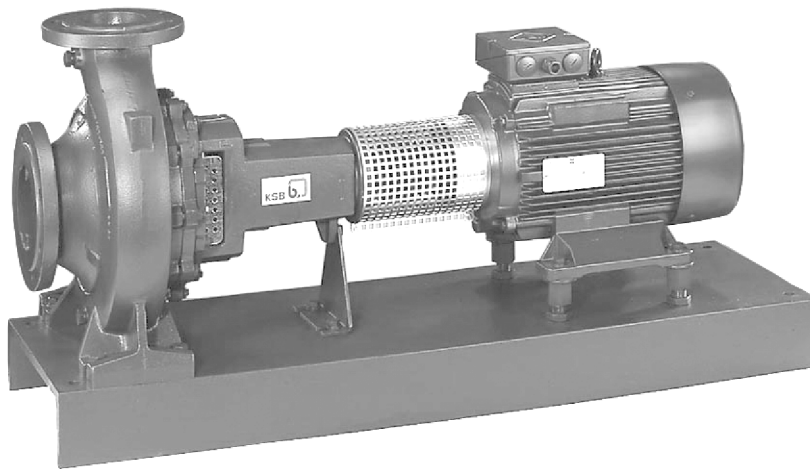


Standardized Pumps



Fields of Application

- Water supply
- Fire-fighting systems
- Sprinkling
- Irrigation
- Drainage
- Heating
- Air-conditioning systems
- Drinking water
- Service water
- Hot water
- Cooling water
- Swimming pool water
- Sea water
- Fire-fighting water
- Brackish water
- Condensate
- Brine
- Oils
- Cleaning agents

Fluid

Pure liquids not chemically or mechanically aggressive to the pump materials.

Operating Data

Q up to 1900 m³/h, (528 l/s)
H up to 102 m
t -30 °C to +140 °C
p₂ up to 16 bar ¹⁾

¹⁾ see pressure/temperature limits given on page 5 of type series booklet 1211.5/9-10.

Design

Horizontal volute casing pump, single-stage (pump size 125-200/2 two-stage), with power ratings and main dimensions to EN 733 up to DN 200 / extension Etanorm-R, with bearing bracket, in back pull-out design.

Shaft with replaceable shaft sleeve/shaft protecting sleeve in the shaft seal area.

Volute casing and impeller with replaceable wear rings.

Volute casing with integrally cast pump feet.

Bearings

Deep-groove ball bearings, grease-lubricated.

Shaft Seal

Mechanical seal to EN 12756 (Standard for Etanorm, for Etanorm-R as option) or gland packing.

Designation

EN(-R) 40 - 160 43 (6238) G 10 ^{*)}

Type series Etanorm _____
Pump size, e.g. _____
Actual impeller diameter - 100 mm, e.g. 143 mm
= (angular reduction of impeller vanes)
e.g. actual diameter 162/138 mm = _____
Casing material, e.g. JL 1040 ²⁾ _____
Shaft seal, e.g. mechanical seal Q₁ Q₁ X4GG _____

²⁾ to EN 1561 = GJL-250
^{*)} for Etanorm only

Accessories

Drive

Surface-cooled KSB-IEC three-phase squirrel cage motor

Winding: up to 2.2 kW: 220-240 V/380-420 V
3 kW and above: 380-420 V/660-725 V

Design: IMB 3

Enclosure: IP 55

Thermal class: F with temperature sensors: 3 PTC resistors

Operating mode: continuous operation S1

or

surface-cooled three-phase squirrel cage motor as described above, but West European brand to KSB's choice.

Coupling

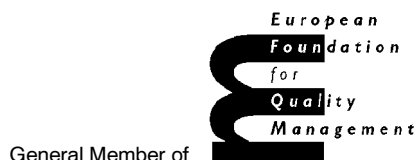
Flexible coupling with/without spacer sleeve

Contact Guard

Coupling guard as per EN 294.

Baseplate

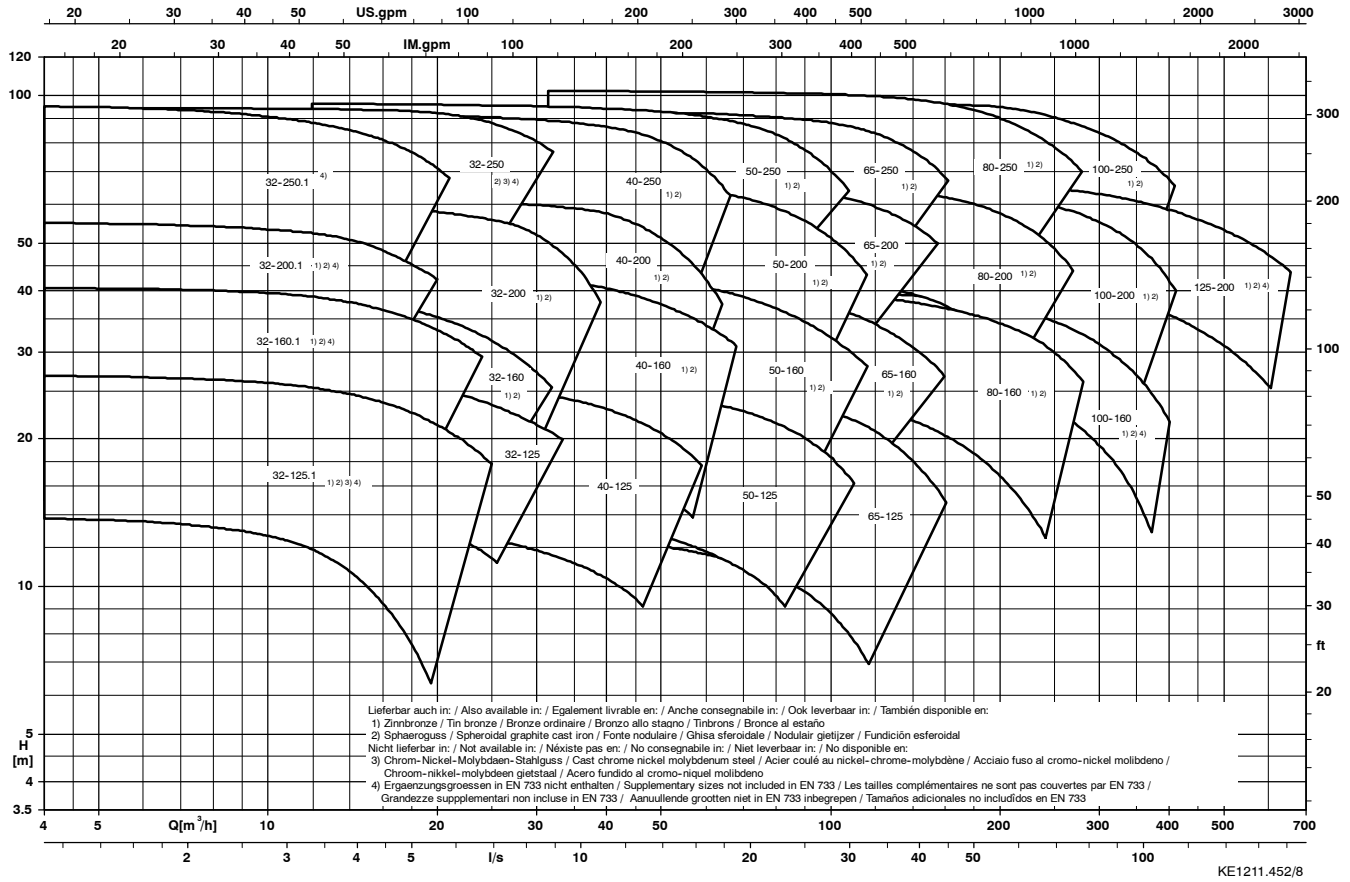
Sectional steel / folded steel plate, fabricated sectional steel for the complete unit (pump and motor) in torsion-resistant design



