

**Durco<sup>®</sup> Mark 3<sup>™</sup> ISO MAG  
Sealless, Magnetic Drive  
Chemical Process Pumps**

ISO 2858/5199/15783



# The premier name in chemical process pumps

Durco Mark 3 ISO MAG sealless, magnetic drive chemical process pumps provide outstanding hydraulic performance, unrivaled reliability and low total cost of ownership. Conforming to ISO 2858, ISO 5199 and ISO 15783 design criteria, Durco Mark 3 ISO MAG pumps incorporate many proven reliability- and performance-enhancing features. The resultant benefits are:

- High-efficiency performance over the life of the pump, minimizing energy usage and total lifecycle costs
- Standardized modular system designed for flexible plant installation
- High environmental and personnel safety during operation and maintenance
- Minimized downtime, maximized working life and low maintenance costs
- Versatile platform for plant-specific seals, accessories and instrumentation systems

## Global design, unmatched performance

Durco Mark 3 ISO MAG chemical process pumps are available in many designs that can be configured to meet precise application requirements.

- Long coupled
- Close coupled

## Standards compliance

Durco Mark 3 ISO MAG pumps conform to ISO 2858, ISO 5199 and ISO 15783 design criteria and are CE marked. Compliance with the following directives is also available:

- ATEX II 2G T1-T5 (2014/34/EU)
- CUTR
- Food grade (1935/2004/EC) (optional)

## Typical applications

- Acid transfer
- Chemical processing
- Corrosive services
- Hydrocarbon processing
- Petrochemical processing
- Pharmaceuticals
- Polymers
- Solvents



## Configurations

Durco Mark 3 ISO MAG pumps are available in three configurations. Each features optimized hydraulics and a hermetically sealed design with true back pullout to deliver safe, leak-free performance with low energy costs. Available in a variety of materials — including metallic or ceramic containment shells — to suit application needs.

### Long coupled

This versatile magnetic coupling chemical process pump is very well-suited for handling toxic, explosive and valuable liquids in nearly all industries. The contained back pullout feature ensures personnel safety while minimizing downtime. 35 sizes available.

#### Operating parameters

Flows to: 475 m<sup>3</sup>/h (2,091 gpm)  
Heads to: 150 m (492 ft)  
Pressure to: 25 bar (365 psi)  
Temperature: -70°C to 350°C (-94°F to 662°F)



### Close coupled

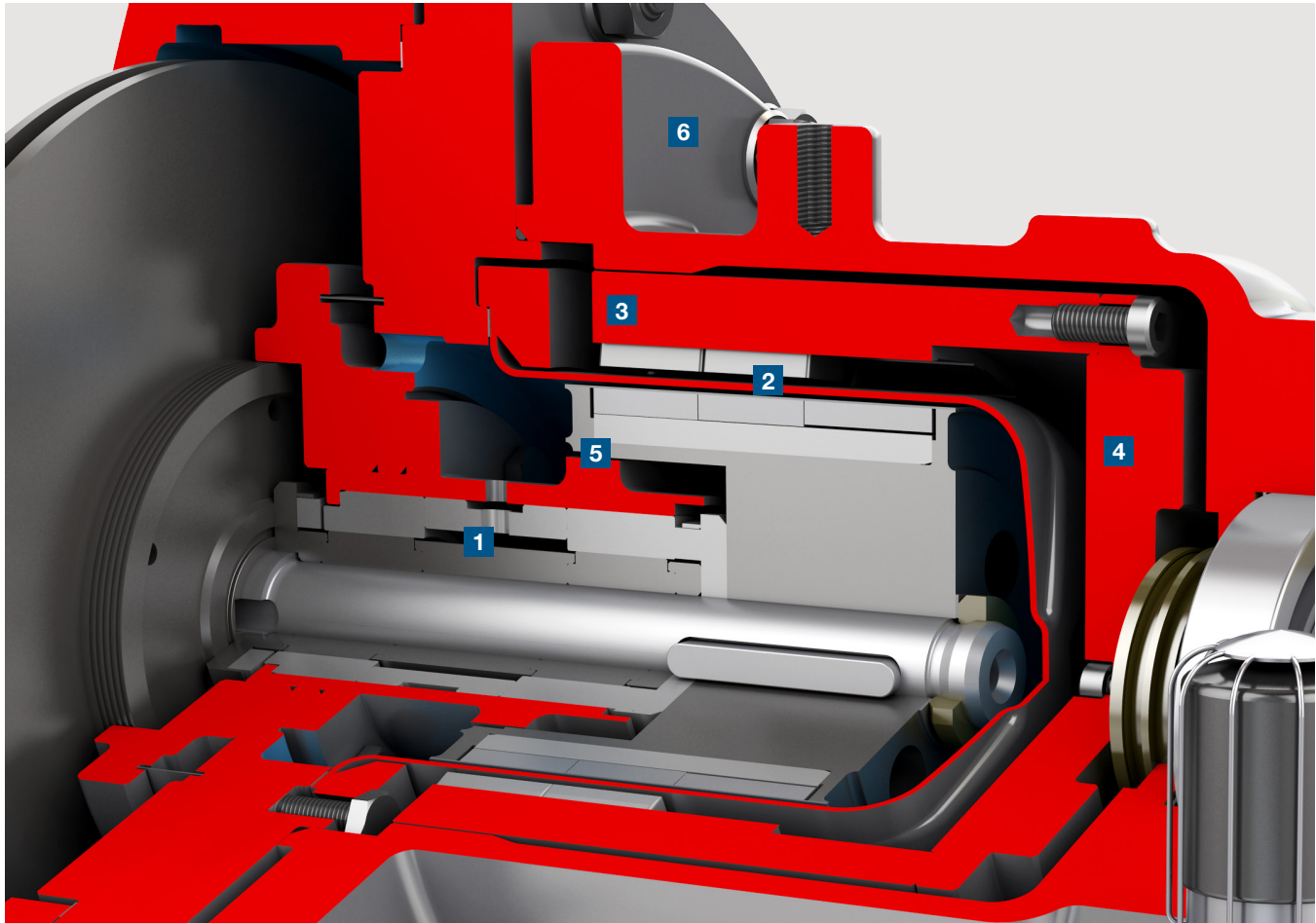
The compact proportions of the Durco Mark 3 ISO MAG close coupled pump make it ideal for installations where space is at a premium. It provides safe, zero-leakage performance of fluids to 350°C (662°F) without cooling. Standard electric motors keep ownership costs low. 35 sizes available.

#### Operating parameters

Flows to: 475 m<sup>3</sup>/h (2,091 gpm)  
Heads to: 150 m (492 ft)  
Pressure to: 25 bar (365 psi)  
Temperature: -70°C to 350°C (-94°F to 662°F)



# Magnetic drive system



## 1 - Sleeve bearings

- Silicon carbide (SiC) sleeve bearings
- Compensation of thermal extension of the maintenance-free sleeve bearings
- High chemical resistance, mechanical strength and abrasion resistance
- Security against bearing failure due to stationary seatlocks
- Special bearings on demand

## 2 - Internal and external magnets

- High-temperature stable Samarium Cobalt magnets
- The strength of SmCo magnets (coupling torque) is fully reversible, provided the magnets are not exposed to operating conditions above maximum operating temperature
- The internal magnets are protected by an Alloy C-4 sleeve

## 3 - Clamping ring for containment shells

- Enables 1:1 interchangeability of different containment shell materials

## 4 - Containment shell options

- Standard Alloy C-4
- High-efficiency Alloy C-4
- TiN-coated ZrO<sub>2</sub> ceramic

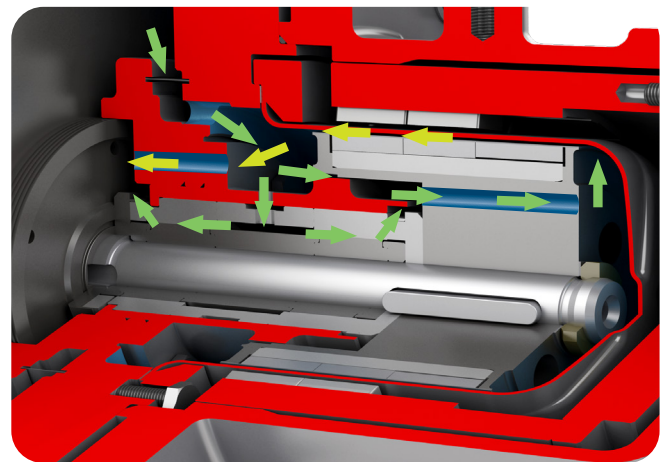


## 5 - Partial flow

Internal partial flow with natural flow direction.

- Self-cleaning screening keeps dirt particles out
- Lubrication of the sleeve bearing
- Cooling of the containment shell
- External partial flow and free flow filters as an option

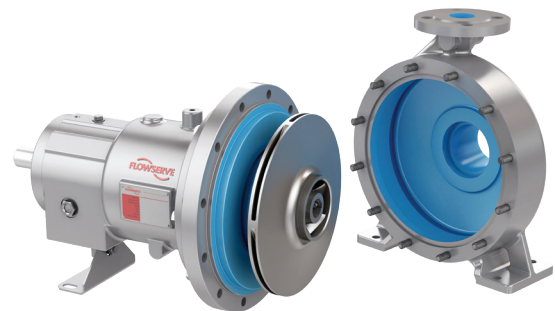
The partial flow passes through the self-cleaning strainer, then splits. A portion enters a port for the lubrication of the sleeve bearings, and another flows in another direction, removing the heat resulting from eddy current losses associated when a metallic containment shell is utilized.



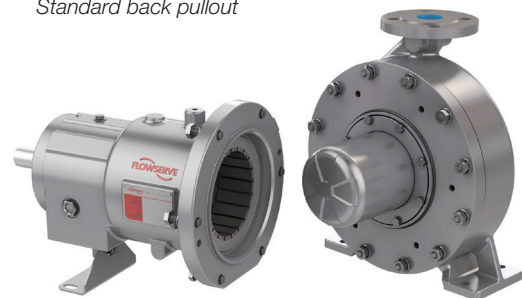
## 6 - Back pullout design

Two back pullout options

- Standard back pullout simplifies maintenance and inspection tasks
  - Back pullout with impeller
  - Volute casing stays in the piping
- Contained back pullout saves time without sacrificing safety
  - No contact with pumped liquid
  - Highest available safety
  - Volute casing stays in the piping

