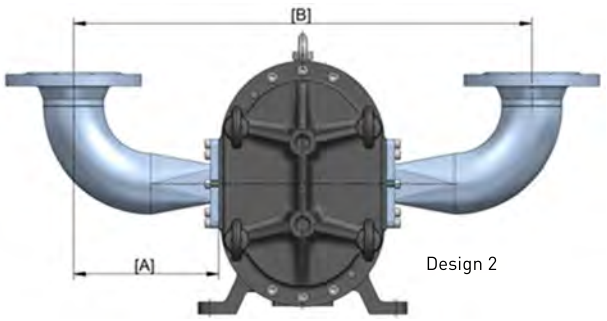
BJ Series – Dimensions Design 1



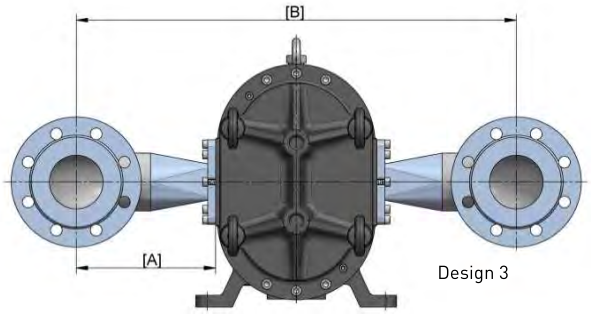
Design 1		BJ 090							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
50	2"	150	5.91	548	21.57	175	6.89	598	23.54
65	2 1/2"	150	5.91	548	21.57	175	6.89	598	23.54
80	3"	150	5.91	548	21.57	170	6.69	588	23.15
100	4"	150	5.91	548	21.57	174	6.85	596	23.46
125	5"	200	7.87	648	25.51	234	9.21	716	28.19
150	6"	200	7.87	648	25.51	234	9.21	716	28.19

Design 1		BJ 140							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
65	2 1/2"	150	5.91	548	21.57	175	6.89	598	23.54
80	3"	150	5.91	548	21.57	170	6.69	588	23.15
100	4"	150	5.91	548	21.57	174	6.85	596	23.46
125	5"	200	7.87	648	25.51	234	9.21	716	28.19
150	6"	200	7.87	648	25.51	234	9.21	716	28.19

BJ Series – Dimensions Designs 2 and 3



Design 2

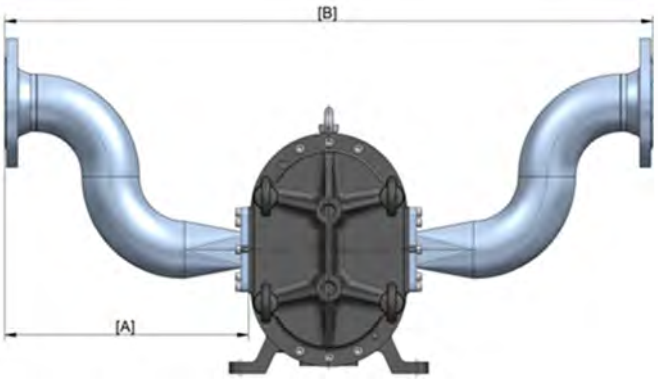


Design 3

Design 2, 3		BJ 090							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
65	2 1/2"	200	7.87	648	25.51	200	7.87	648	25.51
80	3"	214	8.43	676	26.61	214	8.43	676	26.61
100	4"	251	9.88	648	25.51	251	9.88	750	29.53
125	5"	335	13.19	918	36.14	335	13.19	918	36.14
150	6"	374	14.72	996	39.21	374	14.72	996	39.21

Design 2, 3		BJ 140							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
65	2 1/2"	200	7.87	648	25.51	200	7.87	648	25.51
80	3"	214	8.43	676	26.61	214	8.43	676	26.61
100	4"	251	9.88	648	25.51	251	9.88	750	29.53
125	5"	335	13.19	918	36.14	335	13.19	918	36.14
150	6"	374	14.72	996	39.21	374	14.72	996	39.21