Selection charts

Etanorm

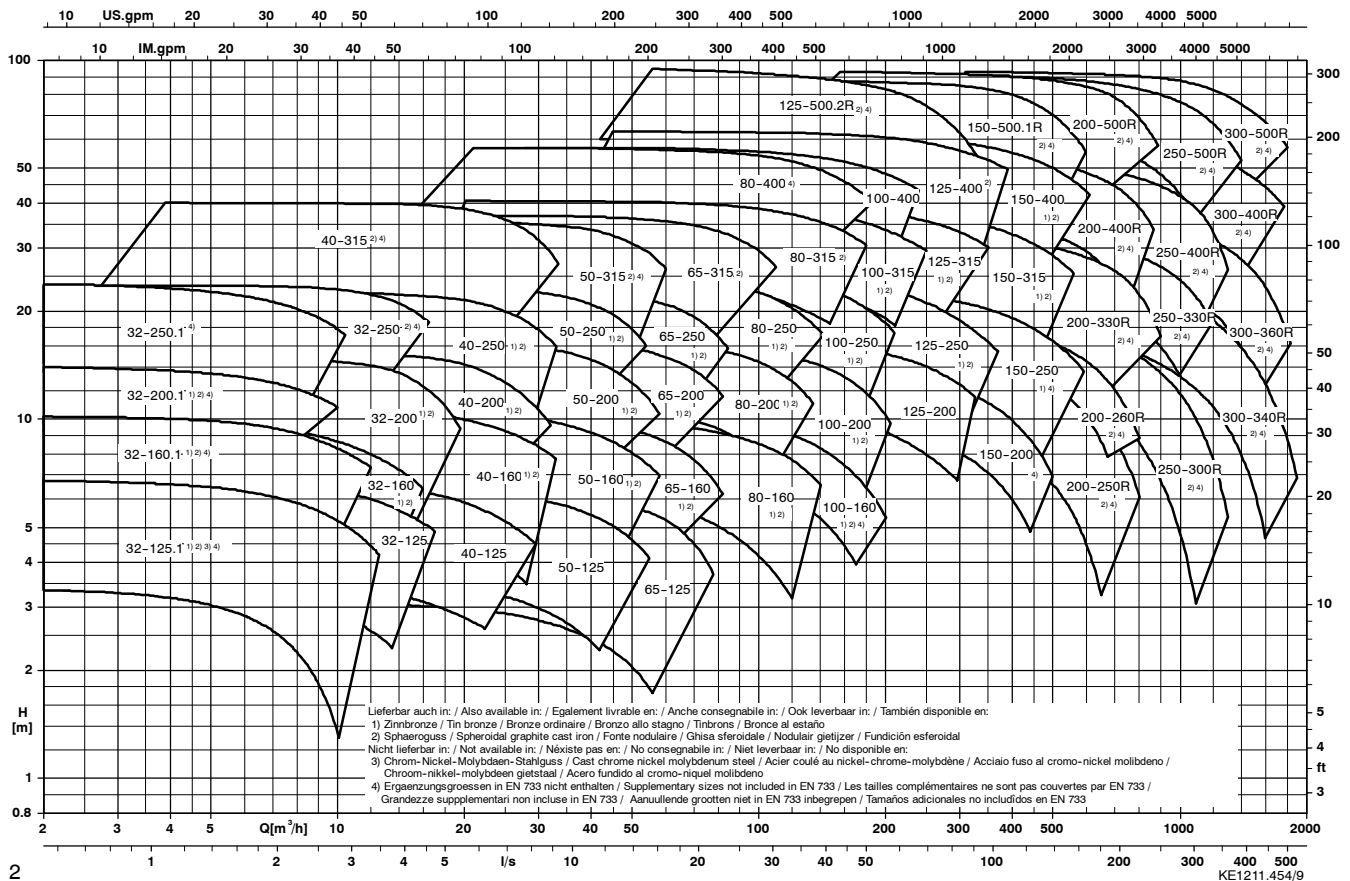
n = 2900 1/min



KE1211.452/8

Etanorm / Etanorm-R

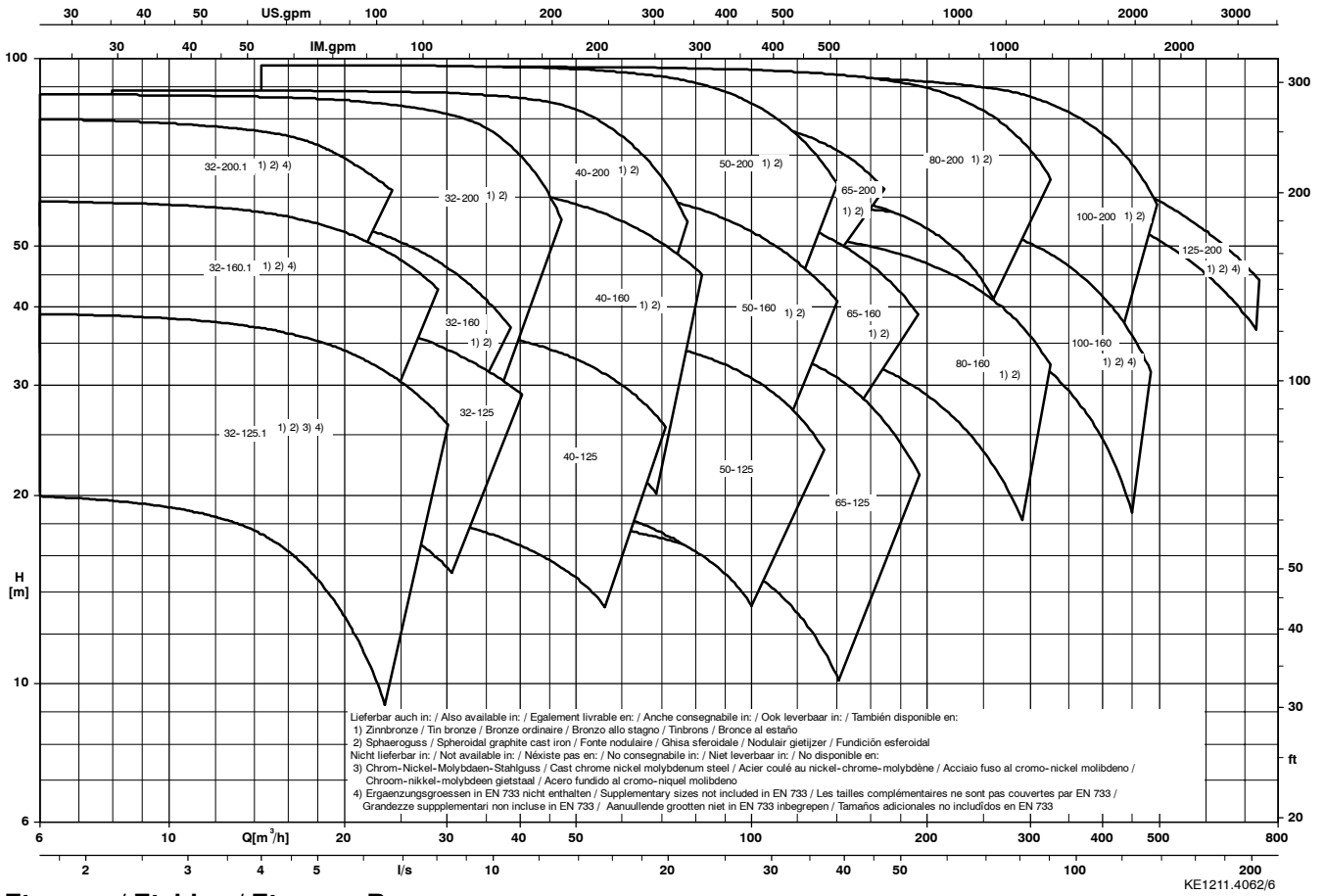
n = 1450 1/min



KE1211.454/9

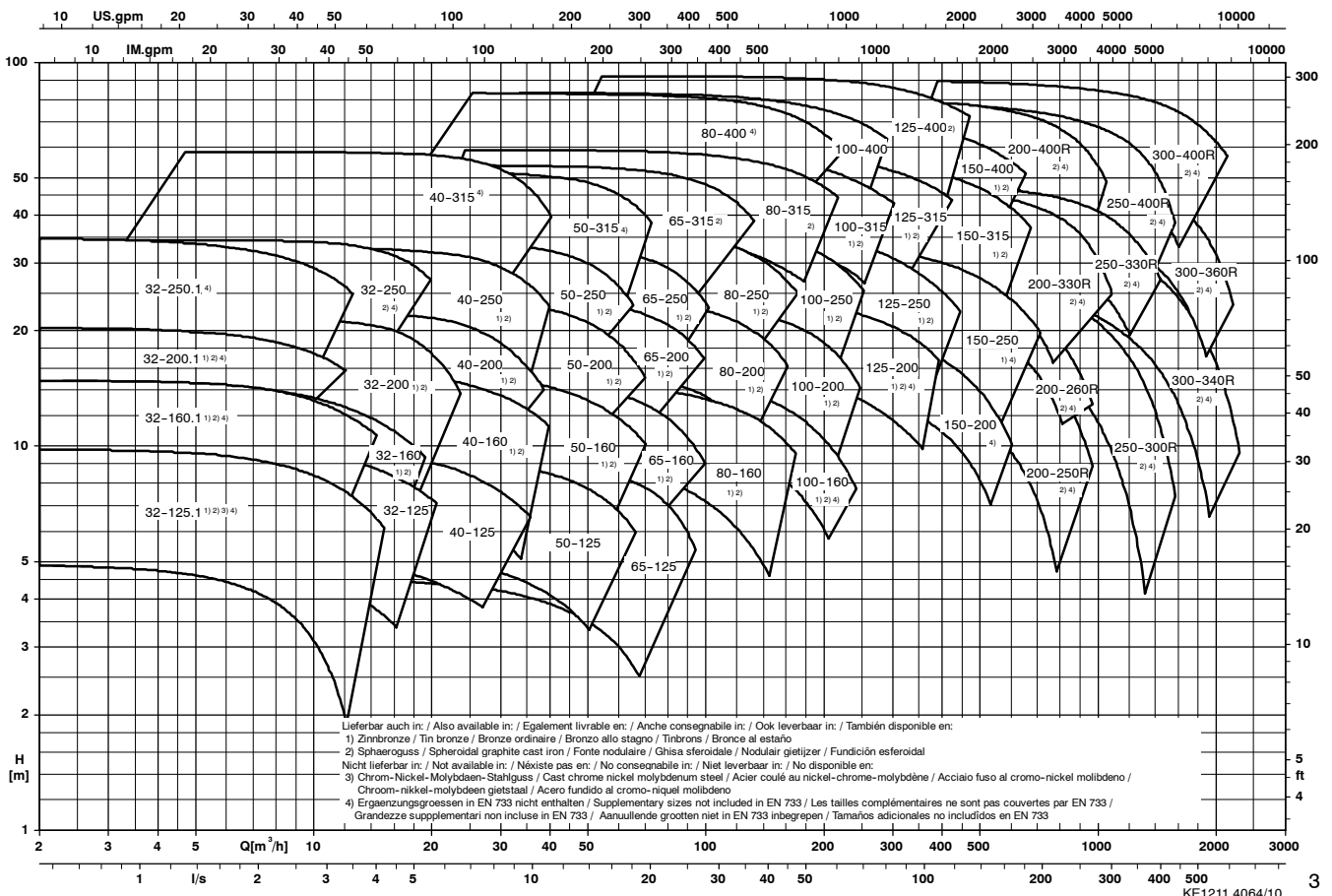
Etanorm

n = 3500 1/min



Etanorm / Etabloc / Etanorm-R

n = 1750 1/min



Materials

	Etanorm G / Etanorm-RG	Etanorm-R GC1	Etanorm M	Etanorm-RM	Etanorm B
Volute casing	Grey cast iron JL 1040 ¹⁾		Grey cast iron JL 1040 ¹⁾		Tin bronze CC 480 K-GS ³⁾
Discharge cover	Grey cast iron JL 1040 ¹⁾		Grey cast iron JL 1040 ¹⁾		Tin bronze CC 480 K-GS ³⁾
Impeller	Grey cast iron JL 1040 ¹⁾	1.4408	Tin bronze CC 480 K-GS ³⁾		Tin bronze CC 480 K-GS ³⁾
Spaltringe	Grey cast iron GG	1.4408	Grey cast iron/Bleibronze GG/G-CuPb10Sn		Leaded bronze CC 495 K-GS ³⁾
Shaft	Tempering steel C45		Tempering steel C45		Chrome nickel molybdenum steel 1.4462
Shaft sleeve	Chrome nickel molybdenum steel 1.4571	1.4122	Chrome nickel molybdenum steel 1.4571	1.4122	Chrome nickel molybdenum steel 1.4571
Shaft protection sleeve	Chrome nickel molybdenum steel 1.4122		Chrome nickel molybdenum steel 1.4122		Chrome nickel molybdenum steel 1.4571
Bearing bracket	Grey cast iron JL 1040 ¹⁾		Grey cast iron JL 1040 ¹⁾		Grey cast iron JL 1040 ¹⁾

	Etanorm S	Etanorm-RS	Etanorm C
Volute casing	Sphäroguss JS 1025 ²⁾		Cast chrome nickel molybdenum steel 1.4408
Discharge cover	Sphäroguss JS 1025 ²⁾		Cast chrome nickel molybdenum steel 1.4408