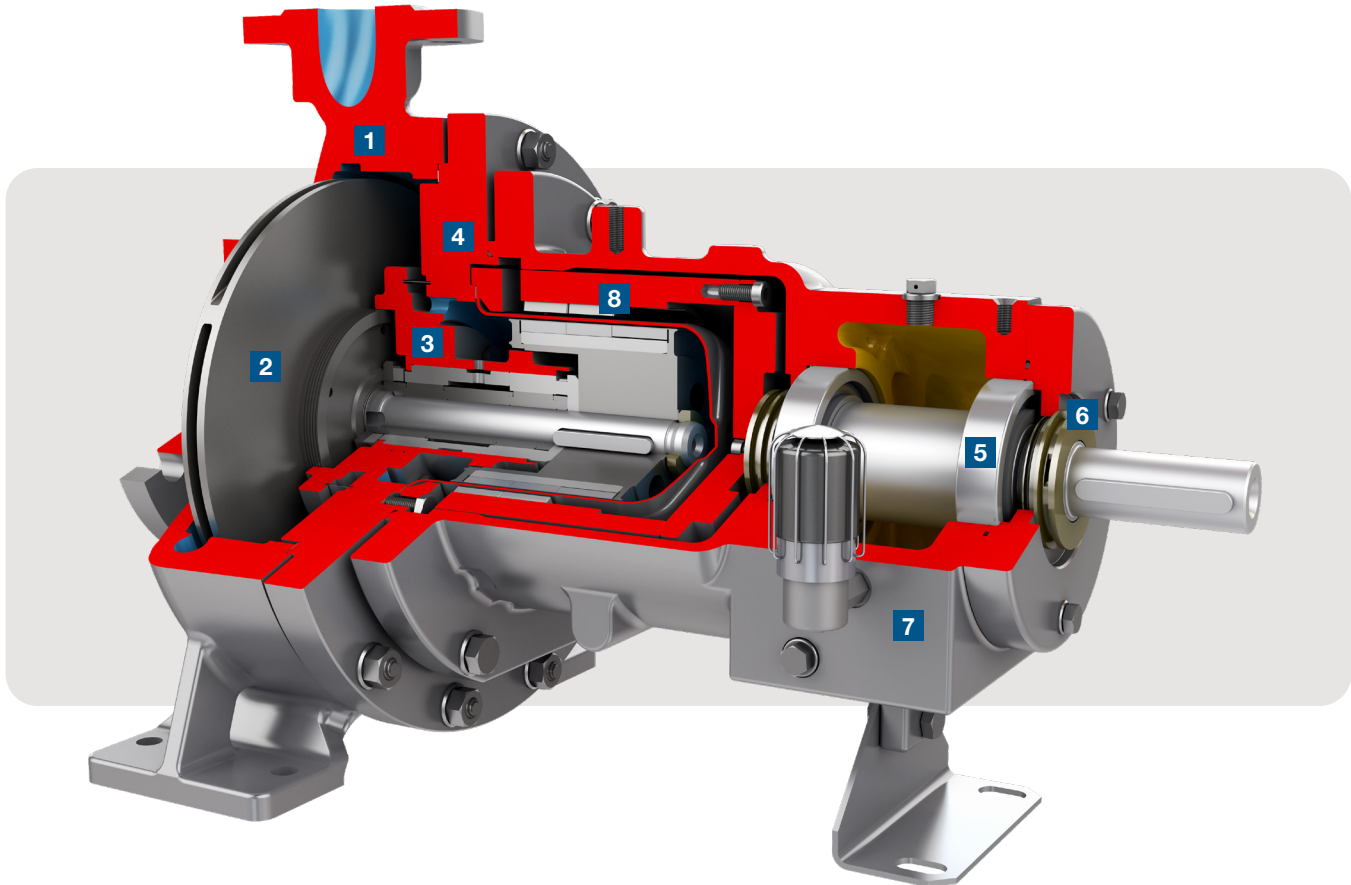


*Standard back pullout*



*Contained back pullout*

## Long coupled design



### 1 - Volute casing

- Standard PN 16 and PN 25 flanges per ISO 1092
- Drilling per ASME 150 and 300
- Drain and recirculation connections

### 2 - Closed impeller

- Balancing holes compensate for axial thrust
- Impeller locking
- Hydraulic performance per ISO 2858 requirements

### 3/4 - Internal and external covers

- Internal wear ring
- Not replaceable
- Strainer support
- Flow path for internal circulation drainage and venting of containment shell

### 5 - Ball bearings

Available with oil and life-greased lubrication.

Grease lubricated:

- Standard lifetime L10h >17,500 h
- Temperature from -40°C to 180°C (-40°F to 356°F)
- Mineral, synthetic or food grade

Oil lubricated:

- Standard lifetime L10h >50,000 h
- Different oil seal options
- Oil splash bath, mineral or synthetic

## 6 - Bearing Gard™ bearing isolators

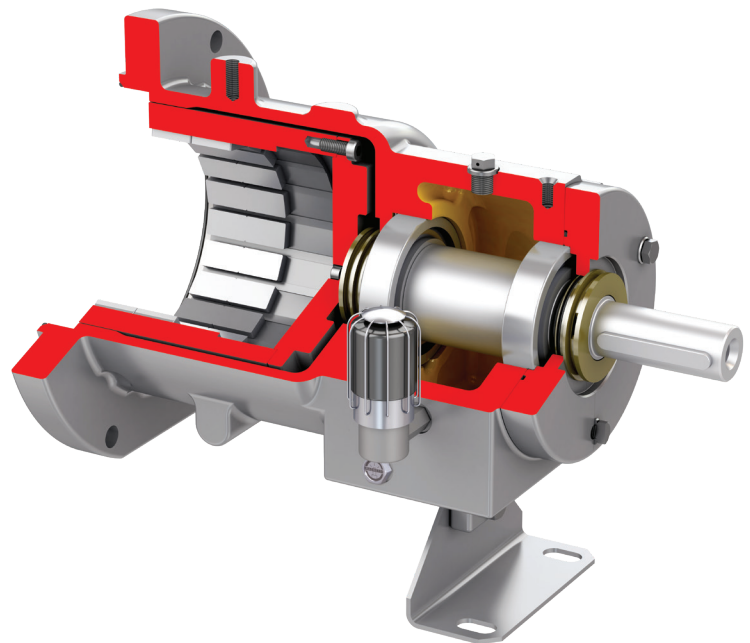
- Standard equipment on all long coupled Mark 3 ISO MAG pumps
- Static sealing technology prevents contamination during shutdown
- Transitions to non-contacting operation at startup
- Alternative bearing isolators available



## 7 - Power ends and interchangeability

Robust one-piece design in ductile cast iron with oversized ball bearings and bearing isolators.

- Oversized ball bearings with L10h life to 50,000+ hours available
- Available with open or closed bearing bracket connecting the pump to the motor (closed design shown)
- Magnetic drain plug
- Oil sight glass
- Different oil seal options
- Prepared for condition monitoring devices
- Interchangeable with mechanically sealed Durco Mark 3 power ends
- Optional secondary control system per ISO 15783
- Available drain, gauge and recirculation connections



## 8 - Lantern bracket designs

### Open

- Available only with the standard Alloy C-4 and high-efficiency C-4 containment shells
- Suitable for temperatures to 350°C (662°F)

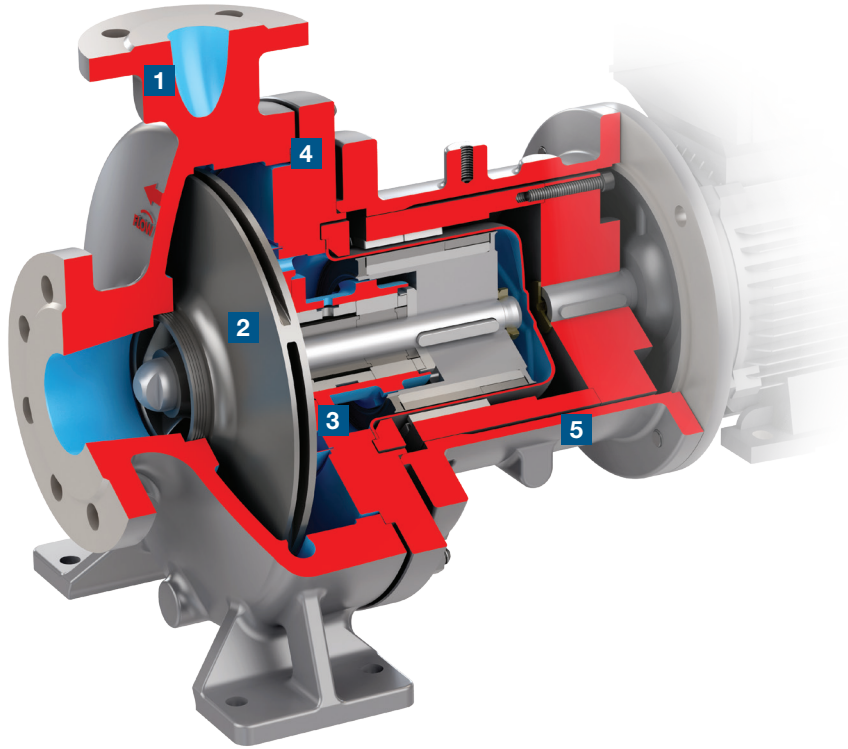
### Closed

- Available with all containment shell types
- Suitable for temperatures to 180°C (356°F)

### Options

- Heating
- Secondary control
- Condition monitoring
- Paints

## Close coupled design



### 1- Volute casing

- Standard PN 16 and PN 25 flanges per ISO 1092
- Drilling per ASME 150 and 300
- Drain and recirculation connections

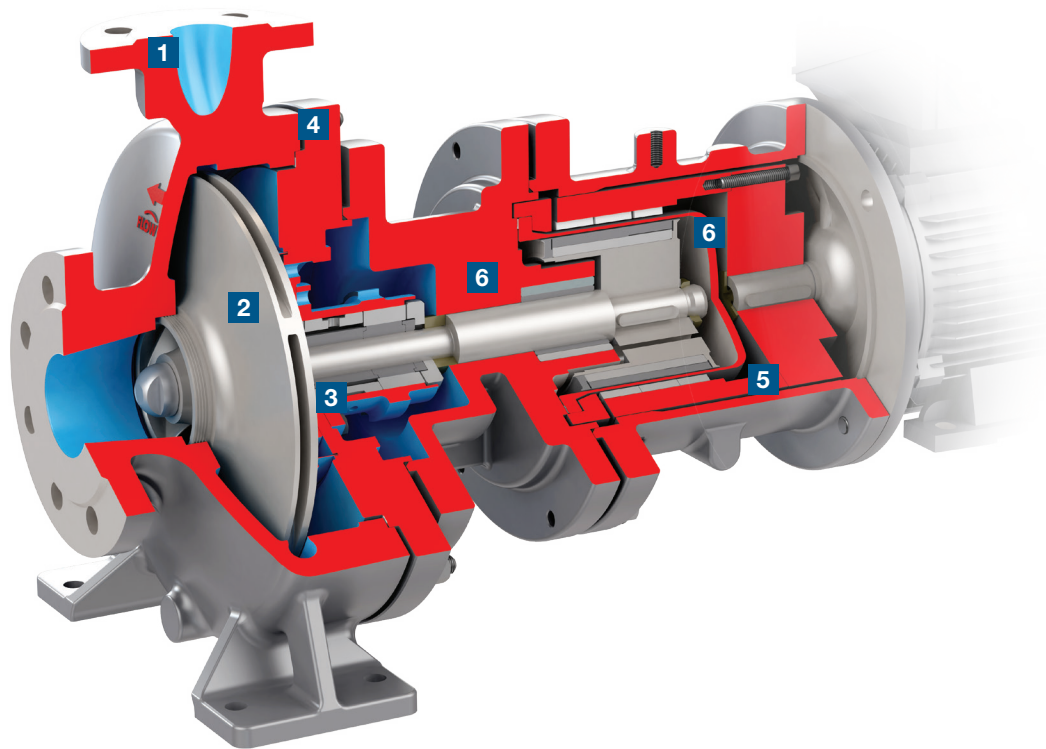
### 2 - Closed impeller

- Balancing holes compensate for axial thrust
- Impeller locking
- Hydraulic performance per ISO 2858 requirements

### 3/4 - Internal and external covers

- Internal wear ring
- Not replaceable
- Strainer support
- Flow path for internal circulation drainage and venting of containment shell