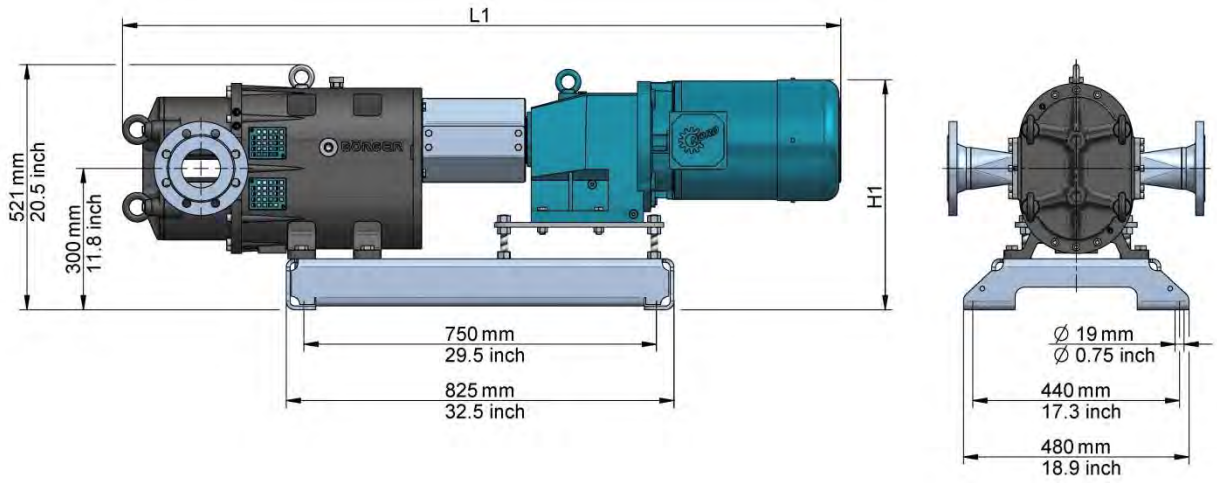
BJ Series – Dimensions Design 6



Design 6		BJ 090							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
65	2 1/2"	340	13.39	928	36.54	365	14.37	978	38.50
80	3"	378	14.88	1,004	39.53	398	15.67	1,044	41.10
100	4"	545	21.46	928	36.54	478	18.82	1,204	47.40
125	5"	580	22.83	1,408	55.43	615	24.21	1,478	58.19
150	6"	658	25.91	1,564	61.57	692	27.24	1,632	64.25

Design 6		BJ 140							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
65	2 1/2"	340	13.39	928	36.54	365	14.37	978	38.50
80	3"	378	14.88	1,004	39.53	398	15.67	1,044	41.10
100	4"	545	21.46	928	36.54	478	18.82	1,204	47.40
125	5"	581	22.87	1,410	55.51	615	24.21	1,478	58.19
150	6"	658	25.91	1,564	61.57	692	27.24	1,632	64.25

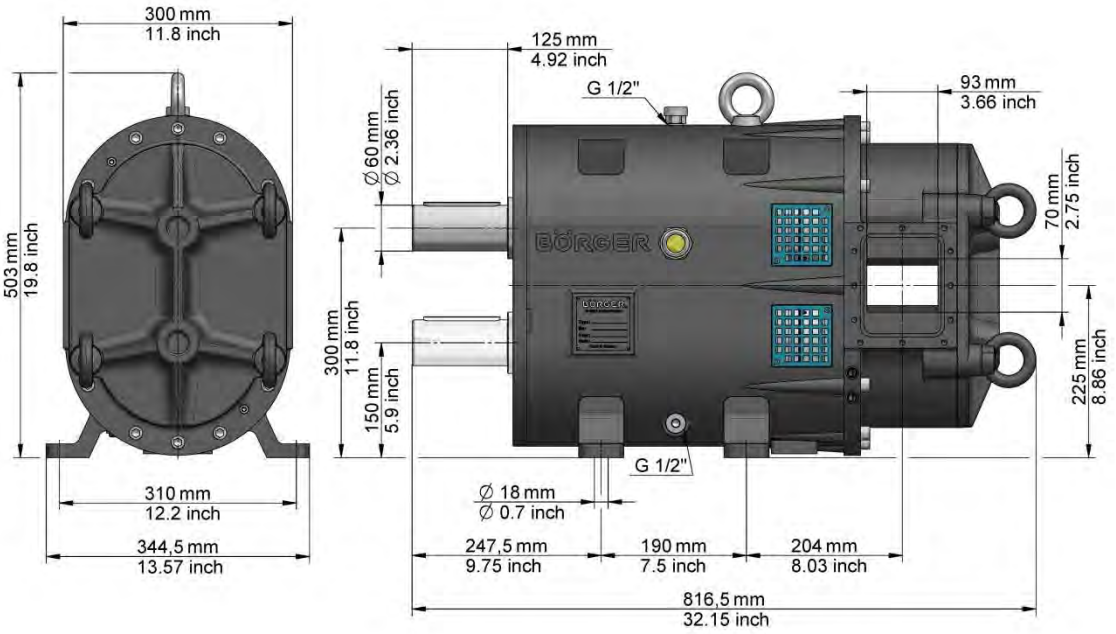
BJ Series – Dimensions and weight incl. drive unit



Drive		BJ 090					
		Weight		Dimensions			
				L1		H1	
[kw]	[hp]	[lbs]	[kg]	[mm]	[inches]	[mm]	[inches]
2.20	2.95	661	300	1,355	53.35	460	18.11
3.00	4.02	739	335	1,355	53.35	460	18.11
4.00	5.36	761	345	1,400	55.12	470	18.50
5.50	7.38	772	350	1,490	58.66	490	19.29
7.50	10.06	783	355	1,500	59.06	490	19.29
9.20	12.34	794	360	1,505	59.25	490	19.29
11.00	14.75	871	395	1,565	61.61	515	20.28