Impeller	Grey cast iron JL 1040 ¹⁾		Cast chrome nickel molybdenum steel 1.4408
Spaltringe	Grey cast iron GG		Cast chrome nickel molybdenum steel 1.4408
Shaft	Tepering steel C45		Chrome nickel molybdenum steel 1.4462
Shaft sleeve	Chrome nickel molybdenum steel 1.4571	1.4122	Chrome nickel molybdenum steel 1.4571
Shaft protection sleeve	Chrome nickel molybdenum steel 1.4122		Chrome nickel molybdenum steel 1.4571
Bearing bracket	Grey cast iron JL 1040 ¹⁾		Grey cast iron JL 1040 ¹⁾

1) to EN 1561 = GJL-250
 2) to EN 1563 = GJS-400-18-LT
 3) to EN 1982

Benefits at a Glance

Large material selection
 Grey cast iron, tin bronze, nodular cast iron, cast chrome nickel molybdenum steel

Pressure jacket designed for 16 bar to guarantee high operating reliability

Connecting dimensions and power ratings to EN 733 (Etanorm)

Wear rings service-friendly

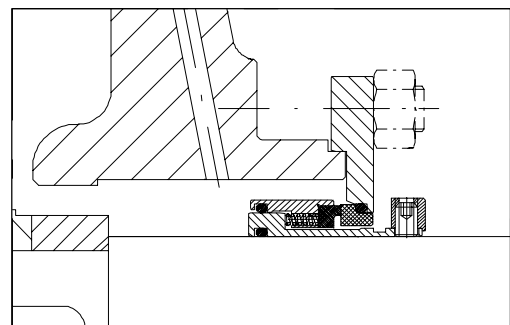
Suction geometry designed for max. suction capacity (NPSH) and optimal cavitation behaviour

Impeller with optimized hydraulics, excellent efficiencies and fine graduation of the QH-performance chart

Mechanical seal or gland packing, uncooled

Back pull-out design: easy dismantling, the casing may remain in the pipeline when the pump is dismantled

Type: Etanorm-R



001936

Robust deep-groove ball bearings, protected against contamination by v-rings

Shaft sleeve/shaft protecting sleeve prevents wear on the shaft

Subject to technical modification without prior notice.

