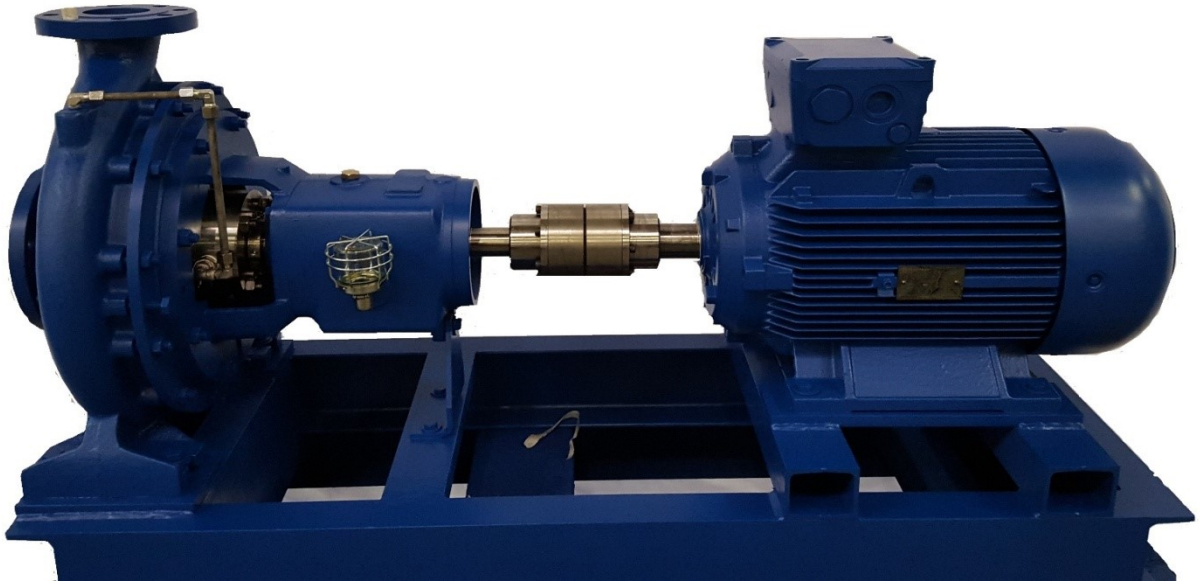
Heavy Duty Chemical Process Pumps

ATEX



TECHNICAL MANUAL

Mas Grup

Revision No: 02

March/2018

NME Series

Heavy Duty Chemical Process Pumps

General Information

Mas Grup

Fields of Application

- Petrol distribution and tanker filling
- Ethanol and biodiesel plants
- Delivery of flammable chemical materials
- Power plants
- Industrial plants
- Starch, fructose and vegetable oil production plants
- Viscous material transfer with heating jacket option
- Heavy Duty Applications

Pumped Liquids

NME series pumps shall be used to pressurize liquids which are clean or mildly impure, low viscosity, non abrasive and not containing large solid particles or fiber.

For special applications, please consult to MAS DAF MAKİNA SAN. A.Ş.

Design

- As standard, single stage, end suction, volute casing ISO EN 2858 DIN 24256 standard pumps (Foot mounted model). As optional, centerline mounted, single stage volute casing pumps with mechanical seals and heating jacket (Centerline mounted model).
- Single suction, radial and mixed flow closed type impeller is equipped with back wear rings to balance axial loads. Impeller is also balanced dynamically according to ISO 1940-1 G6.3.
- Pump and motor are coupled on a rigid frame by using elastic or ATEX certificated couplings.
- Pump shaft, impeller, bearing housing and other components can be dismantled without removing pump casing. Thus maintenance and assembly operations can be easily performed.
- By using spacer coupling it is possible to dismantle pump without removing motor. Same components can be used at maximum versatility and they can be used in pumps at different dimensions so it is easier to store spare parts and change pump components.

Bearings

Rolling bearings are used in norm centrifugal pumps. In pumps complying with DIN 24255, the bearing is provided with 7300 and NJ 300 type bearings which are lubricated with oil according to DIN 625 standard.

Shaft Seal

Pump seals are provided with mechanical seals that's brand John Crane 1648 series. These seals can operate up to 69 bar pressure and 260°C. Seal cooling can be applied if necessary.

Technical Data

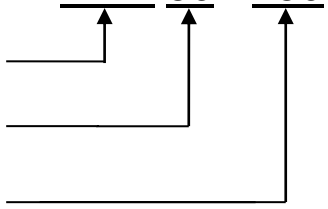
- Suction Flange : DN 50... DN 400
- Discharge Flange : DN 32...DN 350
- Operating Pressure : 16 Bar
- Casing Test Pressure : 20 Bar
- Max Impeller Diameter ø : 500 mm ø
- Speed Range : 1000 – 3600 RPM
- Capacity Range : 5 – 3500 m³ / h
- Head Range : 5–210 m

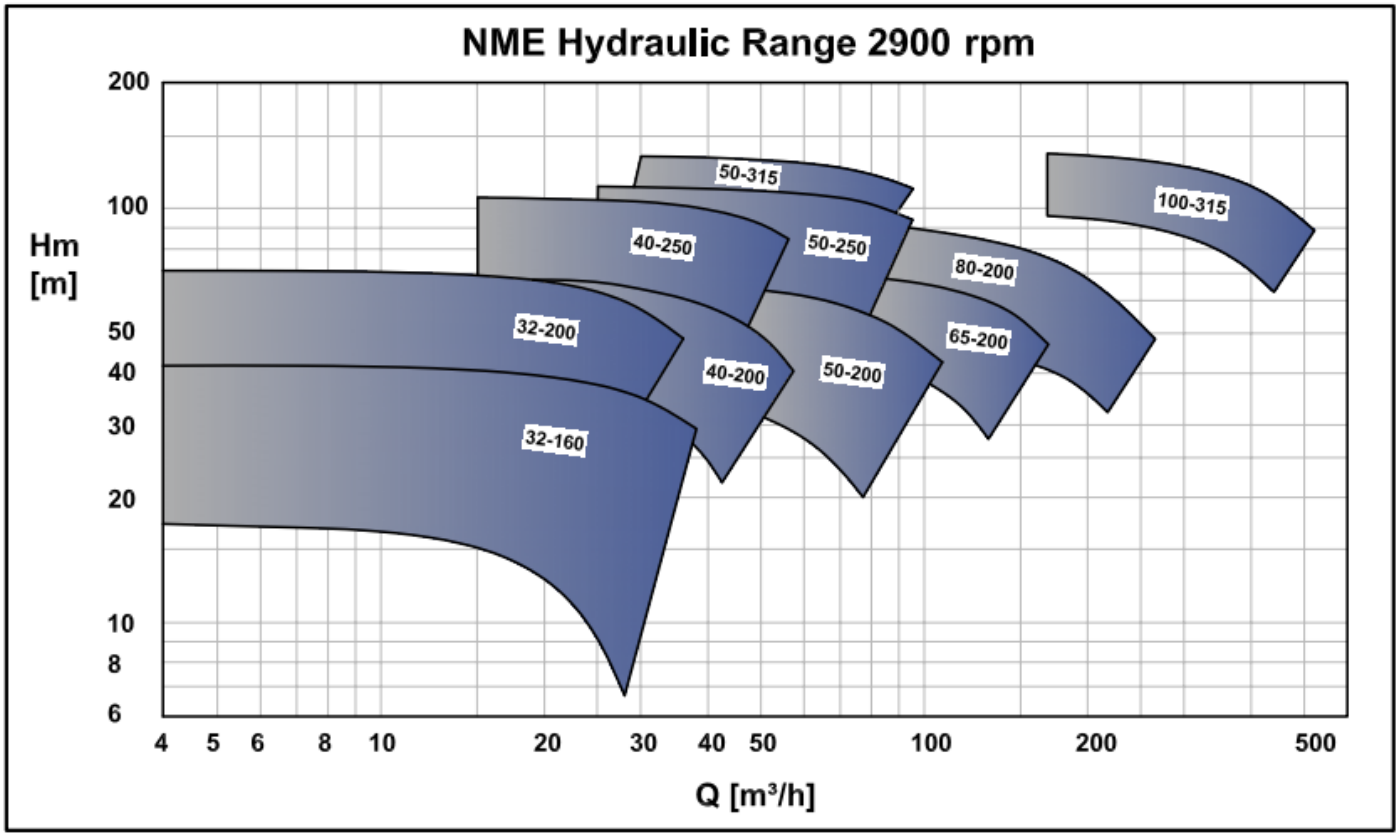
Pump Flanges

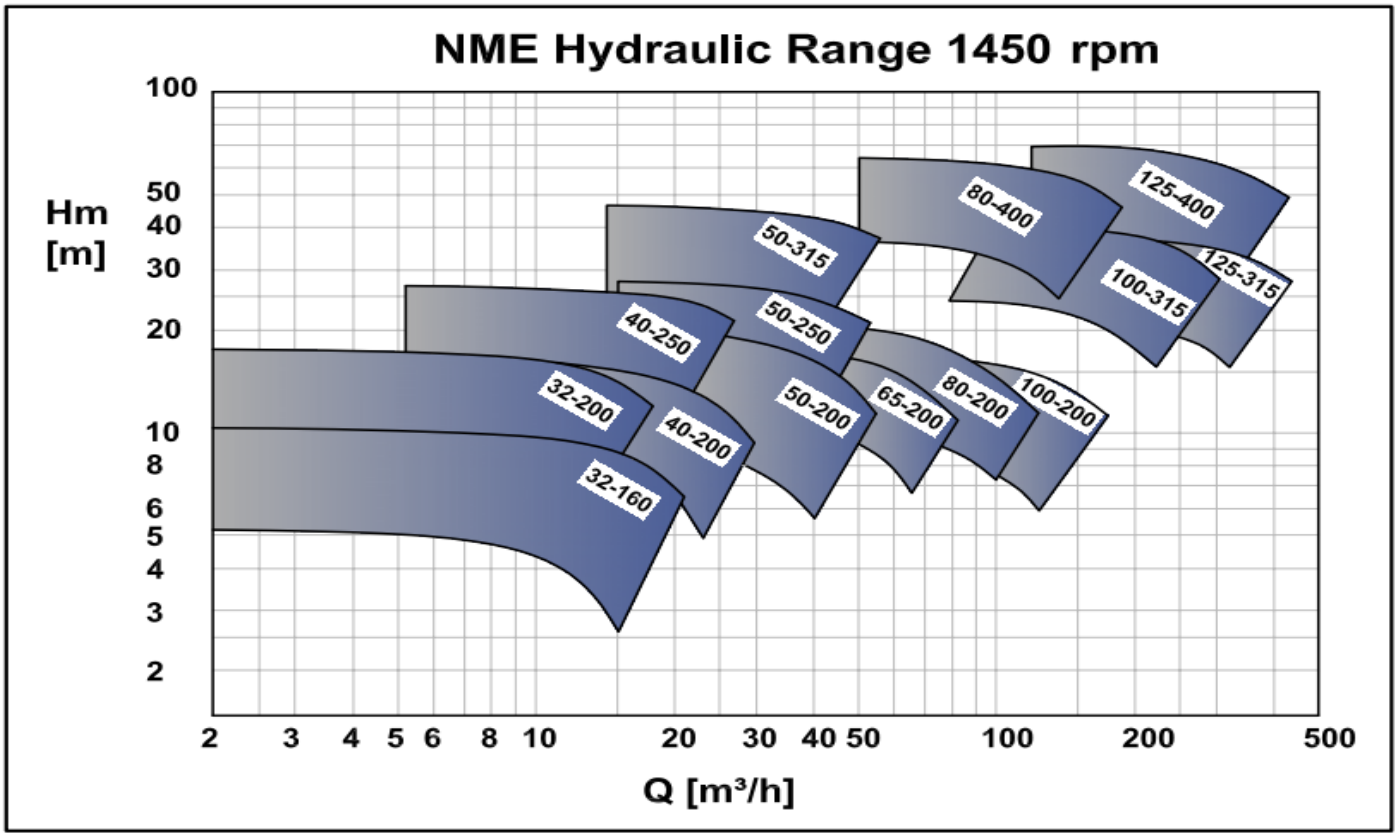
- Discharge Flanges: DN 2858 – PN 16
- Suction Flanges: DN 2858 – PN 16

Identification Code

Example: NME 50 - 250




NME Hydraulic Range 2900 rpm
Hm [m]
200
100
50
40
30
20
10
8
6
4 5 6 8 10 20 30 40 50 100 200 500
Q [m³/h]
50-315
100-315
40-250
50-250
80-200
32-200
65-200
40-200
50-200
32-160


NME Hydraulic Range 1450 rpm
Hm [m]
100
50
40
30
20
10
8
6
5
4
3
2
2 3 4 5 6 8 10 20 30 40 50 100 200 500
Q [m³/h]
125-400
80-400
50-315
125-315
100-315
40-250
50-250
32-200
50-200
65-200
80-200
100-200
40-200
32-160