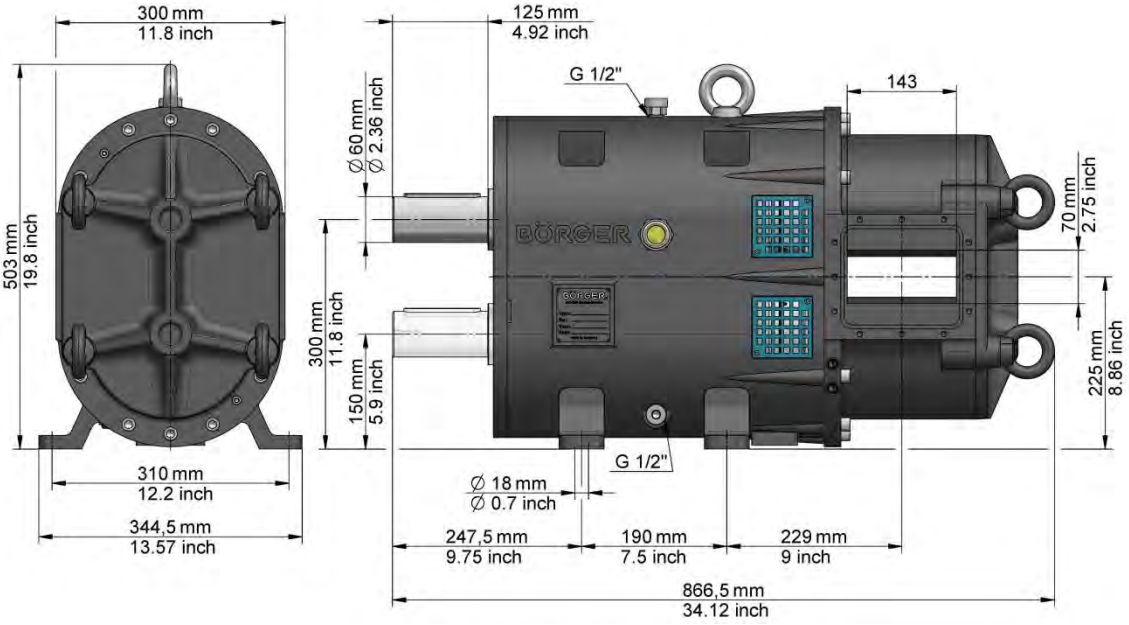
Drive		BJ 140					
		Weight		Dimensions			
				L1		H1	
[kw]	[hp]	[lbs]	[kg]	[mm]	[inches]	[mm]	[inches]
4.0	5.36	783	355	1,440	56.69	470	18.50
5.5	7.38	794	360	1,530	60.24	490	19.29
7.5	10.06	805	365	1,540	60.63	490	19.29
9.2	12.34	816	370	1,545	60.83	490	19.29
11.0	14.75	893	405	1,605	63.19	515	20.28
15.0	20.12	948	430	1,610	63.39	515	20.28

BL 190 – Pump dimensions



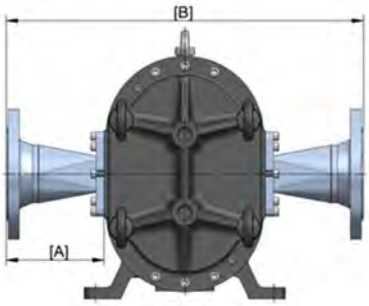
Weight: 643.75 lbs (292 kg)

BL 280 – Pump dimensions



Weight: 692.25 lbs (314 kg)

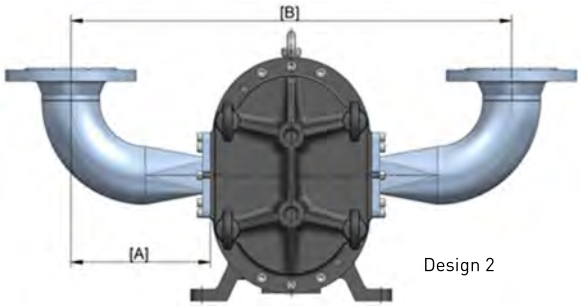
BL Series – Dimensions Design 1



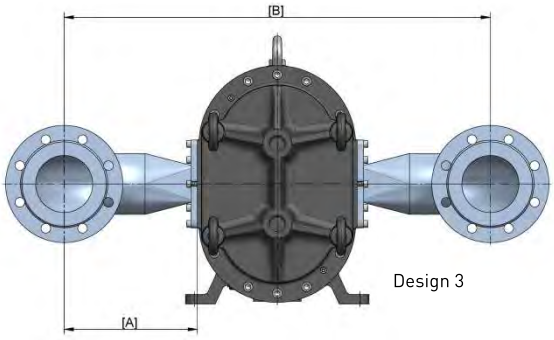
Design 1		BL190							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
80	3"	150	5.91	600	23.62	170	6.69	640	25.20
100	4"	150	5.91	600	23.62	174	6.85	648	25.51
125	5"	200	7.87	600	23.62	234	9.21	768	30.24
150	6"	200	7.87	700	27.56	234	9.21	768	30.24
200	8"	300	11.81	900	35.43	340	13.39	980	38.58

Design 1		BL280							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
80	3"	-	-	-	-	-	-	-	-
100	4"	150	5.91	600	23.62	174	6.85	648	25.51
125	5"	200	7.87	700	27.56	234	9.21	768	30.24
150	6"	200	7.87	700	27.56	234	9.21	768	30.24
200	8"	300	11.81	900	35.43	340	13.39	980	38.58
250	10"	300	11.81	900	35.43	346	13.62	992	39.06