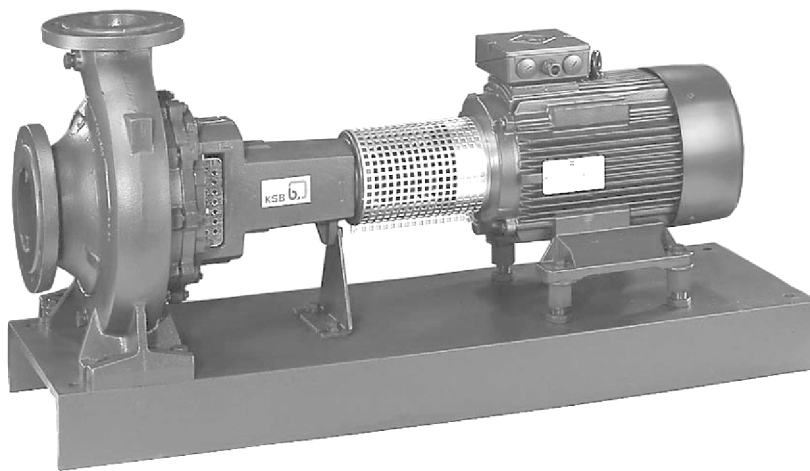
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1211.1/14-10



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Standardized Pumps



Fields of Application

- Water supply
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- Sprinkling
- Irrigation
- Drainage
- Heating
- Air-conditioning systems
- Drinking water
- Service water
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- Oils
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Fluid

Pure liquids not chemically or mechanically aggressive to the pump materials.

Operating Data

Q up to 1900 m³/h, (528 l/s)
H up to 102 m
t -30 °C to +140 °C
p₂ up to 16 bar ¹⁾

¹⁾ see pressure/temperature limits, page 5

Design

Horizontal volute casing pump, single-stage (pump size 125-200/2 two-stage), with power ratings and main dimensions to EN 733 up to DN 200 / extension Etanorm-R, with bearing bracket, in back pull-out design.

Shaft with replaceable shaft sleeve/shaft protecting sleeve in the shaft seal area.

Volute casing and impeller with replaceable wear rings.

Volute casing with integrally cast pump feet.

Bearings

Deep-groove ball bearings, grease-lubricated.

Shaft Seal

Mechanical seal to EN 12756 (Standard for Etanorm, for Etanorm-R as option) or gland packing.

Designation

EN(-R) 40 - 160 43 (6238) G 10 ^{*)}

Type series Etanorm _____
Pump size, e.g. _____
Actual impeller diameter - 100 mm, e.g. 143 mm
= (angular reduction of impeller vanes)
e.g. actual diameter 162/138 mm = _____
Casing material, e.g. JL 1040 ²⁾ _____
Shaft seal, e.g. mechanical seal Q₁ Q₁ X4GG _____

²⁾ to EN 1561 = GJL-250

^{*)} for Etanorm only

Accessories

Drive

Surface-cooled KSB-IEC three-phase squirrel cage motor

Winding: up to 2.2 kW: 220-240 V/380-420 V
3 kW and above: 380-420 V/660-725 V

Design: IMB 3

Enclosure: IP 55

Thermal class: F with temperature sensors: 3 PTC resistors

Operating mode: continuous operation S1
or

surface-cooled three-phase squirrel cage motor as described above, but West European brand to KSB's choice.

Coupling

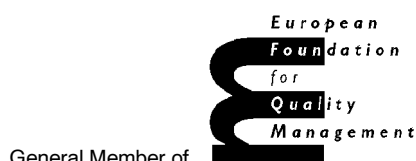
Flexible coupling with/without spacer sleeve

Contact Guard

Coupling guard as per EN 294.

Baseplate

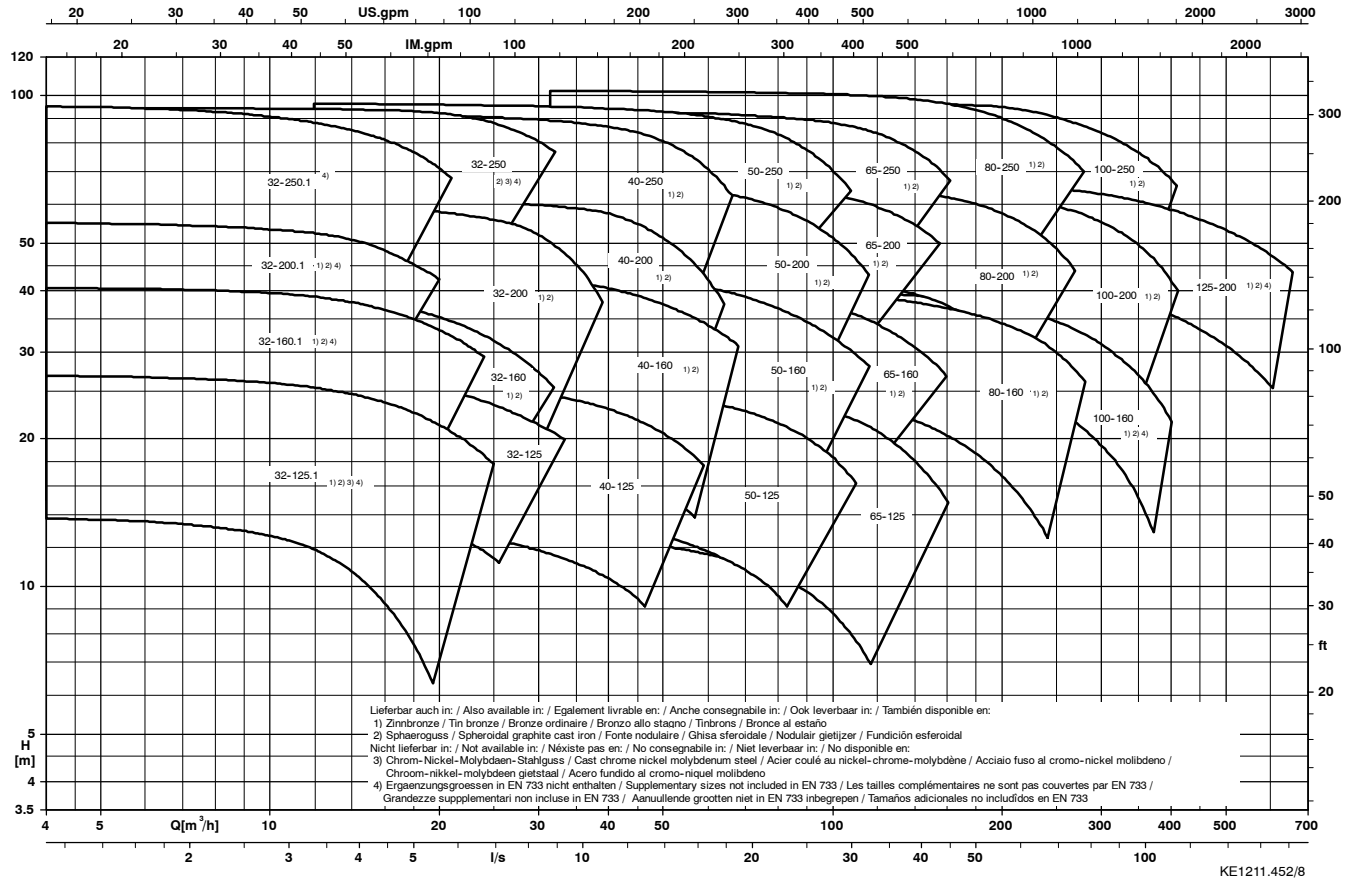
Sectional steel / folded steel plate, fabricated sectional steel for the complete unit (pump and motor)
in torsion-resistant design