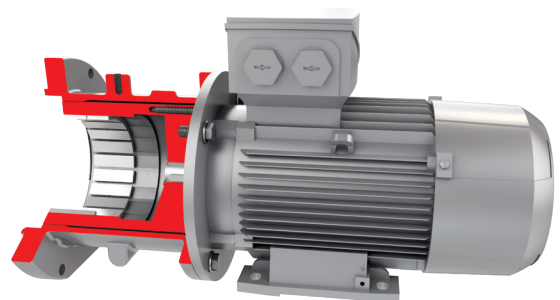




## 5 - Power ends

Space-saving design available with open or closed lantern bracket for connecting the pump to the motor (closed lantern shown)

- Maintenance-free design with no pump bearing housing (no pump bearings or lubrication required)
- Uses a standard electric motor
- No baseplate required
- Optional secondary control system per ISO 15783
- Available drain, gauge and recirculation connections
- Interchangeable with mechanically sealed Durco Mark 3 power ends



## Options

### Containment shells

#### Alloy C-4 containment shell

- Temperature to 350°C (662°F)
- Nominal pressure PN 40
- ATEX conform
- 3.1 material certificate

#### High-efficiency Alloy C-4 containment shell

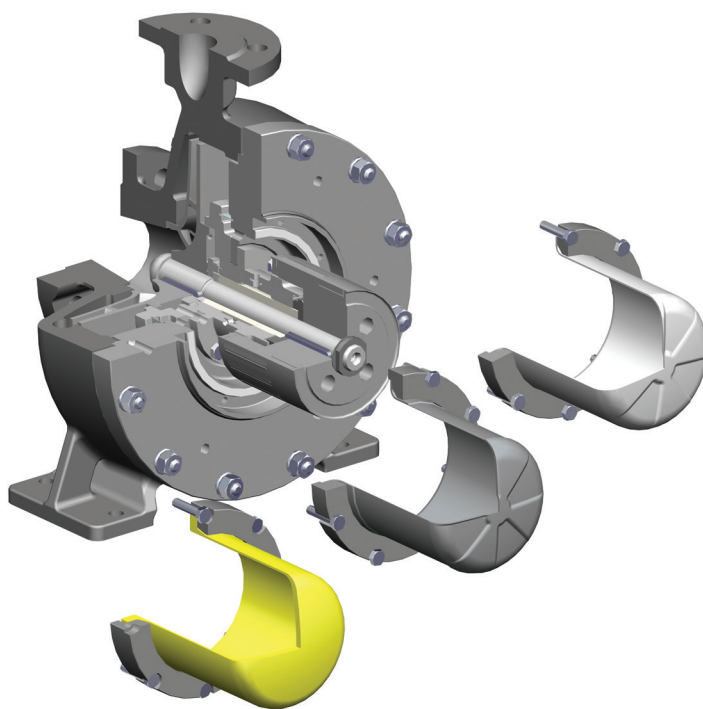
- Temperature to 180°C (356°F)
- Nominal pressure PN 25
- ATEX conform
- 3.1 material certificate
- Eddy current losses savings to 40%
- 5% higher magnetic drive efficiency

#### Ceramic containment shell

- Tin coated  $ZrO_2$
- Temperature to 400°C (752°F)
- Nominal pressure PN 25
- ATEX conform
- 3.1 material certificate
- No eddy current losses
- High fracture toughness
- Chemical, abrasion and thermoshock resistance

#### Interchangeability

The containment shells are 1:1 interchangeable. The gap between the inner and outer magnets allows the change without the need for any new parts except the containment shell. Highest flexibility to ensure safety and savings in your application.



## Secondary control system

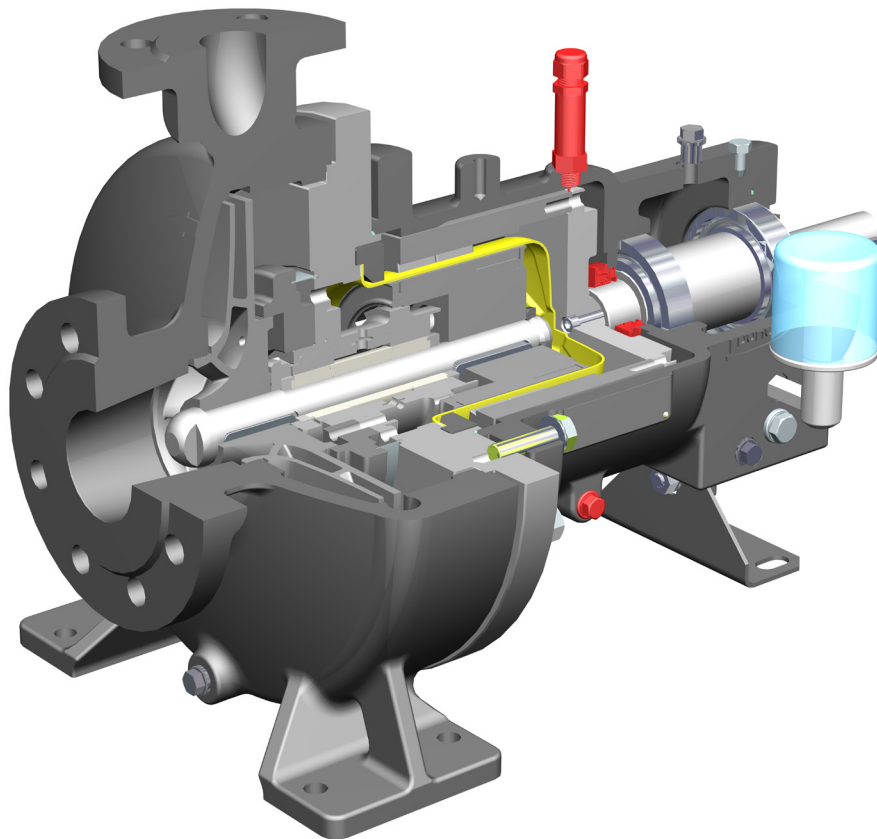
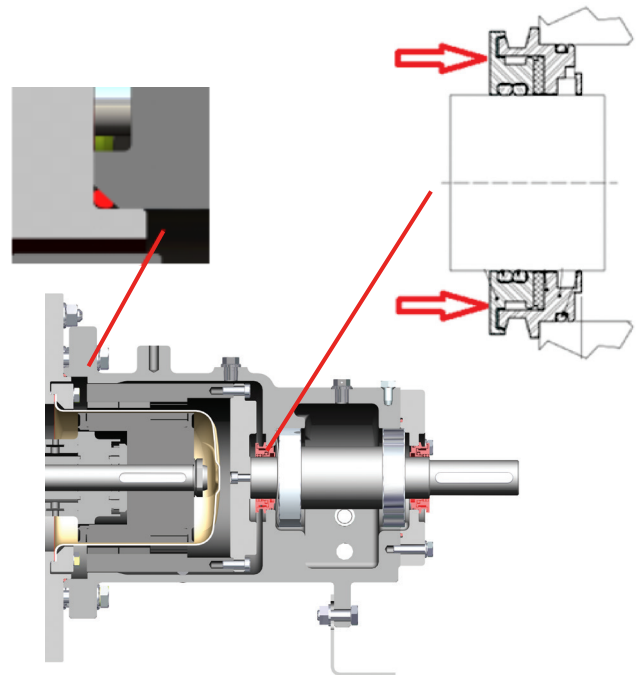
In the unexpected event of a failure of the containment shell, the bearing bracket with a secondary control seal can provide an additional level of protection for both workers and the environment. It is available as an option.

In accordance with EN 15 783, it is available for long and close coupled versions.

- 316 stainless rotor/stator
- Carbon steel stationary internal face
- Non-contacting during operation, so no lubrication is required

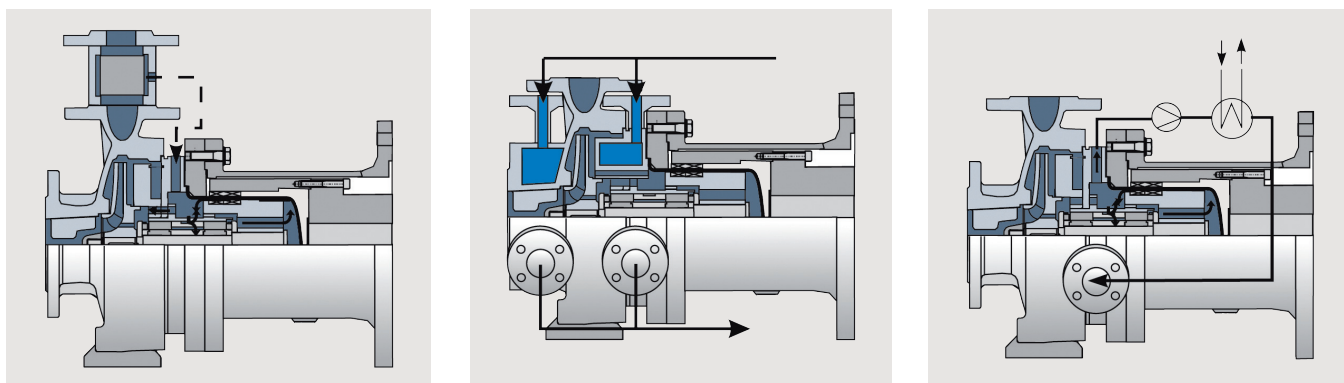
Limitations:

- Pressure to 25 bar (365 psi)
- Max. temperature to 180°C (356°F)
- Max. speed to 3,600 1/min
- Chemical-resistant for chemical applications



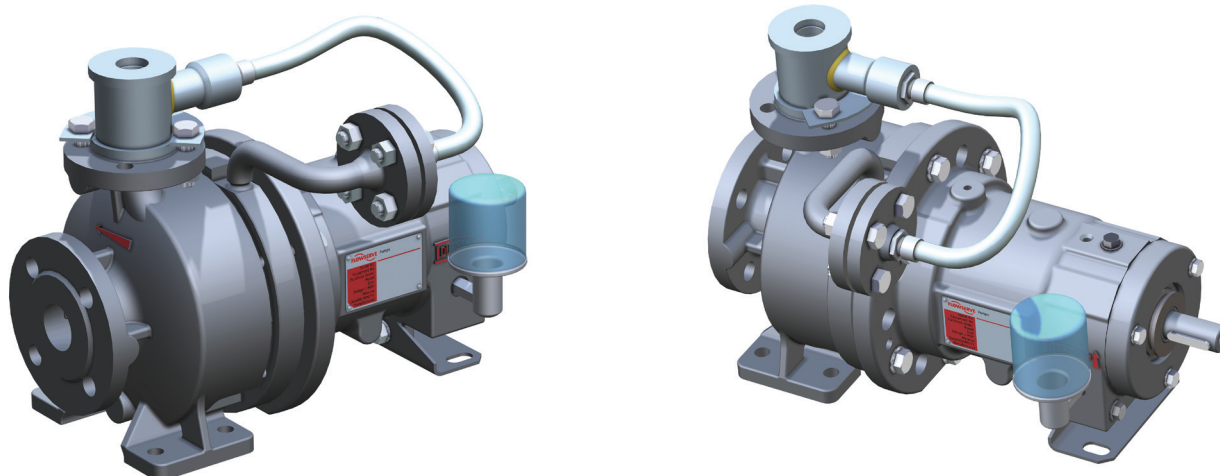
## Flushing

- Internal flow with implemented strainer as standard
- Free-flow filter for fluids
- External partial flow



## Free-flow filter

For applications containing solids, an optional free-flow filter can be installed to replace the standard strainer. The filter is installed between the pump casing discharge flange and the piping. All liquid discharged by the pump passes through the filter. The internal flow channel from the pump casing pressure side to the magnet chamber is closed and replaced by an external flanged connection that is connected to the outlet of the free-flow filter. The pressure inside the discharge line creates a partial flow through the filter strainer element to the magnet chamber. The strainer element has a rectangular mesh size of 0.4 x 4 mm (0.016 x 0.16 in.). Solids blocked by the strainer element are flushed to the process by the main flow passing through the filter.