BL Series – Dimensions Designs 2 and 3



Design 2

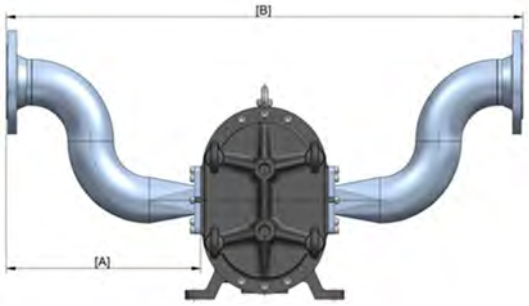


Design 3

Design 2, 3		BL190							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
80	3"	214	8.43	728	28.66	214	8.43	728	28.66
100	4"	251	9.88	802	31.57	251	9.88	802	31.57
125	5"	335	13.19	728	28.66	335	13.19	970	38.19
150	6"	374	14.72	1,048	41.26	374	14.72	1,048	41.26
200	8"	543	21.38	1,386	54.57	543	21.38	1,386	54.57

Design 2, 3		BL280							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
100	4"	251	9.88	802	31.57	251	9.88	802	31.57
125	5"	335	13.19	970	38.19	335	13.19	970	38.19
150	6"	374	14.72	1,048	41.26	374	14.72	1,048	41.26
200	8"	543	21.38	1,386	54.57	513	20.20	1,386	54.57
250	10"	613	24.13	1,526	60.08	613	24.13	1,526	60.08

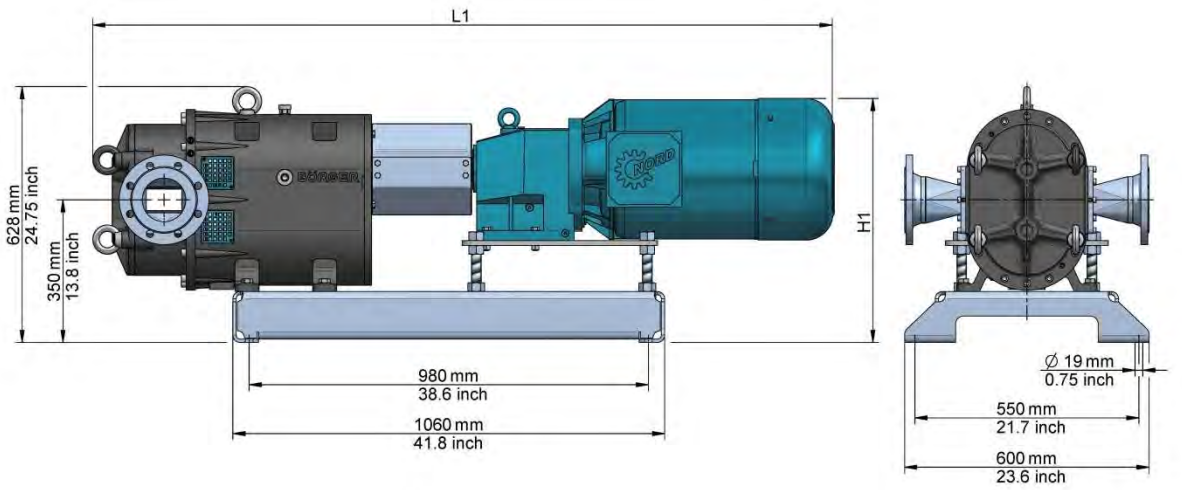
BL Series – Dimensions Design 6



Design 6		BL190							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
80	3"	378	14.88	1,056	41.57	398	15.67	1,096	43.15
100	4"	545	21.46	1,208	47.56	478	18.82	1,256	49.45
125	5"	580	22.83	1,056	41.57	614	24.17	1,528	60.16
150	6"	658	25.91	1,616	63.62	692	27.24	1,684	66.30
200	8"	910	35.83	2,120	83.46	950	37.40	2,200	86.61

Design 6		BL280							
		DIN				ANSI			
Nominal diameter	Dimension	A		B		A		B	
		[mm]	[inches]	[mm]	[inches]	[mm]	[inches]	[mm]	[inches]
100	4"	454	17.87	1,208	47.56	478	18.82	1,256	49.45
125	5"	580	22.83	1,460	57.48	614	24.17	1,528	60.16
150	6"	658	25.91	1,616	63.62	692	27.24	1,684	66.30
200	8"	910	35.83	2,120	83.46	950	37.40	2,200	86.61
250	10"	1062	41.81	2,424	95.43	1108	43.62	2,516	99.05

BL Series – Dimensions and weight incl. drive unit



Drive		BL 190					
		Weight		Dimensions			
				L1		H1	
[kw]	[hp]	[lbs]	[kg]	[mm]	[inches]	[mm]	[inches]
7.5	10.06	1,069	485	1,570	61.81	555	21.85
9.2	12.34	1,113	505	1,605	63.19	555	21.85
11.0	14.75	1,190	540	1,685	66.34	555	21.85
15.0	20.12	1,257	570	1,720	67.72	580	22.83
18.5	24.81	1,367	620	1,880	74.02	600	23.62
22.0	29.50	1,378	625	1,880	74.02	605	23.82

Drive		BL 280					
		Weight		Dimensions			
				L1		H1	
[kw]	[hp]	[lbs]	[kg]	[mm]	[inches]	[mm]	[inches]
15,0	20,12	1,312	595	1,770	69.69	580	22.83
18,5	24,81	1,444	655	1,930	75.98	600	23.62
22,0	29,50	1,433	650	1,930	75.98	605	23.82
30,0	40,23	1,753	795	2,060	81.10	630	24.80
37,0	49,62	1,852	840	2,060	81.10	650	25.59

7.0 Tests and inspections

Throughout the manufacturing process, Börger machines undergo numerous routine tests as outlined in the FAT (Factory Acceptance Tests) document. These are included in the price at no extra charge.