ATEX Codification

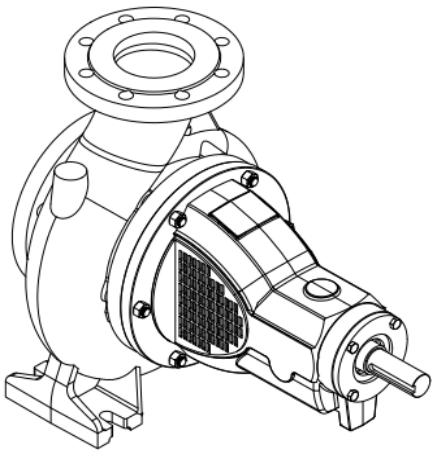
ATEX -95

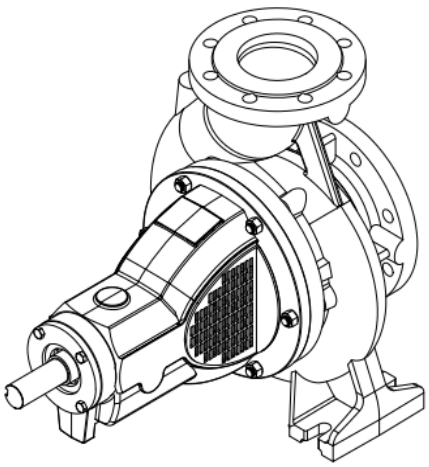
/D c Tx (85˚C – 200˚C)

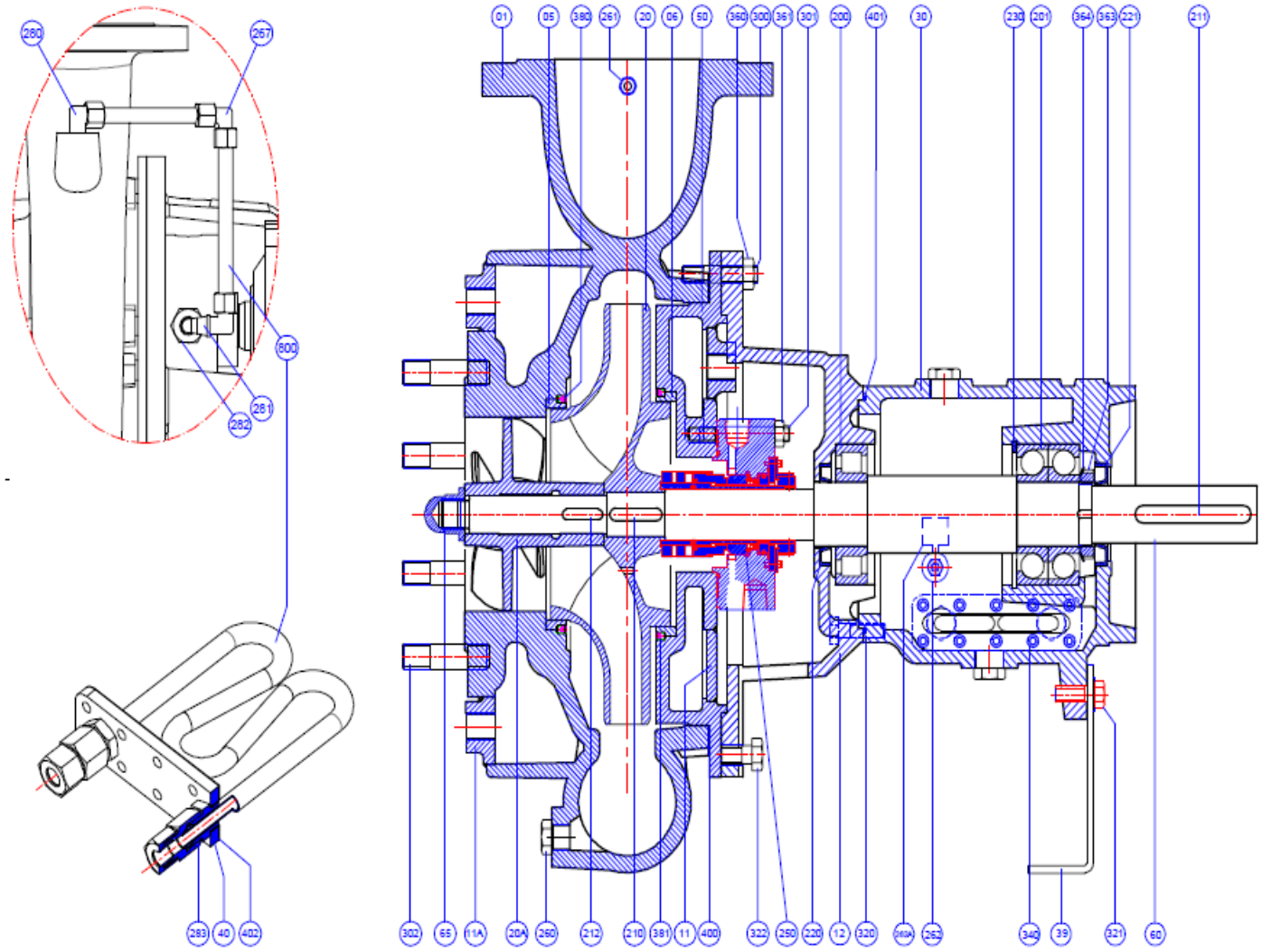
Equipment Groups (Annex I of Directive 94/9/EC)						
Group I (mines, mine gas and dust)		Group II (other explosive atmospheres gas/dust)				
		Category 1		Category 2		Category 3	
Category M 1	Category M 2	G (gas) (Zone 0)	D (dust) (Zone 20)	G (gas) (Zone 1)	D (dust) (Zone 21)	G (gas) (Zone 2)	D (dust) (Zone 22)
For equipment providing a very high level of protection when endangered by an explosive atmosphere	For equipment providing a high level of protection when likely to be endangered by an explosive atmosphere	For equipment providing a very high level of protection when used in areas where an explosive atmosphere is very likely to occur		For equipment providing a high level of protection when used in areas where an explosive atmosphere is likely to occur		For equipment providing a normal level of protection when used in areas where an explosive atmosphere is less likely to occur	

TEMPERATURE CLASS		
Temperature class required by the area classification	Ignition temperature of gas or vapor	Allowable temperature classes of equipment
T1	> 450 °C	T1 - T6
T2	> 300 °C	T2 - T6
T3	> 200 °C	T3 - T6
T4	> 135 °C	T4 - T6
T5	> 100 °C	T5 - T6
T6	> 85 °C	T6

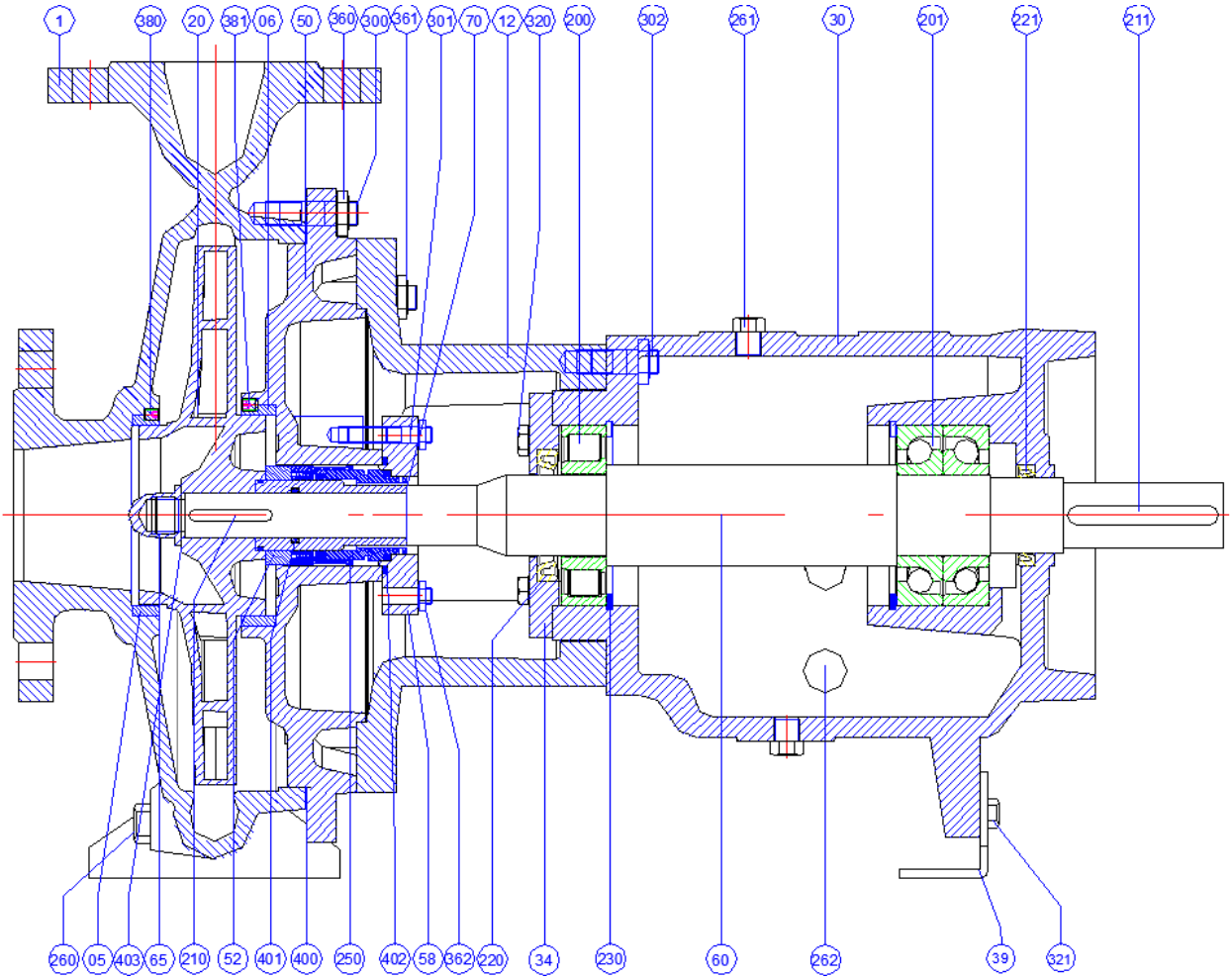
Code	Description
II	The Usage in other non-mining explosive atmospheres
2	2. Category: High level of protection
G	For potentially explosive environments due to gases or vapors
T	Temperature class
X	ATEX Marking of the motor manufacturer







PART NO	PART NAME	PART NO	PART NAME
01	Volute Casing	262	Oil Indicator
05	Front Wearing Ring	262A	Oiler
06	Rear Wearing Ring	263	Plug
11	Steam Jacket (S. Box)	267	1/4 '' Union Elbow
11A	Steam Jacket (V. Casing)	280	1/4 '' Union Nipple
12	Adapter	281	1/4 '' Union Elbow
20	Impeller	282	Blind Plug ½ NPT 14
20A	Inducer	283	1/2 '' Union Nipple
30	Bearing House	300	Stud Bolt
39	Bracket	301	Stud Bolt
40	Cooling Plate	302	Stud Bolt
50	Stuffing Box	320	Hexagonal Screw
60	Shaft	321	Hexagonal Screw
65	Impeller Nut	322	Retention Bolt
200	Cylindrical Roller Bearing	340	Allen Screw
201	Angular Ball Bearing	360	Nut
210	Impeller Key	361	Nut
211	Coupling Key	363	Safety Nut
212	Inducer Key	364	Retainer Ring
220	Oil Seal	380	Set Screw
221	Oil Seal	381	Set Screw
230	Retaining Ring	400	Flat Gasket
250	Mechanical Seal	401	O-Ring (Silicon)
260	Plug	800	Steel Pipe
261	Oil Filling plug		



PART NO	PART NAME	PART NO	PART NAME
01	Volute Casing	260	Drain Plug
05	Front Wearing Ring	261	Plug
06	Rear Wearing Ring	262	Oil Indicator
12	Adapter	262A	Oiler
20	Impeller	263	Plug
30	Bearing Housing	300	Stud (Casing)
34	Bearing Cover	301	Stud (Mechanical Seal Cover)
39	Supporting Part	302	Stud (Adapter)
50	Stuffing Box	320	Hexagonal Bolt
52	Seal Front Bushing	321	Hexagonal Bolt
58	Seal Cover	322	Retention Knob
60	Pump Shaft	323	Bolt (Bearing House)
65	Impeller Nut	360	Nut(Casing)
70	Seal Bushing	361	Nut(Adapter)
200	Cylindrical Roller Bearing	362	Nut(Mechanical Seal Cover)
201	Angular Contact Bearing	380	Set-Screw
210	Impeller Key	381	Set-Screw
211	Coupling Key	400	Presbant Gasket
220	Oil Seal	401	O-ring (Silicone)
221	Oil Seal	402	O-ring(NBR)
230	Segment	403	Gasket
250	Mechanical Seal		

GROUP	BEARING SYSTEM TYPE OF BEARING	PUMPA SIZE
A	2 x 7308 NJ 308	32-160,32-200,40-200,40-250,50-200, 50-250,65-200
B	2 x 7308 NJ 308	50-315,80-200,100-200,100-315
C	2 x 7310 NJ 310	80-400, 125-315, 125-400