Selection charts

Etanorm

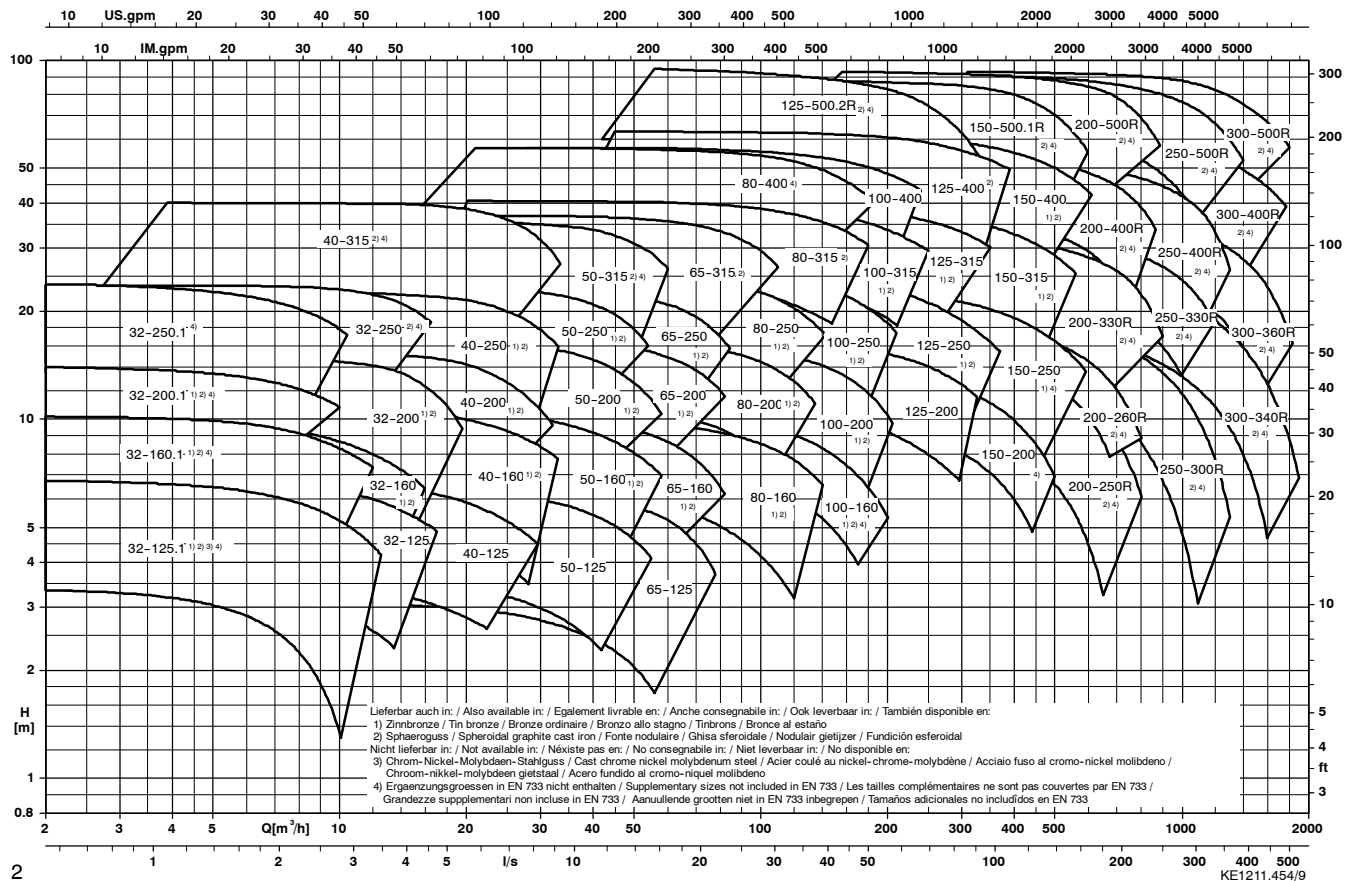
n = 2900 1/min



KE1211.452/8

Etanorm / Etanorm-R

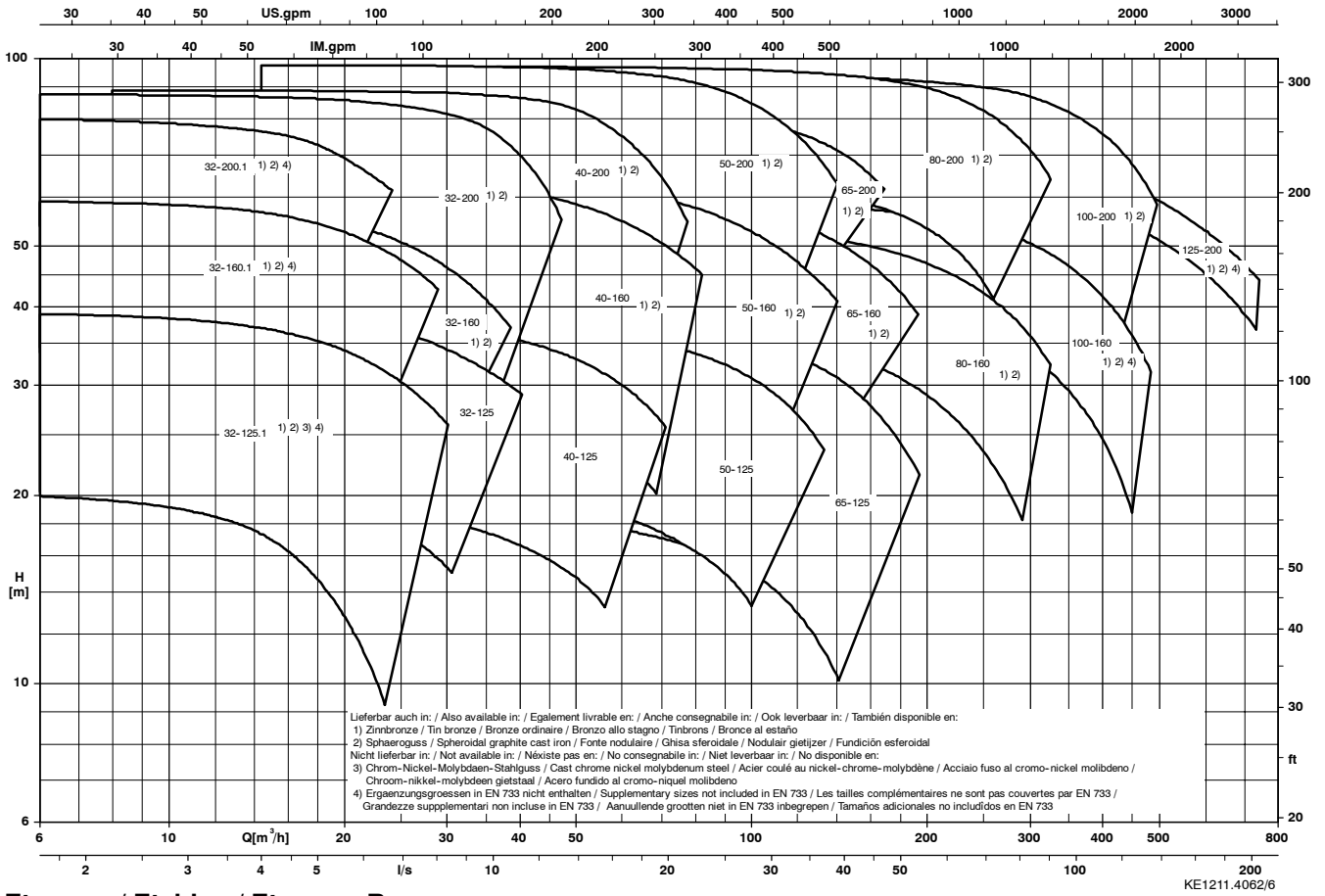
n = 1450 1/min



KE1211.454/9

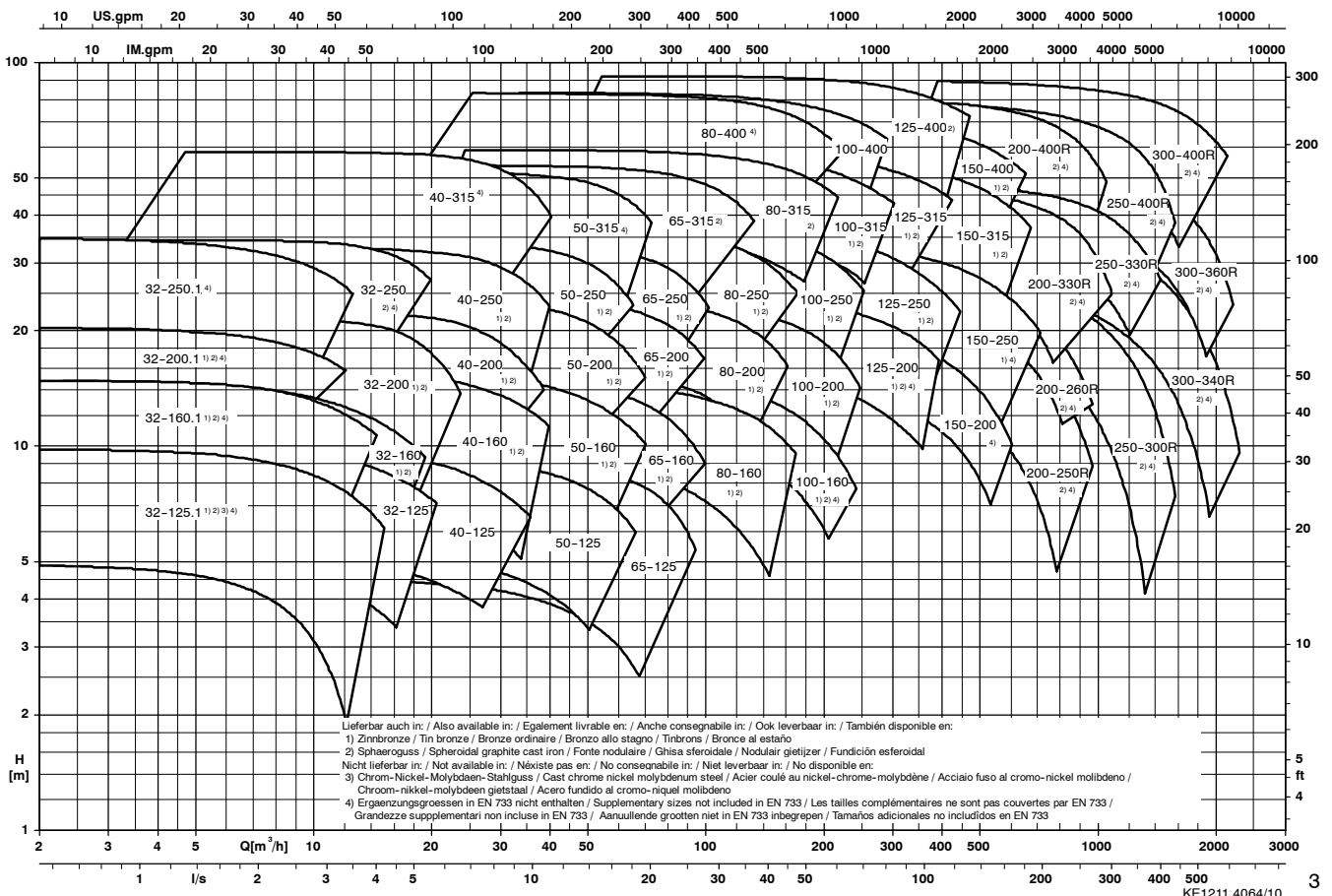
Etanorm

n = 3500 1/min



Etanorm / Etabloc / Etanorm-R

n = 1750 1/min



Materials

	Etanorm G / Etanorm-RG	Etanorm-R GC1	Etanorm M	Etanorm-RM	Etanorm B
Volute casing	Grey cast iron JL 1040 ¹⁾		Grey cast iron JL 1040 ¹⁾		Tin bronze CC 480 K-GS ³⁾
Discharge cover	Grey cast iron JL 1040 ¹⁾		Grey cast iron JL 1040 ¹⁾		Tin bronze CC 480 K-GS ³⁾
Impeller	Grey cast iron JL 1040 ¹⁾	1.4408	Tin bronze CC 480 K-GS ³⁾		Tin bronze CC 480 K-GS ³⁾
Spaltringe	Grey cast iron GG	1.4408	Grey cast iron/Bleibronze GG/G-CuPb10Sn		Leaded bronze CC 495 K-GS ³⁾
Shaft	Tempering steel C45		Tempering steel C45		Chrome nickel molybdenum steel 1.4462
Shaft sleeve	Chrome nickel molybdenum steel 1.4571	1.4122	Chrome nickel molybdenum steel 1.4571	1.4122	Chrome nickel molybdenum steel 1.4571
Shaft protection sleeve	Chrome nickel molybdenum steel 1.4122		Chrome nickel molybdenum steel 1.4122		Chrome nickel molybdenum steel 1.4571
Bearing bracket	Grey cast iron JL 1040 ¹⁾		Grey cast iron JL 1040 ¹⁾		Grey cast iron JL 1040 ¹⁾

	Etanorm S	Etanorm-RS	Etanorm C
Volute casing	Sphäroguss JS 1025 ²⁾		Cast chrome nickel molybdenum steel 1.4408