Cost for the following tests upon request.

Additional testing (internal) with 3.1 certificate	BJ / BL
Penetrant testing (PT) for cast material, according to ISO 3452-2 and QPL-AMS 2644-4 test, with 3.1 certificate according to EN 10204	BPT-C-BJBL *Costs upon request*
Penetrant testing (PT) for weld seams, according to ISO 3452-2 and QPL-AMS 2644-4 test, with 3.1 certificate according to EN 10204	BPT-W-BJBL *Costs upon request*
Hydrostatic pressure testing according to DIN EN 12162 on factory test bench, with 3.1 certificate according to EN 10204	Press-BJBL test *Costs upon request*
Performance testing according to VDMA 24284 on factory test bench, with test bench drive unit, with 3.1 certificate according to EN 10204	Perf-BJBL test *Costs upon request*
Performance testing according to VDMA 24284 on factory test bench, with commissioned drive unit, with 3.1 certificate according to EN 10204	Perf-D-BJBL test *Costs upon request*
Run test (30 min) according to VDMA 24284, on factory test bench, in connection with performance testing with 3.1 certificate according to EN 10204	Run-BJBL test *Costs upon request*
NPSH test according to VDMA 24284 (suction capacity test) in connection with performance testing with 3.1 certificate according to EN 10204	NPSH-BJBL test *Costs upon request*
Vibration analysis according to Börger Standard 07-2011, ISO 10816-1 in connection with performance testing and ISO 10816-3, with 3.1 certificate according to EN 10204	Vibr-BJBL test *Costs upon request*
Noise test – DB (A) reading according to IEC 61672 in connection with performance testing with 3.1 certificate according to EN 10204	Noise-BJBL test *Costs upon request*
Paint test, dry film thickness measurement according to ISO 12944 with 3.1 certificate according to EN 10204	Paint-BJBL test *Costs upon request*
Positive material identification (RF product analysis) for metallic materials with 3.1 certificate according to EN 10204	PMI-BJBL test *Costs upon request*

Additional testing (external) with 3.1 certificate	BJ / BL
Radiographic test (RT) at cast pieces or weld seams, with 3.1 certificate according to EN 10204	RT-BJBL test *Costs upon request*
Ultrasound test (UT) at cast pieces or weld seams with 3.1 certificate according to EN 10204	UT-BJBL test *Costs upon request*
OES material test	Test-OES-BJBL *Costs upon request*

Order-related activities & documentation	BJ / BL
Acceptance test, acceptance by customers or third parties (Third-party acceptance costs are passed on without a surcharge.)	Witness-BJBL *Costs upon request*
Deadline monitoring by the customer or third parties	EM-BJBL *Costs upon request*
ITP quality inspection plan as Börger document	ITP-BJBL *Costs upon request*
Detailed manufacturing plan as Börger document	IMP-BJBL *Costs upon request*
Updates of the detailed manufacturing plan as Börger document	UIMP-BJBL *Costs upon request*
Enhanced documentation as specified by the customer, based on Börger documents, without customer approval	Doku-B-BJBL *Costs upon request*
Enhanced customer-specific documentation with approval by the customer or third parties	Doku-C-BJBL *Costs upon request*

Documents & certificates	BJ / BL
Börger quality certificate Certificate of compliance with the order 2.1 according to EN 10204	Material-2.1 *Costs upon request*
Manufacturer's material certificate (from supplier) Factory certification 2.2 according to EN 10204	Material-L-2.2 *Costs upon request*
Manufacturer's quality certificate Acceptance test certificate 3.1 according to EN 10204	Material-3.1 *Costs upon request*
Proof of welders' qualifications according to ISO 9606-1 (DIN EN 287) Proof of welders' supervisors' qualifications according to ISO 9712 (DIN EN 473)	Weld-Cert *Costs upon request*

