

Horizontal Single-Stage Centrifugal Pumps EA Series



High-efficiency, end-suction, horizontal-shaft, centrifugal pumps compliant with DIN EN 733

Centrifugal pumps with long service life and ease of maintenance are used in

- HVAC systems
- Fire pump systems
- Irrigation
- Water supply
- Water treatment
- Power plants

FLUIDPROPERTY

- Clean, non-hard, non-viscose, chemically neutral water that is free of solid abrasive particles
- The maximum percentage of glycol that can be added to the circulating water is 50%. In case of using glycol-water mixed fluid, please contact our company at the product selection stage.

TECHNICAL SPECIFICATIONS

Max. Flow Rate	: 480 m ³ /h
Max. Head	: 155 mwc
Motor Speed	: 2950 rpm (50 Hz), 1450 rpm (50 Hz)
Connection	: DN 32 - DN 100
Power	: 0.25 kW - 160 kW
Maximum Operating Pressure	: 16 bar
Maximum Ambient Temperature	: 40°C
Temperature of Pumped Liquid	: -10°C ÷ +120°C
Protection Class	: IP55
Insulation Class	: Class F

Design Properties

Pump Body	: GG25 - Cast Iron
Shaft	: AISI 420 - Stainless Steel
Impeller Bronze)	: GG25- Cast Iron (ops. CuSn7
Adapter	: GG25 - Cast Iron
Mechanical Seal	: Carbon / Silicone / Carbide

CONSTRUCTION SPECIFICATIONS

EA

- End-suction, cast iron pump with radial outlet.
- Hydraulic sizes and nominal diameters of inlet and outlet ports conform with (DN) EN 733 DIN 24255.
- Flanges conform with EN 1092-2 DIN 2532.

MOTOR - PUMP COUPLING

- Two different types of motor/pump couplings are available:

EAR- RIGID COUPLING

- Shaft extension (rigid coupling) attached to the standard motor shaft with a wedge, bracket, adapter and pump.

EAS-FLEXABLE COUPLING

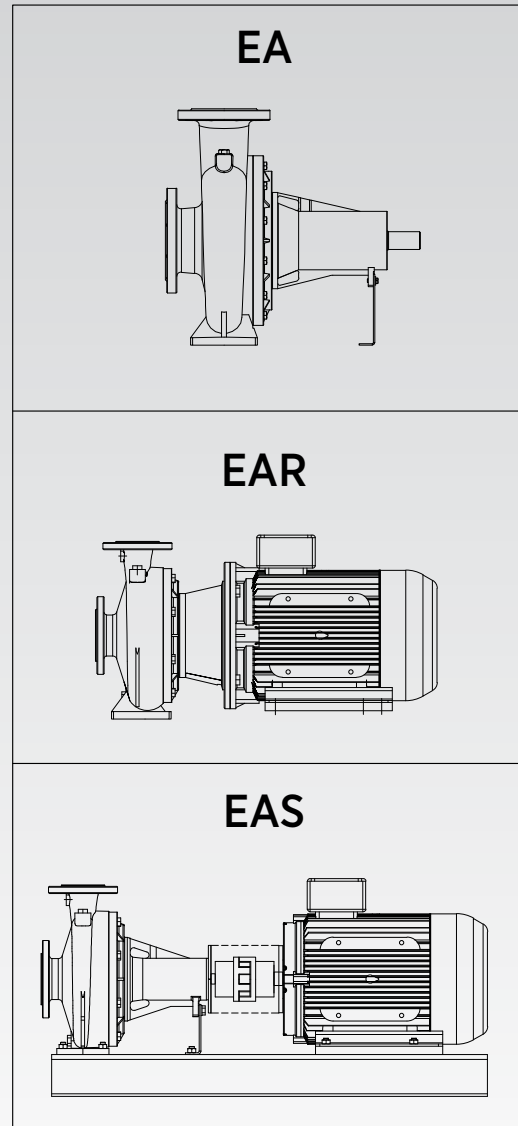
- Pump and electric motor supported with a bracket leg and a connection set on a chassis with a flexible coupling

OPTIONAL ACCESSORIES

- Stainless steel 316 or galvanized steel counter-flanges.
- Pressure gauge attachable intermediate flange.

OPTIONAL FEATURES

- Different voltages and frequencies
- Special materials for the mechanical seal and gasket
- Models with air relief valves
- Frequency converter system
- Flexible coupling for EAS series - Spacer coupling connection system (Enables easy maintenance of mechanical seal, impeller and other parts without dismantling the suction and discharge pipes of the pump body)
- Bronze impeller



EA PUMP SERIES SOUND PRESSURE LEVEL

PUMP TYPE	"POWER [kW]"	" SPEED [rpm]"	"SOUND PRESSURE LEVEL [dB(A)]"
EA 32/20	0,75	1450	46
EA 32/20	1,1	1450	47
EA 32/20	1,5	1450	48
EA 32/26	1,1	1450	47
EA 32/26	1,5	1450	48
EA 32/26	2,2	1450	49
EA 32/23	3	1450	50
EA 40/20	0,75	1450	46
EA 40/20	1,1	1450	47
EA 40/20	1,5	1450	48
EA 40/20	2,2	1450	49
EA 40/26	1,5	1450	48
EA 40/26	2,2	1450	49
EA 40/26	3	1450	50
EA 40/32	2,2	1450	49
EA 40/32	3	1450	50
EA 40/32	4	1450	51
EA 40/32	5,5	1450	52
EA 50/20	1,1	1450	47
EA 50/20	1,5	1450	48
EA 50/20	2,2	1450	49
EA 50/26	2,2	1450	49
EA 50/26	3	1450	50
EA 50/26	4	1450	51
EA 50/26	5,5	1450	52
EA 50/32	4	1450	51
EA 50/32	5,5	1450	52
EA 50/32	7,5	1450	53
EA 50/32	11	1450	54

PUMP TYPE	"POWER [kW]"	" SPEED [rpm]"	"SOUND PRESSURE LEVEL [dB(A)]"
EA 65/20	1,5	1450	48
EA 65/20	2,2	1450	49
EA 65/20	3	1450	50
EA 65/20	4	1450	51
EA 65/26	4	1450	51
EA 65/26	5,5	1450	52
EA 65/26	7,5	1450	53
EA 65/32	4	1450	51
EA 65/32	5,5	1450	52
EA 65/32	7,5	1450	53
EA 80/20	3	1450	50
EA 80/20	4	1450	51
EA 80/20	5,5	1450	52
EA 80/26	4	1450	51
EA 80/26	5,5	1450	52
EA 80/26	7,5	1450	53
EA 80/26	11	1450	54
EA 80/32	11	1450	54
EA 80/32	15	1450	55
EA 80/32	11	1450	54
EA 100/20	3	1450	50
EA 100/20	4	1450	51
EA 100/20	5,5	1450	52
EA 100/20	7,5	1450	53
EA 100/26	5,5	1450	52
EA 100/26	7,5	1450	53
EA 100/26	11	1450	54
EA 100/32	11	1450	54
EA 100/32	15	1450	55
EA 100/32	18,5	1450	63

Sound pressure level measurements were made in a noiseless environment with 50 Hz electric motors.

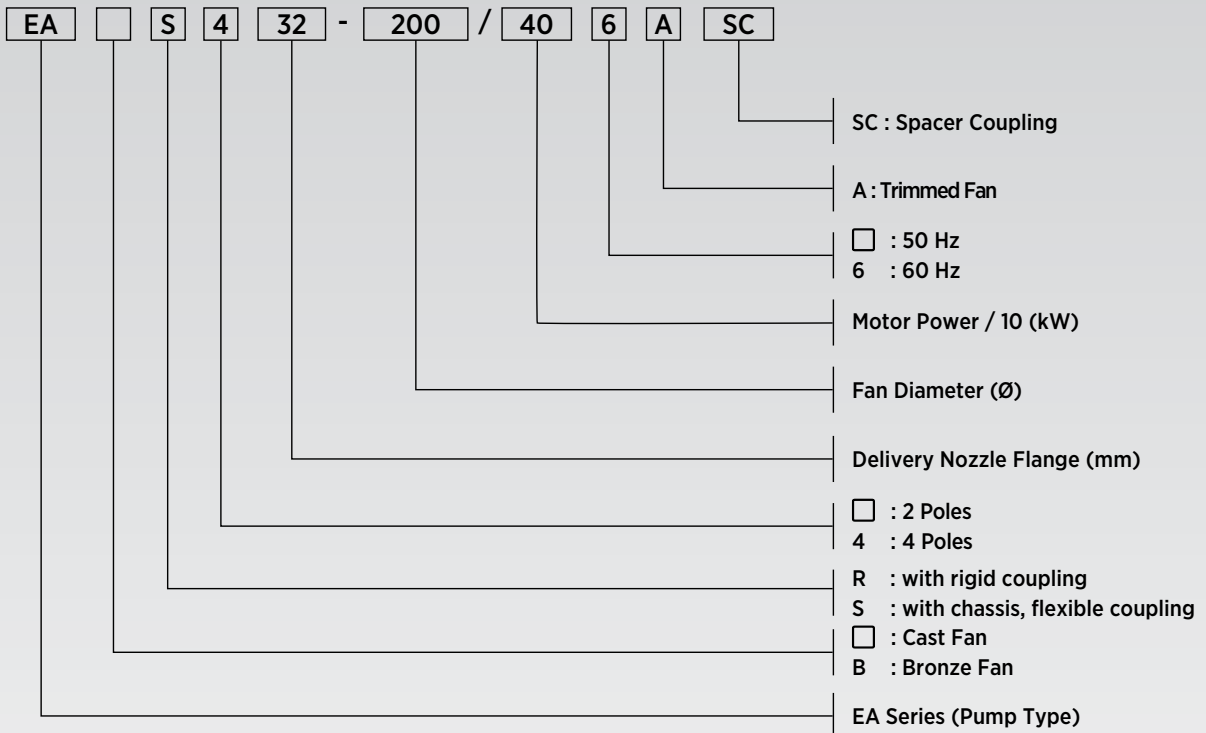
EA PUMP SERIES SOUND PRESSURE LEVEL

PUMP TYPE	"POWER [kW]"	" SPEED [rpm]"	"SOUND PRESSURE LEVEL [dB(A)]"
EA 32/20	5,5	2950	62
EA 32/20	7,5	2950	63
EA 32/20	11	2950	66
EA 32/26	7,5	2950	63
EA 32/26	11	2950	66
EA 32/26	15	2950	67
EA 40/20	7,5	2950	63
EA 40/20	11	2950	66
EA 40/20	15	2950	67
EA 40/26	11	2950	66
EA 40/26	15	2950	67
EA 40/26	18,5	2950	68
EA 40/26	22	2950	71
EA 50/20	11	2950	66
EA 50/20	15	2950	67
EA 50/20	18,5	2950	68
EA 50/20	22	2950	71
EA 50/26	22	2950	71
EA 50/26	30	2950	72
EA 50/26	37	2950	73
EA 50/26	45	2950	73
EA 50/32	37	2950	73
EA 50/32	45	2950	73
EA 50/32	55	2950	74
EA 50/32	75	2950	75
EA 65/20	18,5	2950	68
EA 65/20	22	2950	71
EA 65/20	30	2950	72
EA 65/20	37	2950	73

PUMP TYPE	"POWER [kW]"	" SPEED [rpm]"	"SOUND PRESSURE LEVEL [dB(A)]"
EA 65/26	30	2950	72
EA 65/26	37	2950	73
EA 65/26	45	2950	73
EA 65/26	55	2950	74
EA 65/32	55	2950	74
EA 65/32	75	2950	75
EA 65/32	90	2950	76
EA 80/20	18,5	2950	68
EA 80/20	22	2950	71
EA 80/20	30	2950	72
EA 80/20	37	2950	73
EA 80/20	45	2950	73
EA 80/26	37	2950	73
EA 80/26	45	2950	73
EA 80/26	55	2950	74
EA 80/26	75	2950	75
EA 80/32	90	2950	76
EA 80/32	110	2950	77
EA 80/32	132	2950	78
EA 80/32	160	2950	78
EA 100/20	30	2950	72
EA 100/20	37	2950	73
EA 100/20	45	2950	73
EA 100/20	55	2950	74
EA 100/26	45	2950	73
EA 100/26	55	2950	74
EA 100/26	75	2950	75
EA 100/26	90	2950	76
EA 100/32	110	2950	77
EA 100/32	132	2950	78
EA 100/32	160	2950	78

Sound pressure level measurements were made in a noiseless environment with 50 Hz electric motors.

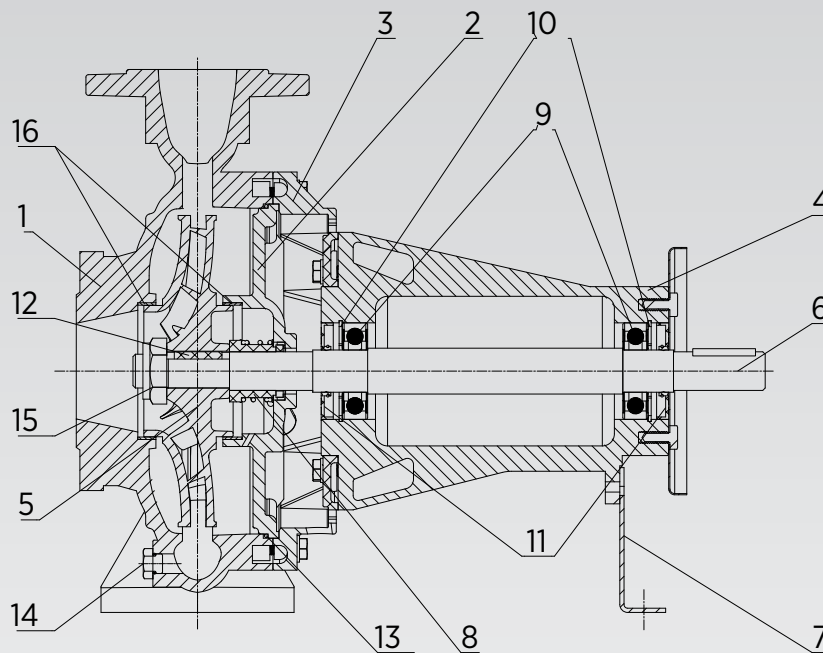
EA SERIES PUMP IDENTIFICATION CODE



PUMP LABEL

ETNA ®		CE	ALP Pompa Teknolojileri A.S. Dudullu OSB 2. Cad. No: 14 34775 Ümraniye - İSTANBUL 0216 561 47 74	
TYPE:				
CAPACITY (Q): m ³ /h			H: mSS	
SPEED: rpm			POWER: kW	
SERIAL NO:			YEAR of MANUFACTURE:	

EA SERIES PUMPS



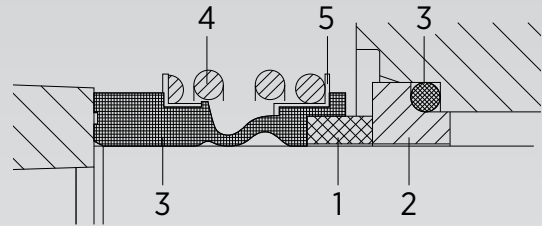
REF. N.	PART NAME	MATERIAL	STANDARDS	
			EUROPE	USA
1	Pump Body	Cast Iron	EN 1561 - GJL 250 (JL1040)	ASTM Class 35
2	Seal Body	Cast Iron	EN 1561 - GJL 250 (JL1040)	ASTM Class 35
3	Pump Flange	Cast Iron	EN 1561 - GJL 200 (JL1030)	ASTM Class 25
4	Bearing Body	Cast Iron	EN 1561 - GJL 200 (JL1030)	ASTM Class 25
5	Impeller (Cast Iron)	Cast Iron	EN 1561 - GJL 200 (JL1030)	ASTM Class 25
	Impeller (Bronze)	Bronze	CuSn7ZnPb - Rg-7 (DIN 1705)	UNS C90700
6	Shaft	Steel	EN 10088-X17CrNi16-2 (1.4057)	AISI 431
7	Pump Foot	Steel	EN 10025:2:2006-S235JR	A283C
8	Mechanical Seal	Ceramic / Carbon / NBR (Standard)		
9	Bearing	Steel	DIN 625 , 6300 Series	
10	Snap Ring	Spring Steel C60-C65	DIN 472	
11	Oil Seal	NBR (Standard)		
12	Wedge	Stainless Steel	EN 10088-1 X2CrNiMo17-12-2 (1.44044)	
13	O-ring	EPOM (Standard)		
14	Fill and Drain	Nickel Coated Brass (Standard)		
15	Shaft End	Stainless Steel	EN 10088-1 X2CrNiMo17-12-2 (1.44044)	
16	Wear Ring	Bronze	CuSn7ZnPb - Rg-7 (DIN 1705)	AISI 316L

MECHANICAL SEAL

Mechanical seal connection dimensions in accordance with EN 12756 and ISO 3069

List of Materials

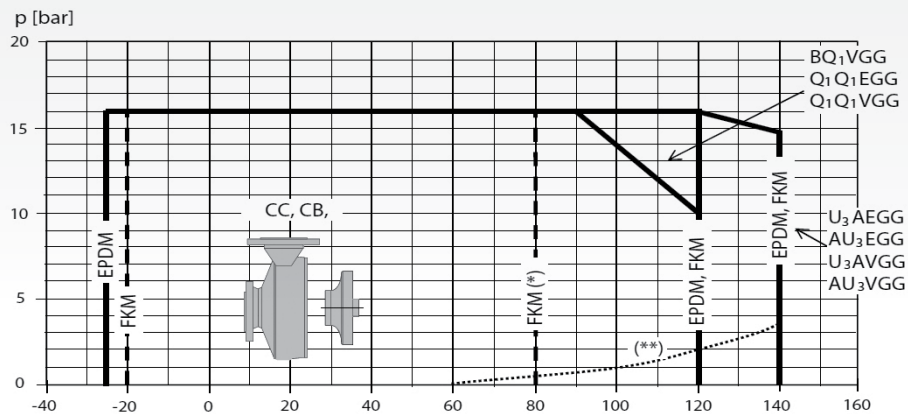
Positions 1-2	Position 3	Positions 4-5
B: Resin-Impregnated Carbon	E: EPDM	G: AISI 304
V: Ceramic	V: FKM (FPM)	
Q1: Silicon Carbide	P: NBR	
U3: Tungsten Carbide		
A: Antimony-Impregnated Carbon		



Seal Type

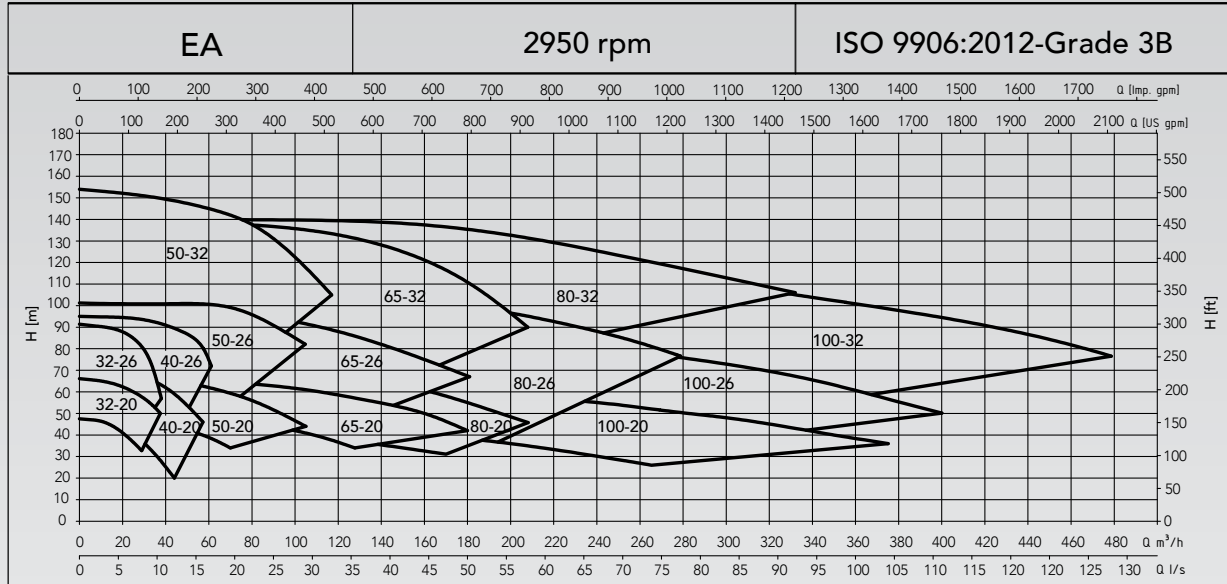
Type	Position					Temperature (°C)
	1 Rotating Part	2 Stationary Part	3 Elastics	4 Springs	5 Other Parts	
Standard Mechanical Seal						
BVEGG	B	V	E	G	G	-30/+120
Other Mechanical Seal Types						
VBVGG	V	B	V	G	G	-10/+120
Q ₁ B V G G	Q ₁	B	V	G	G	-10/+120
Q ₁ Q ₁ V G G	Q ₁	Q ₁	V	G	G	-10/+120
VBEGG	V	B	E	G	G	-30/+120
Q ₁ BEGG	Q ₁	B	E	G	G	-30/+120
Q ₁ Q ₁ E G G	Q ₁	Q ₁	E	G	G	-30/+120
A U ₃ E G G	A	U ₃	E	G	G	-25/+140

Pressure / Temperature Limits (for any type of seal)