Discharge cover	Sphäroguss JS 1025 ²⁾		Cast chrome nickel molybdenum steel 1.4408
Impeller	Grey cast iron JL 1040 ¹⁾		Cast chrome nickel molybdenum steel 1.4408
Spaltringe	Grey cast iron GG		Cast chrome nickel molybdenum steel 1.4408
Shaft	Tepering steel C45		Chrome nickel molybdenum steel 1.4462
Shaft sleeve	Chrome nickel molybdenum steel 1.4571	1.4122	Chrome nickel molybdenum steel 1.4571
Shaft protection sleeve	Chrome nickel molybdenum steel 1.4122		Chrome nickel molybdenum steel 1.4571
Bearing bracket	Grey cast iron JL 1040 ¹⁾		Grey cast iron JL 1040 ¹⁾

1) to EN 1561 = GJL-250

2) to EN 1563 = GJS-400-18-LT

3) to EN 1982

Benefits at a Glance
Large material selection

Grey cast iron, tin bronze, nodular cast iron, cast chrome nickel molybdenum steel

Pressure jacket designed for 16 bar to guarantee high operating reliability

Connecting dimensions and power ratings to EN 733 (Etanorm)

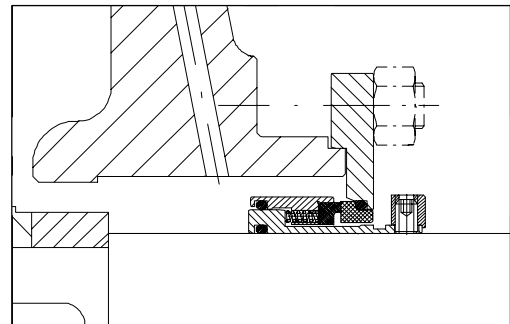
Wear rings service-friendly

Suction geometry designed for max. suction capacity (NPSH) and optimal cavitation behaviour

Impeller with optimized hydraulics, excellent efficiencies and fine graduation of the QH-performance chart

Mechanical seal or gland packing, uncooled

Back pull-out design: easy dismantling, the casing may remain in the pipeline when the pump is dismantled