JOHN CRANE 0350/1648

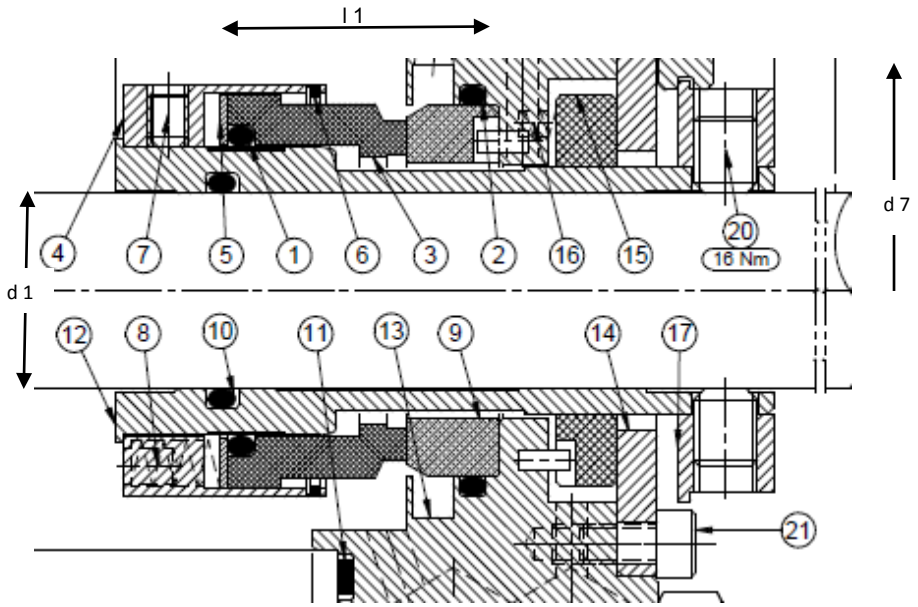
- Single application
- API 682
- Spring-loaded
- Cartridge Type Design

Maximum Operating Conditions

p_1	: 69 Bar
t	: -40…260 ˚C
Vg	: 25 m/s

Standard Materials

Equipment	316
Spring	Hastelloy Alloy
Primary Ring	High Grade Carbon
Seal	Silicon Carbide
Secondary Sealing	Floroelastomer
Bushing	High Grade Carbon



Part No	Part Name for A, B, C	Part No	Part Name for A, B, C	Part No	Part Name for A, B, C
1	O-Ring	8	Spring	15	Floating Bush
2	O-Ring	9	Seat	16	Spring
3	Face	10	O-Ring	17	Drive Collar
4	Retainer	11	Gasket	18	Spacer
5	Thrust Ring	12	Sleeve	19	Hex. Head Screw
6	Snap Ring	13	Gland Plate	20	Set Screw
7	Set Screw	14	Auxiliary Gland	21	Cap Head Screw

Group	Pump Size	Ø d1	Ø d7	l1=l1k
A	32-160,32-200,40-200,40-250,50-200, 50-250,65-200	Ø 30	Ø 80	53

JOHN CRANE 1648 0400/1648

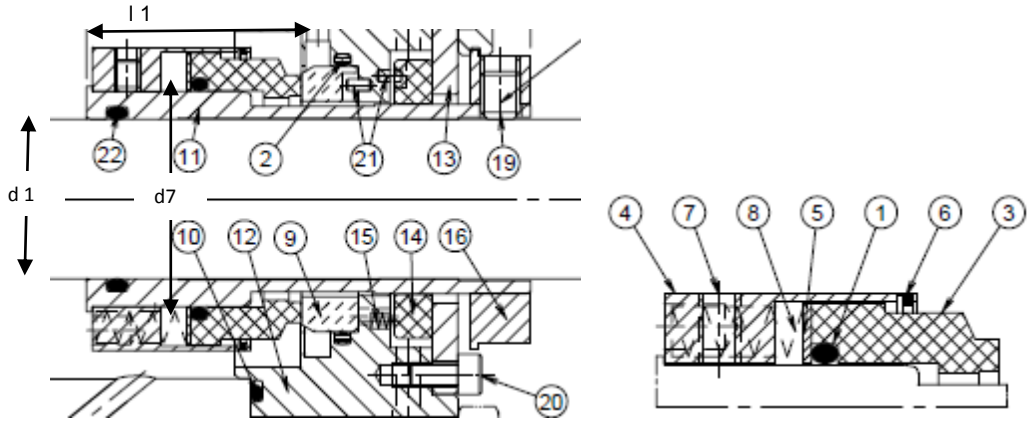
- Single application
- API 682
- Spring-loaded
- Cartridge Type Design

Maximum Operating Conditions

p_1	: 69 Bar
t	: -40…260 ˚C
Vg	: 25 m/s

Standard Materials

Equipment	316
Spring	C-276
Primary Ring	High Grade Carbon
Seal	Silicon Carbide
Secondary Sealing	Floroelastomer
Bushing	High Grade Carbon



Part No	Part Name for A, B, C	Part No	Part Name for A, B, C	Part No	Part Name for A, B, C
1	O-Ring	8	Spring	15	Spring
2	O-Ring	9	Seat	16	Drive Collar
3	Face	10	O-Ring	19	Set Screw
4	Retainer	11	Sleeve	20	Cap Head Screw
5	Thrust Ring	12	Gland Plate	21	Pin
6	Snap Ring	13	Auxiliary Gland	22	O-Ring
7	Set Screw	14	Floating Bush	23	Hexagon Plug Screw

Group	Pump Size	Ø d1	Ø d7	l1=l1k
B	50-315,80-200,100-200,100-315	Ø 40	Ø 90	41

JOHN CRANE 1648 0500/1648

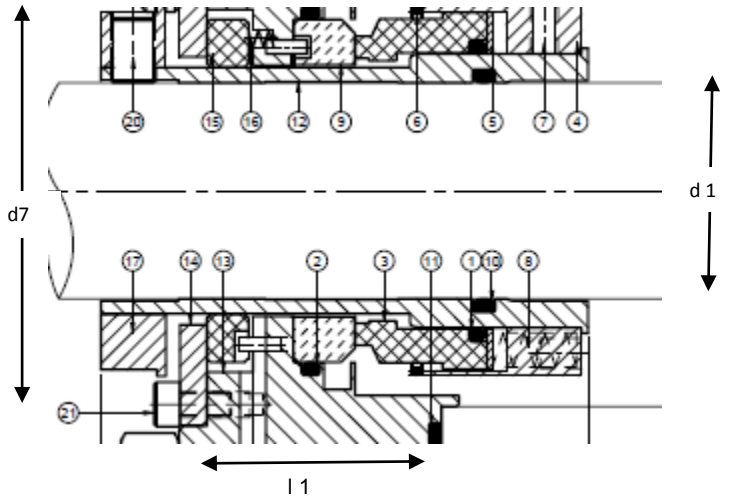
- Single application
- API 682
- Spring-loaded
- Cartridge Type Design

Maximum Operating Conditions

p_1	: 69 Bar
t	: -40…260 ˚C
Vg	: 25 m/s

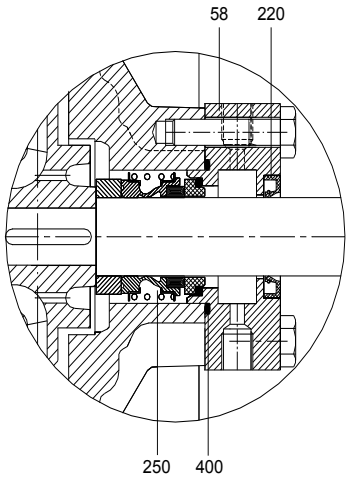
Standard Materials

Equipment	316
Spring	C-276
Primary Ring	High Grade Carbon
Seal	Silicon Carbide
Secondary Sealing	Floroelastomer
Bushing	High Grade Carbon



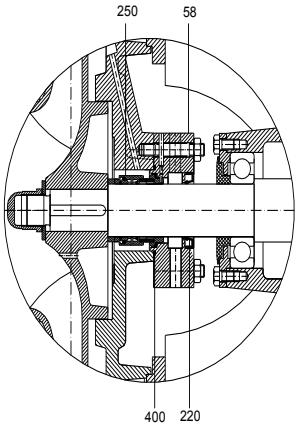
Part No	Part Name for A, B, C	Part No	Part Name for A, B, C	Part No	Part Name for A, B, C
1	O-Ring	7	Set Screw	13	Gland Plate Assembly
2	O-Ring	8	Spring	14	Auxiliary Gland
3	Primary Ring	9	Mating Ring	15	Floating Bush
4	Retainer	10	O-Ring	16	Spring
5	Thrust Ring	11	O-Ring	20	Set Screw
6	Snap Ring	12	Sleeve	21	Cap Head Screw

Group	Pump Size	Ø d1	Ø d7	l1=l1k
C	80-400, 125-315, 125-400	Ø 50	Ø 100	43,6



QUENCHING

58	Mechanical Seal Cover for Quenching
220	Oil Seal
250	Mechanical Seal
400	O-Ring For the Cover



QUENCH WITH AN INTERNAL CIRCULATION

58	Mechanical Seal Cover
220	Oil Seal
250	Mechanical Seal
400	O-Ring For the Cover

For these applications please consult to MAS DAF MAKİNA SAN. A.Ş. representative.

Material Options

Components / Material. No	0.6025	0.7040	2.1050.01	1.0619	1.4021	1.4301	1.4401
Pump Casing	o	o	o	●	o	o	o
Stuffing Box	o	o	o	●	o	o	o
Impeller	o	●	o		o	o	o
Adapter	●	o	o		o	o	o
Wearing Ring*	o	●	o		o	o	o
Shaft					o	●	o
Shaft Sleeve					o	●	o
Bearing Housing	●						

● – Standard Manufacturing

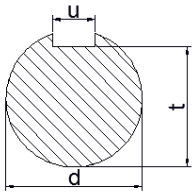
o – Optional

Material Equivalent

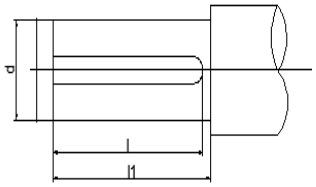
Description	DIN 17007	EN-DIN	ASTM
Cast Iron	0.6025	GJL–250 (GG25)	A 48 Class 40-B
Nodular Cast Iron	0.7040	GJS–400–15 (GGG40)	A 536 Gr.60–40–18
Cast Bronze	2.1050.01	G-Cu Sn 10	B 584 C 90700
Chrome Steel	1.4021	X20 Cr 13	A 276 Type 420
Chrome Nickel Steel	1.4301	X5 Cr Ni 18.9	A 276 Type 304
Chrome Nickel Molybdenum Steel	1.4401	X5 Cr Ni Mo 18.10	A 276 Type 316

**Wearing Rings and Shaft Sleeves are upon request.*

Key-Way and Shaft Dimensions for Motor Side



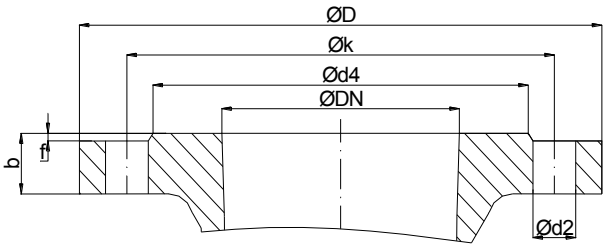
Pump Size	d	t	u
40-250,50-250,50-315	32	27	10
80-40,100-315,125-315, 125-400	45	39,5	14



Pump Size	l	l 1
40-250, 50-250,50-315	75	80
80-40 ,100-315,125-315, 125-400	100	110

Flange Dimensions

Pump Suction And Discharge Flange Dimensions								
DNs / DNd	PN	ØD	Øk	Ød4	Ød2	b	f	Hole Quantity
32	16	140	100	78	18	18	2	4
40		150	110	88	18	18	3	4
50		165	125	102	18	20	3	4
80		200	160	138	18	22	3	8
100		220	180	158	18	24	3	8
125		250	210	188	18	26	3	8
150		285	240	212	22	26	3	8



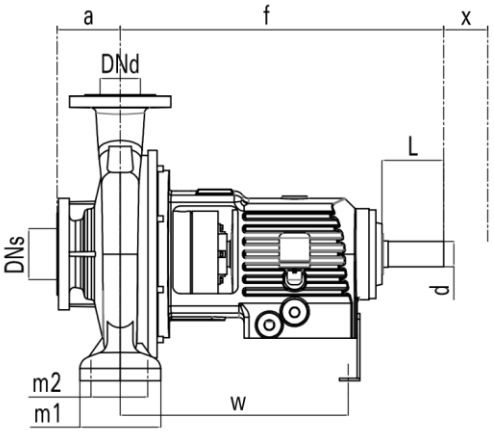
No	Pump Size	Flange			
		DNs (mm) Suction		DNd (mm) Discharge	
1	32-160	50	PN 16	32	PN 16
2	32-200				
3	40-200	65		40	
4	40–250				
5	50-200				
6	50–250	65		50	
7	50–315				
8	65-250	80		65	
9	80-200	100		80	
10	80-400				
11	100-200	125		100	
12	100–315				
13	125–315	150		125	
14	125–400				

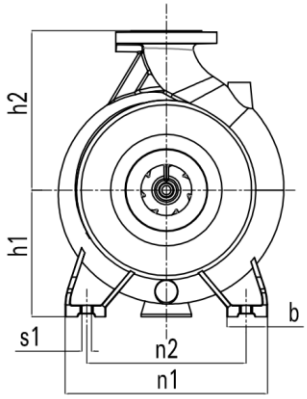
NME Series

Heavy Duty Chemical Process Pumps

Overall Dimensions (Foot Mounted Standard Model)