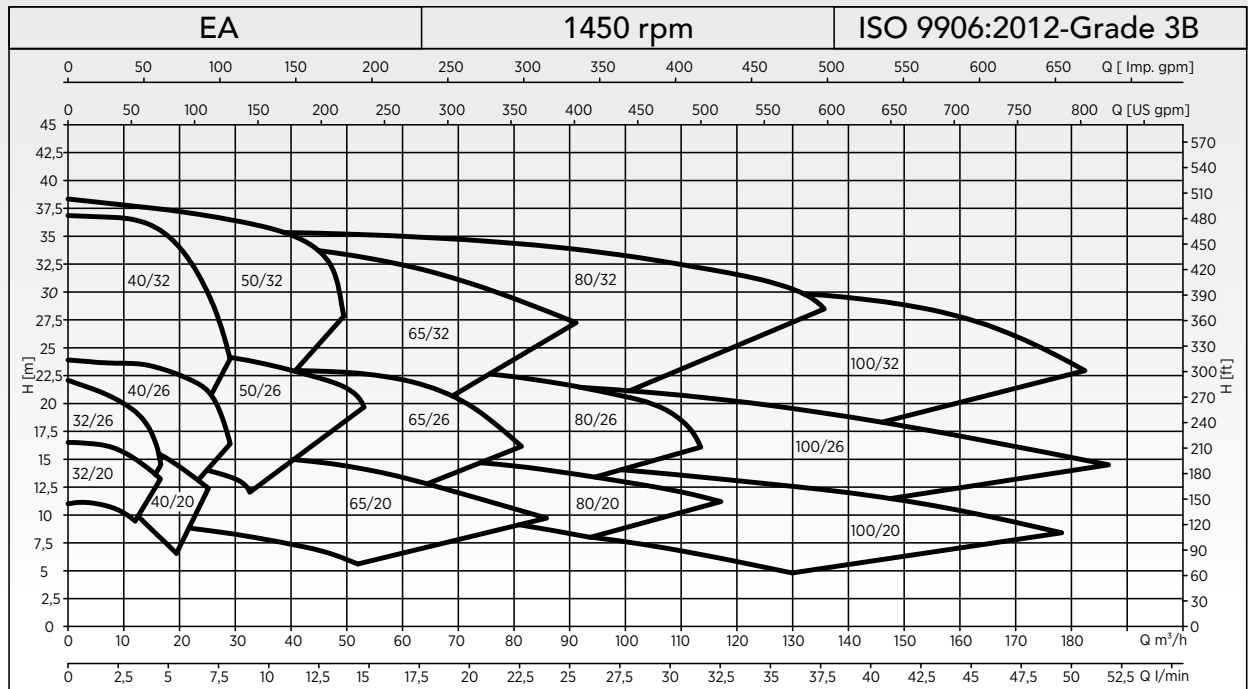


CC: Cast Iron Body, Cast Iron Fan
 CB: Cast Iron Body, Bronze Fan

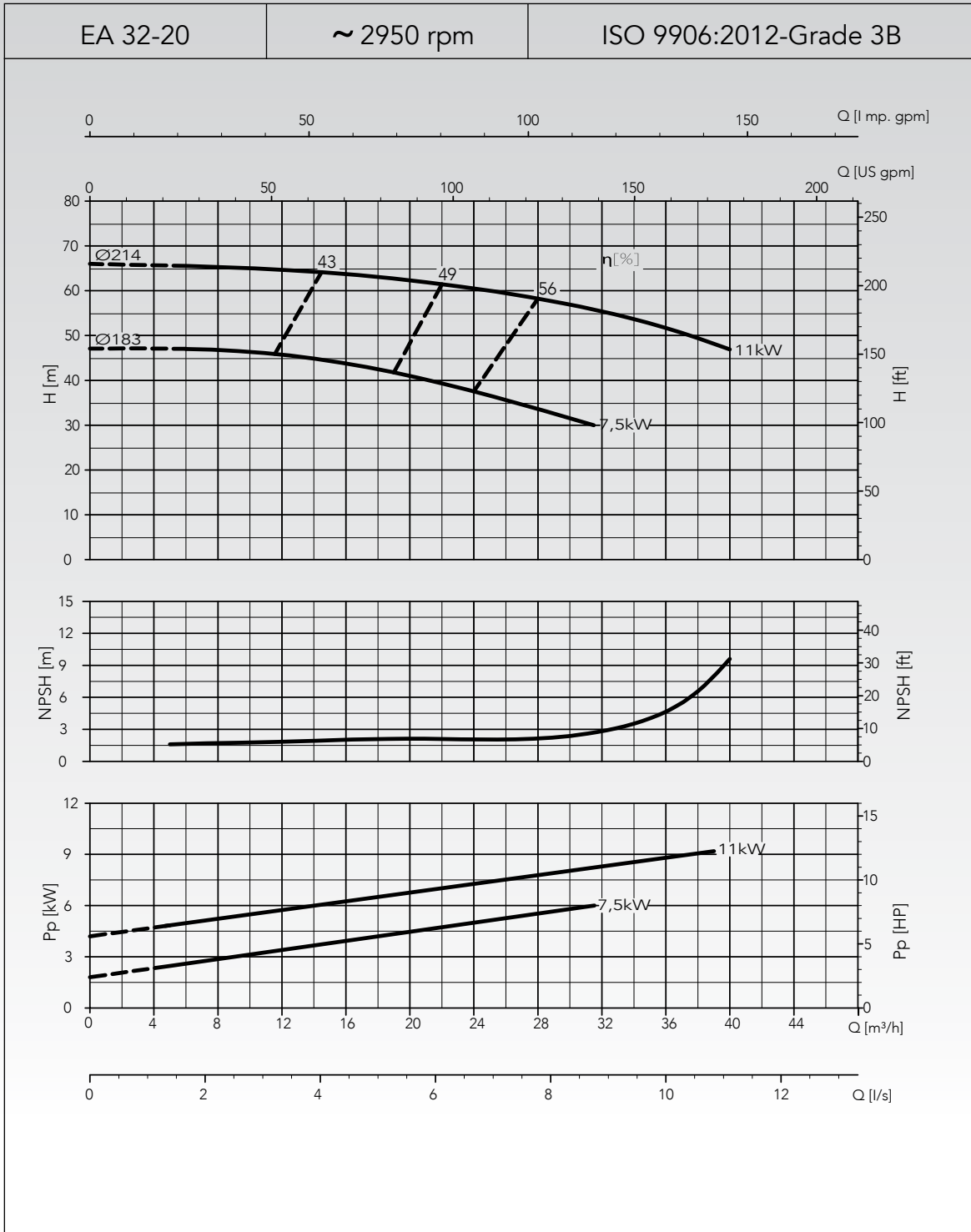
PERFORMANCE CURVES 50Hz, 2 POLES



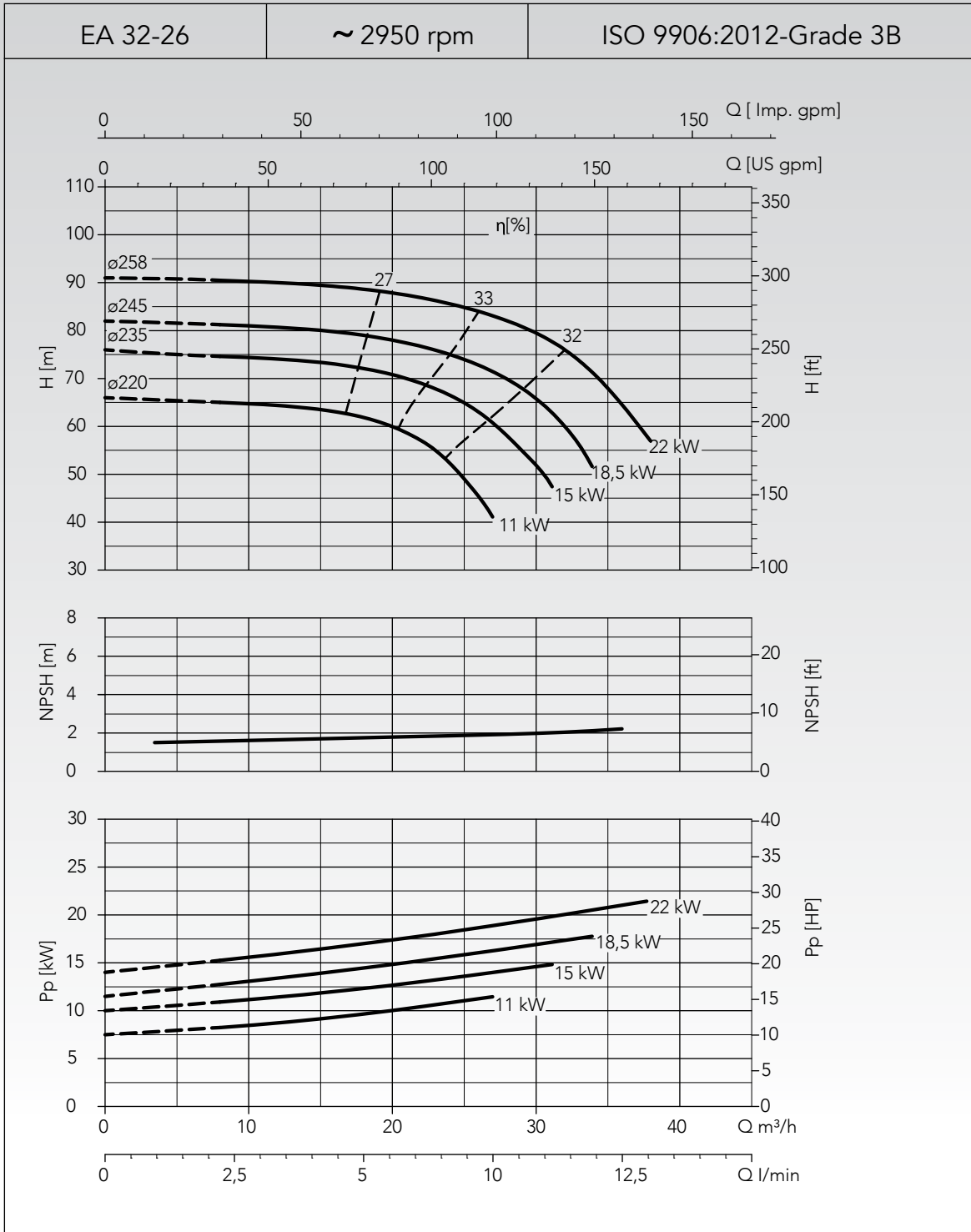
PERFORMANCE CURVES 50Hz, 4 POLES



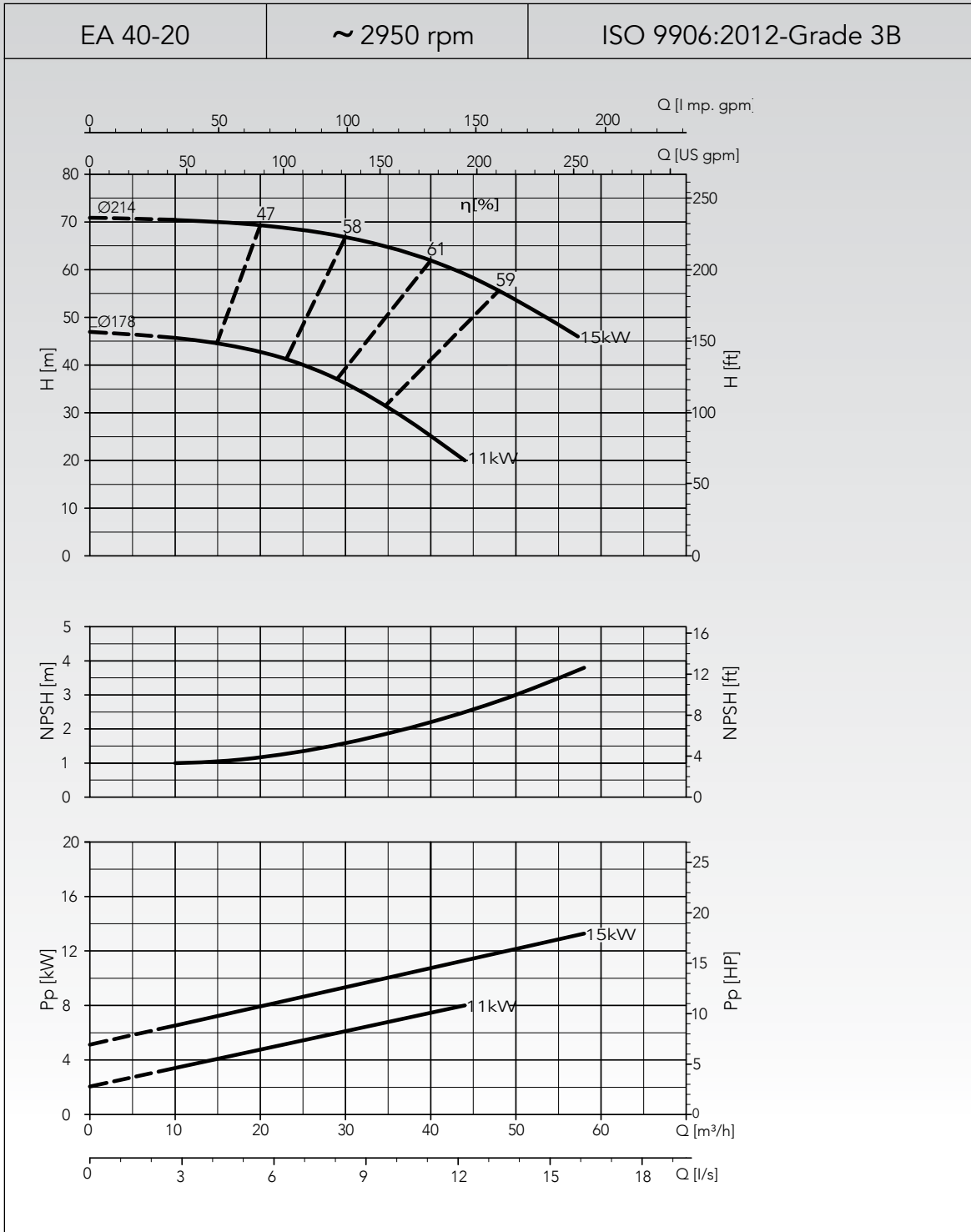
HYDRAULIC PERFORMANCE CURVES



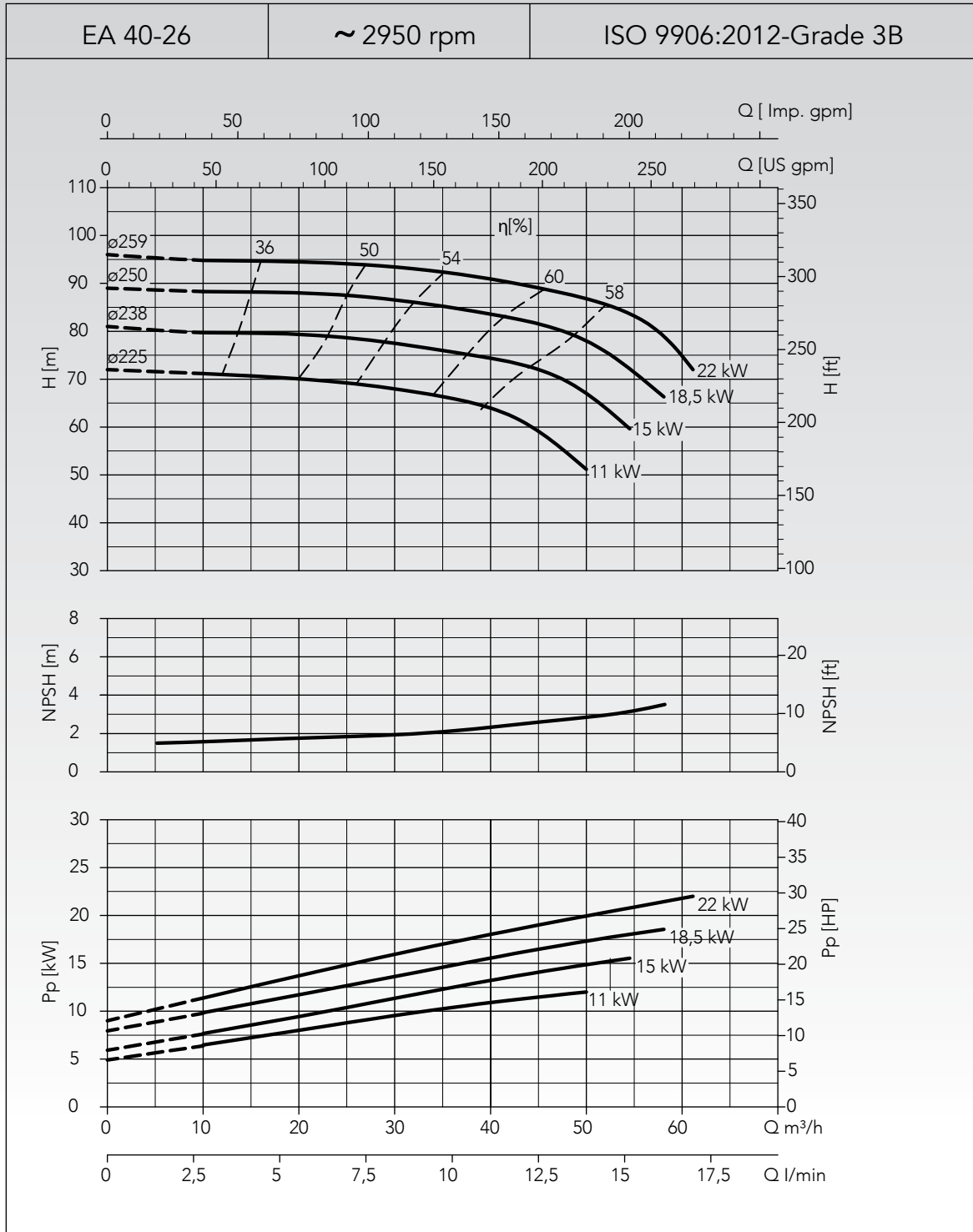
HYDRAULIC PERFORMANCE CURVES



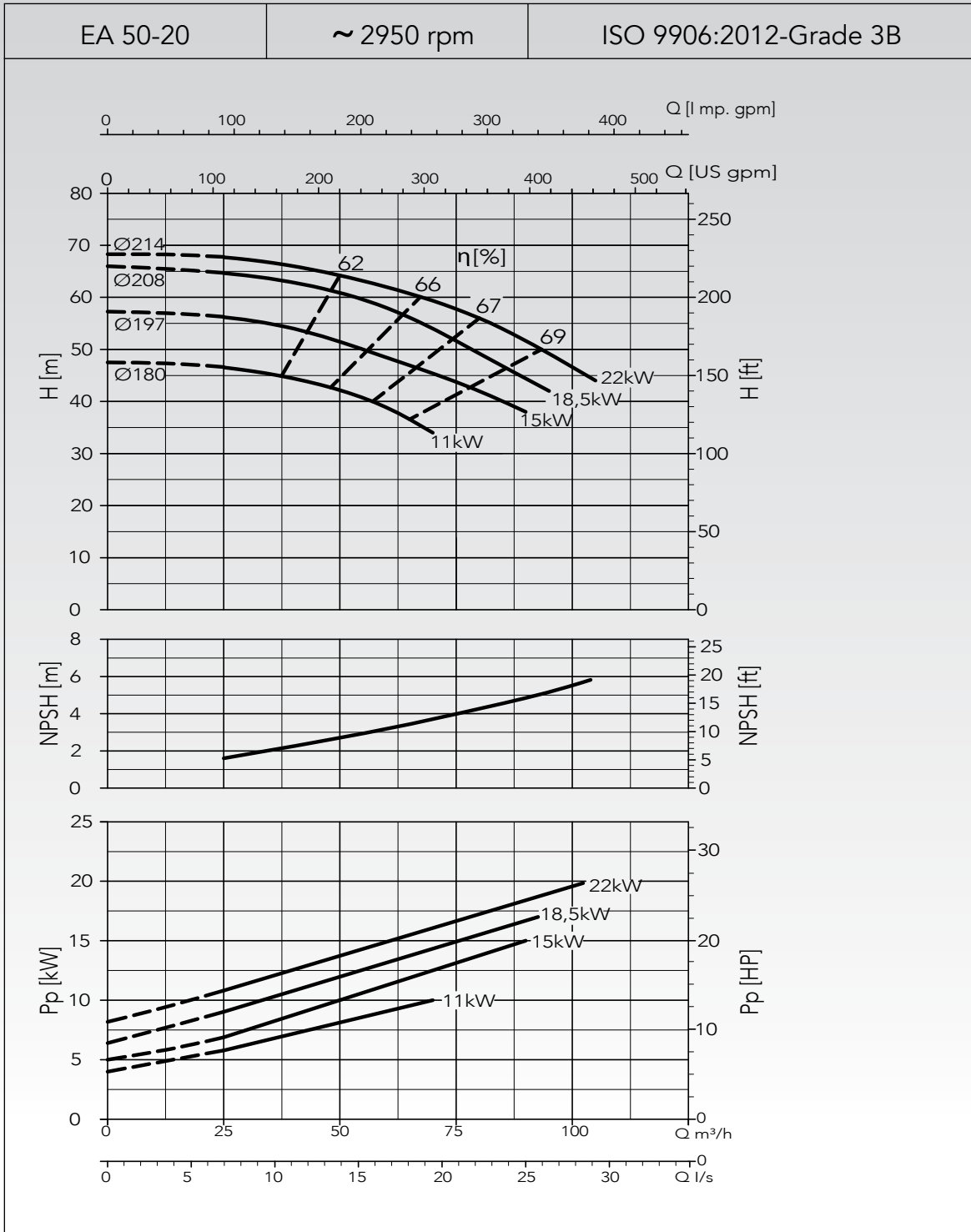
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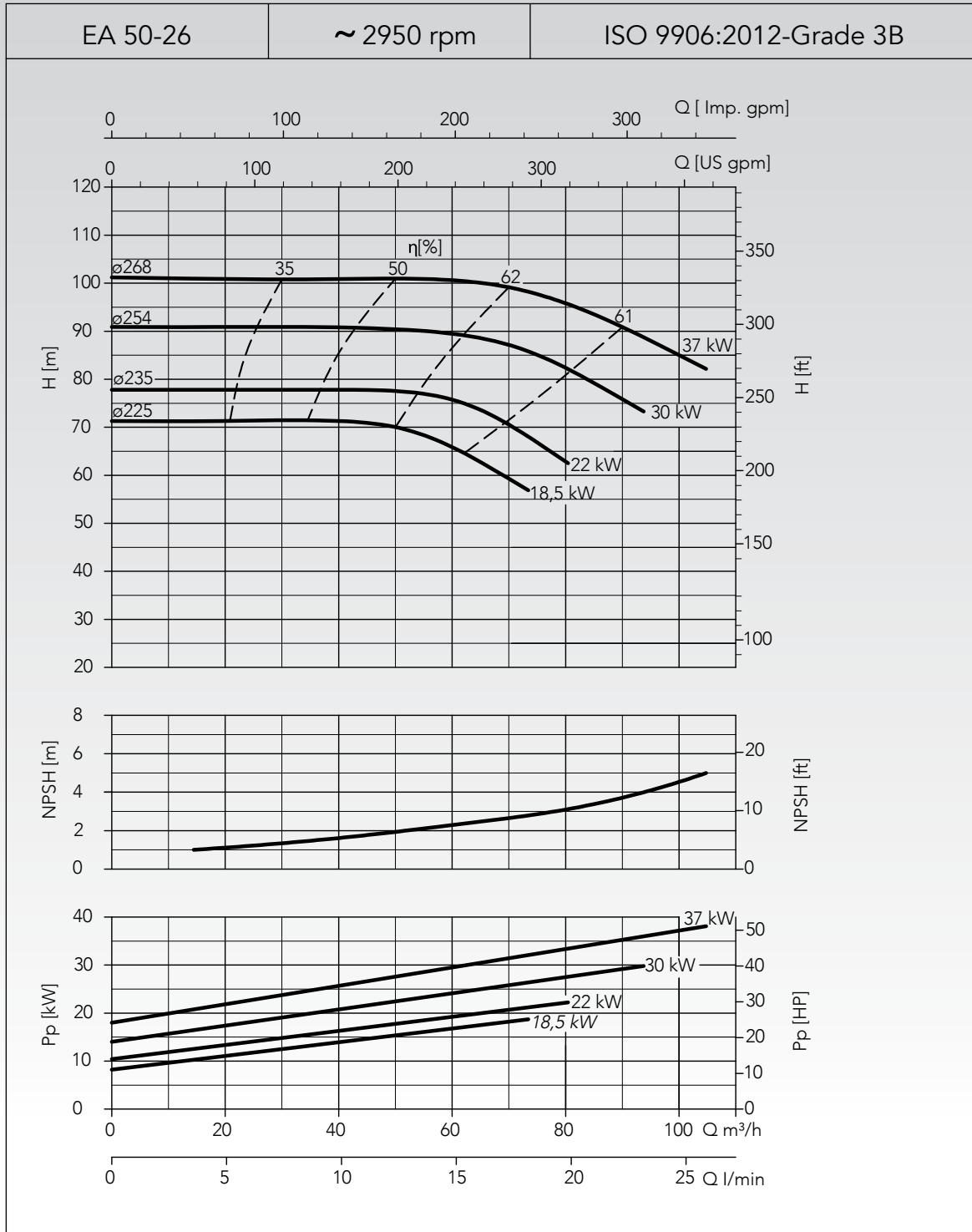