Type: Etanorm-R


001436

Robust deep-groove ball bearings, protected against contamination by v-rings

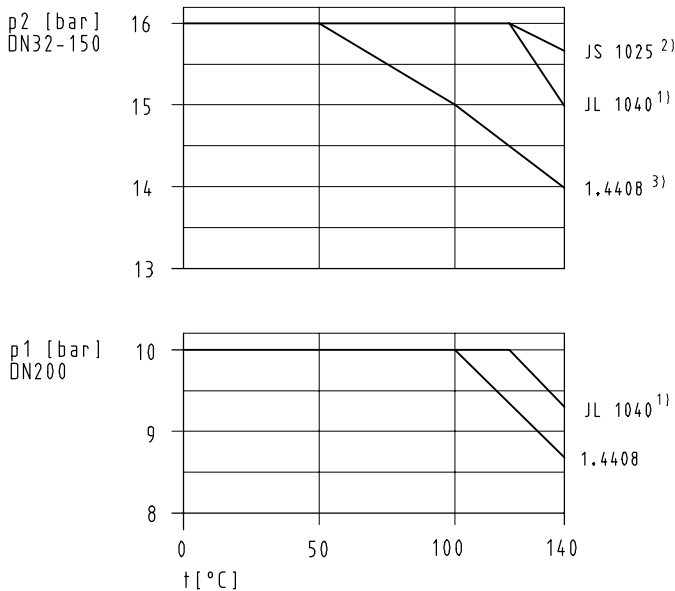
Shaft sleeve/shaft protecting sleeve prevents wear on the shaft

Pressure and Temperature Limits

Etanorm/ Etanorm-R	Förderguttempera- tur 1)4)	Enddruck p ₂ 2)	Prüfdruck 3)	
			Etanorm	Etanorm-R
G	-30 °C bis + 140 °C	5)	bis 21 bar	bis 15 bar
M	-30 °C bis + 140 °C		bis 21 bar	bis 15 bar
S	-30 °C bis + 140 °C		bis 25 bar	bis 24 bar
B	-30 °C bis + 140 °C	10 bar	bis 13 bar	--
C	-30 °C bis + 140 °C	5)	bis 21 bar	--

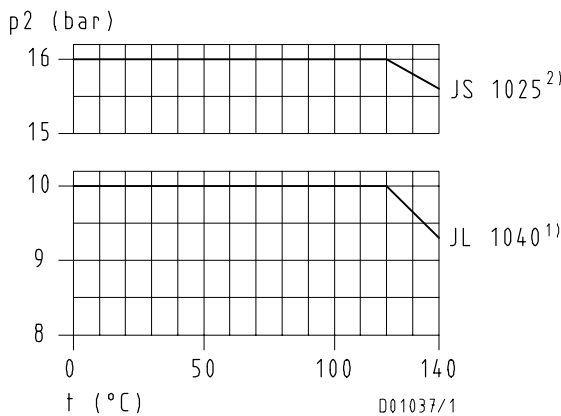
- 1) For hot water heating systems to DIN 4752, section 4.5, application limits must be observed.
- 2) The sum of inlet pressure and shut-off head must not exceed the values shown in the diagram.
- 3) The casing components are checked for leakage by means of an internal pressure test to AN 1897/75-03 D00 with water.
- 4) For product temperatures > 140 °C, Etanorm SYN shall be used.
- 5) See diagram

Pressure/Temperature Diagram for Flanges to EN 1092-1 and EN 1092-2



1211:173/1

Etanorm-R all size



D01037/1

- 1) to EN 1561 = GJL-250
- 2) to EN 1563 = GJS-400-18-LT
- 3) only DN 65-150; DN 32-50 16 bar

Availability of pump sizes in the individual material variants

Pump size	Etanorm				
	G	M	S	B	C
32-125.1	X	X	X	X	-
32-160.1	X	X	X	X	X
32-200.1	X	X	X	X	X
32-250.1	X	X	-	-	X
32-125	X	X	X	X	X
32-160	X	X	X	X	X
32-200	X	X	X	X	X
32-250	X	X	X	X	X
40-125	X	X	-	-	X
40-160	X	X	X	X	X
40-200	X	X	X	X	X
40-250	X	X	X	X	X
40-315	X	X	X	-	X
50-125	X	X	-	-	X
50-160	X	X	X	X	X
50-200	X	X	X	X	X
50-250	X	X	X	X	X
50-315	X	X	X	-	X
65-125	X	X	-	-	X
65-160	X	X	X	X	X
65-200	X	X	X	X	X
65-250	X	X	X	X	X
65-315	X	X	X	-	X
80-160	X	X	X	X	X
80-200	X	X	X	X	X
80-250	X	X	X	X	X
80-315	X	X	X	X	X
80-400	X	X	-	-	X
100-160	X	X	X	X	X
100-200	X	X	X	X	X
100-250	X	X	X	X	X
100-315	X	X	X	X	X
100-400	X	X	-	-	X
125-200	X	X	X	X	X
125-250	X	X	X	X	X
125-315	X	X	X	X	X
125-400	X	X	X	-	X
150-200	X	X	-	-	X
150-250	X	X	-	X	X
150-315	X	X	X	X	X
150-400	X	X	X	X	X

Pump size	Etanorm-R			
	G	GC1	M	S
125-500/2	X	X	X	X
150-500.1	X	X	X	X
200-250	X	X	X	X
200-260	X	X	X	X
200-330	X	X	X	X
200-400	X	X	X	X
200-500	X	X	X	X
250-300	X	X	X	X
250-330	X	X	X	X
250-400	X	X	X	X
250-500	X	X	X	X
300-340	X	X	X	X
300-360	X	X	X	X
300-400	X	X	X	X
300-500	X	X	X	X