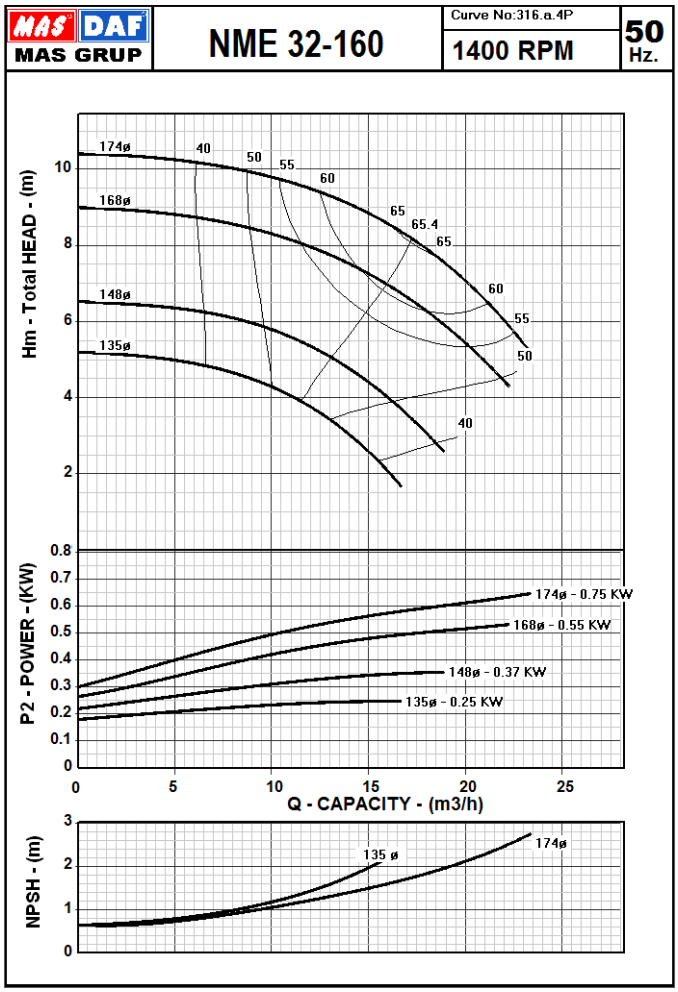
Mas Grup

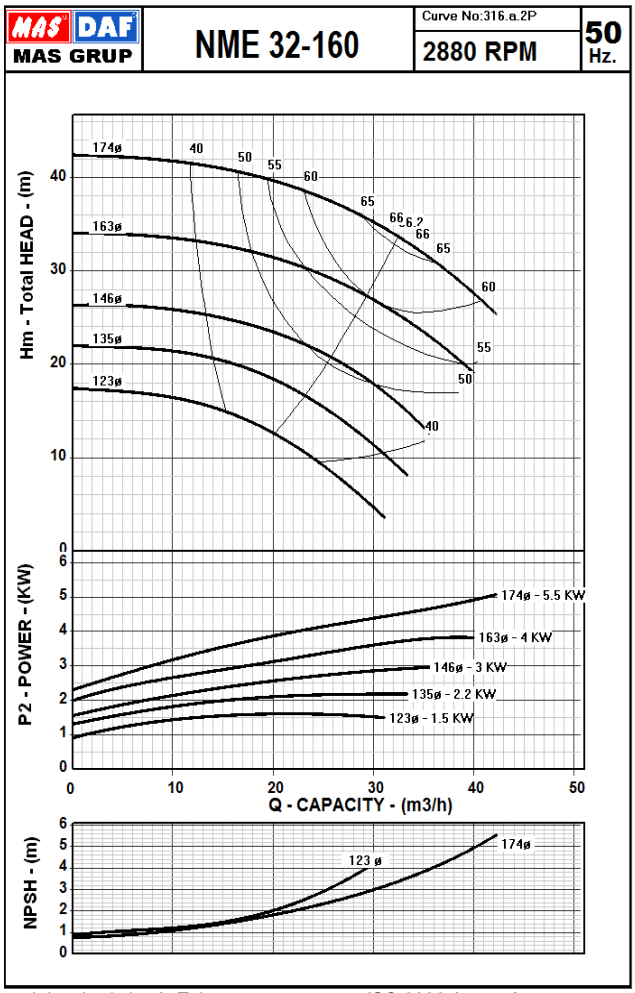




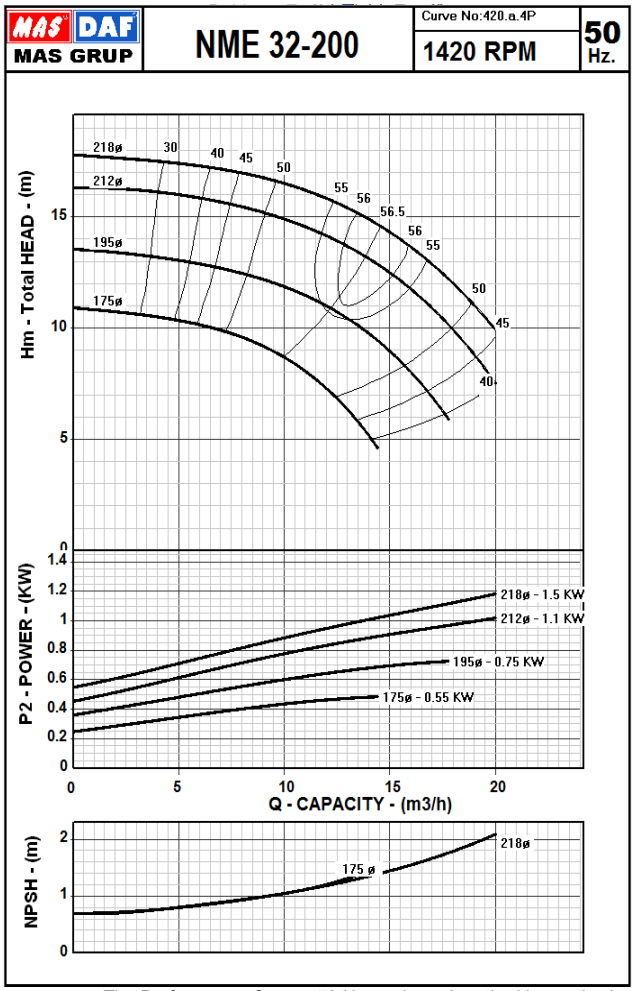
No	Pump Type		Flanges		Length		Height		Fixing Details						W	Shaft End		
	EN ISO 2858	Added	DNs	DNd	a	f	h1	h2	b	m1	m2	n1	n2	s1		d	L	x
			mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm	mm	mm
1	32-160		50	32	80	385	132	160	50	100	70	240	190	M12	285	24	50	100
2	32-200		50	32	80	385	160	180	50	100	70	240	190	M12	285	24	50	100
3	32-250		50	32	100	500	180	225	65	125	95	320	250	M12	370	32	80	100
4	40-200		65	40	100	385	160	180	50	100	70	265	212	M12	285	24	50	100
5	40-250		65	40	100	500	180	225	65	125	95	320	250	M12	370	32	80	100
6	50-200		80	50	100	385	160	200	50	100	70	265	212	M12	285	24	50	100
7	50-250		80	50	125	500	180	225	65	125	95	320	250	M12	370	32	80	100
8	50-315		80	50	125	500	225	280	65	125	95	345	280	M12	370	32	80	100
9	65-200		100	65	100	500	180	225	65	125	95	320	250	M12	370	32	80	100
10	65-250		100	65	125	500	200	250	80	160	120	360	280	M16	370	32	80	100
11	65-315		100	65	125	530	225	280	80	160	120	400	315	M16	370	42	110	100
12		65-400	100	65	125	530	250	355	80	160	120	400	315	M16	370	42	110	120
13	80-200		125	80	125	500	180	250	65	125	95	345	280	M12	370	32	80	140
14	80-250		125	80	125	500	225	280	80	160	120	400	315	M16	370	32	80	140
15	80-315		125	80	125	530	250	315	80	160	120	400	315	M16	370	42	110	140
16	80-400		125	80	125	530	280	355	80	160	120	435	355	M16	370	42	110	140
17	100-200		125	100	125	500	200	280	80	160	120	360	280	M16	370	32	80	140
18	100-250		125	100	140	530	225	280	80	160	120	400	315	M16	370	42	110	140
19	100-315		125	100	140	530	250	315	80	160	120	400	315	M16	370	42	110	140
20	100-400		125	100	140	530	280	355	100	200	150	500	400	M20	370	42	110	140
21	125-250		150	125	140	530	250	355	80	160	120	400	315	M16	370	42	110	140
22	125-315		150	125	140	530	280	355	100	200	150	500	400	M20	370	42	110	140
23	125-400		150	125	140	530	315	400	100	200	150	500	400	M20	370	42	110	140
24	150-250		200	150	160	530	280	375	100	200	150	500	400	M20	370	42	110	180
25	150-315		200	150	160	670	315	400	100	200	150	550	450	M20	500	48	110	180
26	150-400		200	150	160	670	315	450	100	200	150	550	450	M20	500	48	110	180
27		150-500	200	150	180	700	400	525	110	250	200	620	500	M20	500	55	110	140
28		200-400	250	200	180	710	400	500	110	250	200	620	500	M20	500	55	110	160
29		250-500	300	250	280	875	500	700	150	360	290	900	750	M28	560	65	140	320

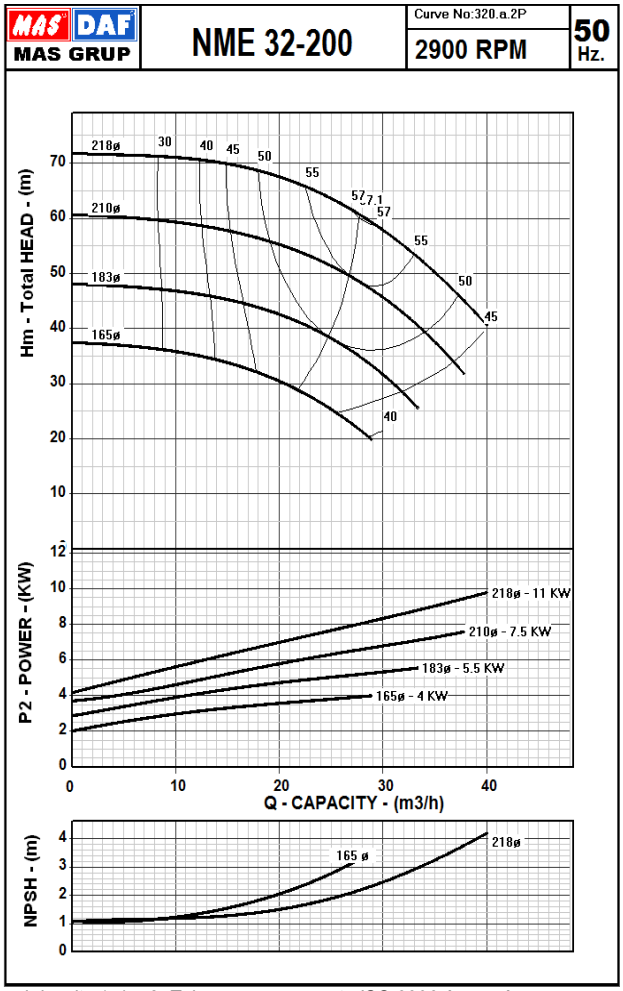
NOTE: *Centerline mounted models can be manufactured depending on request.*





The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm2/s and density 1g/cm3. Tolerances are acc. to ISO 9906 Annex A.





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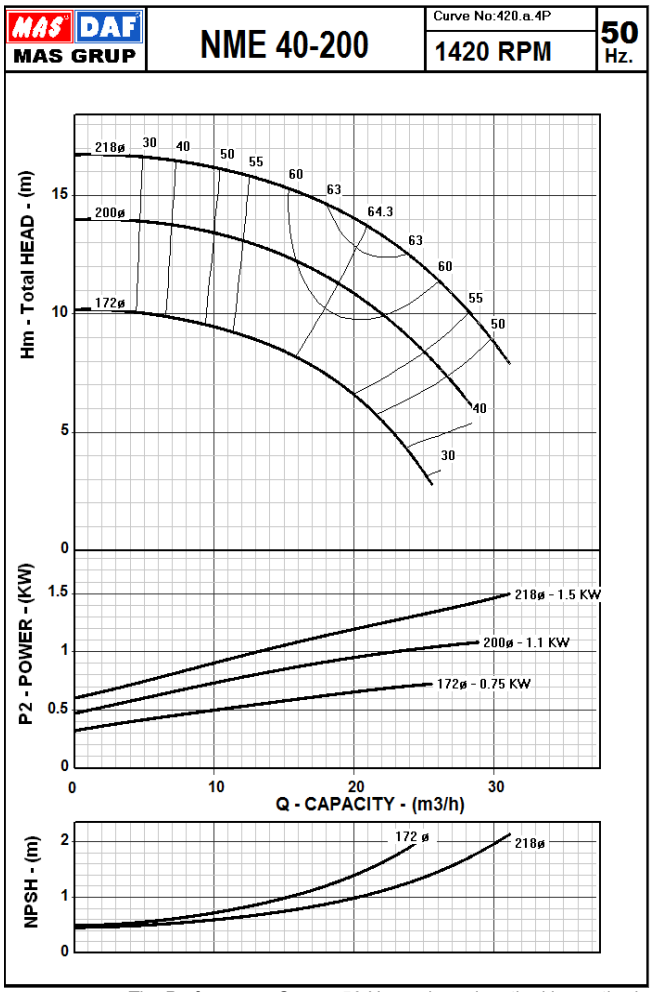