## Paints

The correct paint system can make a considerable difference in a pump's working life, particularly in aggressive environments. The Durco Mark 3 ISO MAG pump is offered with a range of paint systems to meet these challenges, including those compliant with the ISO 12944 requirement of "long-term protection — up to 15 years to first maintenance".

Application	Primer	Intermediate	Finish	Total Dry Film Thickness	ISO 12944
<b>Standard industry</b>	✓	–	✓	>60	–
		–	✓	>90	–
<b>Aggressive chemical</b>		✓	✓	>200	–
<b>High temperature</b>	✓	–	✓	>100	–
<b>Very aggressive chemical or marine</b>	✓	✓	✓	>250	✓

## Testing

The following tests are available at customer request:



- Performance test per ISO 9906 and ASME/HI 14.6
- Dimensional inspection — 3D measuring devices
- Visual inspection — Level II inspectors
- Positive material identification (PMI)
- Liquid penetrant testing (PT)
- Magnetic particle testing (MT)
- Ultrasonic testing (UT)
- Radiographic testing (RT)
- Hydrostatic testing
- Paint adherence testing



# Accessories

## Baseplates

Flowsolve offers four pre-engineered baseplate designs to improve pump performance while reducing costs. This provides versatility in choosing the baseplate that best meets a user's application needs and operating budget. Reducing internal stress and vibration extends the life of pump and motor packages.

Baseplate*	Folded Steel	Cast Iron
		
<b>Number of sizes</b> — The right size baseplate for the pump/motor combination eliminates overhand and trip hazards	9	8
<b>ISO 3661 compliance</b> — Standard compliance for easy installation	Yes	Yes
<b>Grouting required</b> — Improved vibration response and stiffness for minimized MTBF	Yes	Yes
<b>Rigidity</b> — Torsional stress handling from high nozzle load applications	Medium	High
<b>Chemical resistance</b> — Minimizing MTBF	No	No
<b>Integrated drain pan/port</b> — Employee safety	Optional	No
<b>Integrated lifting eye</b> — Minimizing downtime and employee safety	No	No
<b>Stilt mounting</b> — Easy site modification with low installation costs	Optional	No

\*Special baseplates available upon request.

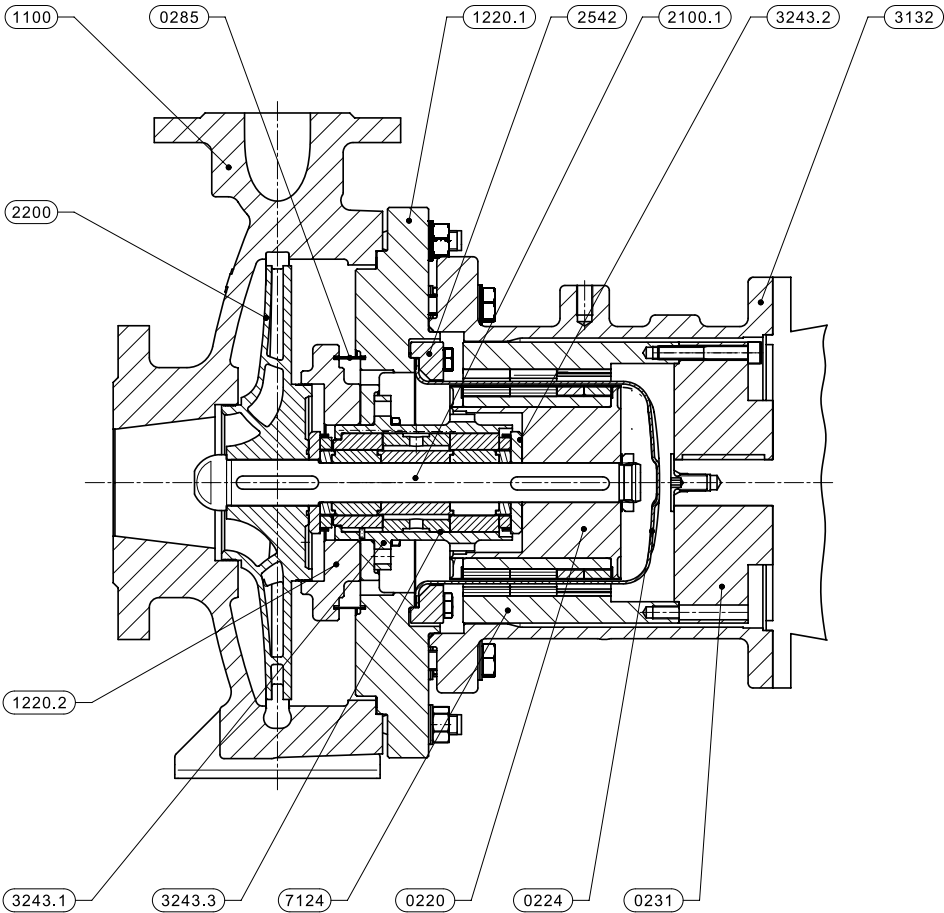
# Parts interchangeability

Frame	Magnetic System / Containment Shell	External Cover	Power End	Internal Cover	Impeller	Casing	Pump Size
							1K 40-25-125
							1K 50-32-125 1
							K 65-40-125
							1K 80-50-125
							1K 100-65-125
							1K 40-25-160
							1K 50-32-160
							1K 65-40-160
							1K 80-50-160
							1K 40-25-200
							1K 50-32-200
							1K 65-40-200
							1K 80-50-200
							2K 100-65-160
							2K 125-80-160
							2K 100-65-200
							2K 50-32-250
							2K 65-40-250
							2K 80-50-250
							2K 125-80-200
							2K 125-100-200
							2K 100-65-250
							2K 125-80-250
							2K 65-40-315
							2K 80-50-315
							2K 125-80-200
							2K 125-100-200
							2K 100-65-250
							2K 125-80-250
							2K 65-40-315
							2K 80-50-315
							3K 125-100-250
3K 150-125-250							
3K 200-150-250							
3K 100-65-315							
3K 125-80-315							
3K 125-100-315							
3K 150-125-315							
3K 125-100-250							
3K 150-125-250							
3K 200-150-250							
3K 100-65-315							
3K 125-80-315							
3K 125-100-315							
3K 150-125-315							

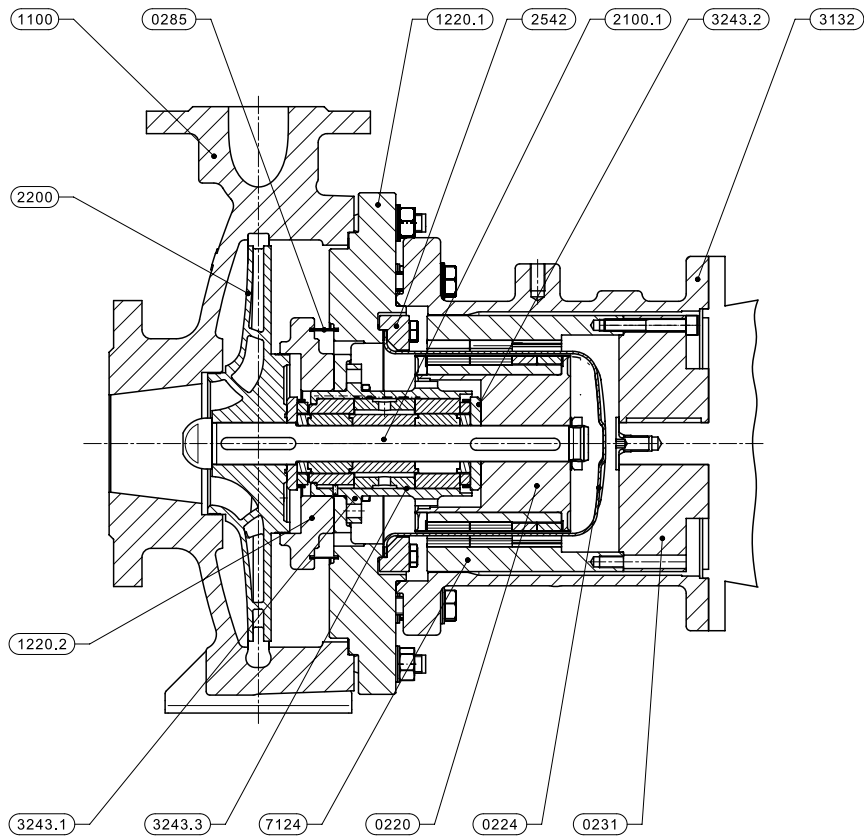
**DEFINITIONS:**

1. MAGNETIC SYSTEM: It is defined as the combination of Magnetic Coupling, Containment Shell, Inner Magnetic Rotor and PE Shaft.
2. POWER END: It is defined as the sub-assembly of components such as Bearing Bracket, DE Shaft, Outer Rotor Flange, Outer Rotor, Bearings, Bearing Guard and Bearing Bracket Cover.
3. IMPELLERS: 25/125 and 32/125 sizes will use the same impellers and similarly 25/160 and 32/160, 25/200 and 32/200 sizes also will use the same impeller, hence the total no. of impellers will be 29 against 32 no. of casings.

# Materials of construction







**Materials of construction (refer to drawings on pages 16 and 17)**

Design	Standard material			High temperature	
	Ductile cast iron	Stainless steel	Duplex	Ductile cast iron	Cast steel
<b>Volute casing</b>	Ductile cast iron	Stainless steel	Duplex	Ductile cast iron	Cast steel
<b>Impeller</b>	Cast iron	Stainless steel	Duplex	Cast iron	
<b>Casing cover</b>	Ductile cast iron	Stainless steel	Duplex	Ductile cast iron	
<b>Drive end shaft</b>	Stainless steel				
<b>Sleeve bearing</b>	Stainless steel / SSiC				
<b>Bearing bracket</b>	Ductile cast iron				
<b>Bearing insert</b>	Duplex / SSiC				
<b>Containment shell</b>	Hastelloy® or ceramic				
<b>Inner magnet</b>	Stainless steel / SmCo				
<b>Outer magnet</b>	Steel / SmCo				
<b>Outer rotor flange</b>	Steel				
<b>Strainer</b>	Stainless steel				
<b>Bearing bracket cover</b>	Ductile cast iron				
<b>Lantern</b>	Ductile cast iron				
<b>Non-drive shaft</b>	Duplex			Chrome steel	
<b>Clamping ring</b>	Steel				

*Hastelloy is a registered trademark of Haynes International.*

# Operating limits

## Temperature/Power

Type	Bearing Lubrication	Min. Temperature	Max. Temperature	Max. Power at 2900 1/min
long coupled	grease	-40°C (-40°F)	180°C (356°F)	90 kW
	oil		350°C (662°F)	
close coupled	none	-40°C (-40°F)	350°C (662°F) <sup>1</sup>	90 kW

1) 400°C (752°F) possible with heat barrier configuration.