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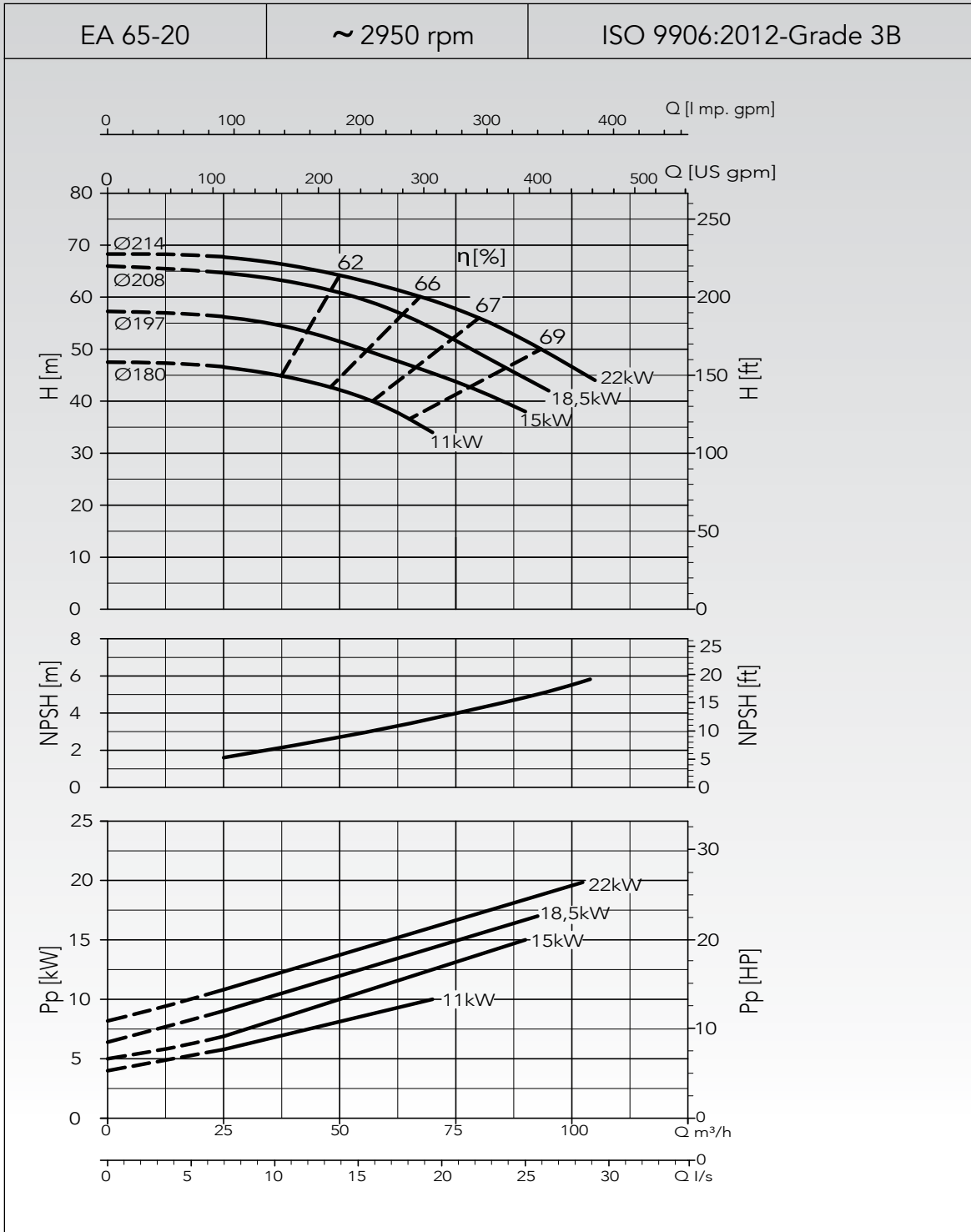
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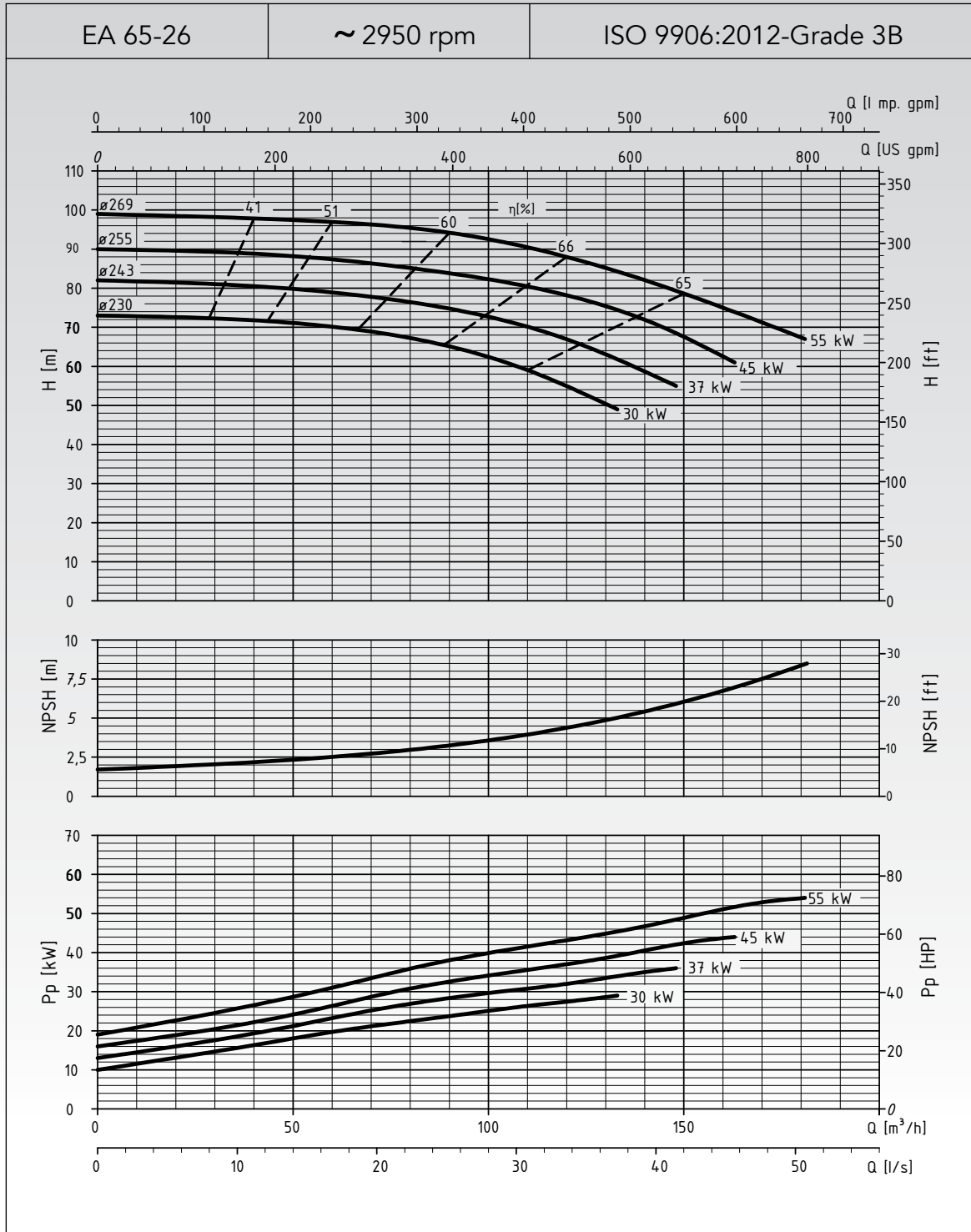
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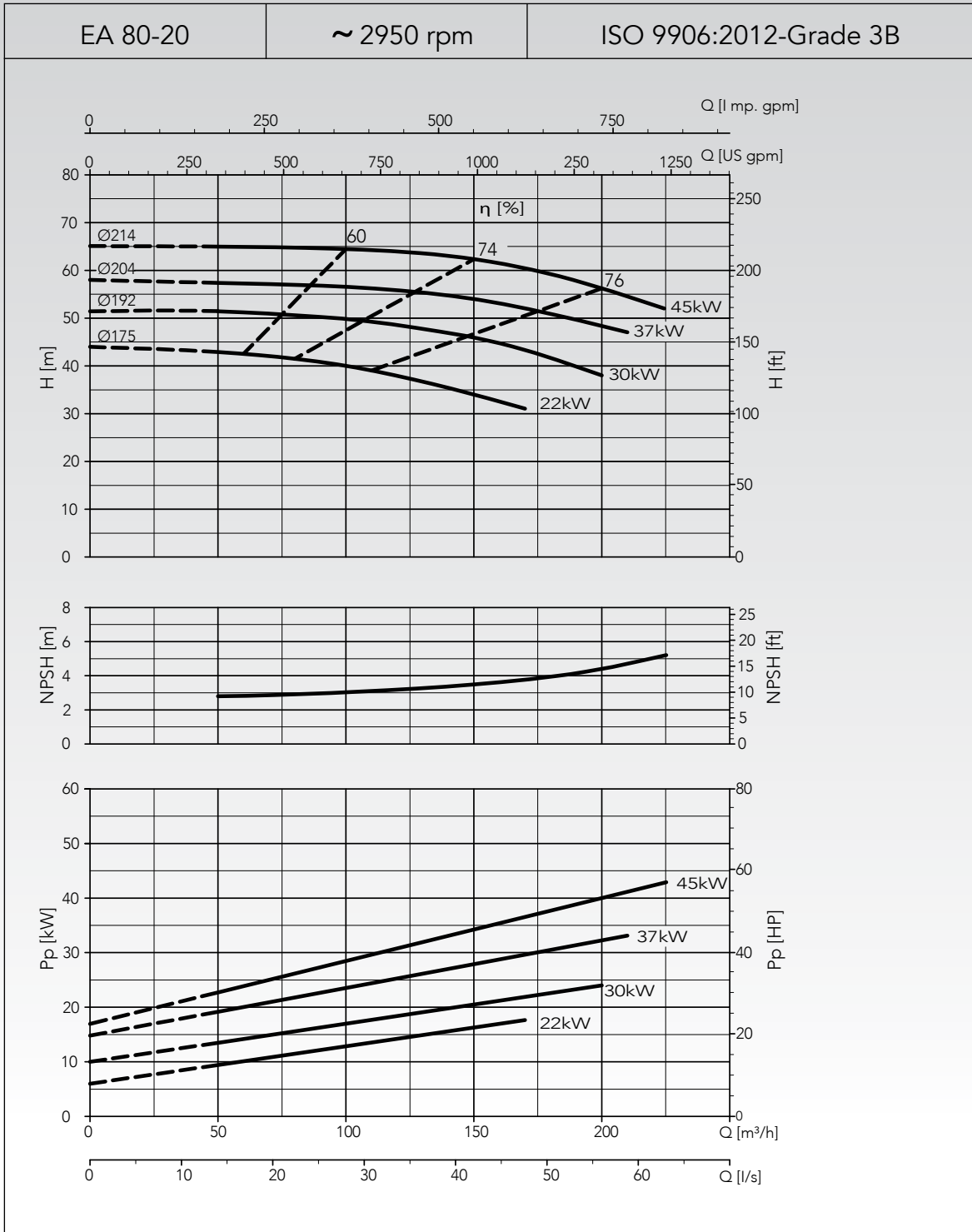
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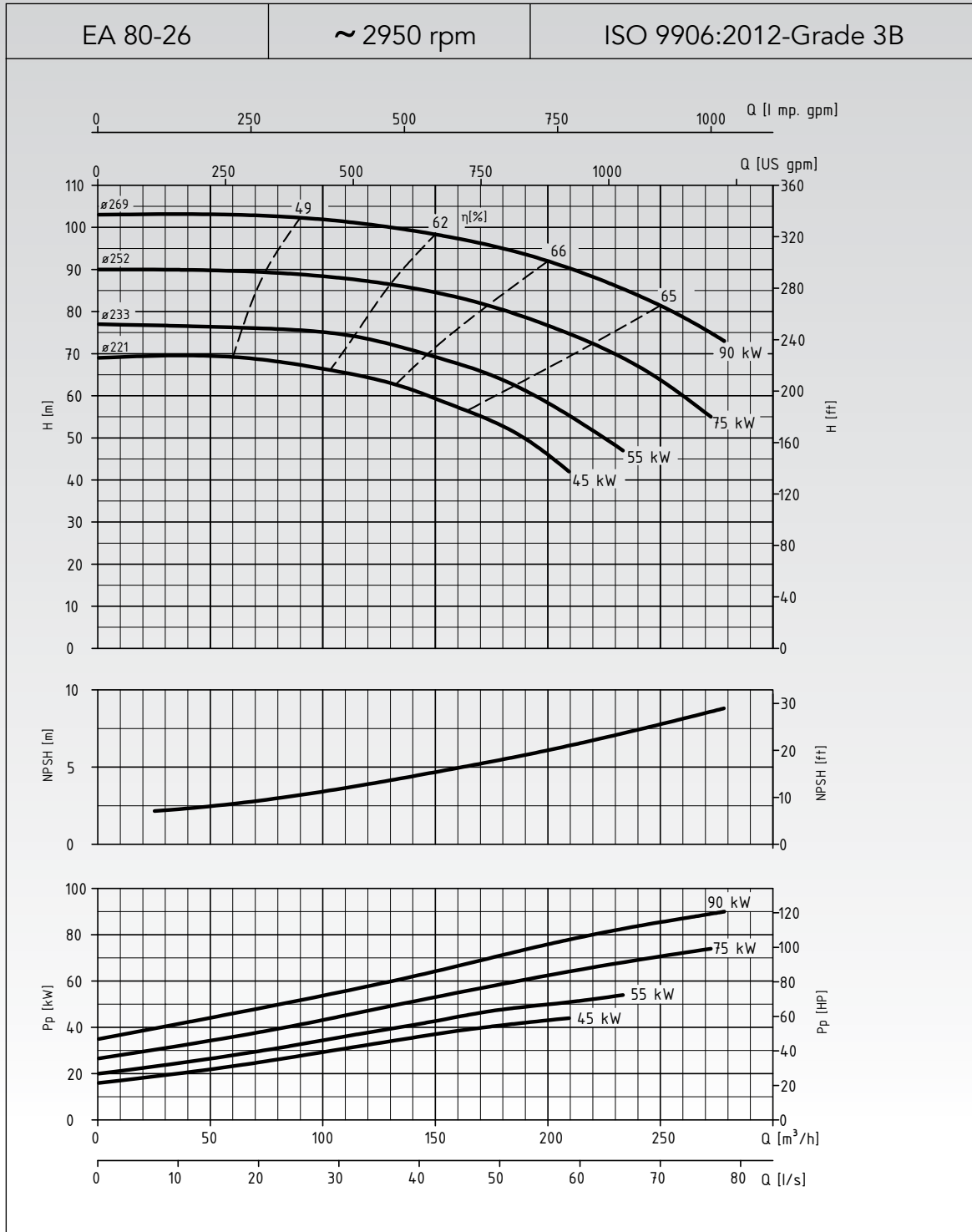
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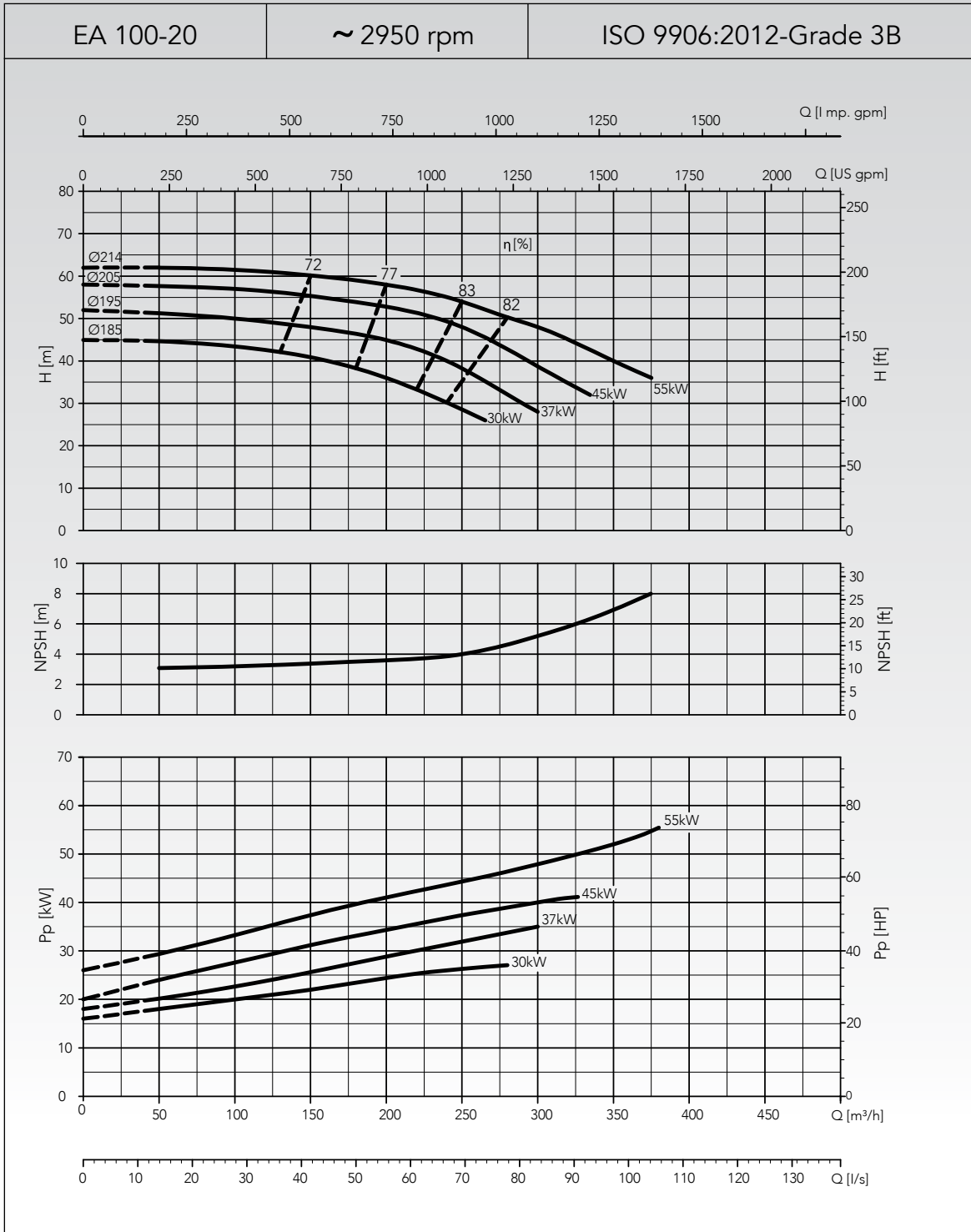
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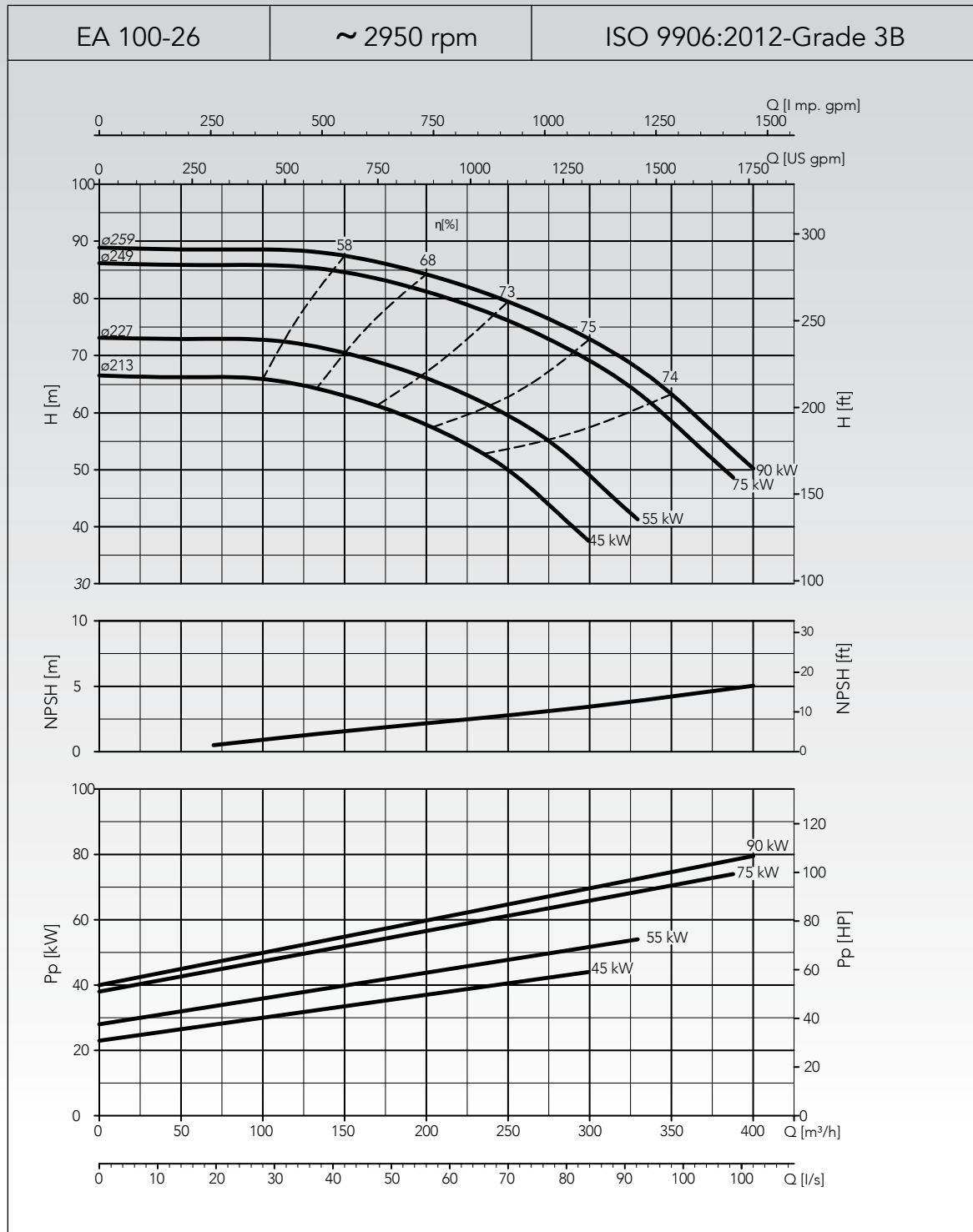