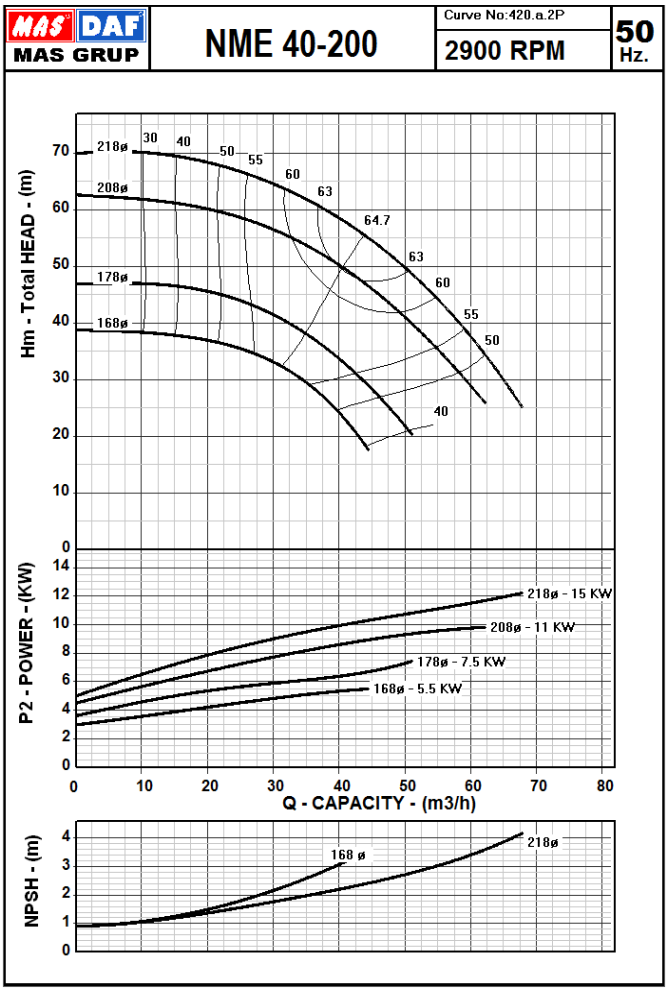

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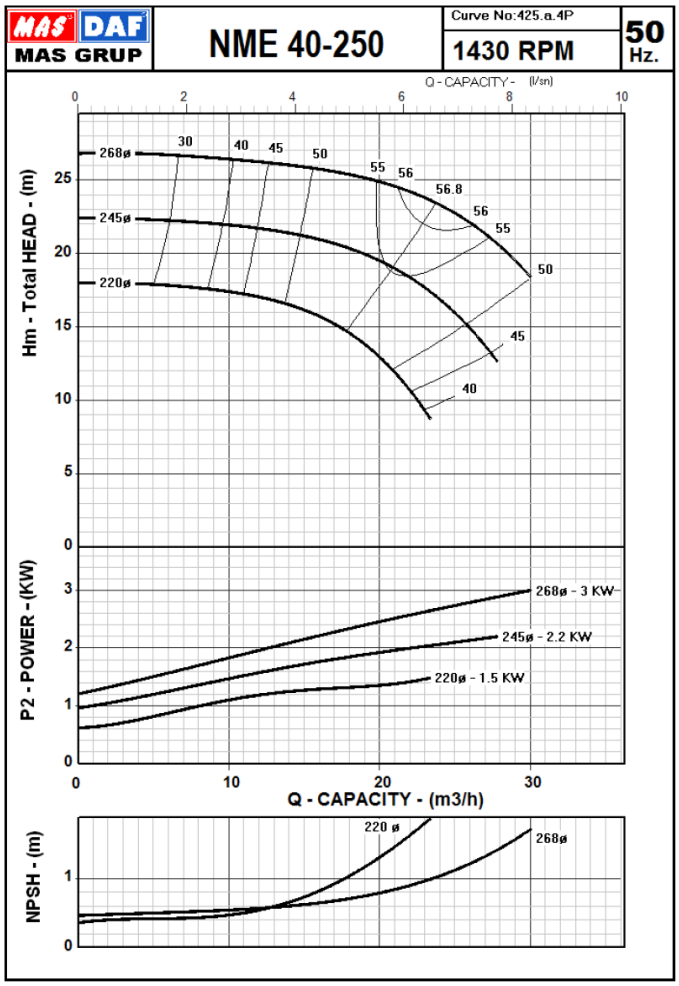

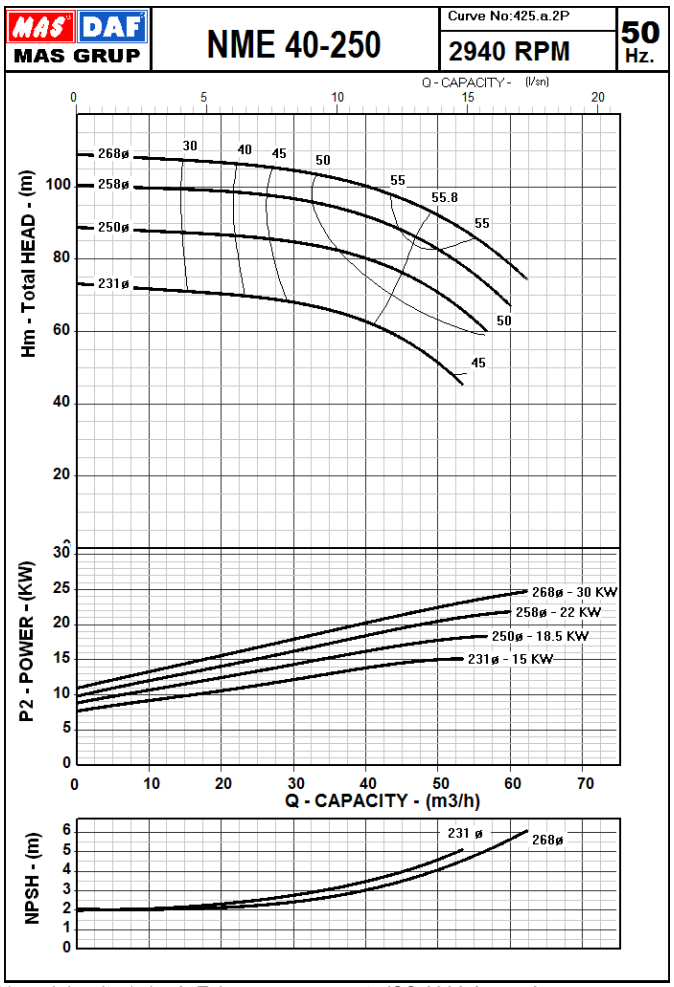

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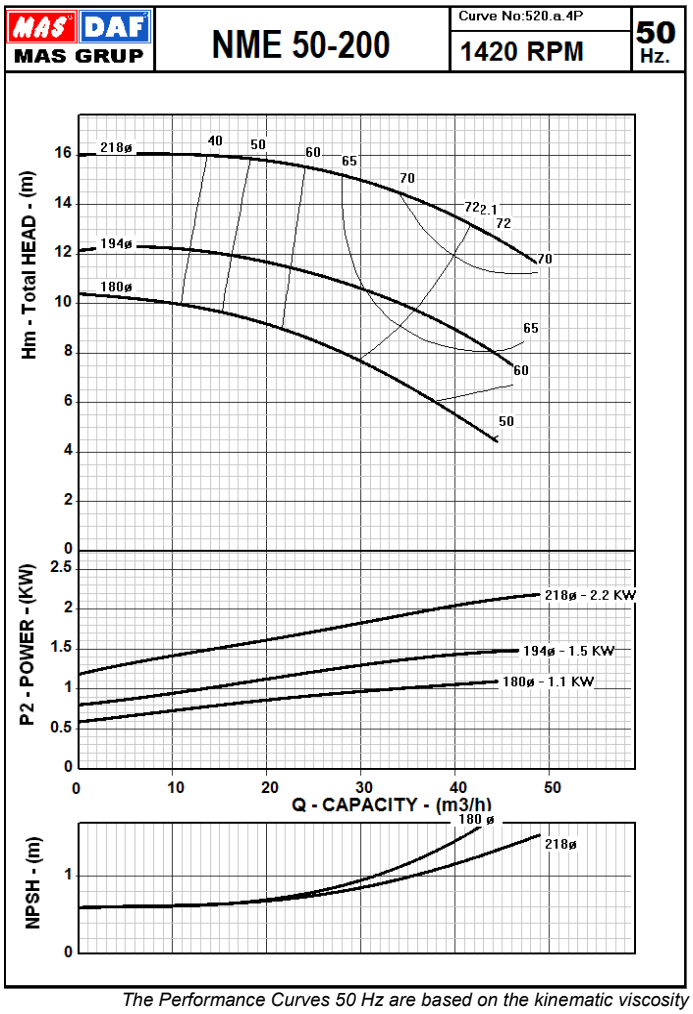

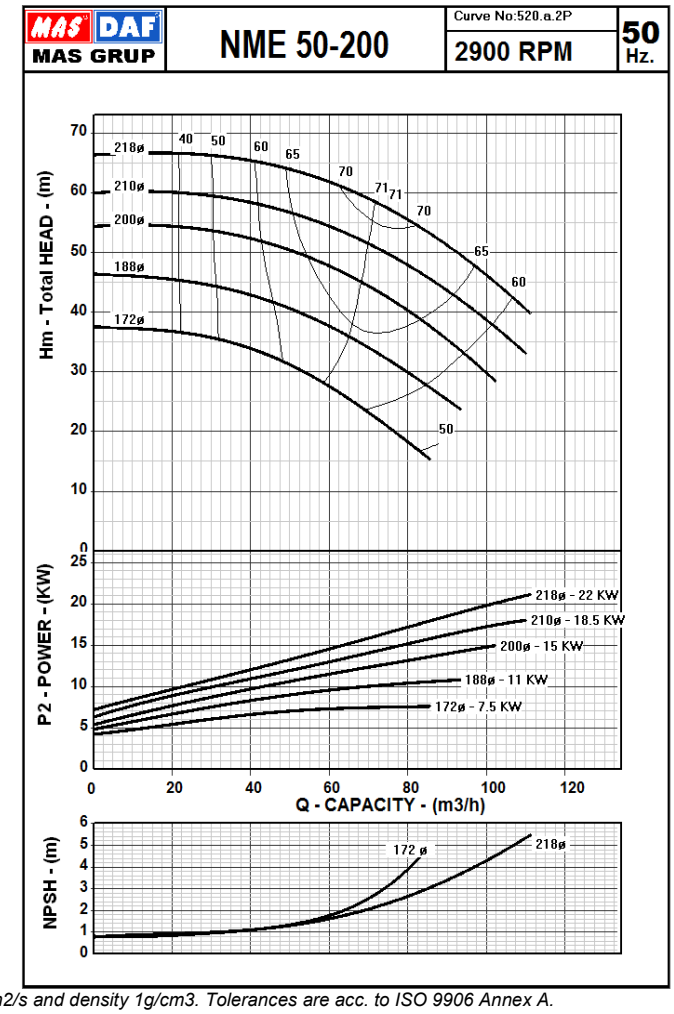

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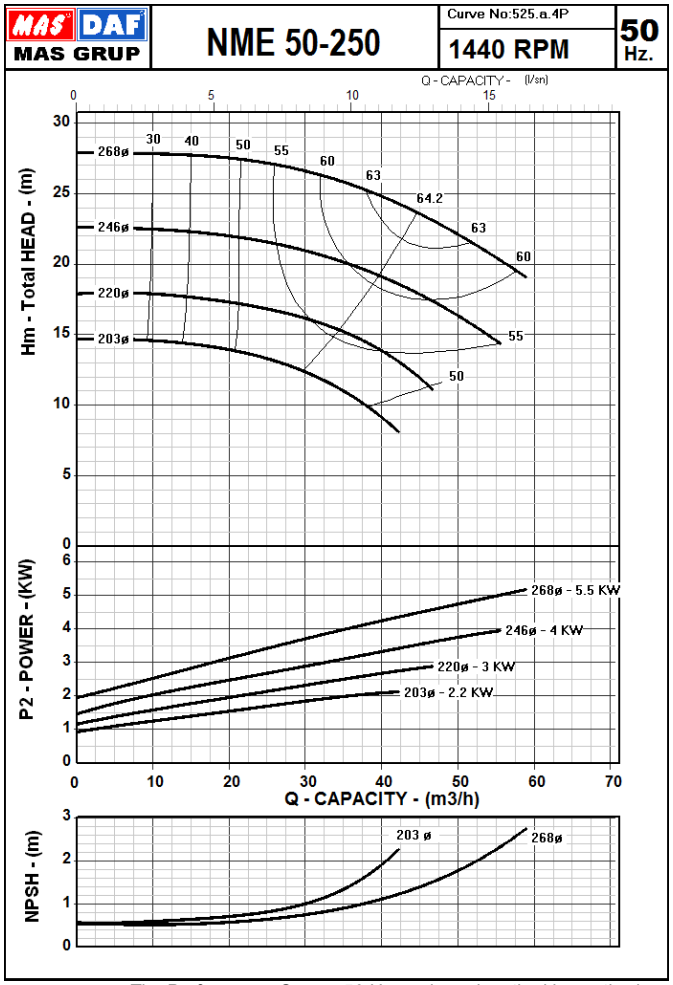