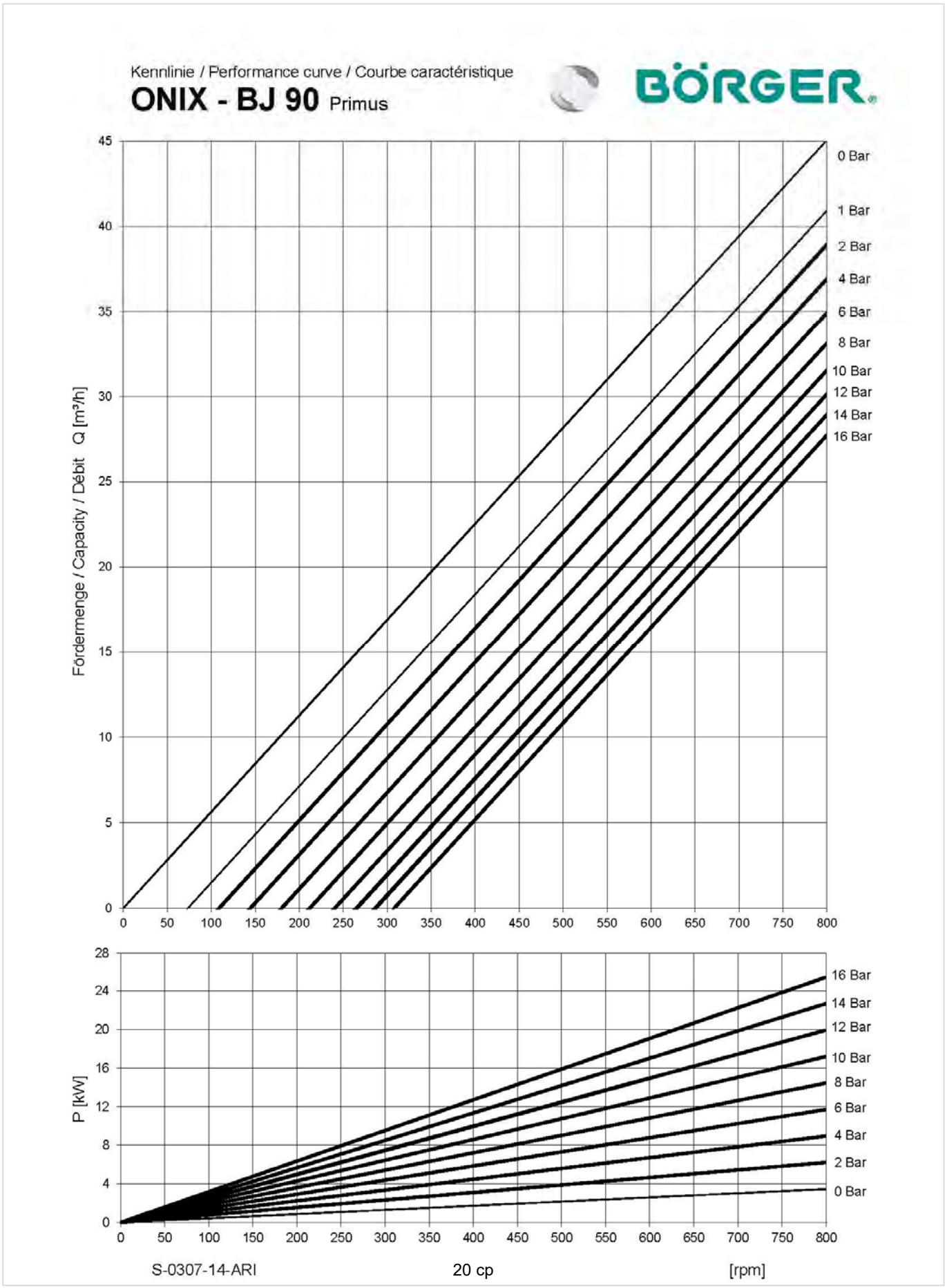
Acceptance testing for marine use	BJ / BL
Acceptance testing for marine use: Hydrostatic test, performance testing, 3.1 certificates for pump casing and shafts, customer acceptance Additionally required (not included in the price): - Special motor (45°C) with test certificate - Classification society fees	Marine-BJBL *Costs upon request*

8.0 Pump code

A 19-digit pump code contains the designs and materials of all components (e.g. PB1SARJTBESPREDD11Z). The character in each position of the pump code permits the original configuration of the pump to be traced back even after many years.