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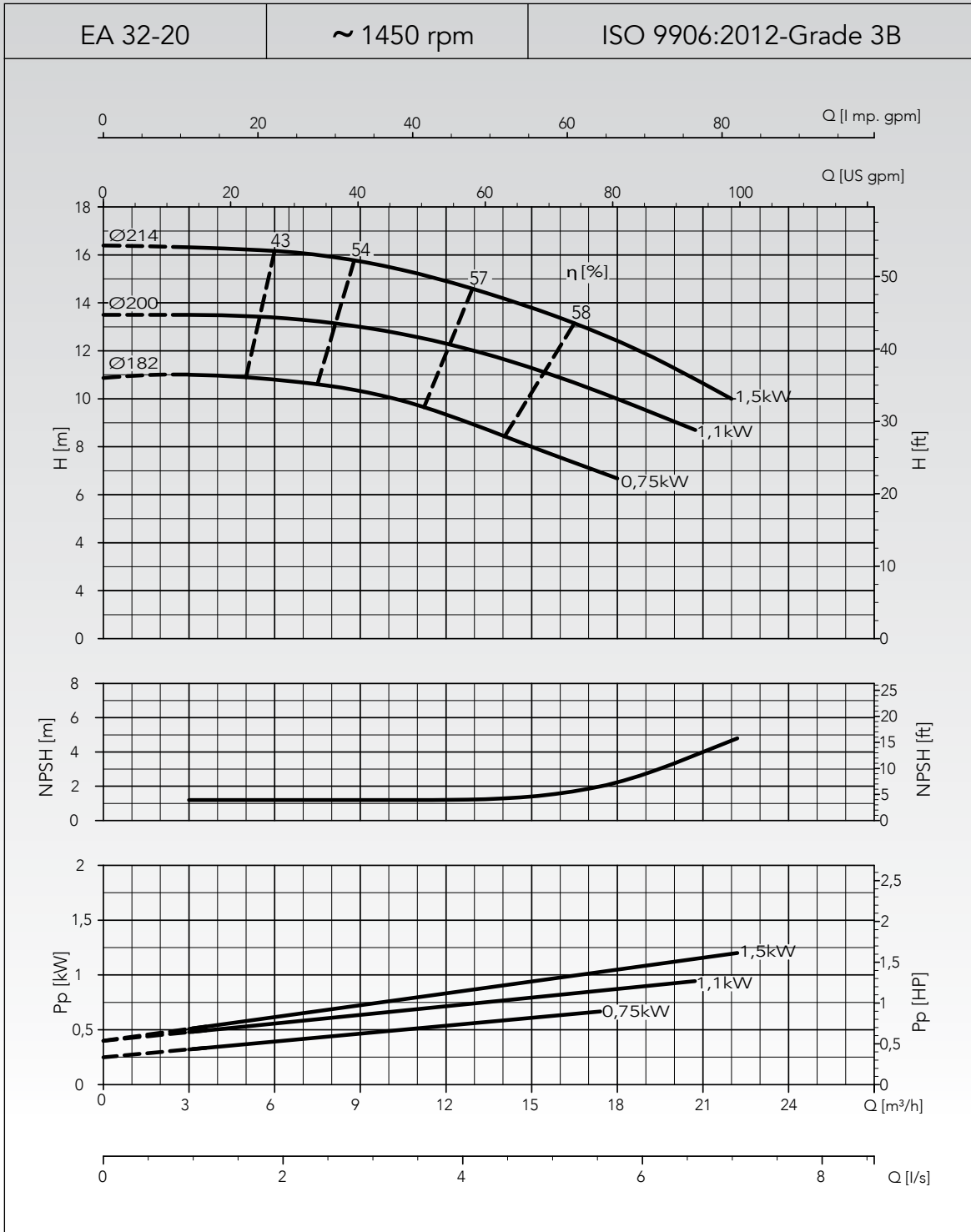
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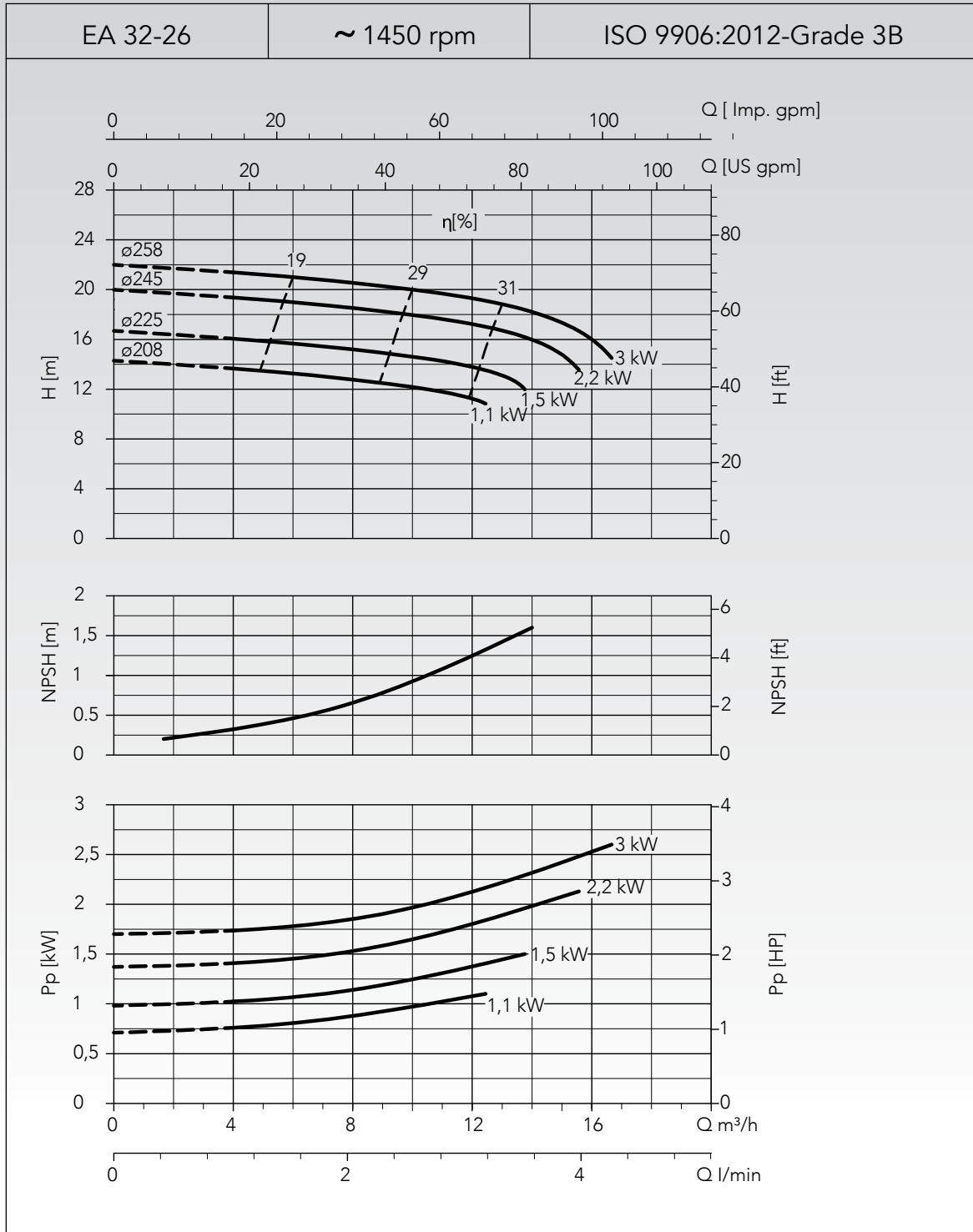
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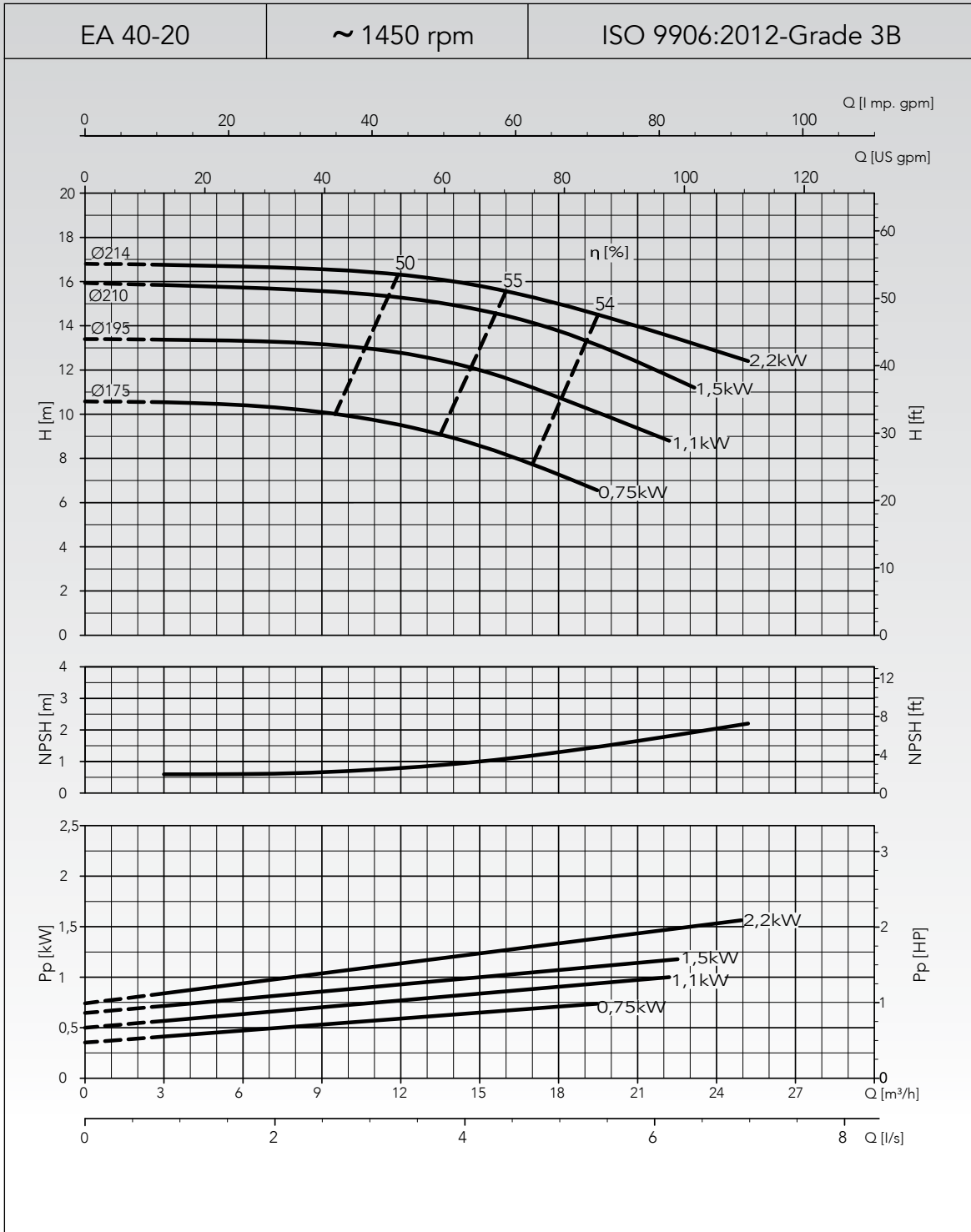
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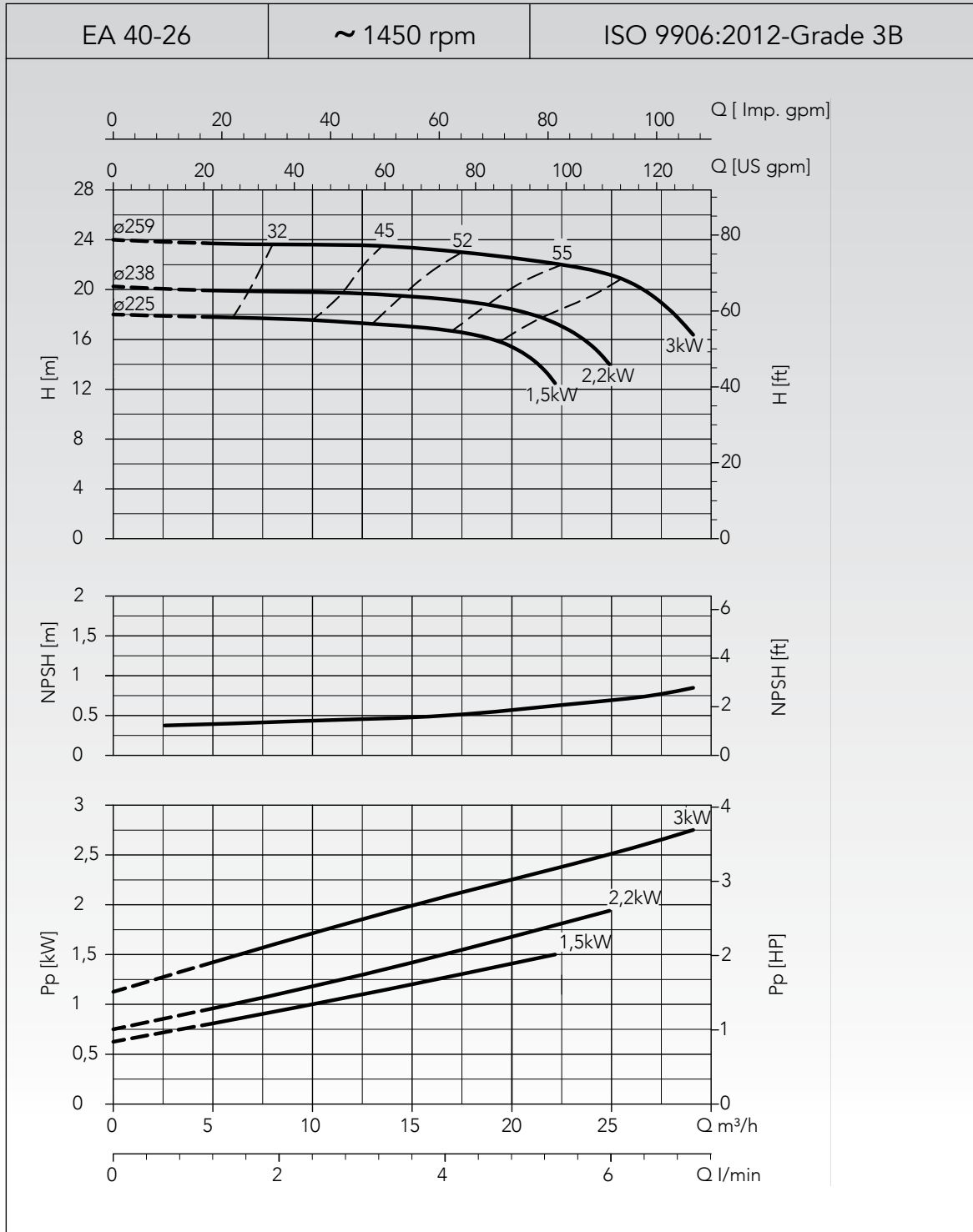
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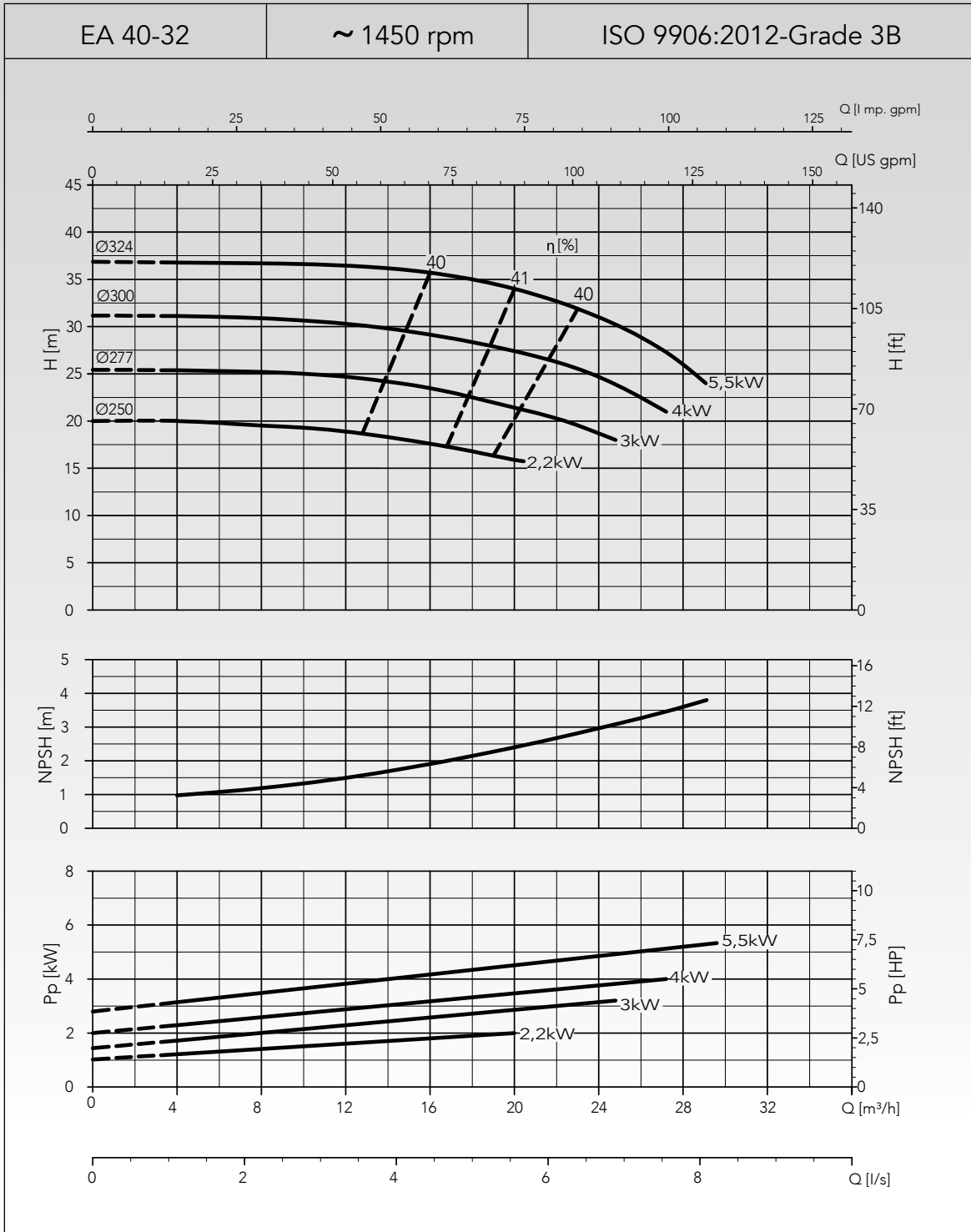
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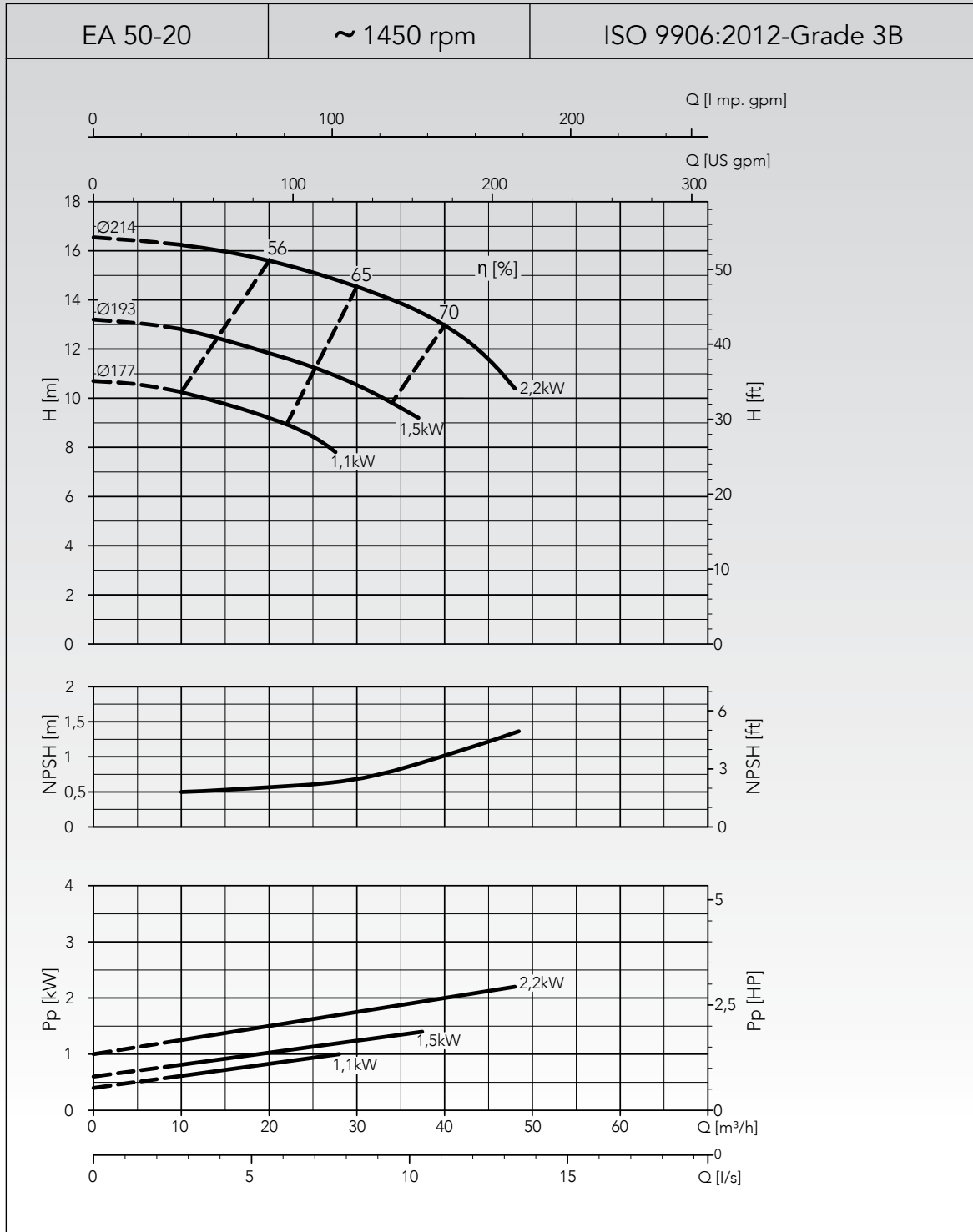