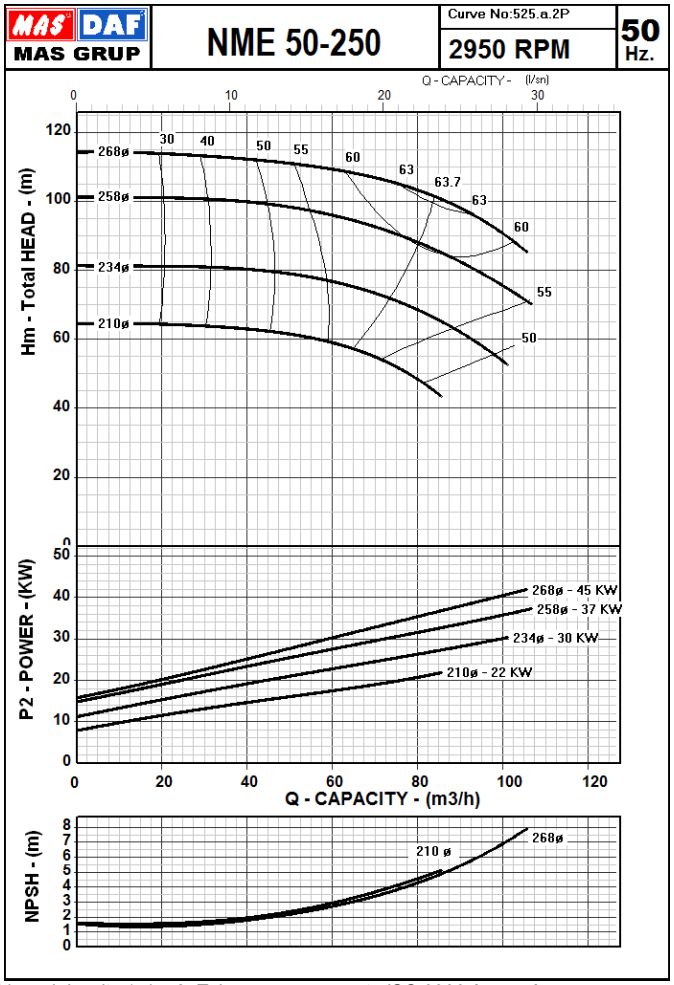

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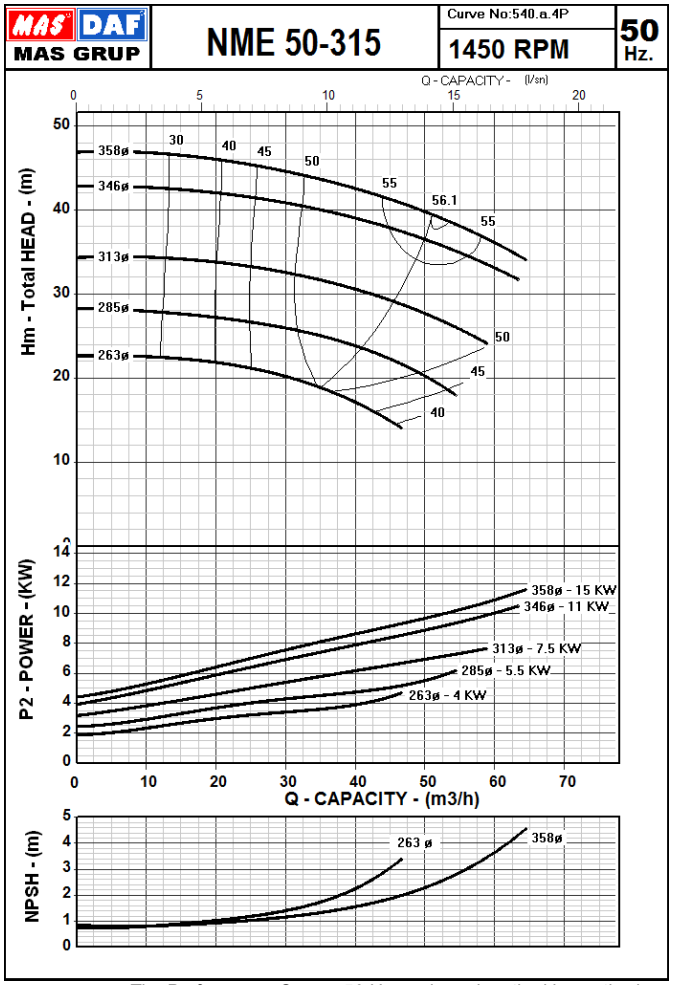

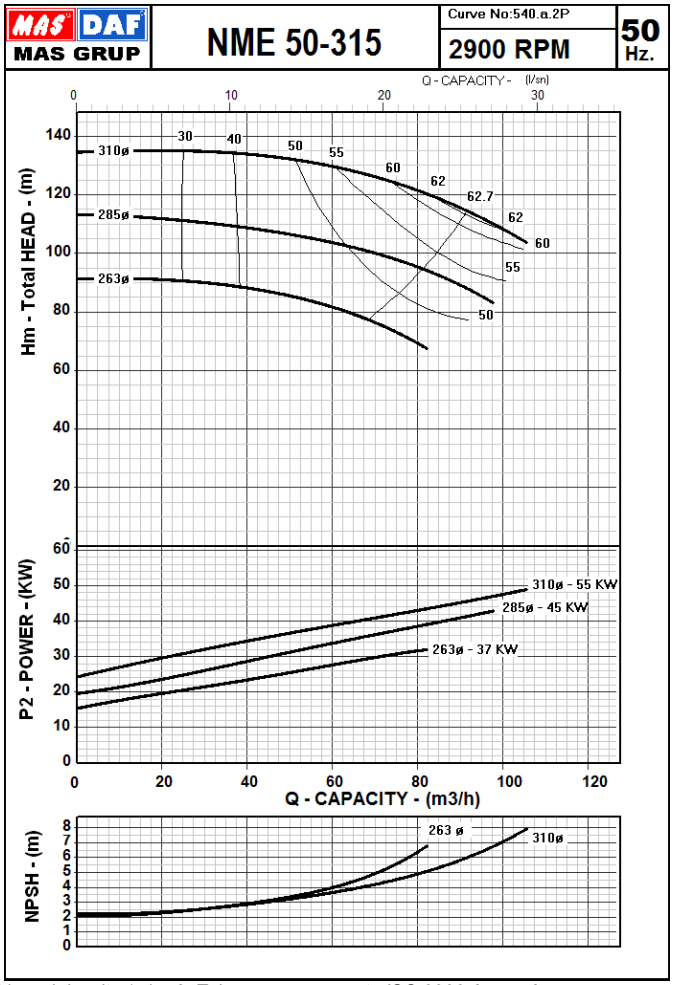

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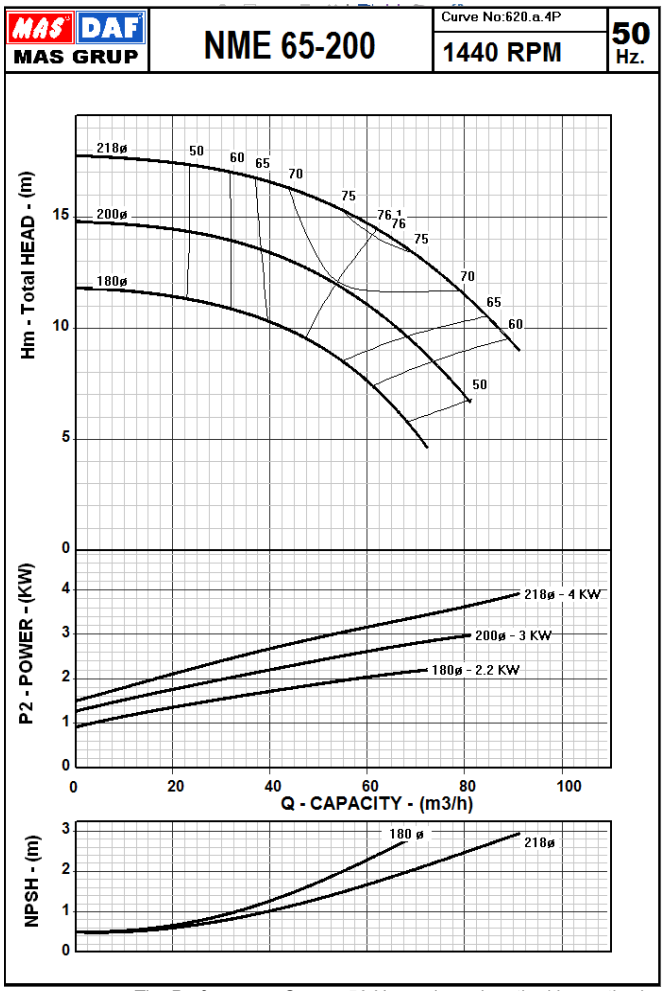

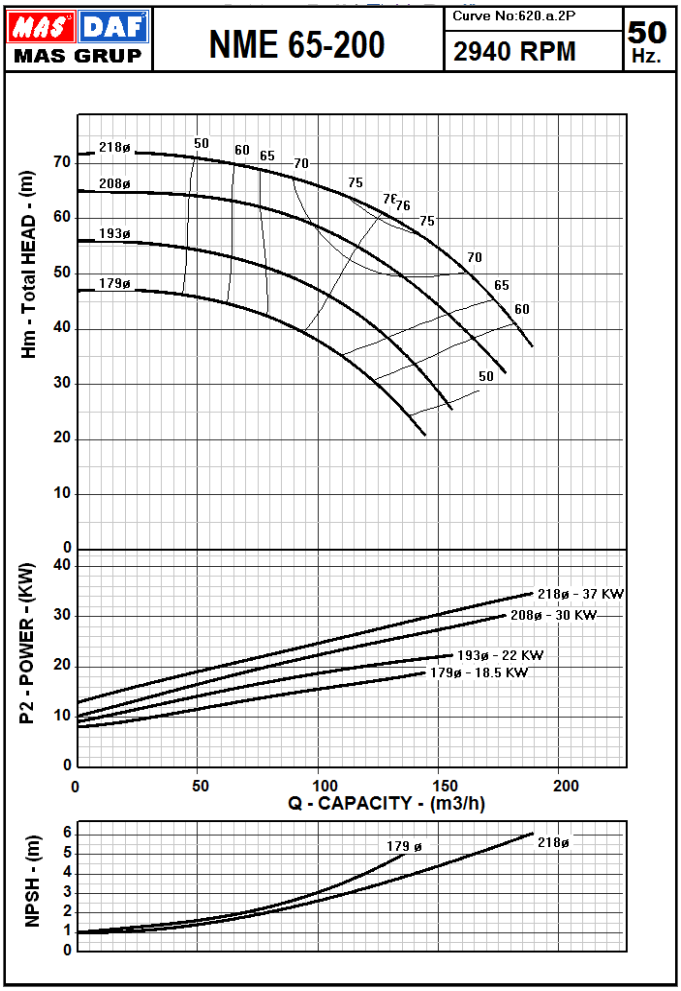

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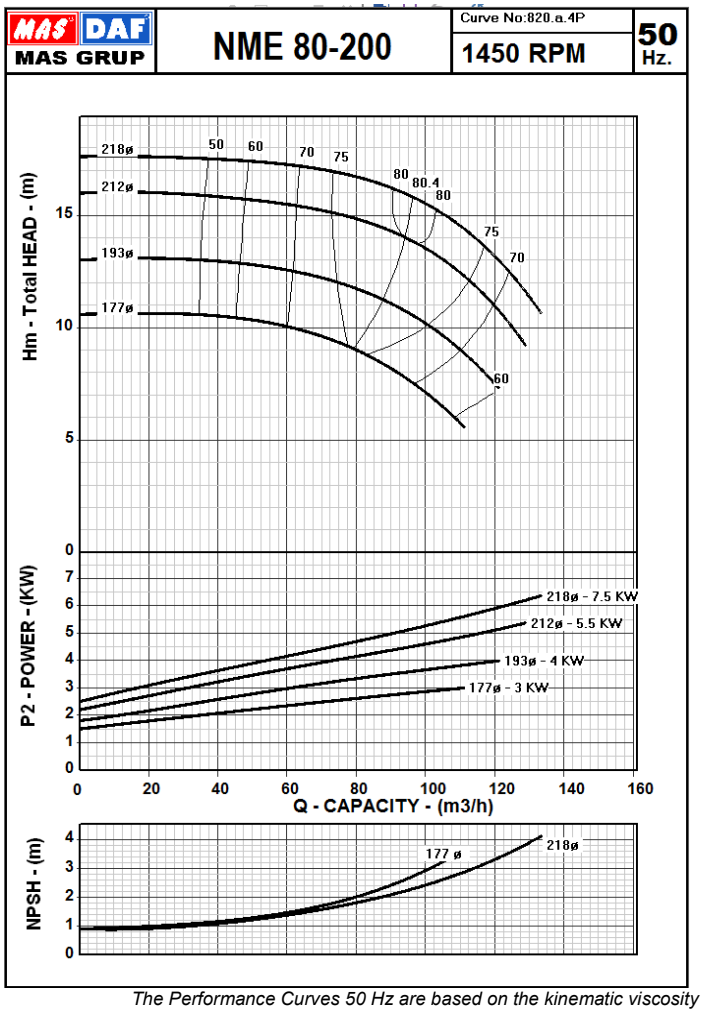