## Speed

Size		Max. Speed, 1/min	
25x125	50x125	3,600	
25x160	50x160		
25x200	50x200		
32x125	50x250		
32x160	65x125		
32x200	65x160		
32x250 <sup>2</sup>	65x200		
40x125	65x250		
40x160	80x160		
40x200	80x200		
40x250 <sup>2</sup>			
40x315 <sup>3</sup>	80x315 <sup>3</sup>		3,000
50x315 <sup>3</sup>	100x200		
65x315 <sup>3</sup>	100x250		
80x250	100x315		
125x250	150x250	1,800	
125x315			

2) Except impeller material GG-25:  $n_{\max} = 2,900$  1/min

3) Except impeller material GG-25:  $n_{\max} = 1,800$  1/min

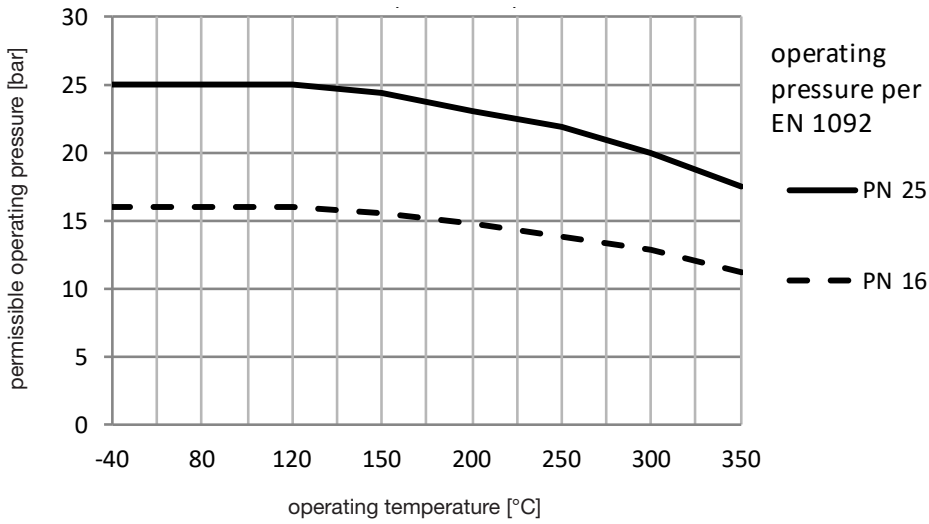
## Casing pressure

### Pressure and temperature limits

casing material: ductile cast iron (1...) alloy steel (2...)

material execution: 1... up to 350°C permissible

material execution: 2... up to 400°C permissible

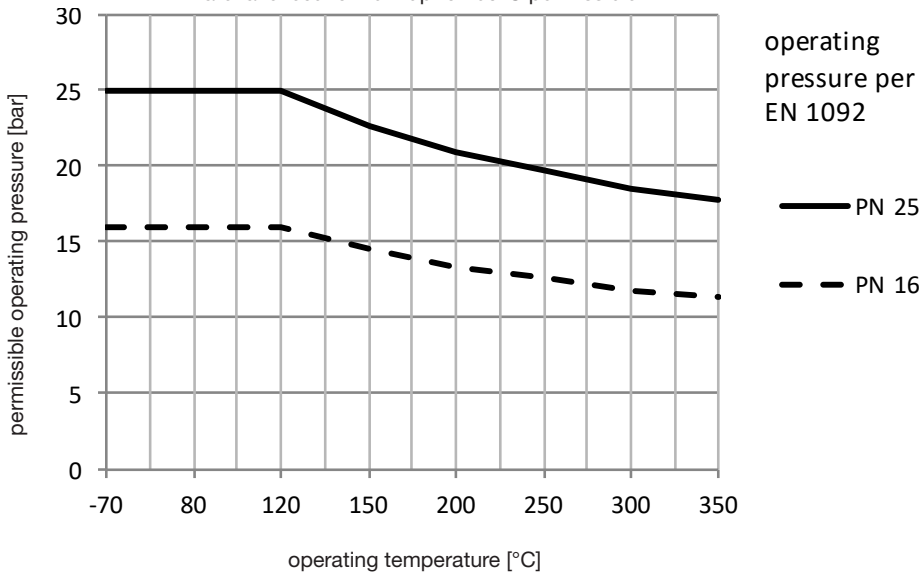


### Pressure and temperature limits

casing material: stainless steel (4...), Hastelloy (5...), Duplex (5...)

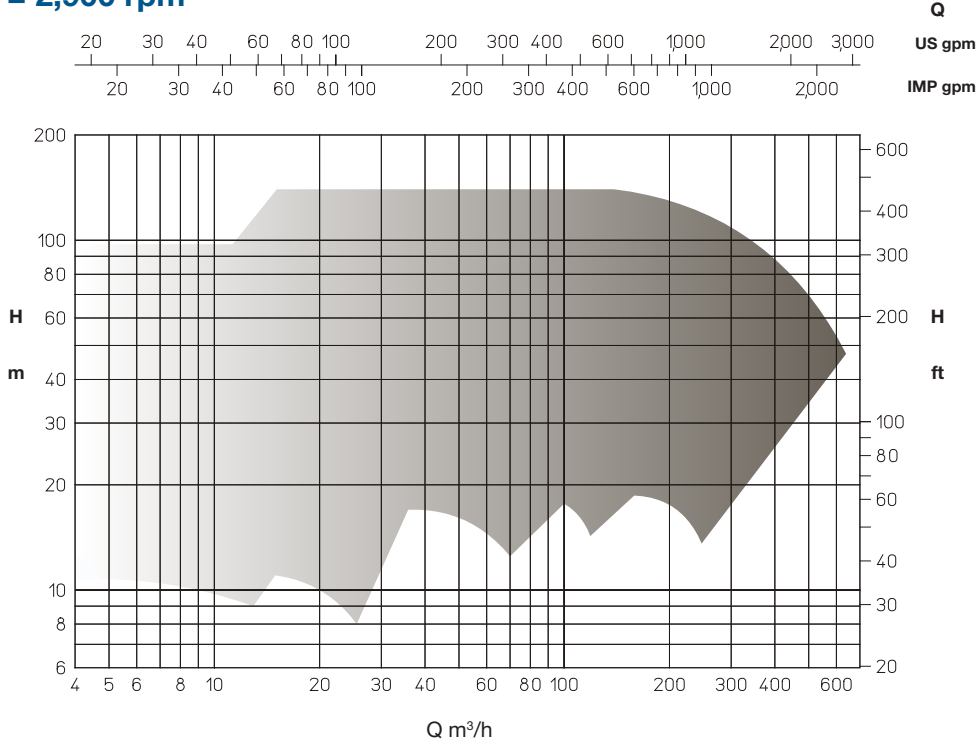
material execution: 4... up to 350°C permissible