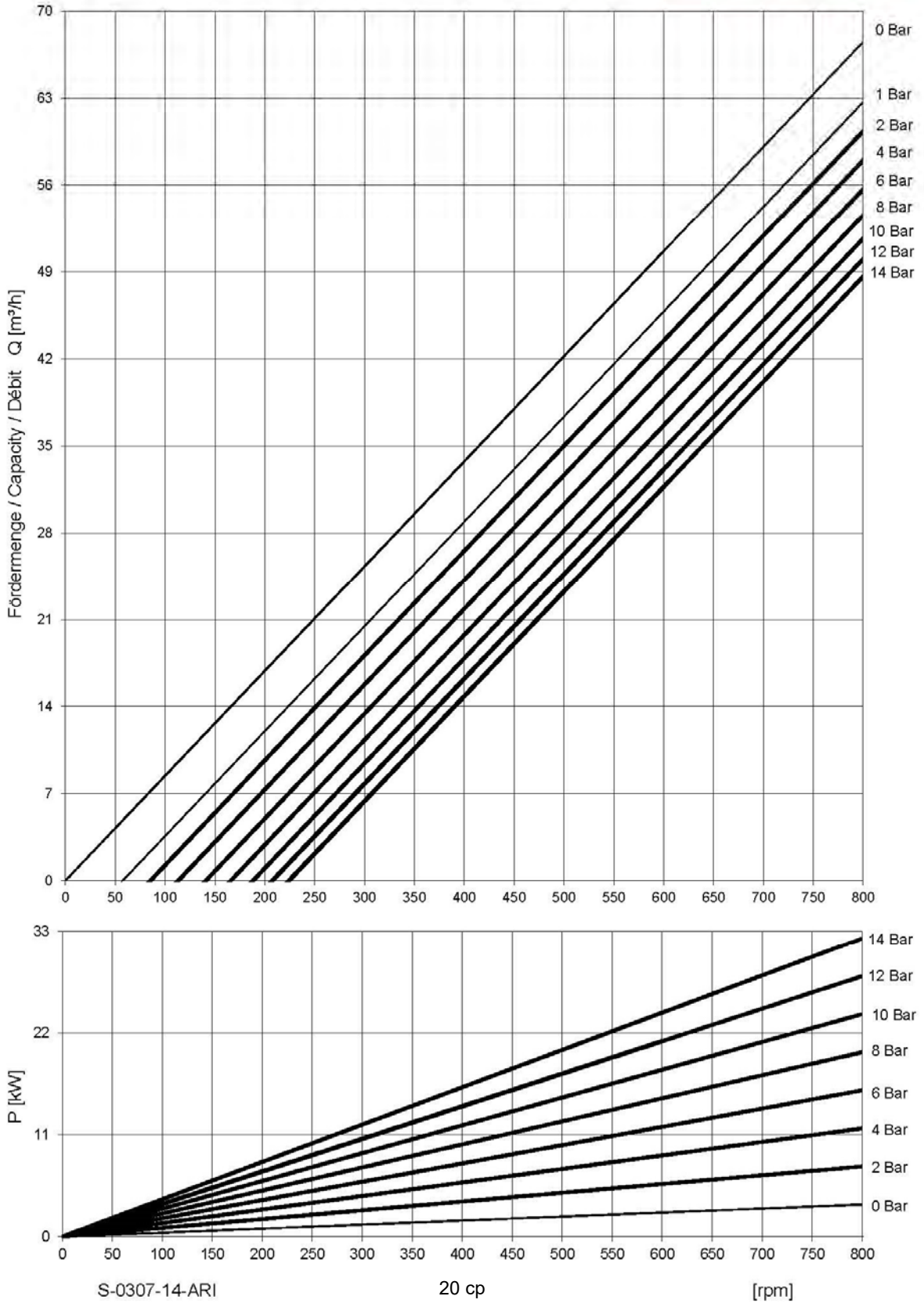
1 Equipment group	8 Casing	15 O-rings
2 Type	9 Casing protection plates	16 Flange seals
3 Size	10 Casing liners	17 Mounting position
4 Gear design	11 Holding bushes	18 Serial number
5 Shafts	12 Mechanical seals	19 Special equipment
6 Flow direction	13 Rotors	
7 Lip seals, inner rings	14 Rotor material	

9.0 Performance curves



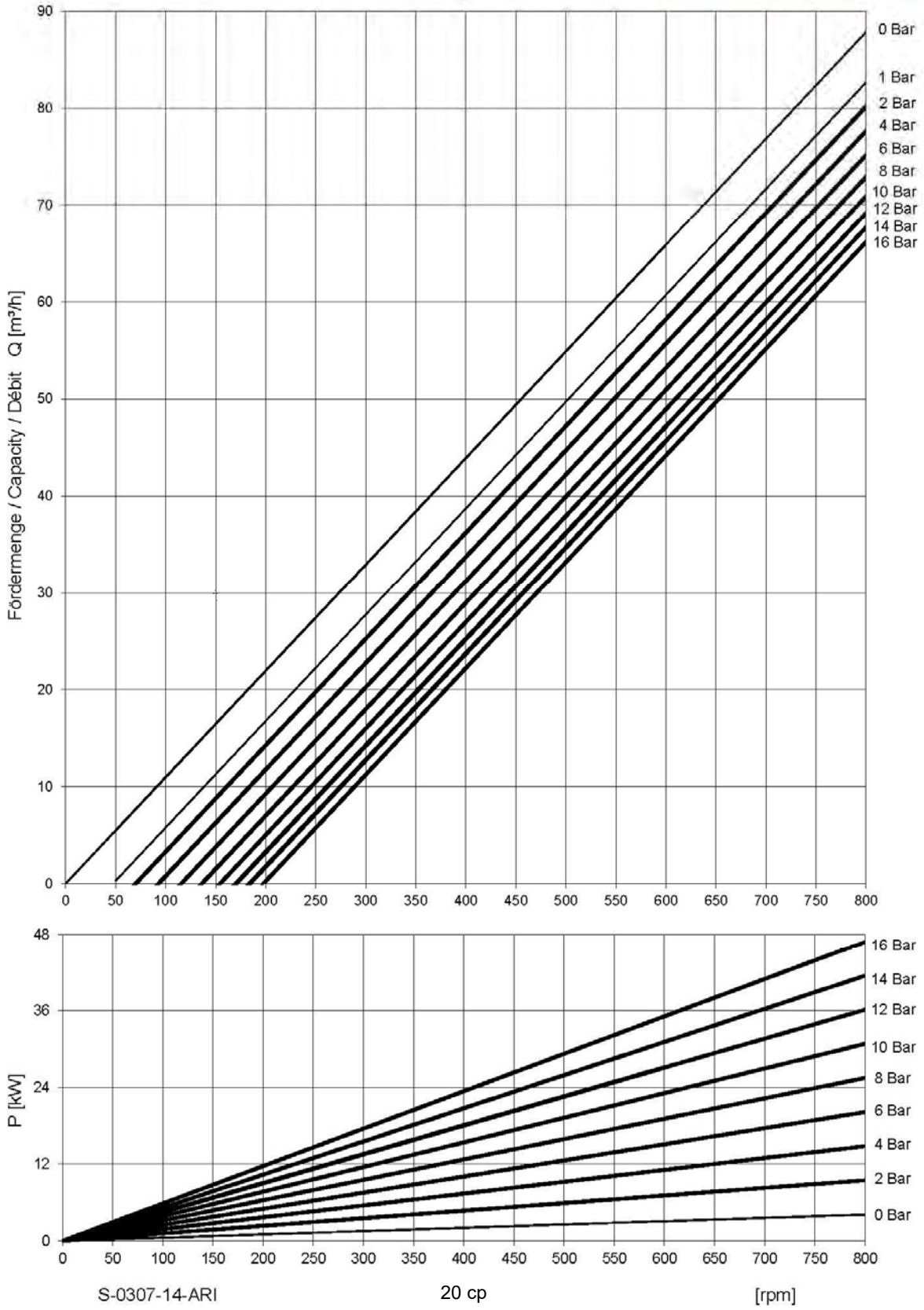
Kennlinie / Performance curve / Courbe caractéristique