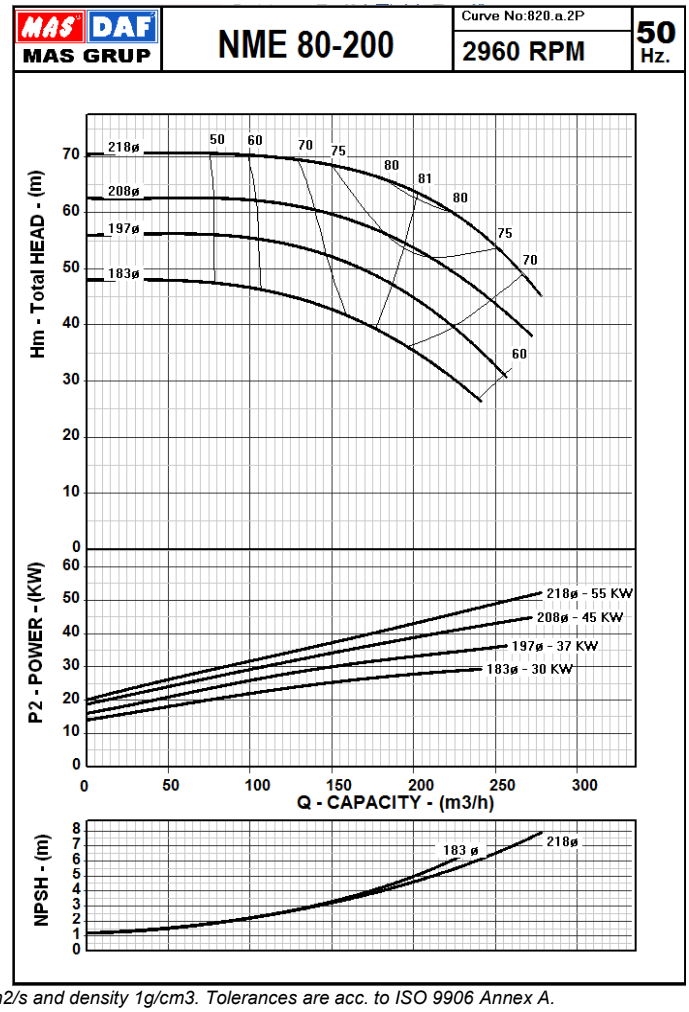

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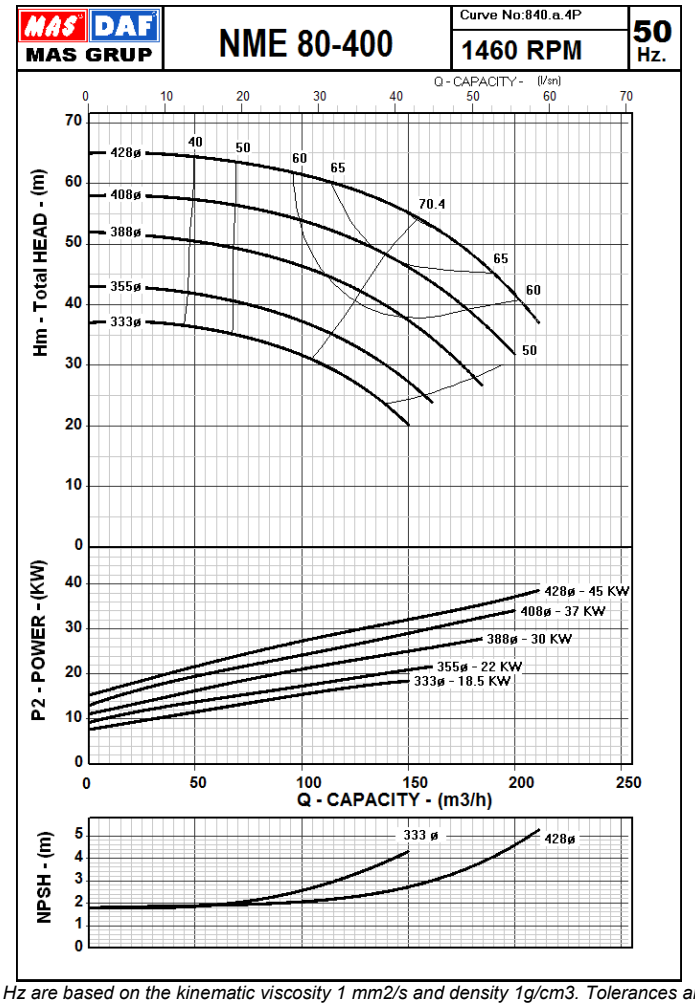

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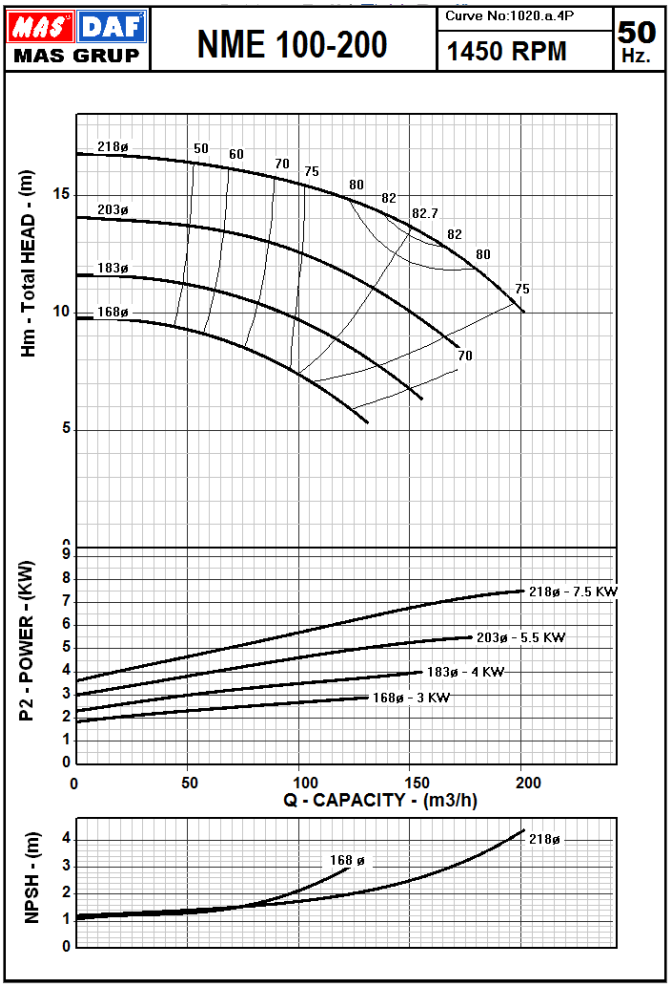

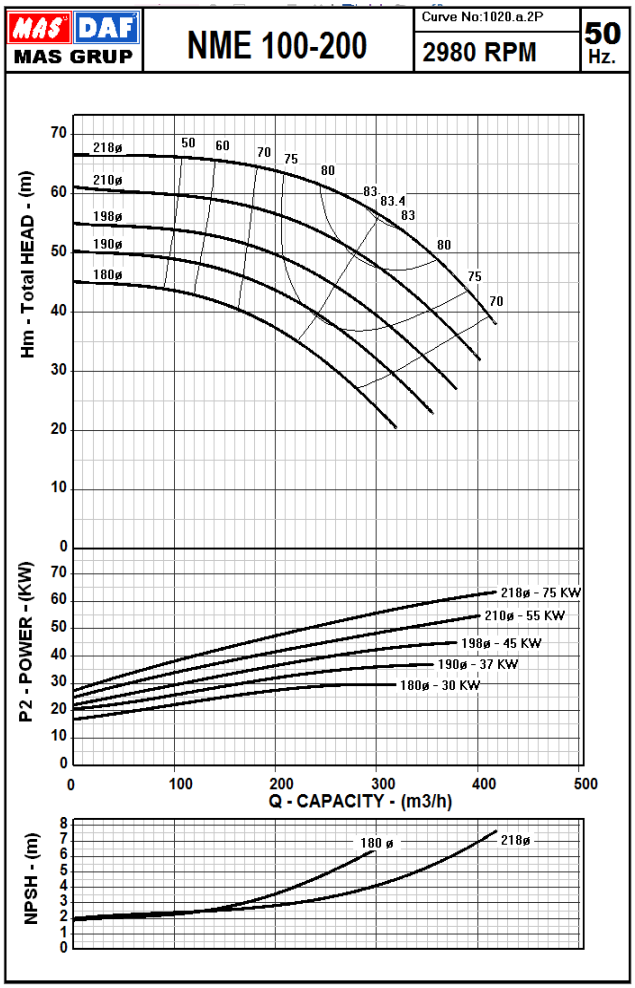

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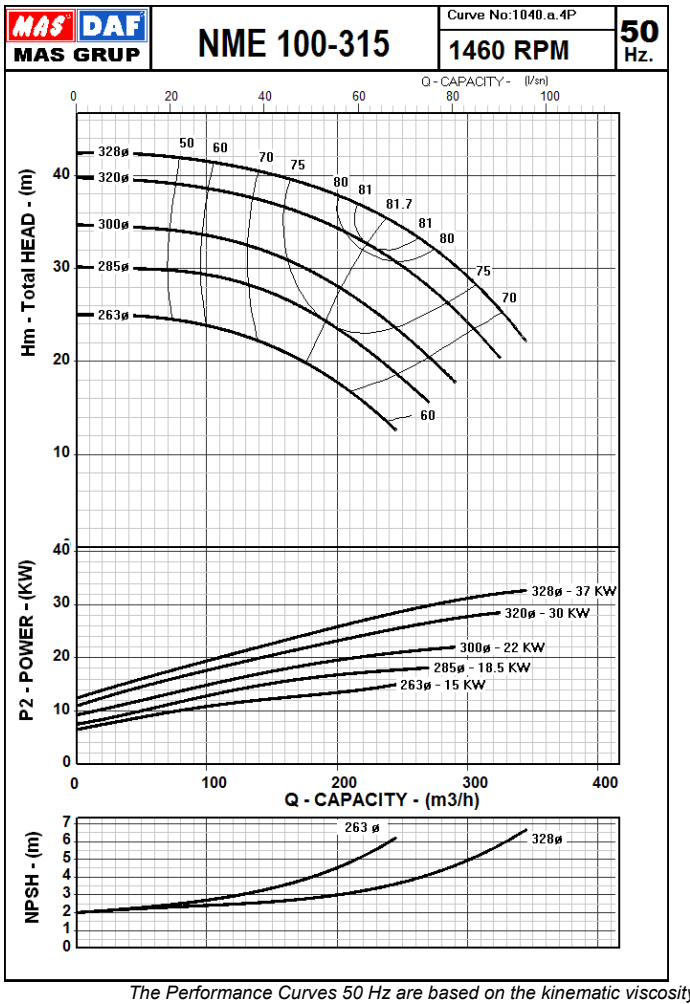

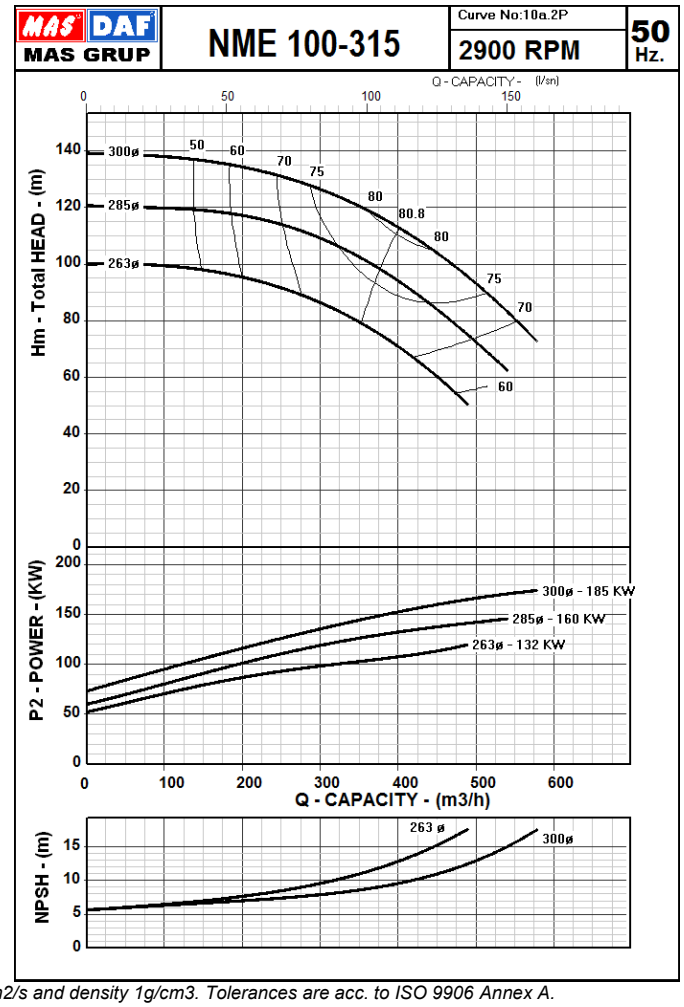

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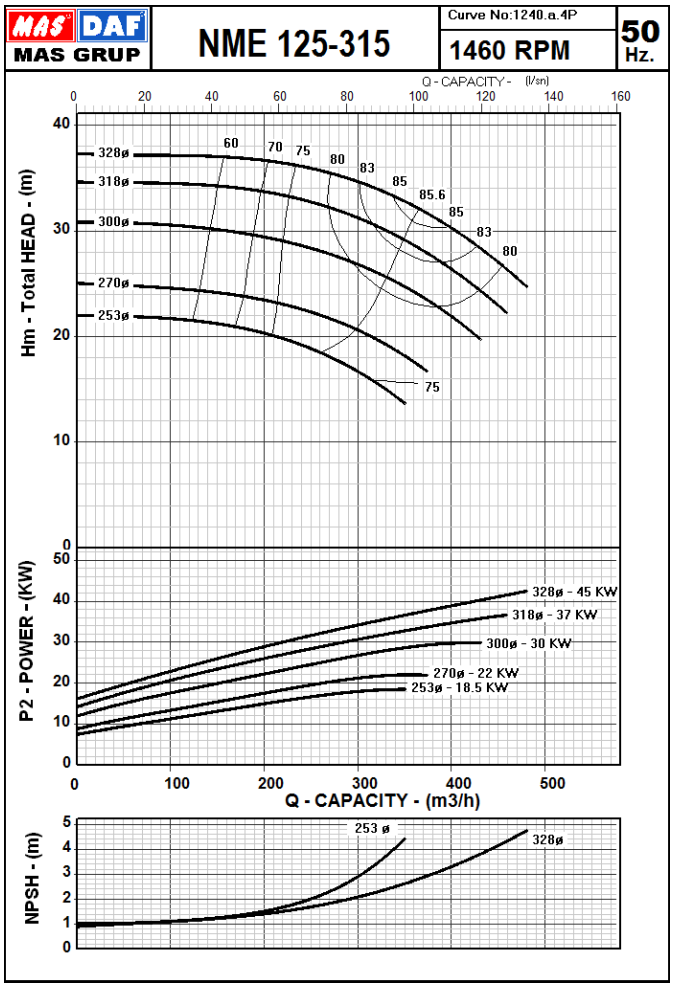