material execution: 5... up to 250°C permissible

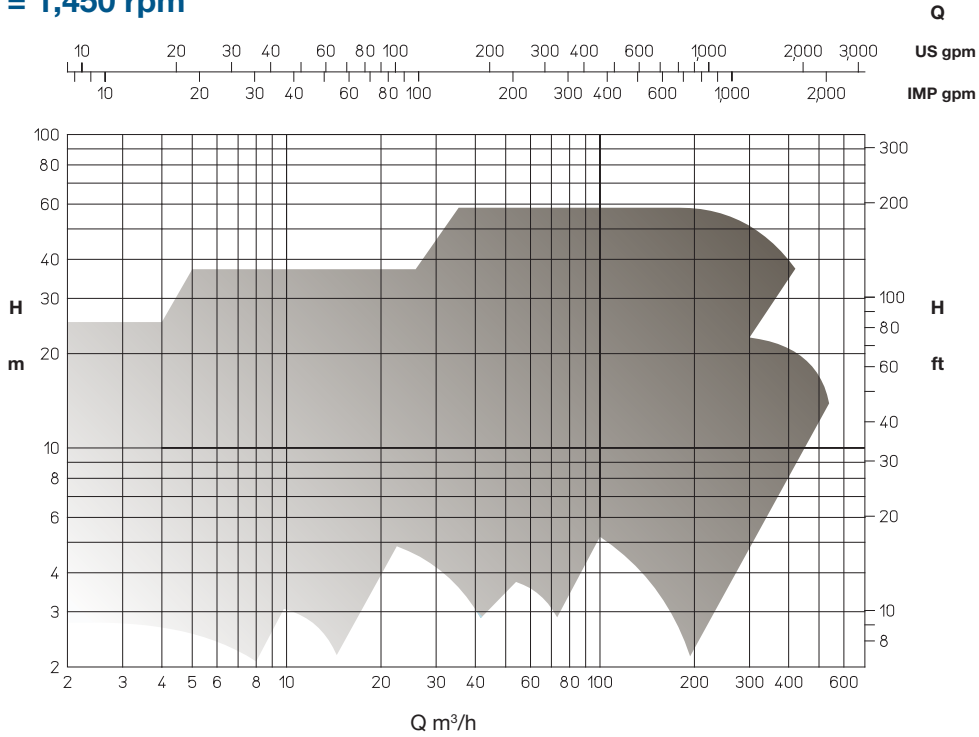


# Coverage charts – ISO 2858 50 Hz

**n = 2,900 rpm**

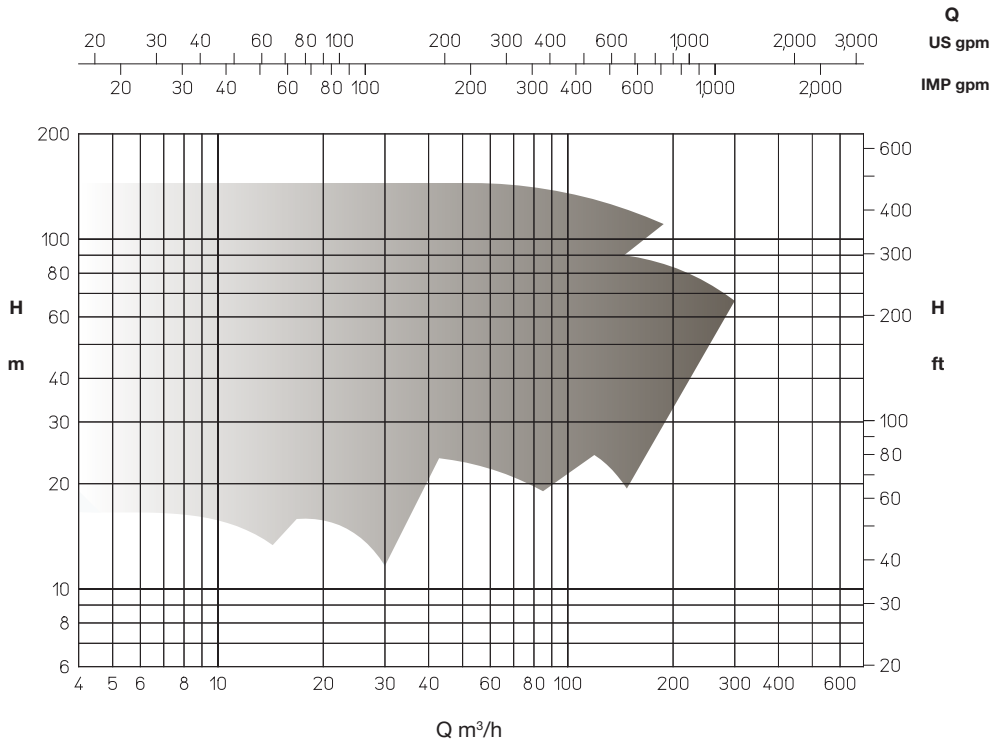


**n = 1,450 rpm**

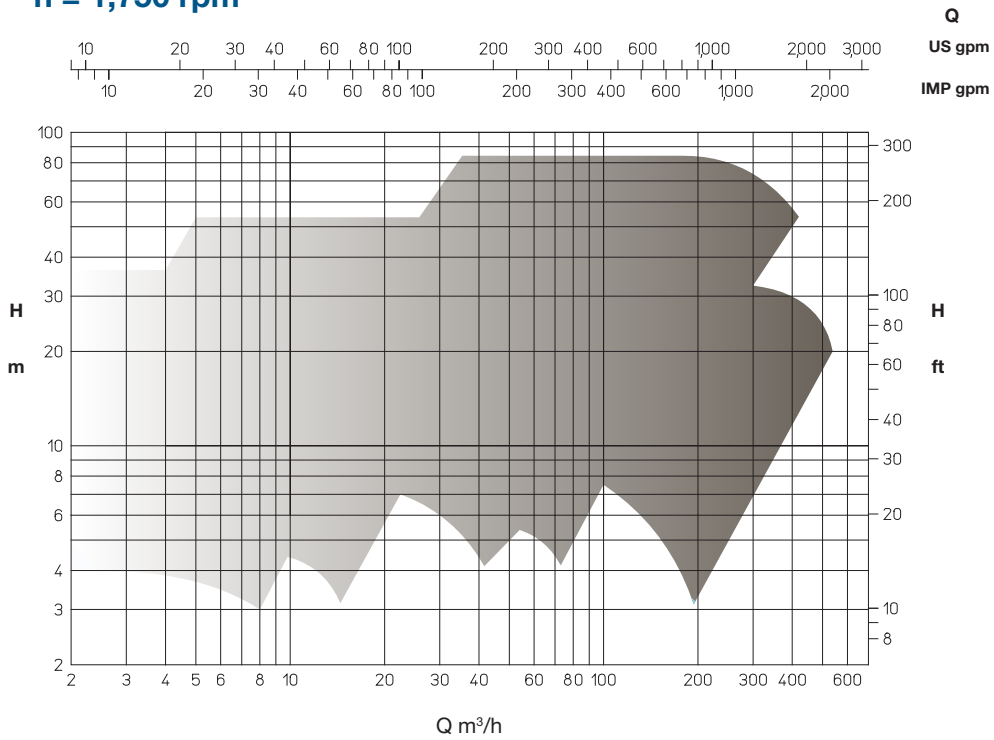


# Coverage charts – ISO 2858 60 Hz

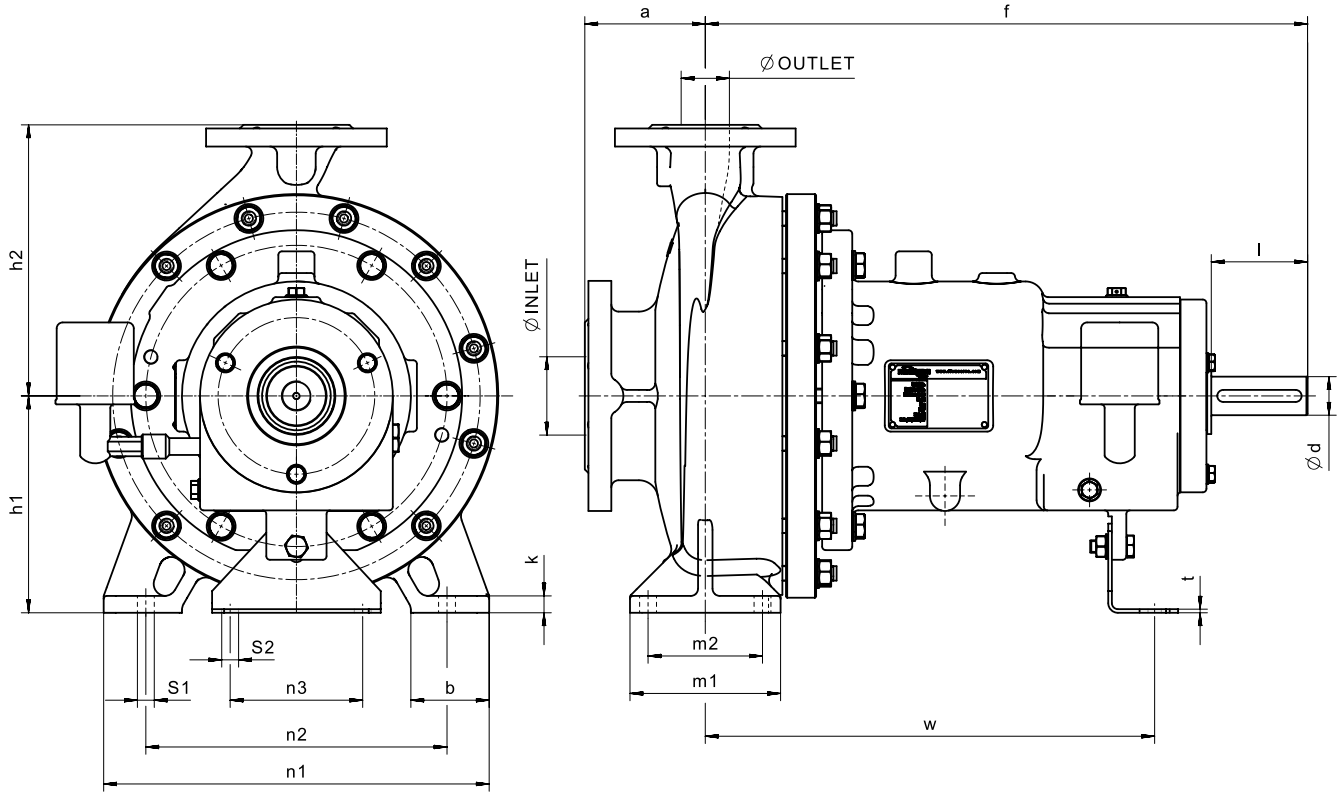
**n = 3,500 rpm**



**n = 1,750 rpm**



# Dimensions – long coupled pump



## Long coupled pump dimensions

All dimensions in mm, tolerances to EN 735

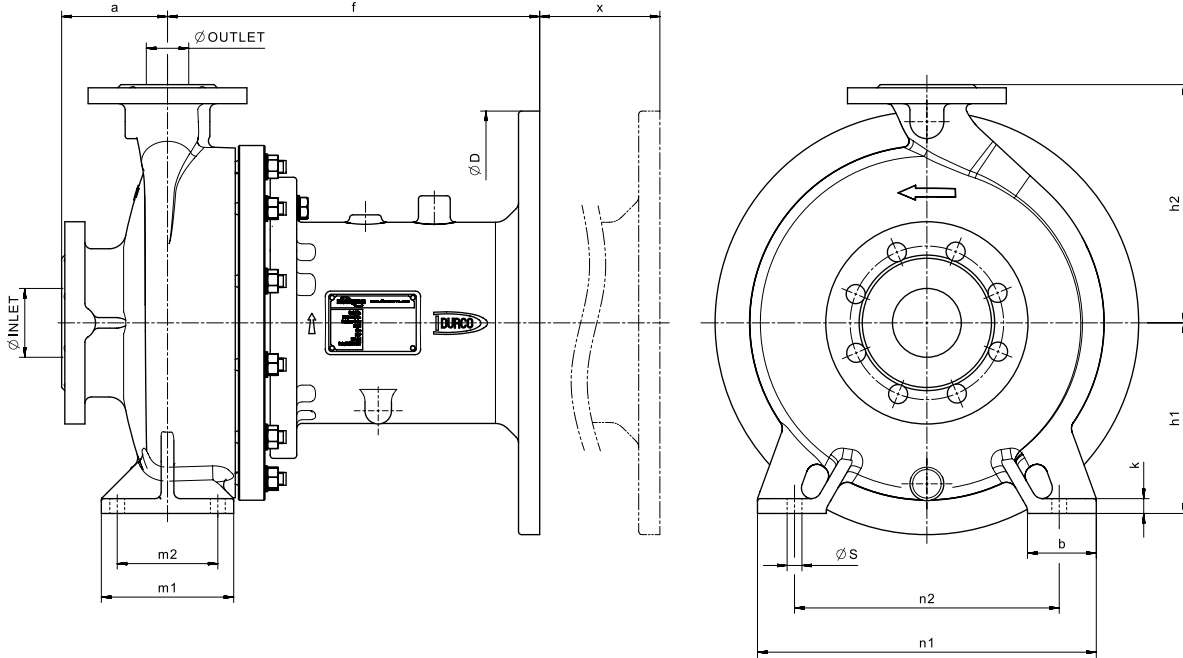
Pump Size			Frame Size	Magnetic System	Pump Dimensions				Support Dimensions							Clearance Holes for Bolts		Shaft End			
Inlet ø	Outlet ø	Impeller ø (Nominal)			a	f	h1	h2	b	m1	m2	n1	n2	n3	k**	t**	w	S1	S2	d	l
40	25	125	1	1	80	112	140	50	100	70	190	140	14								
50	32	125									210	160									
65	40	125									240	190									
80	50	125									280	212									
100	65	125									280	212									
40	25	160			80	385	132	160				240	190	110	3	285	M12	M12	24	50	
50	32	160			80	132	160					240	190	110	3	285	M12	M12	24	50	
65	40	160			80	132	160					240	190	110	3	285	M12	M12	24	50	
80	50	160			100	100	160	180	50	100	70	265	212	14							
40	25	200			2	80	160	180				240	190								
50	32	200	2	80	160	180				240	190										
65	40	200	2	100	160	200				265	212										
80	50	200	2	100	160	200				265	212										

## Long coupled pump dimensions *continued* (see drawing on page 22)

All dimensions in mm, tolerances to EN 735

Pump Size			Frame Size	Magnetic System	Pump Dimensions				Support Dimensions							Clearance Holes for Bolts		Shaft End					
Inlet ø	Outlet ø	Impeller ø (Nominal)			a	f	h1	h2	b	m1	m2	n1	n2	n3	k**	t**	w	S1	S2	d	l		
100	65	160	2	3	100	500	160	200				280	212										
125	80	160			125																		
100	65	200			100																		
50	32	250							180	225	65	125	95	320	250					M12			
65	40	250																					
80	50	250																					
125	80	200			6			250				345											
125	100	200						200	280					280									
100	65	250							250	80	160	120		360					M16	M12	32	80	
125	80	250							225	280				400	315	110		3	370				
65	40	315						200	250														
80	50	315							225	280	65	125	95	345					M12				
125	80	200			4	125	555.5*	180	250					280									
125	100	200							200	280													
100	65	250								250	80	160	120							M16			
125	80	250								225	280					400	315						
65	40	315							200	250													
80	50	315								225	280	65	125	95	345	280				M12			
125	100	250	3	6	140	530	225	280															
150	125	250							250	355	80	160	120	400	315					M16			
200	150	250						160		280	375	100	200	150	500	400				M20			
100	65	315						125		225	280												
125	80	315								315	80	160	120	400	315					M16			
125	100	315								250													
150	125	315						355	100	200	150	500	400					M20	M12	42	110		
125	100	250			4	140	570.5*	225	280						110		3	370					
150	125	250								250	355	80	160	120	400	315				M16			
200	150	250						160		280	375	100	200	150	500	400				M20			
100	65	315						125		225	280												
125	80	315								315	80	160	120	400	315					M16			
125	315	315							250														
150	125	315			140		315																
							280	100	200	150	500	400					M20						