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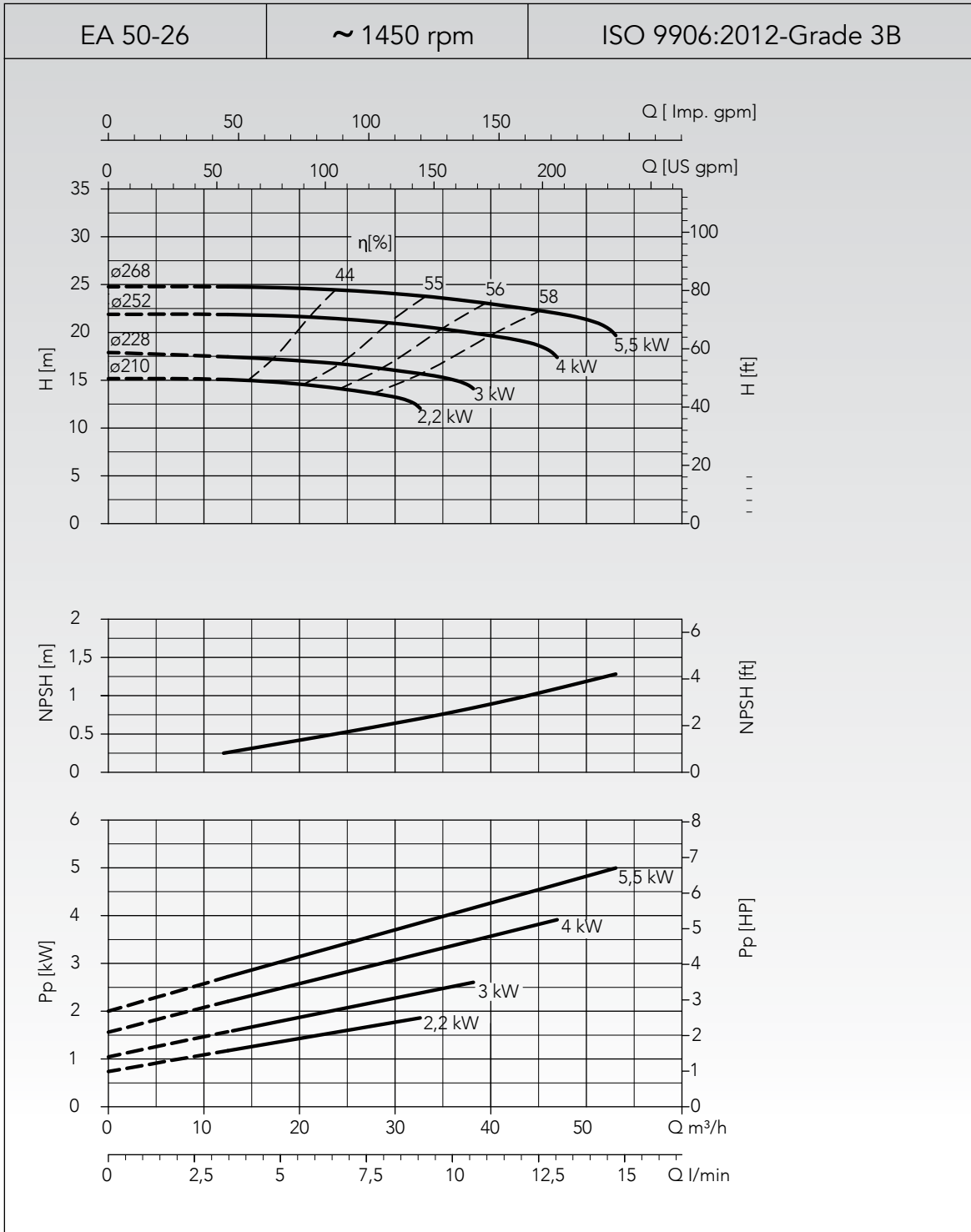
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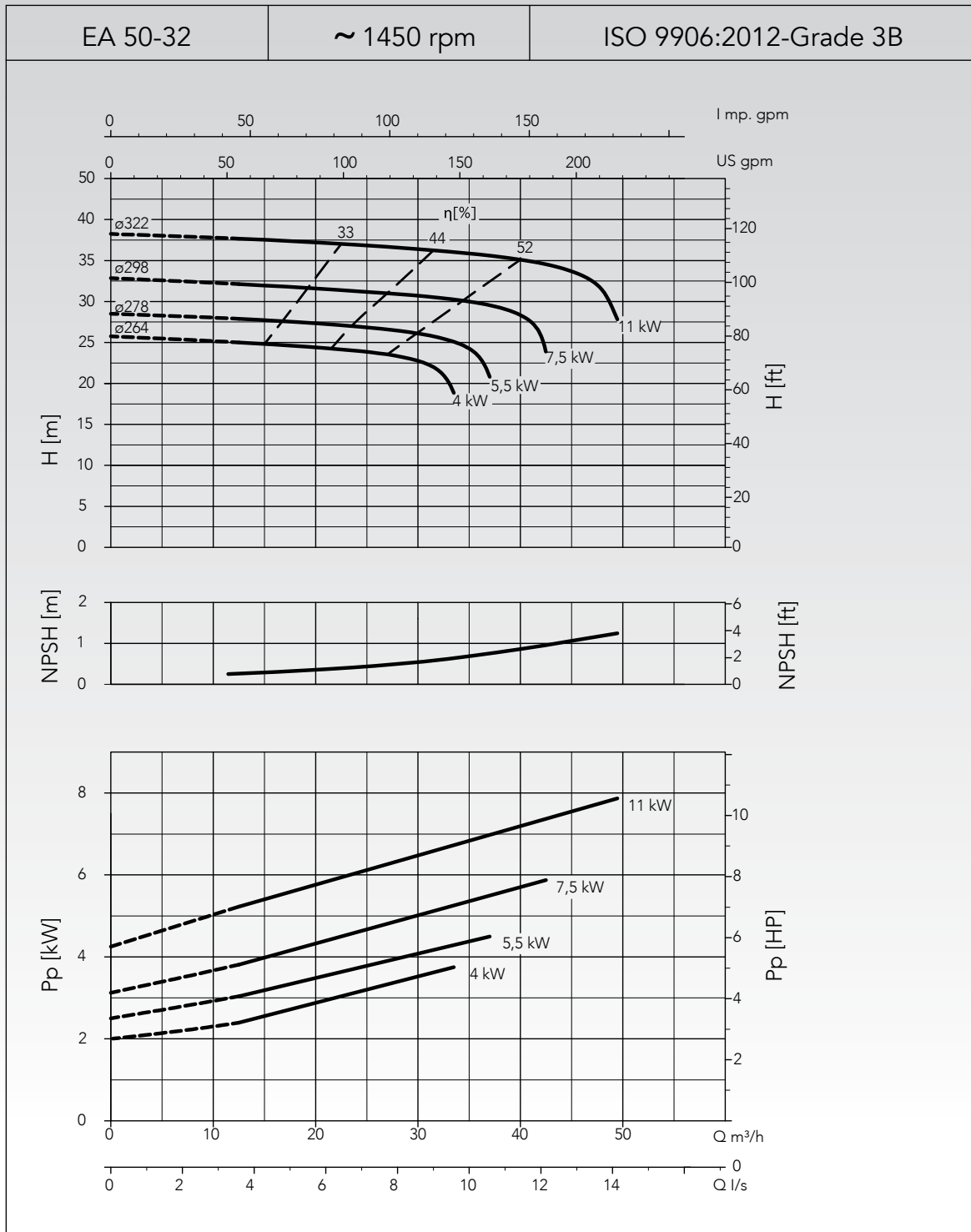
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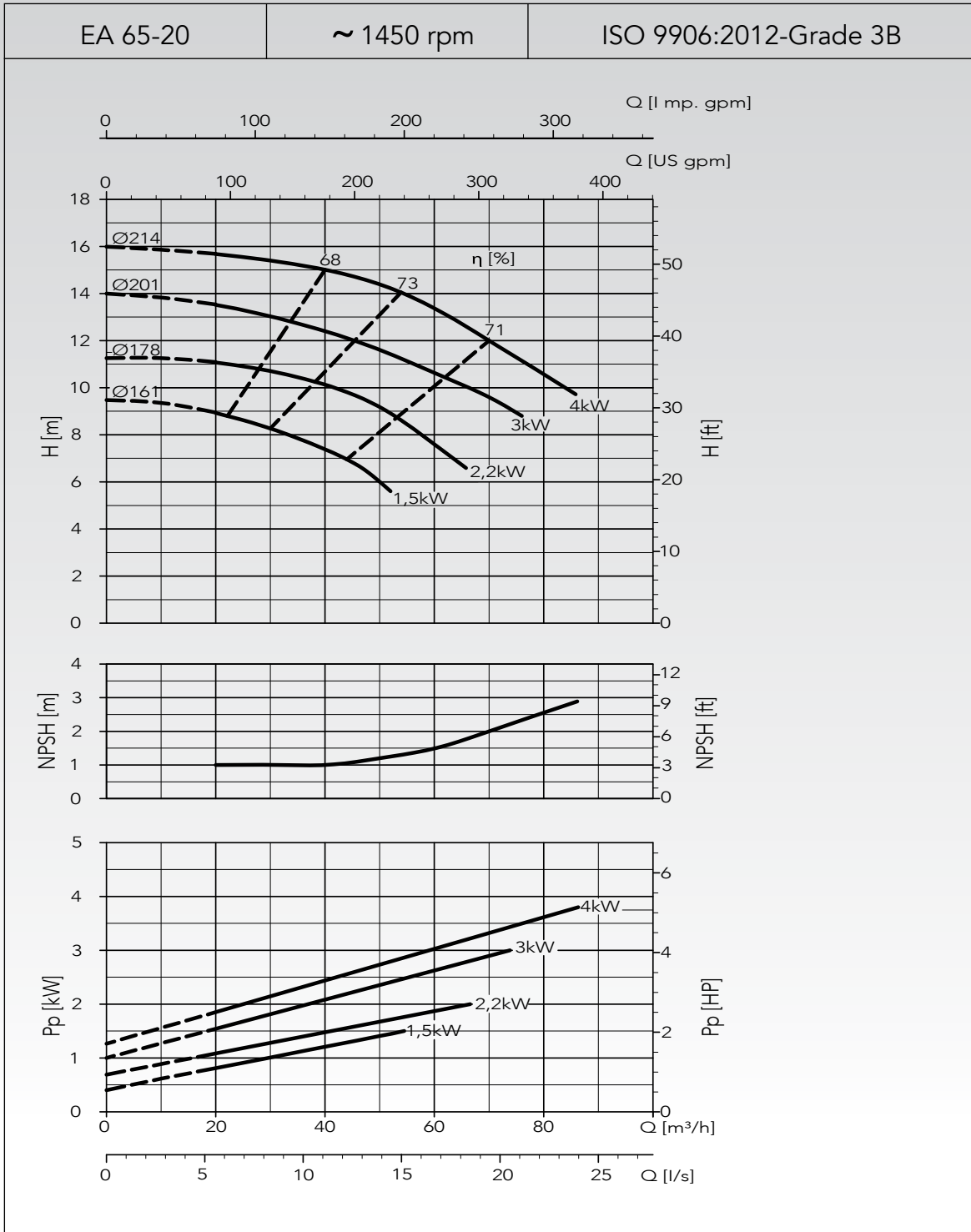
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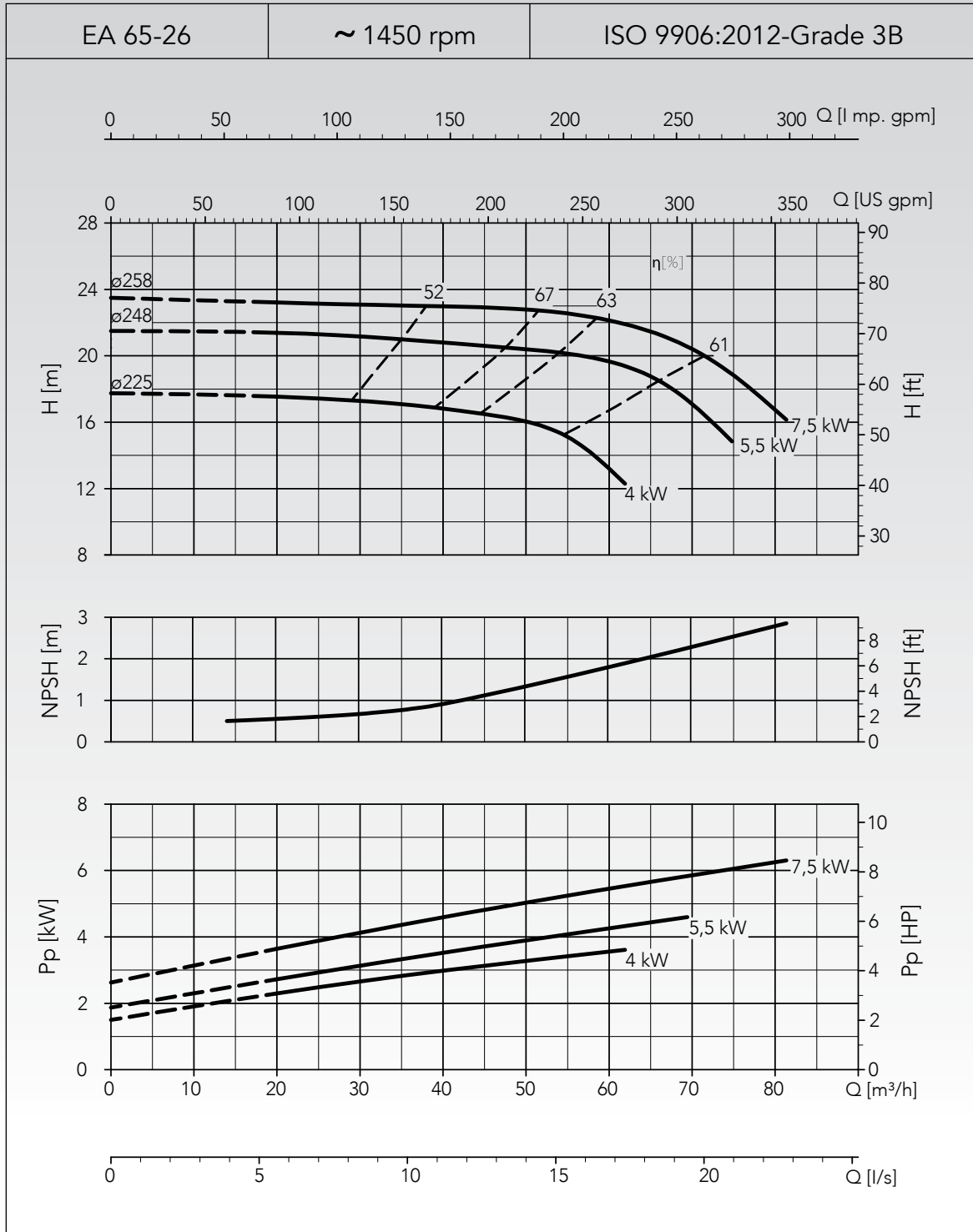
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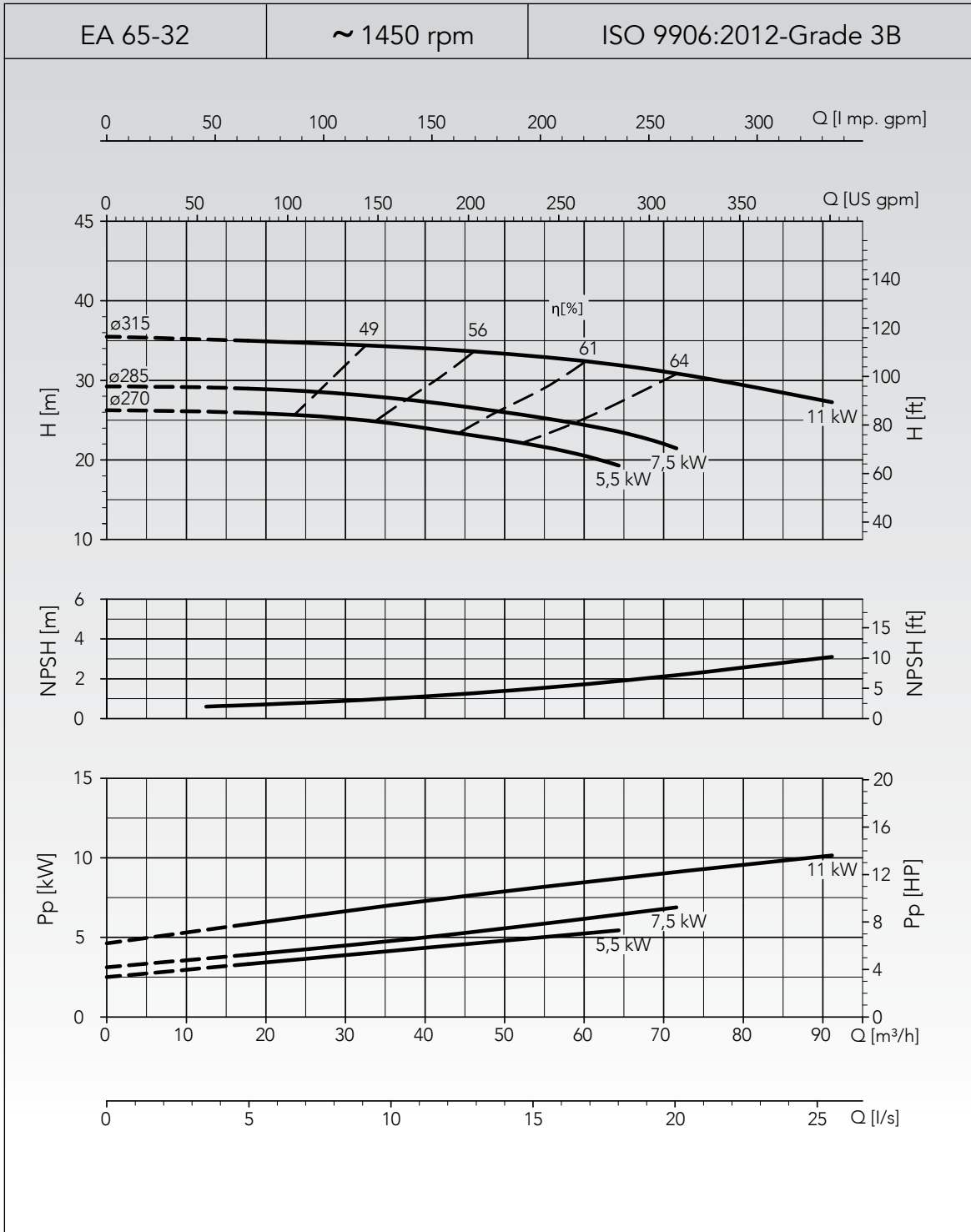
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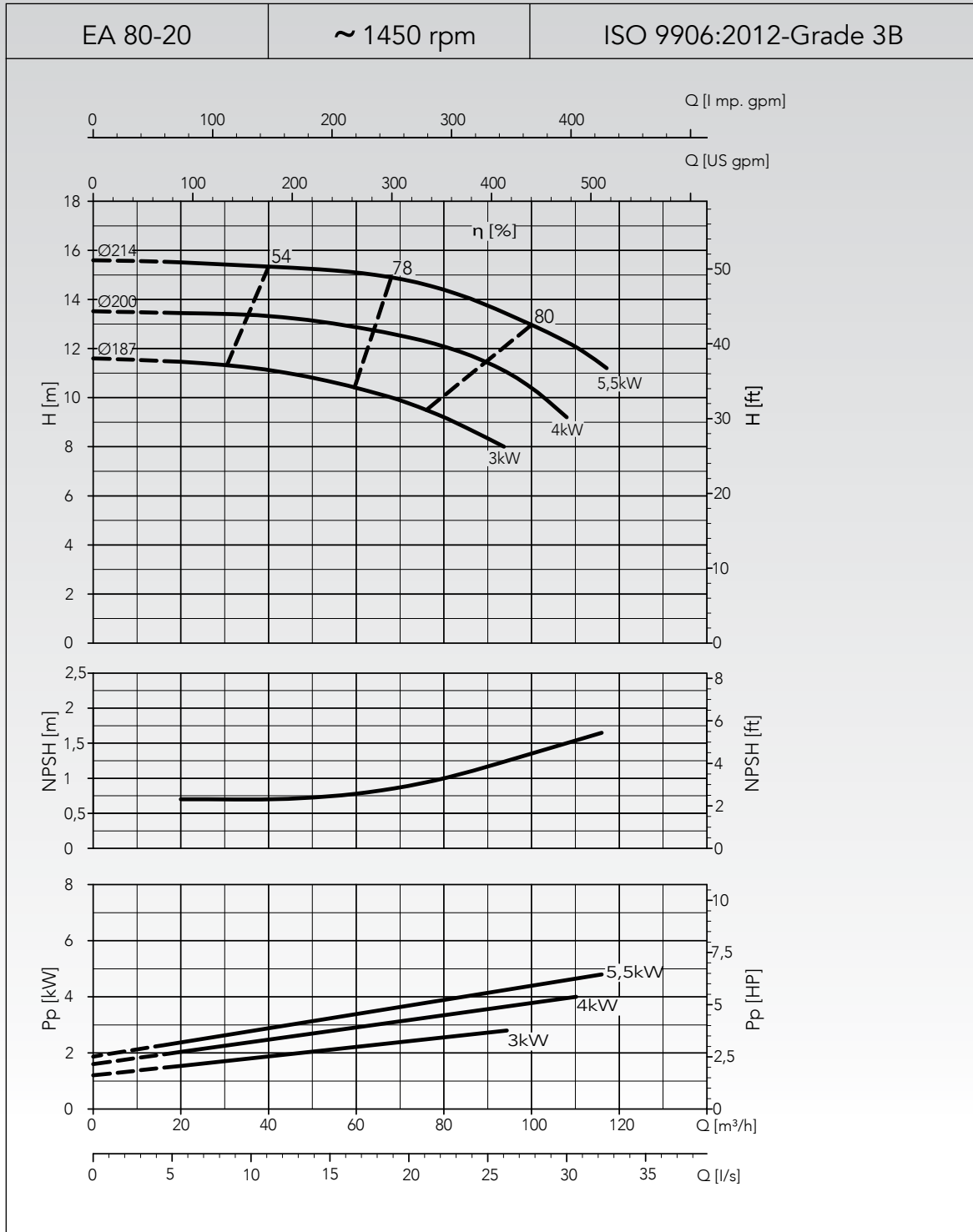