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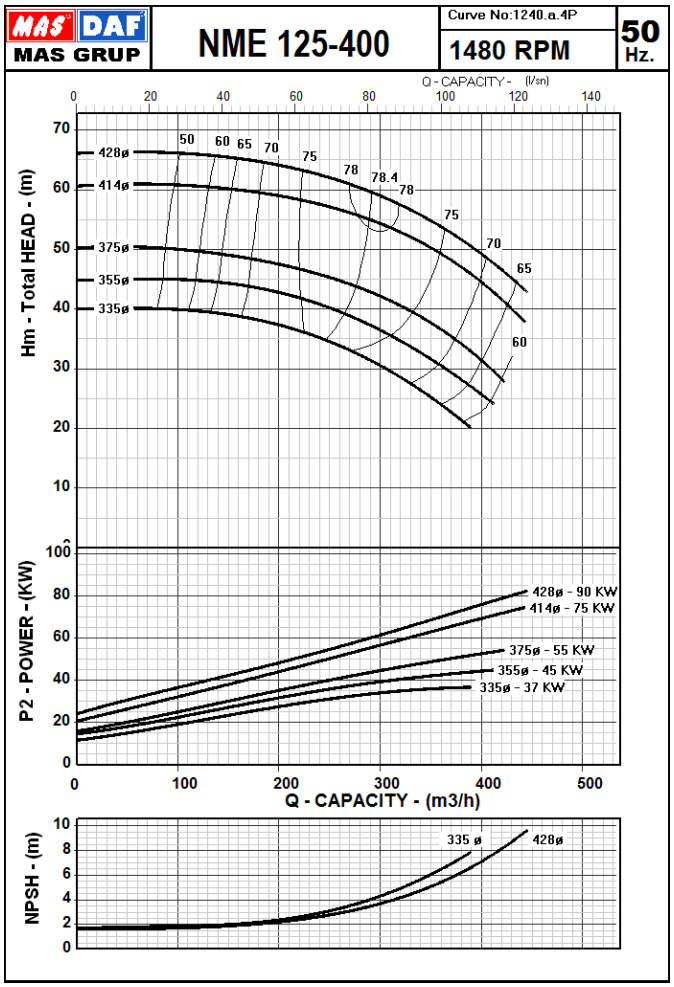


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm2/s and density 1g/cm3. Tolerances are acc. to ISO 9906 Annex A.

Load and torque components on discharge flanges : F_{xD}, F_{yD}, F_{zD}, M_{xD}, M_{yD}, M_{zD}
Load and torque components on suction flanges : F_{xS}, F_{yS}, F_{zS}, M_{xS}, M_{yS}, M_{zS}
Dimension for force and torque : N, Nm

$F_{VD}=|F_{yD}|$: Amount of vertical load on discharge flange
$F_{VS}=|F_{yS}|$: Amount of vertical load on suction flange
$F_{HD}=(F_{xD}^2+F_{zD}^2)^{1/2}$: Amount of horizontal load on discharge flange
$F_{HS}=(F_{xS}^2+F_{zS}^2)^{1/2}$: Amount of horizontal load on suction flange
$M_D=(M_{xD}^2+M_{yD}^2+M_{ZD}^2)^{1/2}$: Amount of torque on discharge flange
$M_S=(M_{xS}^2+M_{yS}^2+M_{zS}^2)^{1/2}$: Amount of torque on suction flange

$\Sigma F_V=2/3x\ F_{VD}+F_{VS}$: Sum of vertical loads
$\Sigma F_H=F_{HD}+F_{HS}$: Sum of horizontal loads
$\Sigma M=M_D+M_S$: Sum of torques

The load on the flange is permissible if the following condition is fulfilled.

$$(\Sigma F_V/\Sigma F_{Vmax})^2+(\Sigma F_H/\Sigma F_{Hmax})^2+(\Sigma M/\Sigma M_{max})^2 \le 1$$

PUMPTYPE	F_{Vmax}[N]	F_{Hmax}[N]	M_{max}[Nm]
NME 32-160	2450	1850	350
NME 32-200	2450	1850	350
NME 40-200	2550	1900	400
NME 40–250	2550	1900	400
NME 50-200	2650	1950	450
NME 50–250	2650	1950	450
NME 50–315	2900	2200	550
NME 65-200	3000	2150	650
NME 80-200	3600	2450	950
NME 80–400	3850	2600	1050
NME 100-200	4750	3000	1400
NME 100–315	4900	3050	1450
NME 125–315	7050	4300	2300
NME 125–400	7050	4300	2300

Note: Pumps are mounted on base plate pressed of steel-sheet, filled with grout and discharge branch upward. Pump casing materials are GG 25, Bronze, GGG 40 and GS.

PUMP TYPE	MOMENT OF INERTIA I [kgm^2]					
	Impeller GG 25 (ρ=7,3 kg/dm^3)		Impeller Bronze (ρ=8,7 kg/dm^3)		Impeller Cast Steel (ρ=7,8 kg/dm^3)	
	Without Water	Without Water	With Water	Without Water	With Water	Without Water
NME 32-160	0,0062	0,0072	0,0074	0,0084	0,0066	0,0076
NME 32-200	0,0123	0,0142	0,0147	0,0166	0,0131	0,0150
NME 40-200	0,0124	0,0145	0,0148	0,0169	0,0132	0,0153
NME 40–250	0,0293	0,0355	0,0349	0,0411	0,0313	0,0375
NME 50-200	0,0136	0,0160	0,0142	0,0186	0,0125	0,0169
NME 50–250	0,0318	0,0380	0,0379	0,0441	0,0340	0,0402
NME 50–315	0.0645	0.0800	0,0788	0,0943	0,0696	0,0941
NME 65-200	0,0150	0,0192	0,0179	0,0221	0,0160	0,0202
NME 80-200	0,0195	0,0255	0,0232	0,0292	0,0208	0,0268
NME 80–400	0,2200	0,2675	0,2622	0,3097	0,2351	0,2826
NME 100-200	0,0253	0,0327	0,0302	0,0376	0,0270	0,0344
NME 100–315	0,0895	0,1205	0,1067	0,1377	0,0956	0,1266
NME 125–315	0,1058	0,1480	0,1261	0,1683	0,1130	0,1552
NME 125–400	0,2358	0,3098	0,2810	0,3550	0,2520	0,3260

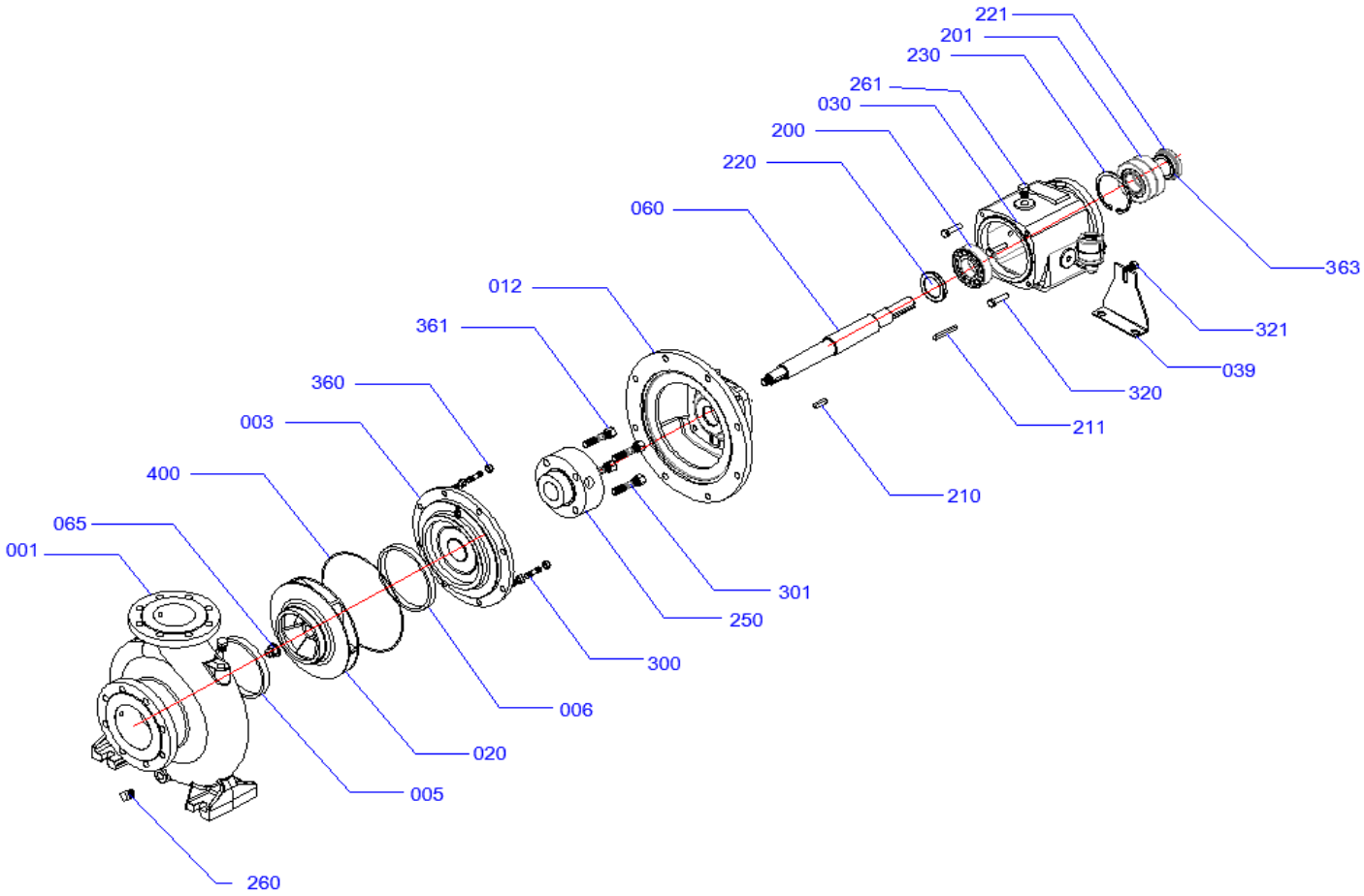
For the water filling ρ=1 kg/dm^3 is used. In case the handled liquid has a different density or the impeller is made of other materials having also a different density, calculate moment of inertia according to the following examples.

Example: Pump Size NME 100-315

Handled liquid density ρ=1.25 kg/dm^3, impeller cast iron GG ρ=7.3 kg/dm^3
I= (0,1205-0,0895)x1,25+0,0895=0,12825 kgm^2

Handled liquid density ρ=1 kg/dm^3, impeller ρ=8 kg/dm^3 (conversion from GG ρ=7.3 kg/dm^3)
I= 0,0895x8/7,3+(0,1205-0,0895)=0,129 kgm^2

Handled liquid density ρ=1.25 kg/dm^3, impeller ρ=8 kg/dm^3
(Conversion from GG ρ=7.3 kg/dm^3 and water ρ=1 kg/dm^3)
I= 0,0895x8/7,3+(0,1205-0,0895)x1,25=0,136 kgm^2



PART NO	PARTNAME	PART NO	PARTNAME
01	Volute Casing	220	Oil Gasket
03	Stuffing Box	221	Oil Gasket
05	Front Wear Ring	230	Retaning Ring
06	Rear Wear Ring	250	Mechanical Seal
12	Adapter	261	Oil Filling Plug
20	Impeller	300	Bolt (Casing)
30	Bearing House	301	Bolt (Mech. Seal Cov.)
39	Bracket	320	Hexagonal Bolt
60	Shaft	321	Hexagonal Bolt
65	Nut(Impeller)	360	Nut (Casing)
200	Cylindrical Roller Bearing	361	Nut (Adapter)
201	Angular Contact Bearing	362	Nut, Hexagonal
210	Key, Impeller	363	Safety Nut
211	Key, Coupling	400	O-Ring

Mas Grup

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