# Dimensions – close coupled pump



## Close coupled pump dimensions

All dimensions in mm, tolerances to EN 735

Motor Size	Pump Size			Frame Size	Magnetic System	Pump Dimensions				Support Dimensions					S	D	x					
	Inlet $\varnothing$	Outlet $\varnothing$	Impeller (Nominal) $\varnothing$			a	f	h1	h2	b	m1	m2	n1	n2				k				
80A, 80B, 90S, 90L, 100L, 112M, 132S, 132M	40	25	125	1	1	80	272	112	140	50	100	70	190	140	14	M12	90	250				
292							300															
272	250																					
292	300																					
272	250																					
292	300																					
100	80	50	125			100	272	132	160	65	125	95	280	212	15			250				
292							300															
100	80	40	160			80	272	132	160	50	100	70	240	190	14			250				
292							300															
272	250																					
292	300																					
272	250																					
292	300																					
80	65	40	160	80	272	160	180	50	100	70	240	190	14	250								
292					300																	
100	80	50	160	100	301.5									160	180	50	100	70	265	212	14	250
351.5					400																	
301.5	250																					
351.5	400																					
301.5	250																					
351.5	400																					
80	50	32	200	80	301.5	160	180	50	100	70	240	190	14	250								
351.5					400																	
301.5	250																					
351.5	400																					
301.5	250																					
351.5	400																					
100	65	40	200	100	301.5	200	200	50	100	70	265	212	14	250								
351.5					400																	
301.5	250																					
351.5	400																					
301.5	250																					
351.5	400																					
100	80	50	200	100	301.5	200	200	50	100	70	265	212	14	250								
351.5					400																	
301.5	250																					
351.5	400																					
301.5	250																					
351.5	400																					

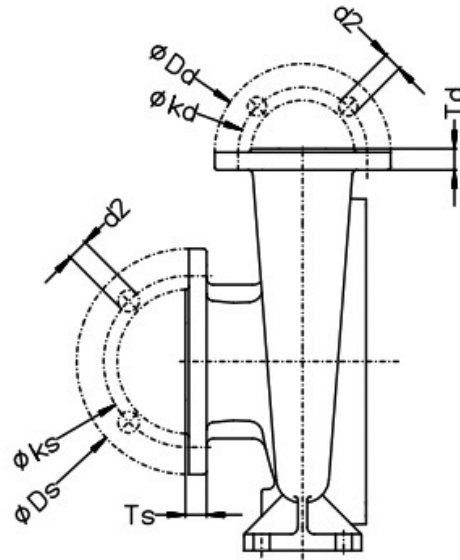


## Close coupled pump dimensions *continued* (see drawing on page 24)

All dimensions in mm, tolerances to EN 735

Motor Size	Pump Size			Frame Size	Magnetic System	Pump Dimensions				Support Dimensions						S	D	x												
	Inlet $\varnothing$	Outlet $\varnothing$	Impeller (Nominal) $\varnothing$			a	f	h1	h2	b	m1	m2	n1	n2	k															
80A, 80B, 90S, 90L, 100L, 112M	100	65	160	2	3	100	301.5	160	200	180	65	125	95	320	250	14	M12	250	90											
132S, 132M, 160M, 160L, 180A, 180L, 200L							351.5											400												
80A, 80B, 90S, 90L, 100L, 112M	125	80	160			125	301.5	250	250									250		250	250	250	250	250	250	250	250	250	250	250
132S, 132M, 160M, 160L, 180A, 180L, 200L							351.5	400																						
80A, 80B, 90S, 90L, 100L, 112M	100	65	200			100	301.5	250	250									250		250	250	250	250	250	250	250	250	250	250	250
132S, 132M, 160M, 160L, 180A, 180L, 200L							351.5	400																						
80A, 80B, 90S, 90L, 100L, 112M	50	32	250			100	301.5	250	250									250		250	250	250	250	250	250	250	250	250	250	250
132S, 132M, 160M, 160L, 180A, 180L, 200L							351.5	400																						
80A, 80B, 90S, 90L, 100L, 112M	65	40	250			100	301.5	250	250									250		250	250	250	250	250	250	250	250	250	250	250
132S, 132M, 160M, 160L, 180A, 180L, 200L							351.5	400																						
80A, 80B, 90S, 90L, 100L, 112M	80	50	250			100	301.5	250	250									250		250	250	250	250	250	250	250	250	250	250	250
132S, 132M, 160M, 160L, 180A, 180L, 200L							351.5	400																						
132S, 132M, 160M, 160L, 180A, 180L, 200L	125	80	200		125	432.5	250	250	250									250		250	250	250	250	250	250	250	250	250	250	
225S, 225M, 250S, 250M, 280S, 280A						461.5	550																							
132S, 132M, 160M, 160L, 180A, 180L, 200L	125	100	200		125	432.5	200	280	280									280		280	280	280	280	280	280	280	280	280	280	
225S, 225M, 250S, 250M, 280S, 280A						461.5	550																							
132S, 132M, 160M, 160L, 180A, 180L, 200L	100	65	250		100	432.5	250	250	250									250		250	250	250	250	250	250	250	250	250	250	
225S, 225M, 250S, 250M, 280S, 280A						461.5	550																							
132S, 132M, 160M, 160L, 180A, 180L, 200L	125	80	250		125	432.5	225	280	280									280		280	280	280	280	280	280	280	280	280	280	
225S, 225M, 250S, 250M, 280S, 280A						461.5	550																							
132S, 132M, 160M, 160L, 180A, 180L, 200L	65	40	315		65	432.5	200	250	250									250		250	250	250	250	250	250	250	250	250	250	
225S, 225M, 250S, 250M, 280S, 280A						461.5	550																							
132S, 132M, 160M, 160L, 180A, 180L, 200L	80	50	315		80	432.5	225	280	280									280		280	280	280	280	280	280	280	280	280	280	
225S, 225M, 250S, 250M, 280S, 280A						461.5	550																							
132S, 132M, 160M, 160L, 180A, 180L, 200L	125	100	250	125	447.5	280	280	280	280	280	280	280	280	280	280	280	280	280	280											
225S, 225M, 250S, 250M, 280S, 280A					476.5	550																								
132S, 132M, 160M, 160L, 180A, 180L, 200L	150	125	250	150	447.5	250	355	355	355	355	355	355	355	355	355	355	355	355	355											
225S, 225M, 250S, 250M, 280S, 280A					476.5	550																								
132S, 132M, 160M, 160L, 180A, 180L, 200L	200	150	250	200	447.5	280	375	375	375	375	375	375	375	375	375	375	375	375	375											
225S, 225M, 250S, 250M, 280S, 280A					476.5	550																								
132S, 132M, 160M, 160L, 180A, 180L, 200L	100	65	315	100	447.5	225	280	280	280	280	280	280	280	280	280	280	280	280	280											
225S, 225M, 250S, 250M, 280S, 280A					476.5	550																								
132S, 132M, 160M, 160L, 180A, 180L, 200L	125	80	315	125	447.5	315	315	315	315	315	315	315	315	315	315	315	315	315	315											
225S, 225M, 250S, 250M, 280S, 280A					476.5	550																								
132S, 132M, 160M, 160L, 180A, 180L, 200L	125	100	315	125	447.5	250	355	355	355	355	355	355	355	355	355	355	355	355	355											
225S, 225M, 250S, 250M, 280S, 280A					476.5	550																								
132S, 132M, 160M, 160L, 180A, 180L, 200L	150	125	315	150	447.5	280	355	355	355	355	355	355	355	355	355	355	355	355	355											
225S, 225M, 250S, 250M, 280S, 280A					476.5	550																								

## Dimensions – flanges



### DIN PN 16

DN <sub>d</sub> DN <sub>s</sub>	25	32	40	50	65	80	100	125	150	200	250	300
k - PCD	85	100	110	125	145	160	180	210	240	295	355	410
d <sub>2</sub> x n - HD X NB	14x4	18x4	18x4	18x4	18x4	18x8	18x8	18x8	22x8	22x12	26x12	26x12

### DIN PN 25

DN <sub>d</sub> DN <sub>s</sub>	25	32	40	50	65	80	100	125	150	200	250	300
k	85	100	110	125	145	160	190	220	250	310	370	430
d <sub>2</sub> x n	14x4	18x4	18x4	18x4	18x8	18x8	22x8	26x8	26x8	26x12	30x12	30x16

### ASME 150 RF

DN <sub>d</sub> DN <sub>s</sub>	25	32	40	50	65	80	100	125	150	200	250	315
	1 in. <sup>2</sup>	1.5 in. <sup>1</sup>	1.5 in.	2 in.	2.5 in.	3 in.	4 in.	5 in.	6 in.	8 in.	10 in.	12 in.
k	79.4	98.4	98.4	120.6	139.7	152.4	190.5	215.9	241.3	298.4	362	431.8
d <sub>2</sub> x n	16x4	16x4	16x4	20x4	20x4	20x4	20x8	23x8	23x8	23x8	26x12	26x12

### ASME 300 RF

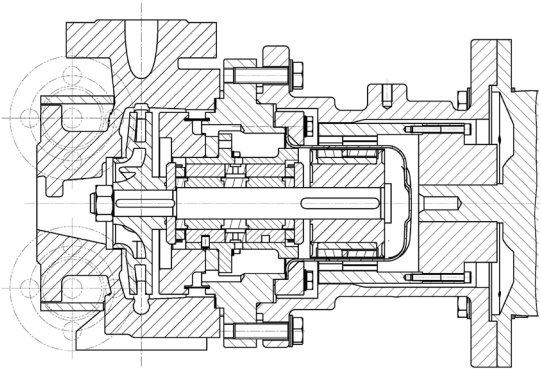
DN <sub>d</sub> DN <sub>s</sub>	25	32	40	50	65	80	100	125	150	200	250	315
	1 in. <sup>2</sup>	1.5 in. <sup>1</sup>	1.5 in.	2 in.	2.5 in.	3 in.	4 in.	5 in.	6 in.	8 in.	10 in.	12 in.
k	88.9	98.6	114.3	127	149.2	168.3	200	235	269.9	330.2	387.4	450.8
d <sub>2</sub> x n	20x4	20x4	23x4	20x8	23x8	23x8	23x8	23x8	23x12	26x12	29x16	32x16

## Flange dimensions

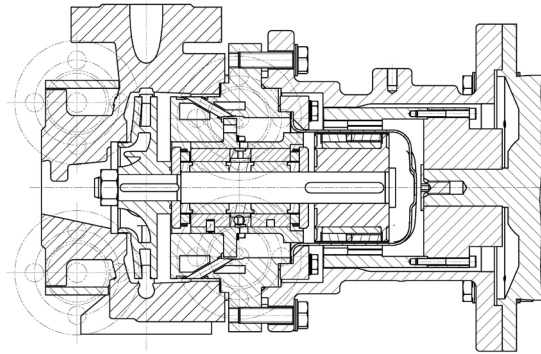
All dimensions in mm, tolerances to EN 735