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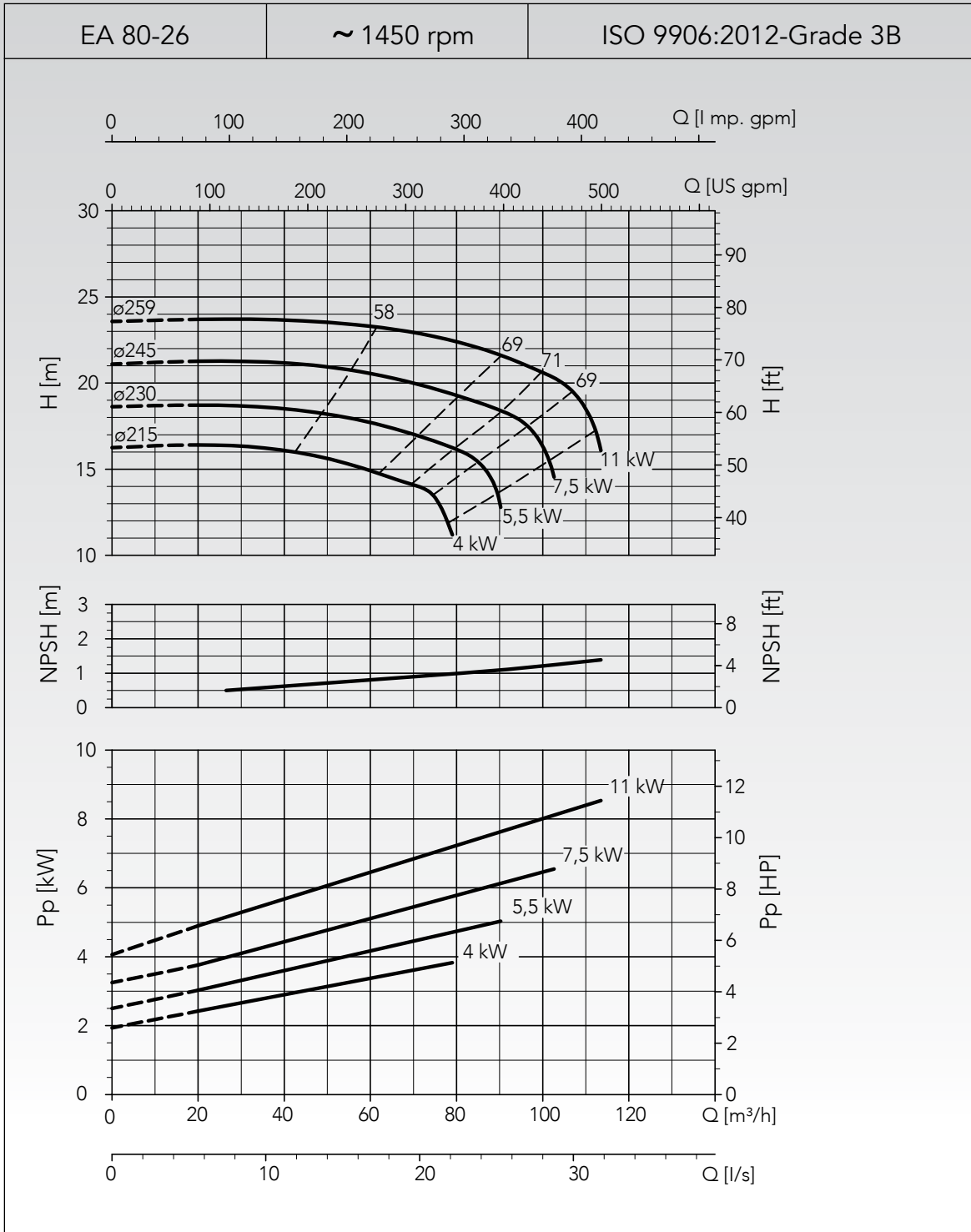
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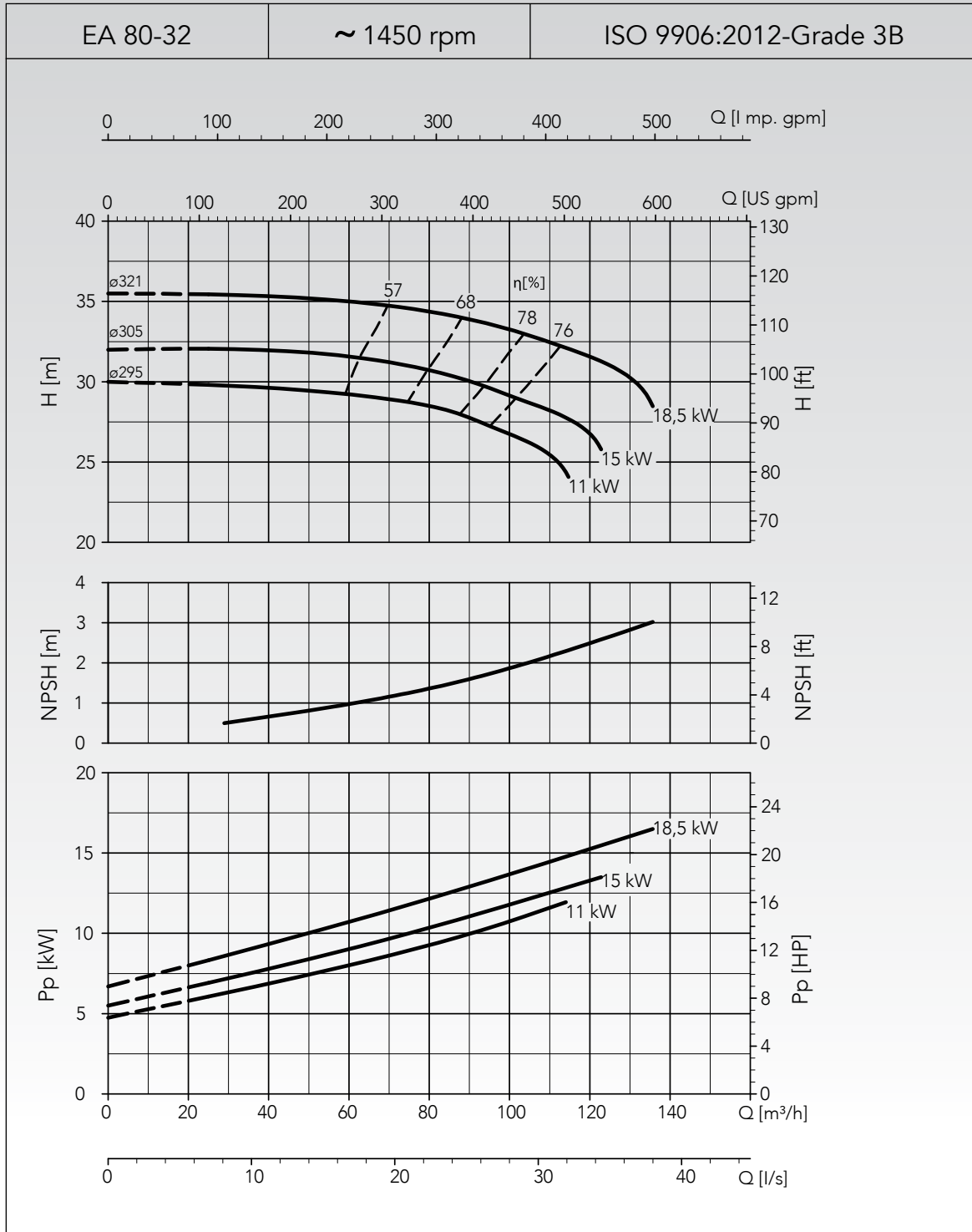
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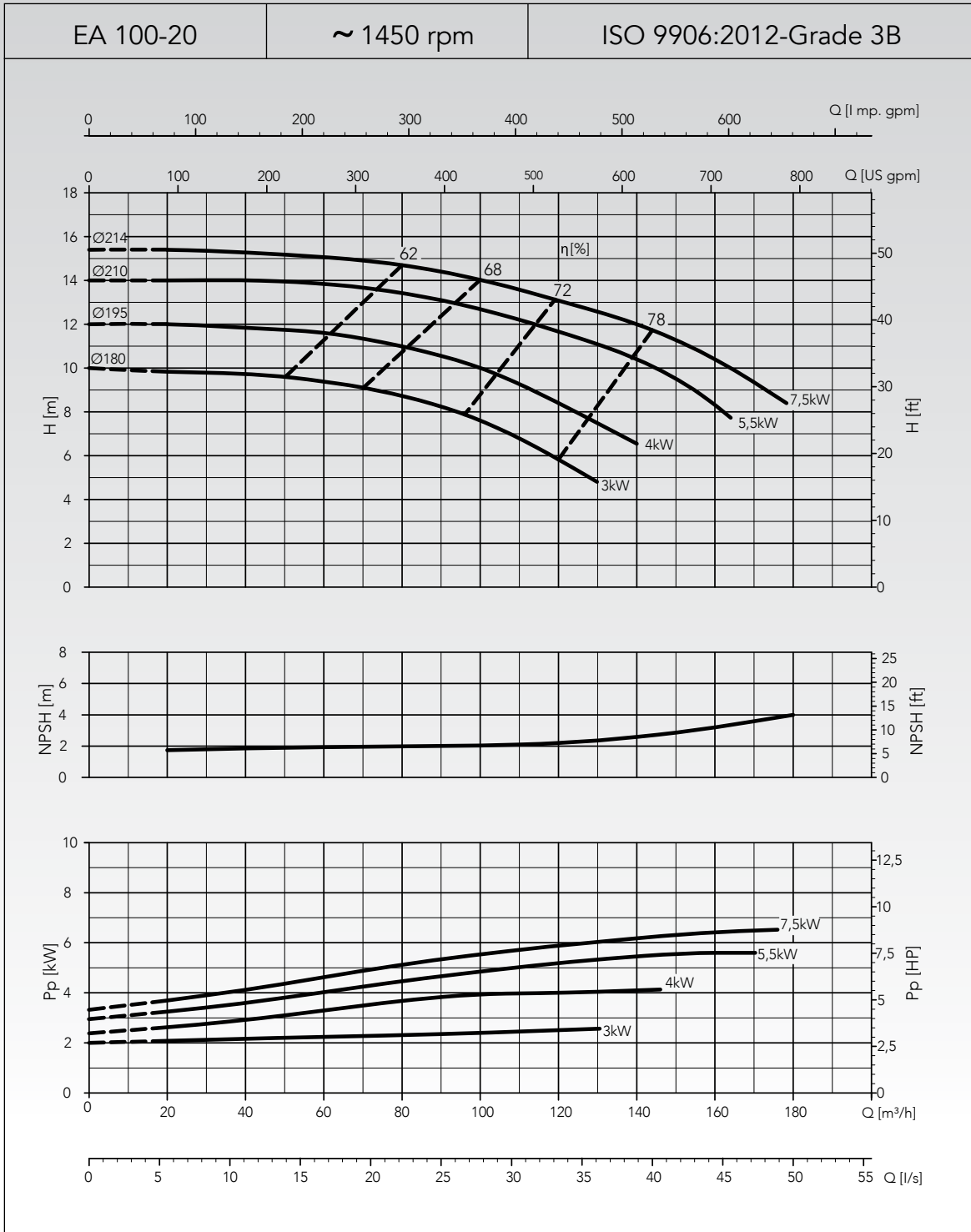
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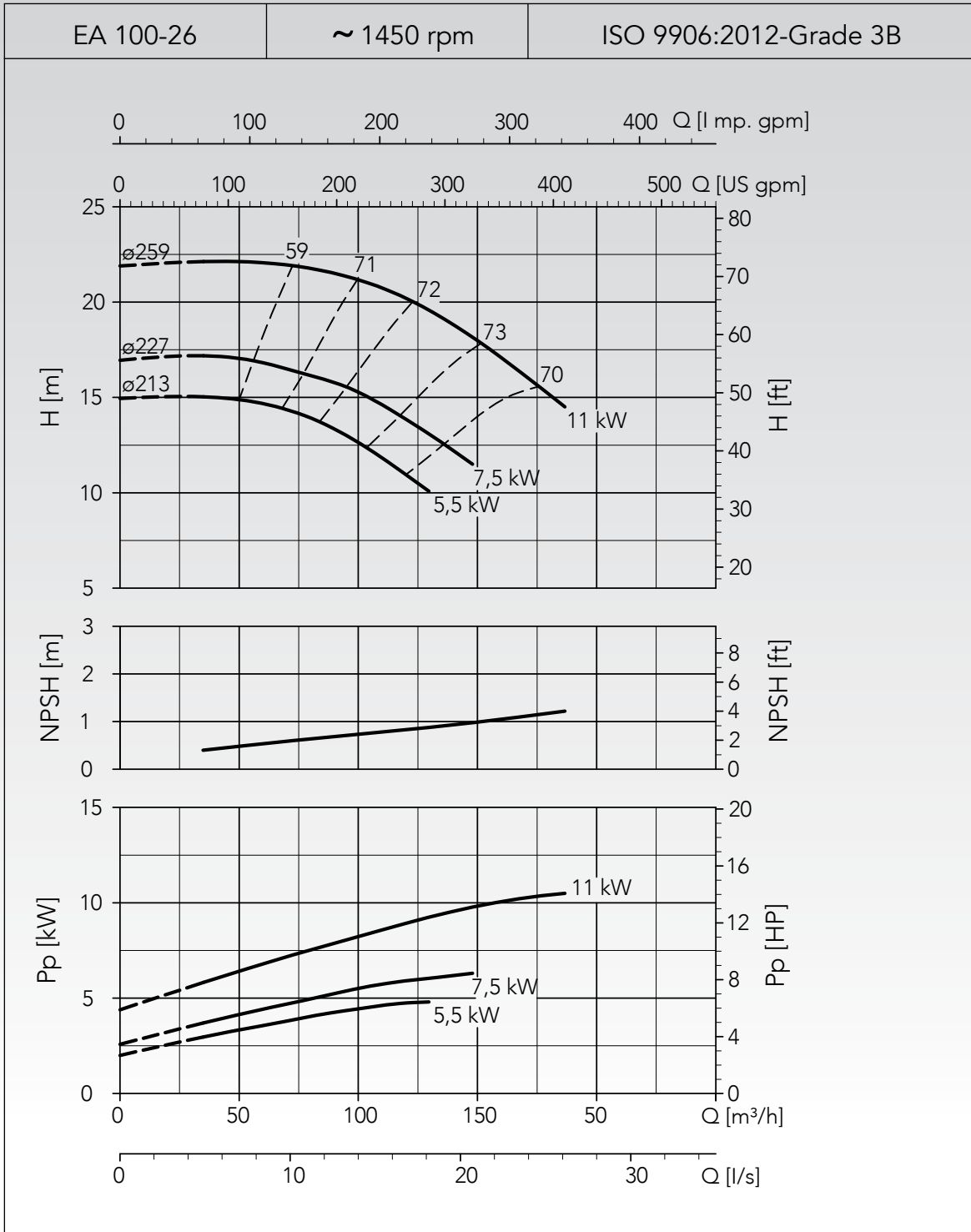
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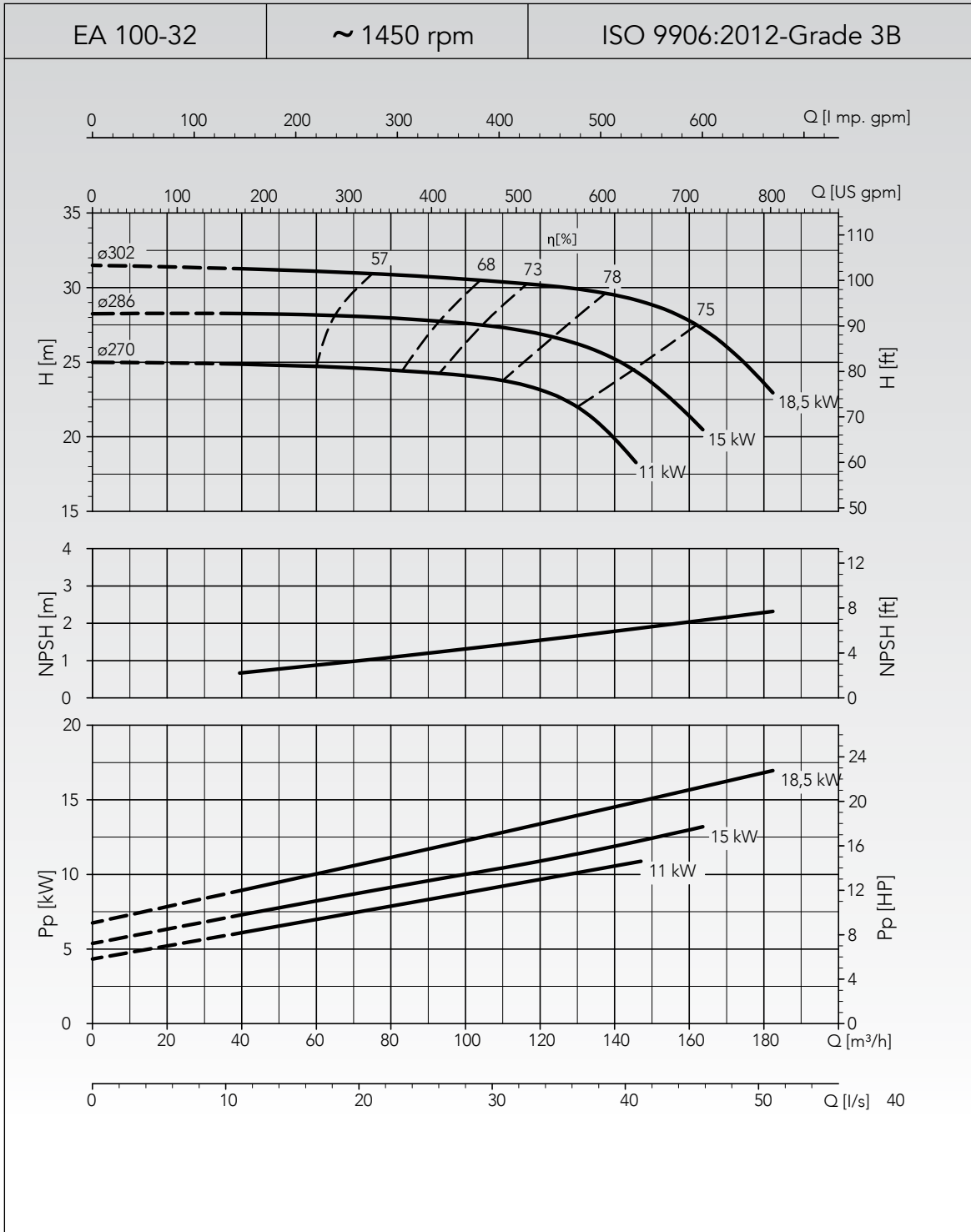
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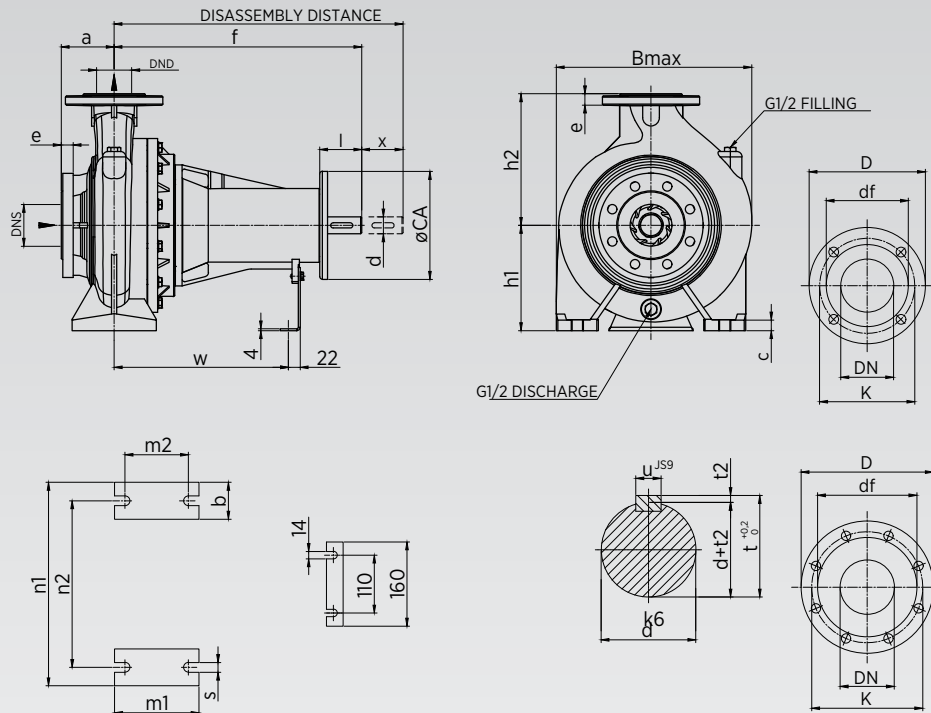
HYDRAULIC PERFORMANCE CURVES