Etanorm

Medium handled	Application limits	Materials ⁹⁾						Shaft seal						Reference code		Comments		
		Casing/Impeller						Gland packing		Mechanical seal							Gland packing Na:p1 ≤ 0,5 bar Nb:p1 > 0,5 bar	Mechanical seal
		Grey cast iron/ Grey cast iron	Grey cast iron/ Tin bronze	Nodular cast iron/ Grey cast iron	Zinnbronz Zinnbronz Cast CrNiMo steel/ Cast CrNiMo steel	FT-P	Pure graphite	U3BEGG 4)	U3U3X4GG	Q1Q1X4GG	BQ1EGG	Q1Q1MMGG						
G	M	S	B	C	1	3	6	9	10	11	12							
Water																		
Brackish water ³⁾	t ≤ 25 °C; p ≤ 10 bar				X		X				X				B1	B10	Cast CrNiMo steel possible	
Condensate ²⁾	t ≤ 120 °C; p ≤ 10 bar	X					X				X				G1	G11		
Condensate, unconditioned	t ≤ 120 °C; p ≤ 10 bar					X	X				X				C1	C11		
Cooling water ¹⁾ (no anti-freezes)	t ≤ 60 °C ⁷⁾ ; p ≤ 10 bar	X					X				X				G1	G10	open circuit: M1/M10 required	
Cooling water pH value ≥ 7.5 (with anti-freeze) ⁵⁾	t ≤ 120 °C; p ≤ 10 bar	X					X				X				G1	G11	open circuit: M1/M11 required	
Dam water ¹⁾	t ≤ 40 °C; p ≤ 10 bar				X		X				X				B1	B10	If solids-laden: contact KSB	
Drinking water ¹⁾	t ≤ 60 °C ⁷⁾ ; p ≤ 10 bar		X				X				X				M1	M10		
Fire-fighting water ¹⁾	t ≤ 60 °C ⁷⁾ ; p ≤ 10 bar		X				X				X				M1	M10	Contact KSB if VdS guideline has been specified	
Fully desalinated water	t ≤ 120 °C; p ≤ 10 bar					X	X						X		C1	C11	Purity requirements cannot be met.	
Fully desalinated water as boiler feed water ²⁾	t ≤ 120 °C; p ≤ 10 bar	X					X						X		G1	G11		
Heating water ²⁾	t ≤ 120 °C; p ≤ 10 bar	X					X						X		G1	G11		
Heating water ²⁾	t ≤ 140 °C; p ≤ 16 bar	X						X	X						G3	G6	If used as circulation pump to DIN 4752; p max. ≤ 10 bar	
Heating water ²⁾	t ≤ 110 °C; p ≤ 10 bar	X					X				X				G1	G10		
Partly desalinated water ²⁾	t ≤ 60 °C ⁸⁾ ; p ≤ 10 bar		X				X				X				M1	M11		
Pure water ⁶⁾	t ≤ 60 °C ⁸⁾ ; p ≤ 10 bar	X					X						X		G1	G11		
Raw water ¹⁾	t ≤ 25 °C; p ≤ 10 bar				X		X				X				B1	B10		
Sea water ³⁾	t ≤ 60 °C ⁷⁾ ; p ≤ 10 bar	X					X				X				G1	G10	Cast CrNiMo steel possible	
Slightly contaminated water ¹⁾	t ≤ -30 °C; p ≤ 10 bar t ≤ 110 °C	X					X						X		G1	G11		
Swimming-pool water (fresh water) ¹⁾	t ≤ 60 °C ⁷⁾ ; p ≤ 10 bar	X					X						X		G1	G10	Also if DIN 19 643 has been specified	
Swimming-pool water (sea water) ³⁾	t ≤ 60 °C; p ≤ 10 bar	X					X						X		G1	G10	Cast CrNiMo steel possible if t ≤ +25 °C	
Coolants, cooling brines																		
Cooling brine, inorganic, pH value > 7.5; inhibited	t ≤ -30 °C; p ≤ 10 bar t ≤ 25 °C	X					X						X		G1	G11		
Water with anti-freeze, pH value ≥ 7.5; ^{1), 5)}	t ≤ -30 °C; p ≤ 10 bar t ≤ 110 °C	X					X						X		G1	G11		
Oils/Emulsions																		
Diesel oil, fuel oil EL	t ≤ 60 °C; p ≤ 10 bar			X									X			S10	Grey cast iron possible, unless specific standards have to be observed	
Drilling/Grinding emulsion	t ≤ 60 °C; p ≤ 10 bar	X										X			G1	G9		
Lubricating oil, turbine oil, does not apply to SDF oils (hardly inflammable)	t ≤ 80 °C; p ≤ 10 bar			X									X			S10	If specified "without" internal primer, contact KSB. Grey cast iron possible, unless specific standards have to be observed	
Oil-water emulsion	t ≤ 60 °C; p ≤ 10 bar	X										X			G1	G9		
Cleaning agents																		
Lees for bottle rinsing	t ≤ 90 °C; p ≤ 10 bar	X						X							G1	G7	Q ₁ Q ₁ EGG	
Brewery applications																		
Beer mash	t ≤ 100 °C; p ≤ 10 bar	X												X		G12	If there is a risk of the pump running dry due to excessive emptying of the tank, an Etanorm with dual seal in tandem arrangement must be used.	
Beer wort	t ≤ 100 °C; p ≤ 10 bar	X												X		G12		

- General criteria for results of water analysis: pH value ≥ 7; chloride (Cl) content ≤ 250 mg/kg, chlorine (Cl₂) ≤ 0,6 mg/kg.
- Treatment to VdTUV 1466; additional requirement: O₂ ≤ 0,02 mg/l
- Criteria for all parts made of bronze: ammonia (NH₃) ≤ 5 mg/kg, free from hydrogen sulphide (H₂S); no limitation of Cl content required in this case. Please contact KSB if limits are exceeded.
- applies only to shaft units 25 and 35; shaft unit 55 = AQ1EGG
Pump size / shaft unit combinations see page 15
- antifreeze on ethylene glycol basis with inhibitors. Content: >20 % to 50 % (e.g. Antifrogen N)
- No ultra-pure water! Conductivity at 25 °C: ≤ 800 µS/cm, neutral with regard to chemical corrosion
- Mechanical seal suitable for t ≤ 110 °C
- Mechanical seal suitable for t ≤ 120 °C
- Table of materials/pump size combinations see page 3.

Example:
Given: pure water 15 °C; Q = 60 m³/h; H = 80 m

Found: Etanorm G 50 - 250 G 1 (or G 11)

Material variant (as per above table) _____

Pump size (as per characteristic curve 2900 1/min) _____

Reference code (as per above table) _____

Required drive rating 22 kW

Etanorm-R

Medium handled	Application limits	Materials Casing/Impeller			Shaft seal		Reference code	
		G	M	S	Gland packing	Mechanical seal	Gland packing Na: $P_1 \leq 0,5$ bar Nb: $P_1 > 0,5$ bar	Mechanical seal
Water					1	4		
Condensate ²⁾	$t \leq 120$ °C; $p \leq 10$ bar	X			X		G1	Contact KSB
Cooling water ¹⁾ (no anti-freezes)	$t \leq 60$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Cooling water pH-Wert $\geq 7,5$ (with anti-freezes) ⁵⁾	$t \geq -30$ °C; $t \leq 110$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Dam water ¹⁾	$t \leq 60$ °C; $p \leq 10$ bar		X			X	-	M4
Drink water ¹⁾	$t \leq 60$ °C; $p \leq 10$ bar		X		X	X	M1	M4
Fire-fighting water ¹⁾	$t \leq 60$ °C; $p \leq 10$ bar		X			X	-	M4
Fully desalinated water as boiler feed water ²⁾	$t \leq 120$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Heating water ²⁾	$t \leq 120$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Heating water ²⁾	$t \leq 140$ °C; $p \leq 16$ bar			X	X	X	S1	S4
Heating water ²⁾	$t \leq 110$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Partly desalinated water ²⁾	$t \leq 120$ °C; $p \leq 10$ bar	X			X		G1	Contact KSB
Pure water ⁴⁾	$t \leq 25$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Raw water (industrie applications) ¹⁾	$t \leq 60$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Raw water irrigation) ¹⁾	$t \leq 60$ °C; $p \leq 10$ bar	X				X	-	G4
Service water	$t \leq 60$ °C; $p \leq 10$ bar	X				X	-	G4
Slightly contaminated water ¹⁾	$t \leq 60$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Swimming-pool water (fresh water) ¹⁾	$t \leq 60$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Coolants, cooling brines								
Cooling brine, inorganic, pH value > 7.5; inhibited	$t \geq -30$ °C; $t \leq 25$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Water with anti-freeze, pH value $\geq 7,5$; ^{1) 3)}	$t \geq -30$ °C; $t \leq 110$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Oils/Emulsions								
Diesel oil, fuel oil EL	$t \leq 60$ °C; $p \leq 10$ bar			X		X		S4
Drilling/Grinding emulsion	$t \leq 60$ °C; $p \leq 10$ bar	X				X		G4
Lubricating oil, turbine oil, does not apply to SDF oils (hardly inflammable)	$t \leq 80$ °C; $p \leq 10$ bar			X		X		S4
Oil-water emulsion	$t \leq 60$ °C; $p \leq 10$ bar	X			X	X	G1	G4
Cleaning agents								
Lees for bottle rinsing	$t \leq 90$ °C; $p \leq 10$ bar	X			X		G1	
Brewery applications								
Beer mash	$t \leq 100$ °C; $p \leq 10$ bar	X			X	X		G4
Beer wort	$t \leq 100$ °C; $p \leq 10$ bar	X				X		G4

1) General criteria for results of water analysis: pH value ≥ 7 ; chloride (Cl) content ≤ 250 mg/kg, chlorine (Cl₂) $\leq 0,6$ mg/kg.

2) Treatment to VdTUV 1466; additional requirement: O₂ $\leq 0,02$ mg/l

3) antifreeze on ethylene glycol basis with inhibitors. Content: >20 % to 50 % (e.g. Antifrogen N)

4) No ultra-pure water! Conductivity at 25 °C: ≤ 800 μ S/cm, neutral with regard to chemical corrosion

5) antifreeze on ethylene glycol basis with inhibitors. Content: >20 % to 50 % (e.g. Antifrogen N)