Pump size			Ductile cast iron, PN 16 / PN 25				Stainless steel, PN 16 / PN 25				Ductile cast iron, ASME 150 RF				Stainless steel, ASME 150 RF				Ductile cast iron, ASME 300 RF				Stainless steel, ASME 300 RF					
			Discharge nozzle		Suction nozzle		Discharge nozzle		Suction nozzle		Discharge nozzle		Suction nozzle		Discharge nozzle		Suction nozzle		Discharge nozzle		Suction nozzle		Discharge nozzle		Suction nozzle			
			DN <sub>v</sub>	DN <sub>s</sub>	Dd	Td	Ds	Ts	Dd	Td	Ds	Ts	Dd	Td	Ds	Ts	Dd	Td	Ds	Ts	Dd	Td	Ds	Ts	Dd	Td	Ds	Ts
40	25	125																										
40	25	160	25	40	-	-	-	-	115	18	150	19	-	-	-	-	115	18	150	19	-	-	-	-	115	18	150	19
40	25	200																										
50	32	125																										
50	32	160	32	50	140	20	165	22	140	18	165	20	140	18	165	20	140	18	165	20	140	18	165	20	140	18	165	20
50	32	200																										
50	32	250																										
65	40	125								22	185						-	-	-	-					-	-	-	-
65	40	160																										
65	40	200	40	65	150	20	191	24	150																			
65	40	250								18	191						150	18	191	22					150	18	191	22
65	40	315																										
80	50	125																										
80	50	160																										
80	50	200																										
80	50	250	50	80	165	22	200	26	165	20	200	24	165	20	200	24	165	20	200	24	165	20	200	24	165	20	200	24
80	50	315																										
100	65	125																										
100	65	160																										
100	65	200	65	100	191	24	235	28	191	22	235	24	191	22	235	25	191	22	235	24	191	22	235	25	191	22	235	24
100	65	250																										
100	65	315														26												
125	80	160																										
125	80	200																										
125	80	250	80	125	200	26	270	30	200	24	270	26	200	24	270	27	200	24	270	26	200	24	270	27	200	24	270	26
125	80	315																										
125	80	400																										
125	100	200																										
125	100	250																										
125	100	315	100	125	235	28	270	30	229	24	270	26	235	25	270	27	229	24	270	26	235	25	270	27	229	24	270	26
125	100	400																										
150	125	250																										
150	125	315	125	150	270	30	300	34	270	26	300	28	270	27	300	31	270	26	300	28	270	27	300	31	270	26	300	28
150	125	400																										
200	150	250	150	200	300	34	360	34	300	29	360	32	300	31	360	31	300	29	360	32	300	31	360	31	300	29	360	32

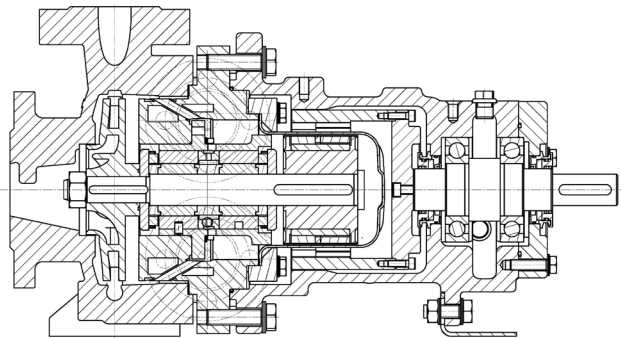
## Dimensions – heating jackets



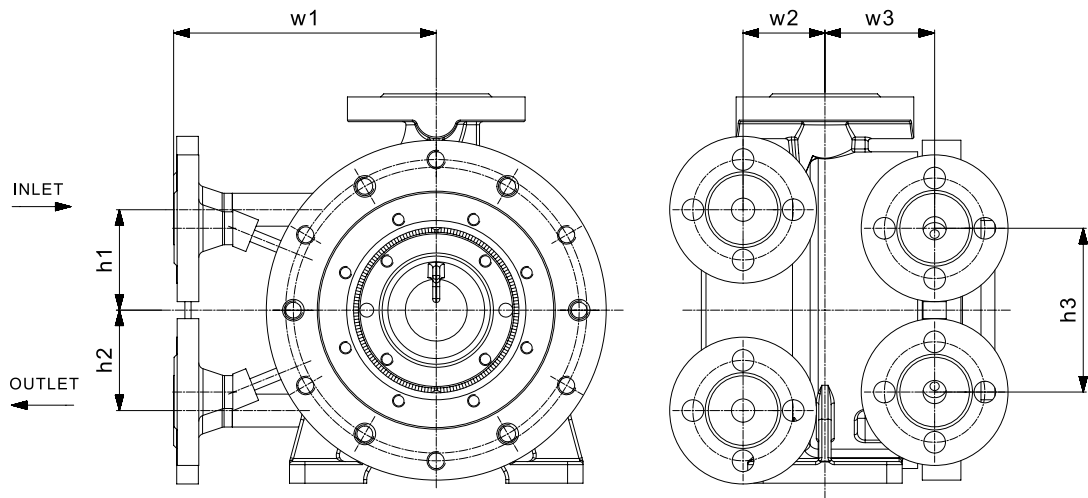
Heatable volute casing



Heatable volute casing and cover



Heatable cover

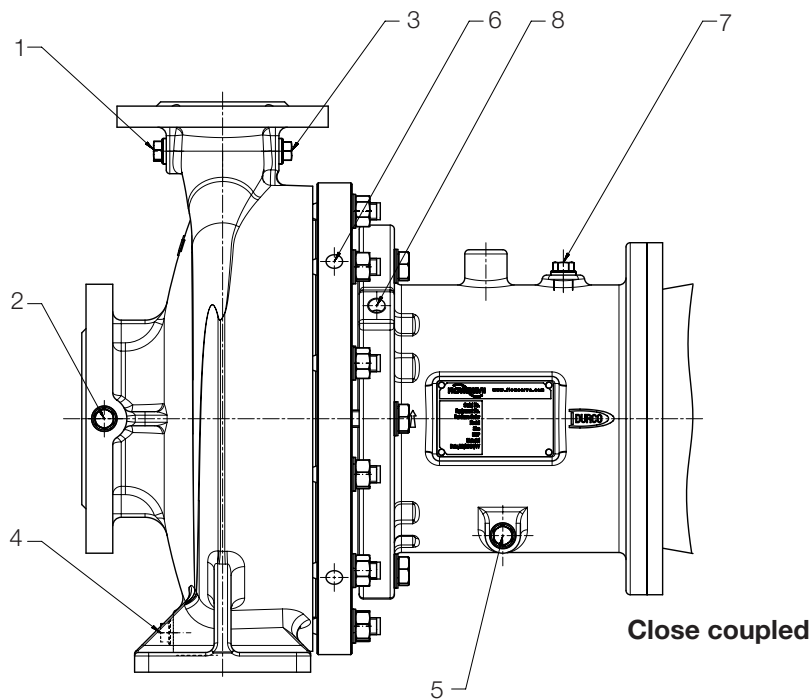


## Heating jacket dimensions

All dimensions in mm or °, tolerances to EN 735

Pump size			Frame Size	Values of connections											
				$h_1$	$h_2$	$h_3$	$w_1$	$w_2$	$w_3$	$w_4$	$f_1$	$f_2$	$l$	Flange	
50	32	125	1	70	70	-	160	45	71	-	55	0	75	DN15	
50	32	160		69.5	69.5	152	175	40	77	70		10			
50	32	200		103	97	162	190	50	66	67		0			
50	32	250	2	114.5	110.5	196	200	65	76	70	35	-			
65	40	125	1	-	-	-	-	-	-	-		55			10
65	40	160		82	82	152	175	43	77	70					0
65	40	200		95	95	162	200	60	66	67	0				
65	40	250	2	110	115	196		65	76	70	35	10			
65	40	315		125	125	-		75	93	-		0			
80	50	125	1	-	-	-	-	-	-	-	55	10			
80	50	160		87	87	152	175	50	77	70		0			
80	50	200		100	100	162	205	55	66	67		0			
80	50	250	2	120	120	-	200	75	76	-	35	10			
80	50	315		-	-	-	230	85	93	-		0			
100	65	125	1	-	-	-	-	-	-	-	55	-			
100	65	160	2	92	63	152	188	55	73	70		0			
100	65	200		110	110	-	210	60	76	-		10			
100	65	250		115	115	174	235	75	77	83		0			
100	65	315	3	-	-	-	-	-	-	-		10			
125	80	160	2	130	130	-	215	80	73	80		0			
125	80	200		115	115	-	220	75	81	75		10			
125	100	200		135	135	-	215	80	80	-	0				

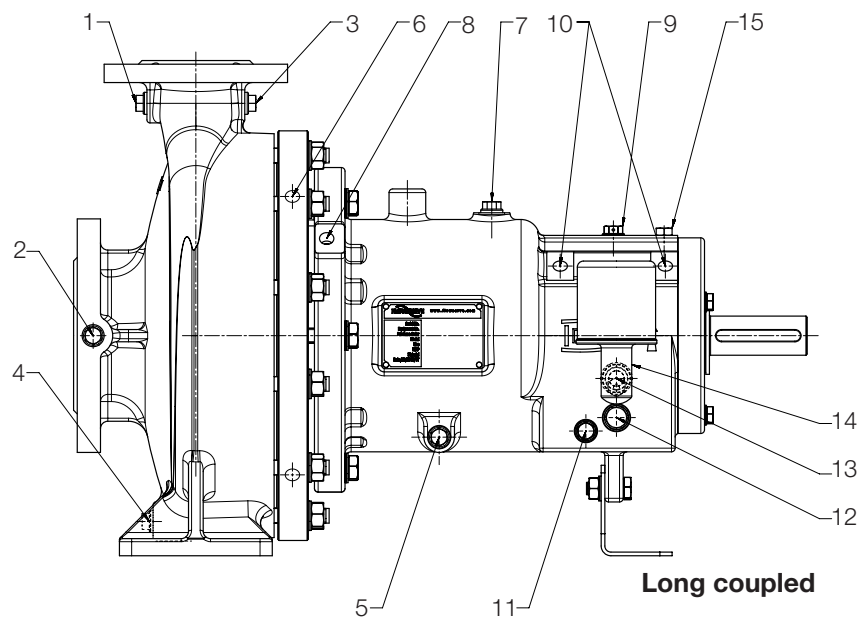
## Dimensions – connections



### Close coupled

Pos.	Description	Execution	Connection
1	Pressure gauge	By request	G1/4, G1/2 <sup>1</sup>
2	Vacuum and pressure gauge	By request	G1/4, G1/2 <sup>1</sup>
3	Re-circulation	By request	G1/4
4	Casing drain	By request	G1/4, G3/8 <sup>1</sup>
5	Secondary drain	By request (LHS or RHS)	G1/4
6	External flush	By request	DN15
7	Leak detector	By request	G1/4
8	Containment shell temperature probe	By request (LHS or RHS)	G1/4

1) Depending on size



### Long coupled

Pos.	Description	Execution	Connection
1	Pressure gauge	By request	G1/4, G1/2 <sup>1</sup>
2	Vacuum and pressure gauge	By request	G1/4, G1/2 <sup>1</sup>
3	Re-circulation	By request	G1/4
4	Casing drain	By request	G1/4, G3/8 <sup>1</sup>
5	Secondary drain	By request (LHS or RHS)	G1/4
6	External flush	By request	DN15
7	Leak detector	By request	G1/4
8	Containment shell temperature probe	By request (LHS or RHS)	G1/4
9	Filter/vent/breather	For oil lubrication – vent	G1/4
10	Bearing temperature probe	By request (LHS or RHS)	G1/4
11	Oil drain	For oil lubrication – drain	G1/4
12	Oil cooler	For oil lubrication	G3/8
13	Oil level sight glass	Execution with oil dip stick or oil sight glass	G1/2
14	Constant level oiler	Execution with oil level controller	G1/4
15	Vibration monitor	All executions	M8

1) Depending on size



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