ONIX - BJ 140 Primus



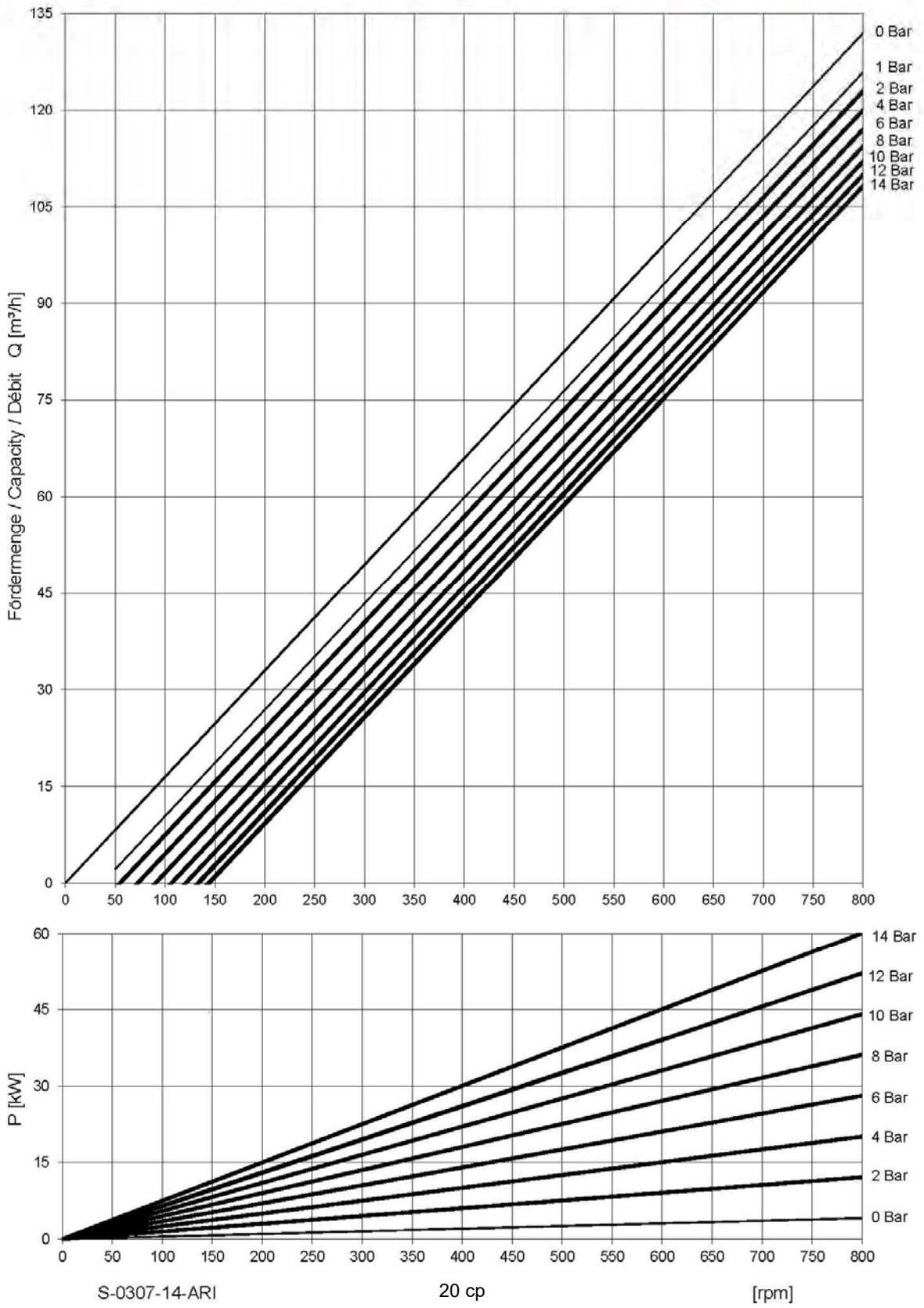
Kennlinie / Performance curve / Courbe caractéristique

ONIX - BL 190 Primus



Kennlinie / Performance curve / Courbe caractéristique

ONIX - BL 280 Primus



All details provided in this document correspond to the technical standard at the time of printing. We reserve the right to make technical improvements or amendments.

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EXCELLENCE - MADE TO LAST

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