HYDRAULIC PERFORMANCE CURVES



EA SERIES PUMP DIMENSIONS AND WEIGHTS

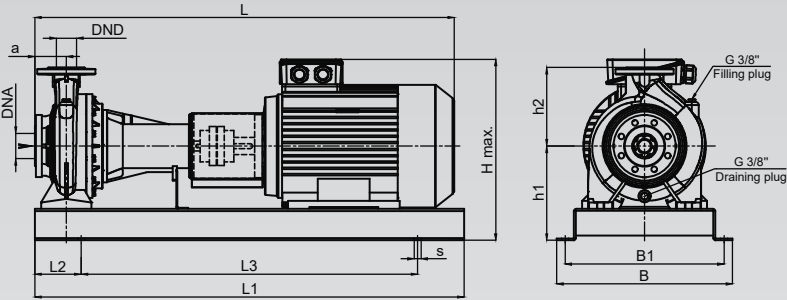


EN1092-2, PN 16 *						ASME B16.5 Class 150 RF *					
DN	D	K	e	df	L	DN	D	K	e	df	L
32	140	100	18	76	4x19	1 1/4	140	89	18	63,5	4x19
40	150	110	18	84	4x19	1 1/2	150	98,5	18	73	4x19
50	165	125	20	99	4x19	2	165	120,5	20	92	4x19
65	185	145	20	118	4x19	2 1/2	185	139,5	20	105	4x19
80	200	160	20	138	8x19	3	200	152,5	22	127	8x19
100	220	180	22	158	8x19	4	230	190,5	24	157	8x19
125	250	210	22	188	8x19	5	255	216	26	186	8x23
150	285	240	24	212	8x23	6	285	241,5	26	216	8x22

TOLERANCE TABLE		
DIAMETER	CODE	T. VALUES
ø24	k6	+0.015
		+0.002
		+0.018
ø32	k6	+0.015
		+0.002
		+0.018
ø42	k6	+0.015
		+0.002
		+0.018
8-10	JS9	-0.018
		+0.0215
10-12	JS9	+0.0215
		-0.0215

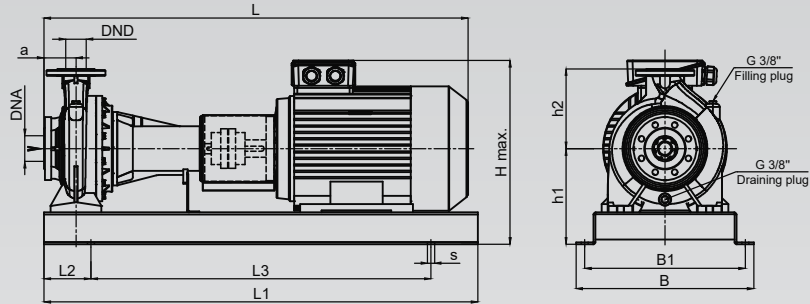
PUMP MODEL	DIMENSIONS (mm)																			B	X	Weight (kg)	
	PUMP						FOOT						SHAFT										
	DND	DNS	a	f	h1	h2	øCA	b	c	m1	m2	n1	n2	s	w	d	l	t	u				
EA 32/20	32	50	80		160	180		50		100	70	240	190								250		41
EA 32/26					180	225		65		125	90	320	255		260		50				330	100	53
EA 40/20					160	180		50		100	70	265	215								280		45
EA 40/26	40	65		360	180	225		65	14			320	255	14	234	24	40	27	8		340	100	58
EA 40/32					200	250		80		125	95	345	280								360		67
EA 50/20					160	200		50		100	70	265	215		260		50				280	100	48
EA 50/26	50	65			180	225						320	250								340		60
EA 50/32			125	470	225	280		65		125	95	345	280	18	340	32	80	35	10		360	112	68
EA 65/20				360	180	225			16			320	250	14	260	24	50	27	8		340	140	51
EA 65/26	65	80			200	250		80				360	280								370		73,4
EA 65/32					225	280		80	14	160	120	400	315	18							434	112	95
EA 80/20					180	250		65		125	95	345	280			32		35	10		360	140	63
EA 80/26	80	100			200	280			16			400	315	14							434	112	86
EA 80/32					250	315						400	315		42		45,7	12			434	112	111
EA 100/20					200	280						360	280			32	80				370	140	87
EA 100/26	100	125		470	225	280		80		160	120			18	340						434		112
EA 100/32												400	315								370	140	87
EA 125/20			140		250	315			18			400	315								434		116
EA 125/26	125	150								180												112	94
EA 150/20					355																	116	117
EA 150/26	150	200	160		280			100		200	150	500	400	24							540	140	97
					375																	140	110
																						150	150
																						160	160

EAS SERIES PUMP DIMENSIONS AND WEIGHTS 50 Hz, 4 POLES (1450 rpm)



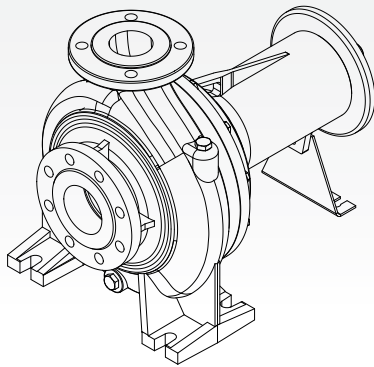
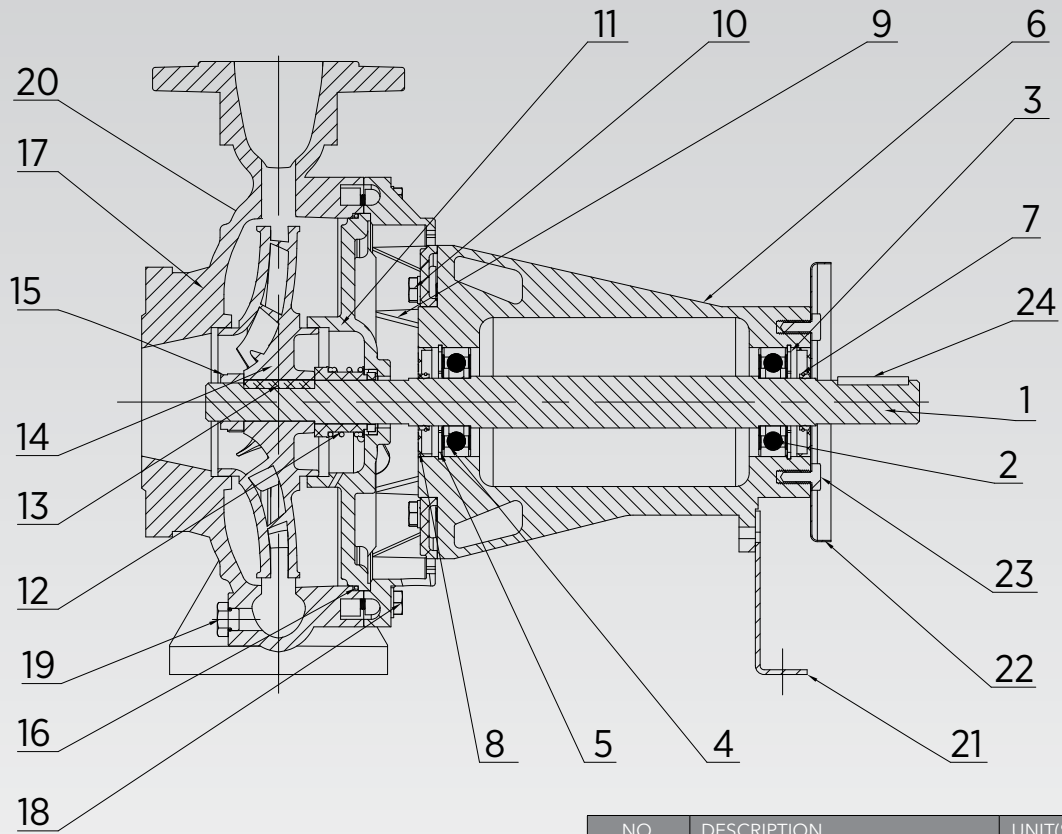
PUMP TYPE	DIMENSIONS												
	DND	DNS	a	h1	h2	B	B1	L	L1	L2	L3	Øs	Hmax
EAS 32-20 / 0,75	32	50	80	210	180	380	340	710	740	640	640	22	435
EAS 32-20 / 1,1								740					
EAS 32-20 / 1,5								770					
EAS 32-20 / 2,2	32	50	80	210	180	380	340	790	785	710	640	22	455
EAS 32-26 / 1,1								815					
EAS 32-26 / 1,5								860					
EAS 32-26 / 2,2	32	50	80	230	225	440	400	945	840	740	685	22	435
EAS 32-26 / 3								860					
EAS 40-20 / 5,5								815					
EAS 40-20 / 7,5	40	50	80	210	180	440	400	1090	990	890	685	22	455
EAS 40-20 / 11								815					
EAS 40-20 / 15								860					
EAS 40-20 / 18,5	40	50	80	230	225	440	400	945	840	740	685	22	475
EAS 40-26 / 1,5								815					
EAS 40-26 / 2,2								860					
EAS 40-26 / 3	40	50	80	250	250	440	400	815	785	660	685	22	435
EAS 40-32 / 2,2								860					
EAS 40-32 / 3								880					
EAS 40-32 / 4	40	50	80	230	225	440	400	945	840	740	685	22	455
EAS 40-32 / 5,5								815					
EAS 40-32 / 7,5								860					
EAS 50-20 / 2,2	50	65	100	210	200	380	340	815	760	660	685	22	435
EAS 50-20 / 3								860					
EAS 50-20 / 4								860					
EAS 50-26 / 2,2	50	65	100	230	225	440	400	815	785	685	685	22	455
EAS 50-26 / 3								860					
EAS 50-26 / 4								880					
EAS 50-26 / 5,5	50	65	100	230	225	440	400	1090	990	890	685	22	475
EAS 50-32 / 4								1010					
EAS 50-32 / 5,5								1080					
EAS 50-32 / 7,5	50	65	100	275	280	440	400	1080	940	840	685	22	500
EAS 50-32 / 11								1120					
EAS 65-20 / 2,2								1225					
EAS 65-20 / 3	65	80	100	230	225	440	400	815	785	685	685	22	455
EAS 65-20 / 4								860					
EAS 65-20 / 5,5								880					
EAS 65-26 / 4	65	80	100	250	250	480	440	945	940	840	685	22	475
EAS 65-26 / 5,5								990					
EAS 65-26 / 7,5								1055					
EAS 65-32 / 5,5	65	80	100	275	280	520	480	1080	1120	1020	685	22	500
EAS 65-32 / 7,5								1225					
EAS 65-32 / 11								995					
EAS 80-20 / 3	80	100	125	230	250	440	400	1010	940	840	685	22	455
EAS 80-20 / 4								1010					
EAS 80-20 / 5,5								1080					
EAS 80-20 / 7,5	80	100	125	250	280	520	480	1010	1120	1020	685	22	475
EAS 80-26 / 4								1080					
EAS 80-26 / 5,5								1080					
EAS 80-26 / 7,5	80	100	125	300	315	520	480	1080	1120	1020	685	22	525
EAS 80-26 / 11								1225					
EAS 80-32 / 11								1225					
EAS 80-32 / 15	80	100	125	250	280	480	440	1010	965	865	685	22	530
EAS 80-32 / 18,5								1225					
EAS 100-20 / 4								1090					
EAS 100-20 / 5,5	100	125	140	275	280	520	480	1090	1120	1020	685	22	555
EAS 100-20 / 7,5								1240					
EAS 100-20 / 11								1240					
EAS 100-26 / 5,5	100	125	140	300	315	520	480	1090	1120	1020	685	22	580
EAS 100-26 / 7,5								1240					
EAS 100-26 / 11								1240					
EAS 100-32 / 11	100	125	140	300	315	520	480	1090	1120	1020	685	22	580
EAS 100-32 / 15								1300					
EAS 100-32 / 18,5								1390					
EAS 125-20 / 7,5	125	150	160	330	355	560	520	1165	1180	1080	685	22	580
EAS 125-20 / 11								1390					
EAS 125-20 / 15								1240					
EAS 125-20 / 18,5	125	150	160	330	355	560	520	1390	1230	1130	685	22	610
EAS 125-26 / 15								1165					
EAS 125-26 / 18,5								1245					
EAS 125-26 / 22	125	150	160	330	355	560	520	1390	1230	1130	685	22	610
EAS 125-26 / 30								1260					
EAS 150-20 / 7,5								1320					
EAS 150-20 / 11	150	200	160	330	375	700	660	1410	1350	1250	685	22	610
EAS 150-20 / 15								1245					
EAS 150-26 / 11								1260					
EAS 150-26 / 15	150	200	160	330	375	700	660	1320	1255	1155	685	22	610
EAS 150-26 / 18,5								1410					
EAS 150-26 / 22								1410					
EAS 150-26 / 30	150	200	160	330	375	700	660	1410	1350	1250	685	22	610
EAS 150-26 / 11								1245					
EAS 150-26 / 15								1260					
EAS 150-26 / 18,5	150	200	160	330	375	700	660	1320	1255	1155	685	22	610
EAS 150-26 / 22								1410					
EAS 150-26 / 30								1410					

EAS SERIES PUMP DIMENSIONS AND WEIGHTS 50 Hz, 2 POLES (2950 rpm)



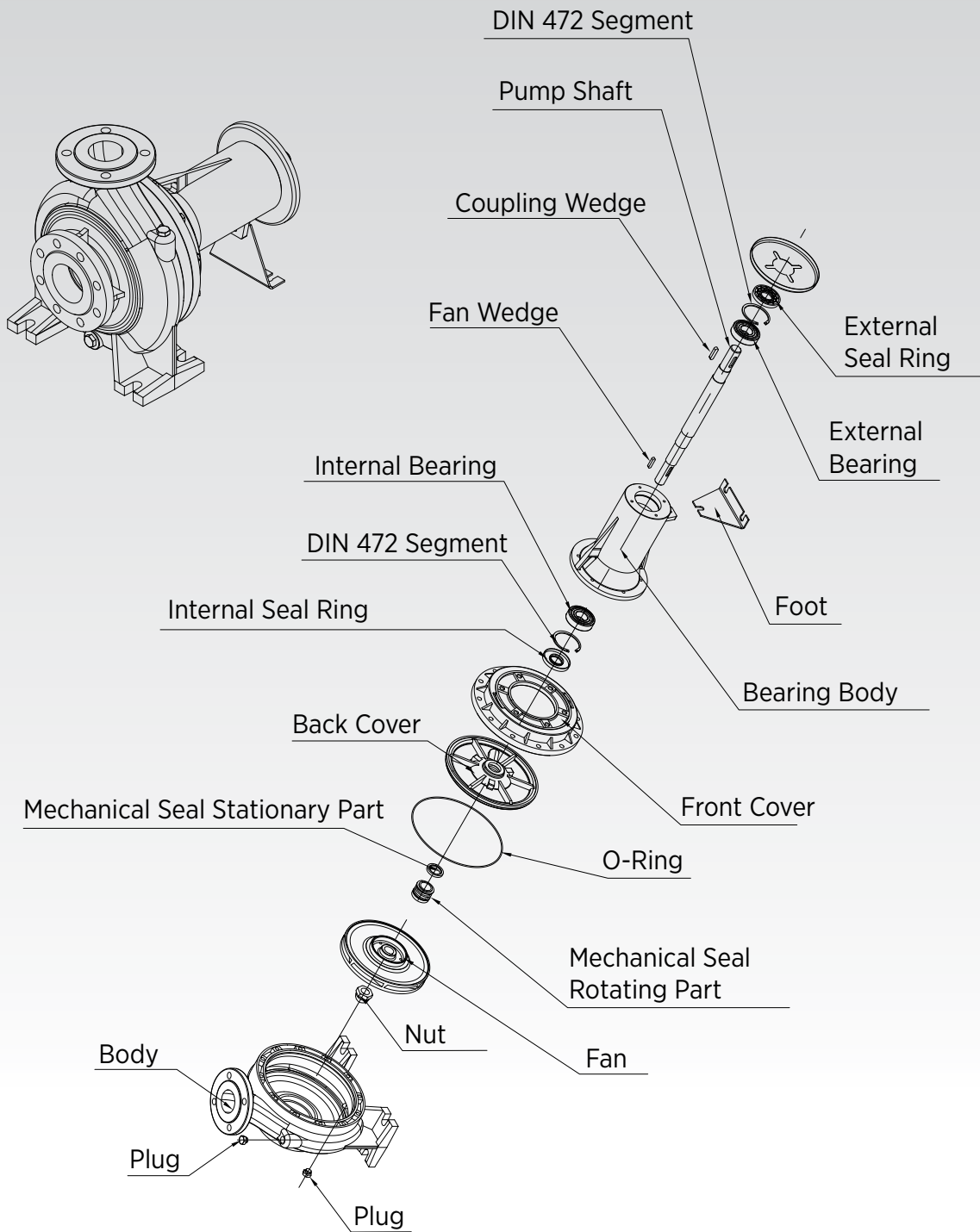
PUMP TYPE	DIMENSIONS																					
	DND	DNS	a	h1	h2	B	B1	L	L1	L2	L3	Øs	Hmax									
EAS 32-20 / 5,5	32	50	80	210	180	440	400	925	840	740	940	22	435									
EAS 32-20 / 7,5								1070	990													
EAS 32-20 / 11								1090	1040													
EAS 32-20 / 15								1150	1040													
EAS 32-26 / 11								945	840													
EAS 32-26 / 15								1090	990													
EAS 32-26 / 18,5	40	50	100	230	225	500	460	945	840	890	940	470										
EAS 32-26 / 22								1150	1040													
EAS 40-20 / 5,5								40	50				100	210	180	440	400	945	840	890	940	435
EAS 40-20 / 7,5																		1090	990			
EAS 40-20 / 11																		1090	990			
EAS 40-20 / 15																		1150	1040			
EAS 40-20 / 18,5	945	840																				
EAS 40-26 / 11	1090	990																				
EAS 40-26 / 15	50	65	100	230	225	500	460	945	840	890	940	470										
EAS 40-26 / 18,5								1150	1040													
EAS 40-26 / 22								945	840													
EAS 50-20 / 15								50	65				100	210	200	440	400	1090	990	890	940	435
EAS 50-20 / 18,5																		1150	1040			
EAS 50-20 / 22																		945	840			
EAS 50-20 / 30	230	225	500	460	1150	1040	940			470												
EAS 50-26 / 18,5	250	225	580	540	1240	1100	100			530												
EAS 50-26 / 22	230	225	440	400	1090	990	890			455												
EAS 50-26 / 30	50	65	100	230	225	500	460	1150	1040	1000	1230	560										
EAS 50-26 / 37								1290	1330				1130	550								
EAS 50-26 / 45								580	540				1425	1330	1230	560						
EAS 50-32 / 37								620	580				1530	1450	1350	620						
EAS 50-32 / 45								680	640				1600	1475	1375	830						
EAS 50-32 / 55								620	580				1530	1450	1350	620						
EAS 50-32 / 75	65	80	100	230	225	440	400	1090	990	890	940	455										
EAS 65-20 / 15								500	460				1150	1040	940	470						
EAS 65-20 / 18,5								580	540				1240	1100	1000	530						
EAS 65-20 / 22								560	520				1350	1230	1130	560						
EAS 65-20 / 30								580	540				1400	1330	1230	560						
EAS 65-26 / 37								300	280				620	580	1505	1450	620					
EAS 65-26 / 45	80	100	125	275	250	580	540	1425	1330	1350	1375	830										
EAS 65-26 / 55								620	580				1530	1450	1350	620						
EAS 65-32 / 45								620	580				1530	1450	1350	620						
EAS 65-32 / 55								680	640				1600	1475	1375	830						
EAS 65-32 / 75								560	520				1285	1180	1080	470						
EAS 65-32 / 90								580	540				1385	1230	1130	530						
EAS 80-20 / 22	80	100	125	250	250	560	520	1385	1230	1130	1230	560										
EAS 80-20 / 30								1385	1230				1130	530								
EAS 80-20 / 37								580	540				1440	1330	1230	560						
EAS 80-20 / 45								620	580				1530	1450	1350	620						
EAS 80-20 / 55								560	520				1375	1230	1130	530						
EAS 80-26 / 37								580	540				1425	1330	1230	560						
EAS 80-26 / 45	100	125	140	275	280	620	580	1530	1450	1350	1375	830										
EAS 80-26 / 55								620	580				1530	1450	1350	620						
EAS 80-26 / 75								680	640				1600	1475	1375	830						
EAS 80-32 / 90								560	520				1390	1230	1130	530						
EAS 80-32 / 110								580	540				1425	1330	1230	560						
EAS 80-32 / 132								620	580				1530	1450	1350	620						
EAS 80-32 / 160	100	125	140	300	280	680	640	1600	1475	1375	1770	1065										
EAS 100-20 / 37								620	580				1550	1450	1350	620						
EAS 100-20 / 45								680	640				1620	1475	1375	830						
EAS 100-20 / 55								620	580				1600	1475	1375	830						
EAS 100-20 / 75								850	750				1770	1870	1770	1065						
EAS 100-26 / 45								580	540				1440	1330	1230	560						
EAS 100-26 / 55	125	150	140	300	315	620	580	1550	1430	1330	1375	830										
EAS 100-26 / 75								680	640				1620	1475	1375	830						
EAS 100-26 / 90								850	750				1770	1870	1770	1065						
EAS 100-32 / 90								580	540				1440	1330	1230	560						
EAS 100-32 / 110								620	580				1550	1430	1330	620						
EAS 100-32 / 132								680	640				1620	1475	1375	830						
EAS 100-32 / 160	125	150	140	330	315	680	640	1620	1475	1375	1770	1065										
EAS 125-20 / 45								620	580				1550	1430	1330	620						
EAS 125-20 / 55								680	640				1620	1475	1375	830						
EAS 125-20 / 75								850	750				1770	1870	1770	1065						
EAS 125-20 / 90								580	540				1440	1330	1230	560						
EAS 125-20 / 110								620	580				1550	1430	1330	620						

EA BARESHAFT PUMP ASSEMBLY



NO.	DESCRIPTION	UNIT(S)
1	PUMP SHAFT	1
2	BEARING OUTSIDE	1
3	SEGMENT OUTSIDE - DIN 472	1
4	BEARING INSIDE	1
5	SEGMENT INSIDE - DIN 472	1
6	BEARING BODY	1
7	SEAL RING OUTSIDE	1
8	SEAL RING INSIDE	1
9	FRONT COVER	1
10	BOLT WASHER GROUP	6
11	MECHANICAL SEAL BODY	1
12	MECHANICAL SEAL SET	1
13	FAN WEDGE	1
14	FAN	1
15	FAN FASTENING NUT	1
16	O-RING	1
17	BODY	1
18	BODY ATTACHMENT GROUP	12
19	PLUG	1
20	PLUG	1
21	FOOT	1
22	FLANGE	4
23	BOLT GROUP	1
24	COUPLING WEDGE	1

EA BARESHAFT PUMP ASSEMBLY



TECHNICAL APPENDIX

The minimum operating values are limited with the start of cavitation formed in the suction end of the pump.

Cavitation means the fluid pressure to locally drop down to a critical level or the local pressure to become equal or slightly lower than the vaporization pressure due to the formation of gaps full of vapor inside the fluid.

When these gaps full of vapor arrive to spots with higher pressure through flow, the vapor in these gaps condensates.

These gaps hit each other and create pressure waves on internal walls. This causes a stress cycle and an increasing deformation and abrasion.

This phenomenon is characterized as a metallic sound created by a hammer hitting the internal walls and called the 'start-up cavitation phase'.

The damage caused by cavitation causes the ambient temperature to increase due to electrochemical corrosion and plastic deformation of internal walls. Metals that are resistant to heat and corrosion are alloyed steels. The conditions triggering cavitation may be identified by calculating the total suction head. In technical literature:

NPSH (Net Positive Suction Head)

NPSH is the total energy measured under the cavitation start-up conditions, excluding the evaporation pressure (expressed in m) at the pump inlet. (expressed in m)

The following formula is used to find the static suction head (hz) under safe pump assembly conditions:

$$hp + hz \geq hz (NPSHr + 0.5) + hf + hpv$$

hp: the absolute pressure applied to the free liquid surface in the suction tank. (expressed in m), hp is the quotient between the absolute pressure and the specific weight of the liquid.

hz: the suction head between the free liquid surface and the pump axis in the suction tank. (expressed in m), hz is negative if the liquid level is lower than the pump axis.

hf: total of suction line and accessories, valve and check valve elbows etc. friction (flow) resistances.

h_{pv}: evaporation pressure of the fluid under operating conditions. (expressed in m), h_{pv} is the quotient between the evaporation pressure and the specific weight of the liquid.

0,5: Safety factor. (for safety)

For assemblies, maximum possible suction head depends on atmospheric pressure values. (for example: the altitude of the pump's location above the sea level and the temperature of the fluid) As a reference to the users, the following table indicates the hydraulic suction loss in the given altitudes above sea level for 4 °C water, and similarly the thermal loss.

Water Temperature (°C)	20	40	60	80	90	110	120
Suction Loss (m)	0,2	0,7	2,0	5,0	7,4	15,4	21,5

Altitude Above Sea Level (m)	500	1000	1500	2000	2500	3000
Suction Loss (m)	0,55	1,1	1,65	2,2	2,75	3,3

EXAMPLE

Let us make the following calculation:

Water Temperature : 15 °C $\gamma = 0,9992$
 Flow Rate : 50 m³ / h
 Delivery Head : 67 m
 Suction Head : 3,5 m

Selected pump EA 50/26 - Required NPSHr at 50 m³ / h is = 2 m

For 15 °C water
 $h_p = P_a / \gamma = 10.33$ m
 $h_{pv} = P_v / \gamma = 0.174$ m (0.01704 bar)
 $h_f = 3.5$ m total loss in the suction line (1 elbow and 1 check valve)
 $h_z = 3.5$ m
 if we put this into our formula;

$10.33 + (-3.5) \geq (2 + 0.5) + 3.4 + 0.174$
 then
 $6.83 > 6$ m

The result is:
 pump can perform suction.

DESCRIPTION

γ = Specific weight of the liquid 15 °C = 0.9992 = 1 (from evaporation pressure table)

Pa = Atmospheric pressure = barometric pressure = 1013hPa = 1.013 bar (directly from meteorology)
 1 bar = 10.2 m
 $1.013 \times 10.2 = 10.33$ m

hpv = 15 °C $P_v = 0.01704$ bar (from evaporation pressure table) 0.01704 bar \times 10.2 m

$0,1738 / 0,9992 = 0,174$ m

hz = 3.5 m suction head

hf = (suction pipe $\varnothing 65$ 3.5 m pipe + 90° wide elbow + check valve) flow resistances

From flat pipe flow resistance and armature loss table:

For 50 m³ / h $\varnothing 65$ pipe, 100 m pipe loss is not given in the table, but based on interpolation calculation method;

On the table, for 48 m³ / h, the loss is $h_r = 42$ m

On the table, for 54 m³ / h, the loss is $h_r = 52$ m

For $54 - 48 = 6$ m³, the loss is $52 - 42 = 10$ m

For $10/6 = 1.66 \times 2$ m³, the loss is $h_r = 2 \times 1.66 = 3.32$ m

For 50 m³ / h, the loss is $h_r = 42 + 3.32 = 45.3$ (for 100 m pipe)

For 1 m pipe, the loss is $45 / 100 = 0.453$ m

$\varnothing 65$ 3.5 m pipe loss = $3,5 \times 0,453 = 1,59$ m

$\varnothing 65$ 90° wide elbow = $0,9 \times 0,453 = 0,4$ m

$\varnothing 65$ Check valve = $3 \times 0,453 = 1,4$ m

$h_f = 1,59 + 0,4 + 1,4 = 3,4$ m

FRICION LOSS IN 100 M STRAIGHT PIPE CAST IRON PIPE (HAZEN-WILLIAMS FORMULA C=100)

FLOW RATE		NOMINAL DIAMETER as mm and inch																	
m ³ /h	l/min	15 1/2"	20 3/4"	25 1"	32 1 1/4"	40 1 1/2"	50 2	65 2 1/2"	80 3"	100 4"	125 5"	150 6"	175 7"	200 8"	250 10"	300 12"	350 14"	400 16"	
0,6	10	v h	0,94 16	0,53 3,94	0,34 1,33	0,21 0,40	0,13 0,13												
0,9	15	v h	1,42 33,9	0,80 8,35	0,51 2,82	0,31 0,85	0,20 0,29												
1,2	20	v h	1,89 57,7	1,06 14,21	0,68 4,79	0,41 1,44	0,27 0,49	0,17 0,16											
1,5	25	v h	2,36 87,2	1,33 21,5	0,85 7,24	0,52 2,18	0,33 0,73	0,21 0,25											
1,8	30	v h	2,83 122	1,59 30,1	1,02 10,1	0,62 3,05	0,40 1,03	0,25 0,35											
2,1	35	v h	3,30 162	1,86 40,0	1,19 13,5	0,73 4,06	0,46 1,37	0,30 0,46											
2,4	40	v h		2,12 51,2	1,36 17,3	0,83 5,19	0,53 1,75	0,34 0,59	0,20 0,16										
3	50	v h		2,65 77,4	1,70 26,1	1,04 7,85	0,66 2,65	0,42 0,89	0,25 0,25										
3,6	60	v h		3,18 108	2,04 36,6	1,24 11,0	0,80 3,71	0,51 1,25	0,30 0,35										
4,2	70	v h		3,72 144	2,38 48,7	1,45 14,6	0,93 4,93	0,59 1,66	0,35 0,46										
4,8	80	v h		4,25 185	2,72 62,3	1,66 18,7	1,06 6,32	0,68 2,13	0,40 0,59										
5,4	90	v h			3,06 77,5	1,87 23,3	1,19 7,85	0,76 2,65	0,45 0,74	0,30 0,27									
6	100	v h			3,40 94,1	2,07 28,3	1,33 9,54	0,85 3,22	0,50 0,90	0,33 0,33									
7,5	125	v h			4,25 142	2,59 42,8	1,66 14,4	1,06 4,86	0,63 1,36	0,41 0,49									
9	150	v h				3,11 59,9	1,99 20,2	1,27 6,82	0,75 1,90	0,50 0,69	0,32 0,23								
10,5	175	v h				3,63 79,7	2,32 26,9	1,49 9,07	0,88 2,53	0,58 0,92	0,37 0,31								
12	200	v h				4,15 102	2,65 34,4	1,70 11,6	1,01 3,23	0,66 1,18	0,42 0,40								
15	250	v h				5,18 154	3,32 52,0	2,12 17,5	1,26 4,89	0,83 1,78	0,53 0,60	0,34 0,20							
18	300	v h					3,98 72,8	2,55 24,6	1,51 6,85	1,00 2,49	0,64 0,84	0,41 0,28							
24	400	v h					5,31 124	3,40 41,8	2,01 11,66	1,33 4,24	0,85 1,43	0,54 0,48	0,38 0,20						
30	500	v h					6,63 187	4,25 63,2	2,51 17,6	1,66 6,41	1,06 2,16	0,68 0,73	0,47 0,30						
36	600	v h						5,10 88,6	3,02 24,7	1,99 8,98	1,27 3,03	0,82 1,02	0,57 0,42	0,42 0,20					
42	700	v h						5,94 118	3,52 32,8	2,32 11,9	1,49 4,03	0,95 1,36	0,66 0,56	0,49 0,26					
48	800	v h						6,79 151	4,02 42,0	2,65 15,3	1,70 5,16	1,09 1,74	0,75 0,72	0,55 0,34					
54	900	v h						7,64 188	4,52 52,3	2,99 19,0	1,91 6,41	1,22 2,16	0,85 0,89	0,62 0,42					
60	1000	v h						5,03 63,5	3,32 23,1	2,12 7,79	1,36 2,63	0,94 1,08	0,69 0,51	0,53 0,27					
75	1250	v h						6,28 96,0	4,15 34,9	2,65 11,8	1,70 3,97	1,18 1,63	0,87 1,63	0,66 0,40					
90	1500	v h						7,54 134	4,98 48,9	3,18 16,5	2,04 5,57	1,42 2,29	1,04 1,08	0,80 0,56					
105	1750	v h						8,79 179	5,81 65,1	3,72 21,9	2,38 7,40	1,65 3,05	1,21 1,44	0,93 0,75					
120	2000	v h						6,63 83,3	4,25 28,1	2,72 9,48	1,89 3,90	1,39 1,84	1,06 0,96	0,68 0,32					
150	2500	v h						8,29 126	5,31 42,5	3,40 14,3	2,36 5,89	1,73 2,78	1,33 1,45	0,85 0,49					
180	3000	v h									6,37 59,5	4,08 20,1	2,83 8,26	2,08 3,90	1,59 2,03	1,02 0,69	0,71 0,28		
210	3500	v h									7,43 79,1	4,76 26,7	3,30 11,0	2,43 5,18	1,86 2,71	1,19 0,91	0,83 0,38		
240	4000	v h									8,49 101	5,44 34,2	3,77 14,1	2,77 6,64	2,12 3,46	1,36 1,17	0,94 0,48		
300	5000	v h									6,79 51,6	4,72 21,2	3,47 10,0	2,65 5,23	1,70 1,77	1,18 0,73			
360	6000	v h									8,15 72,3	5,66 29,8	4,16 14,1	3,18 7,33	2,04 2,47	1,42 1,02			
420	7000	v h										6,61 39,6	4,85 18,7	3,72 9,75	2,38 3,29	1,65 1,35	1,21 0,64		
480	8000	v h										7,55 50,7	5,55 23,9	4,25 12,49	2,72 4,21	1,89 1,73	1,39 0,82		
540	9000	v h										8,49 63,0	6,24 29,8	4,78 15,5	3,06 5,24	2,12 2,16	1,56 1,02	1,19 0,53	
600	10000	v h											6,93 36,2	5,31 18,9	3,40 6,36	2,36 2,62	1,73 1,24	1,33 0,65	

FRICITION LOSS

TABLE FOR THE FLOW RESISTANCES IN ELBOWS, CHECK VALVES AND VALVES

Flow resistance is calculated based on the following table using the equivalent pipe length method.

ACCESSORY TYPE	DN											
	25	32	40	50	65	80	100	125	150	200	250	300
	E value pipe length (m)											
45° Elbow	0,2	0,2	0,4	0,4	0,6	0,6	0,9	1,1	1,5	1,9	2,4	2,8
90° Elbow	0,4	0,6	0,9	1,1	1,3	1,5	2,1	2,6	3,0	3,9	4,7	5,8
90° Wide Elbow	0,4	0,4	0,4	0,6	0,9	1,1	1,3	1,7	1,9	2,8	3,4	3,9
Sleeve T or Cross-Piece	1,1	1,3	1,7	2,1	2,6	3,2	4,3	5,3	6,4	7,5	10,7	12,8
Valve	-	-	-	0,2	0,2	0,2	0,4	0,4	0,6	0,9	1,1	1,3
Check Valve	1,1	1,5	1,9	2,4	3,0	3,4	4,7	5,9	7,4	9,6	11,8	13,9

- The table is for Hazen Williams coefficient, and C equals to 100 (cast iron pipe installation)
- The coefficient for steel pipe installations is 1.41
- The coefficient for stainless steel, copper pipe and galvanized cast iron pipe installations is 1.85
- When an equivalent pipe length is identified, the friction resistance is obtained from the flow resistance table.
- The given values are approximate values for models and especially for valves and check valves, and should be compared with the values provided by the manufacturer.

EVAPORATION PRESSURE Pv and γ SPECIFIC WEIGHT OF WATER

t	T	Pv	γ
°C	K	bar	kg/dm ³
0	273,15	0,00611	0,9998
1	274,15	0,00657	0,9999
2	275,15	0,00706	0,9999
3	276,15	0,00758	0,9999
4	277,15	0,00813	1,0000
5	278,15	0,00872	1,0000
6	279,15	0,00935	1,0000
7	280,15	0,01001	0,9999
8	281,15	0,01072	0,9999
9	282,15	0,01147	0,9998
10	283,15	0,01227	0,9997
11	284,15	0,01312	0,9997
12	285,15	0,01401	0,9996
13	286,15	0,01497	0,9994
14	287,15	0,01597	0,9993
15	288,15	0,01704	0,9992
16	289,15	0,01817	0,9990
17	290,15	0,01936	0,9988
18	291,15	0,02062	0,9987
19	292,15	0,02196	0,9985
20	293,15	0,02337	0,9983
21	294,15	0,024850	0,9981
22	295,15	0,02642	0,9978
23	296,15	0,02808	0,9976
24	297,15	0,02982	0,9974
25	298,15	0,03166	0,9971
26	299,15	0,03360	0,9968
27	300,15	0,03564	0,9966
28	301,15	0,03778	0,9963
29	302,15	0,04004	0,9960
30	303,15	0,04241	0,9957
31	304,15	0,04491	0,9954
32	305,15	0,04753	0,9951
33	306,15	0,05029	0,9947
34	307,15	0,05318	0,9944
35	308,15	0,05622	0,9940
36	309,15	0,05940	0,9937
37	310,15	0,06274	0,9933
38	311,15	0,06624	0,9930
39	312,15	0,06991	0,9927
40	313,15	0,07375	0,9923
41	314,15	0,07777	0,9919
42	315,15	0,08198	0,9915
43	316,15	0,09639	0,9911
44	317,15	0,09100	0,9907
45	318,15	0,09582	0,9902
46	319,15	0,10086	0,9898
47	320,15	0,10612	0,9894
48	321,15	0,11162	0,9889
49	322,15	0,11736	0,9884
50	323,15	0,12335	0,9880
51	324,15	0,12961	0,9876
52	325,15	0,13613	0,9871
53	326,15	0,14293	0,9862
54	327,15	0,15002	0,9862

t	T	Pv	γ
°C	K	bar	kg/dm ³
55	328,15	0,15741	0,9857
56	329,15	0,16511	0,9852
57	330,15	0,17313	0,9846
58	331,15	0,18147	0,9842
59	332,15	0,19016	0,9837
60	333,15	0,1992	0,9832
61	334,15	0,2086	0,9826
62	335,15	0,2184	0,9821
63	336,15	0,2286	0,9816
64	337,15	0,2391	0,9811
65	338,15	0,2501	0,9805
66	339,15	0,2615	0,9799
67	340,15	0,2733	0,9793
68	341,15	0,2856	0,9788
69	342,15	0,2984	0,9782
70	343,15	0,3116	0,9777
71	344,15	0,3253	0,9770
72	345,15	0,3396	0,9765
73	346,15	0,3543	0,9760
74	347,15	0,3696	0,9753
75	348,15	0,3855	0,9748
76	349,15	0,4019	0,9741
77	350,15	0,4189	0,9735
78	351,15	0,4365	0,9729
79	352,15	0,4547	0,9723
80	353,15	0,4736	0,9716
81	354,15	0,4931	0,9710
82	355,15	0,5133	0,9704
83	356,15	0,5342	0,9697
84	357,15	0,5557	0,9691
85	358,15	0,5780	0,9684
86	359,15	0,6011	0,9678
87	360,15	0,6249	0,9671
88	361,15	0,6495	0,9665
89	362,15	0,6749	0,9658
90	363,15	0,7011	0,9652
91	364,15	0,7281	0,9644
92	365,15	0,7561	0,9638
93	366,15	0,7849	0,9630
94	367,15	0,8146	0,9624
95	368,15	0,8453	0,9616
96	369,15	0,8769	0,9610
97	370,15	0,9094	0,9602
98	371,15	0,9430	0,9596
99	372,15	0,9776	0,9586
100	373,15	1,0133	0,9581
102	375,15	1,0878	0,9567
104	377,15	1,1668	0,9552
106	379,15	1,2504	0,9537
108	381,15	1,3390	0,9522
110	383,15	1,4327	0,9507
112	385,15	1,5316	0,9491
114	387,15	1,6362	0,9476
116	389,15	1,7465	0,9460
118	391,15	1,8628	0,9445

t	T	Pv	γ
°C	K	bar	kg/dm ³
120	393,15	1,9854	0,9429
122	395,15	2,1145	0,9412
124	397,15	2,2504	0,9396
126	399,15	2,3933	0,9379
128	401,15	2,5435	0,9362
130	403,15	2,7013	0,9346
132	405,15	2,867	0,9328
134	407,15	3,041	0,9311
136	409,15	3,223	0,9294
138	411,15	3,414	0,9276
140	413,15	3,614	0,9258
145	418,15	4,155	0,9214
155	428,15	5,433	0,9121
160	433,15	6,181	0,9073
165	438,15	7,008	0,9024
170	443,15	7,920	0,8973
175	448,15	8,924	0,8921
180	453,15	10,027	0,8869
185	458,15	11,233	0,8815
190	463,15	12,551	0,8760
195	468,15	13,987	0,8704
200	473,15	15,550	0,8647
205	478,15	17,243	0,8588
210	483,15	19,077	0,8528
215	488,15	21,060	0,8467
220	493,15	23,198	0,8403
225	498,15	25,501	0,8339
230	503,15	27,976	0,8273
235	508,15	30,632	0,8205
240	513,15	33,478	0,8136
245	518,15	36,523	0,8065
250	523,15	39,776	0,7992
255	528,15	43,246	0,7916
260	533,15	46,943	0,7839
265	538,15	50,877	0,7759
270	543,15	55,058	0,7678
275	548,15	59,496	0,7593
280	553,15	64,202	0,7505
285	558,15	69,186	0,7415
290	563,15	74,461	0,7321
295	568,15	80,037	0,7223
300	573,15	85,927	0,7122
305	578,15	92,144	0,7017
310	583,15	98,70	0,6906
315	588,15	105,61	0,6791
320	593,15	112,89	0,6669
325	598,15	120,56	0,6541
330	603,15	128,63	0,6404
340	613,15	146,05	0,6102
350	623,15	165,35	0,5743
360	633,15	186,75	0,5275
370	643,15	210,54	0,4518
374,15	647,30	221,20	0,3154

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