

50 Hz



e-NSC Series

100, 125, 150, 200, 250, 300

HORIZONTAL CENTRIFUGAL ELECTRIC PUMPS
EQUIPPED WITH IE3 MOTORS

ErP 2009/125/EC

Cod. 191002951 Rev. A Ed.05/2014

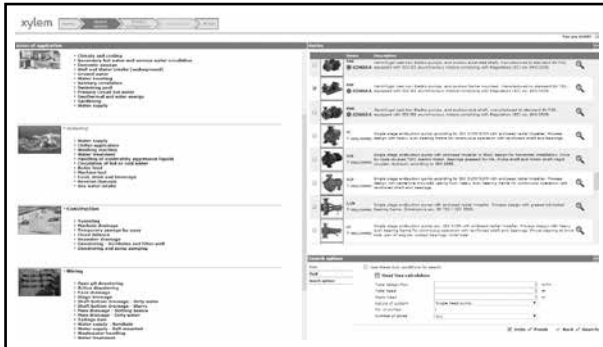
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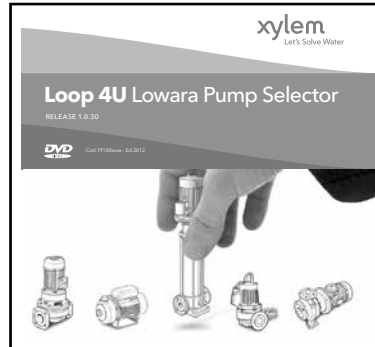
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For more information, please, see page 89-90.

Ecodesign Directive (ErP)

Over last decade the European Commission with the 'Energy Efficiency Plan' pushed the European Parliament and the Council to adopt specific measures to the purpose of reducing energy consumption and further negative environmental impacts.

Through the Directives 2005/32/EC, energy-using products (EuP), and 2009/125/EC, energy-related products (ErP) a framework for **ecodesign** requirements was established.

The Commission Regulations (EC) No 640/2009 and (EU) No 4/2014 have implemented two directives with regard to ecodesign requirements for **three-phase 50 Hz electric motors** placed on the market and put into service inside EU zone as self-alone units or integrated in other products.

This regulation states that motors must have **efficiency level IE3** (or IE2 + Variable Speed Drive) from **1 January 2015 for 7,5 to 375 kW** rated powers and from **1 January 2017 for 0,75 to 375 kW** ones.

The Commission Regulation (EU) No 547/2012 has implemented two directives with regard to ecodesign requirements for some types of **clean water pumps** placed on the market and put into service inside EU zone as self-alone units or integrated in other products.

This regulation states that water pumps shall have **index MEI 0.4** as minimum from **1 January 2015**. That index comes from a dedicated formula which considers hydraulic efficiency values at 'best efficiency point' (BEP), 75 % of the flow at BEP (Part load – PL) and 110 % of the flow at BEP (Over load – OL).

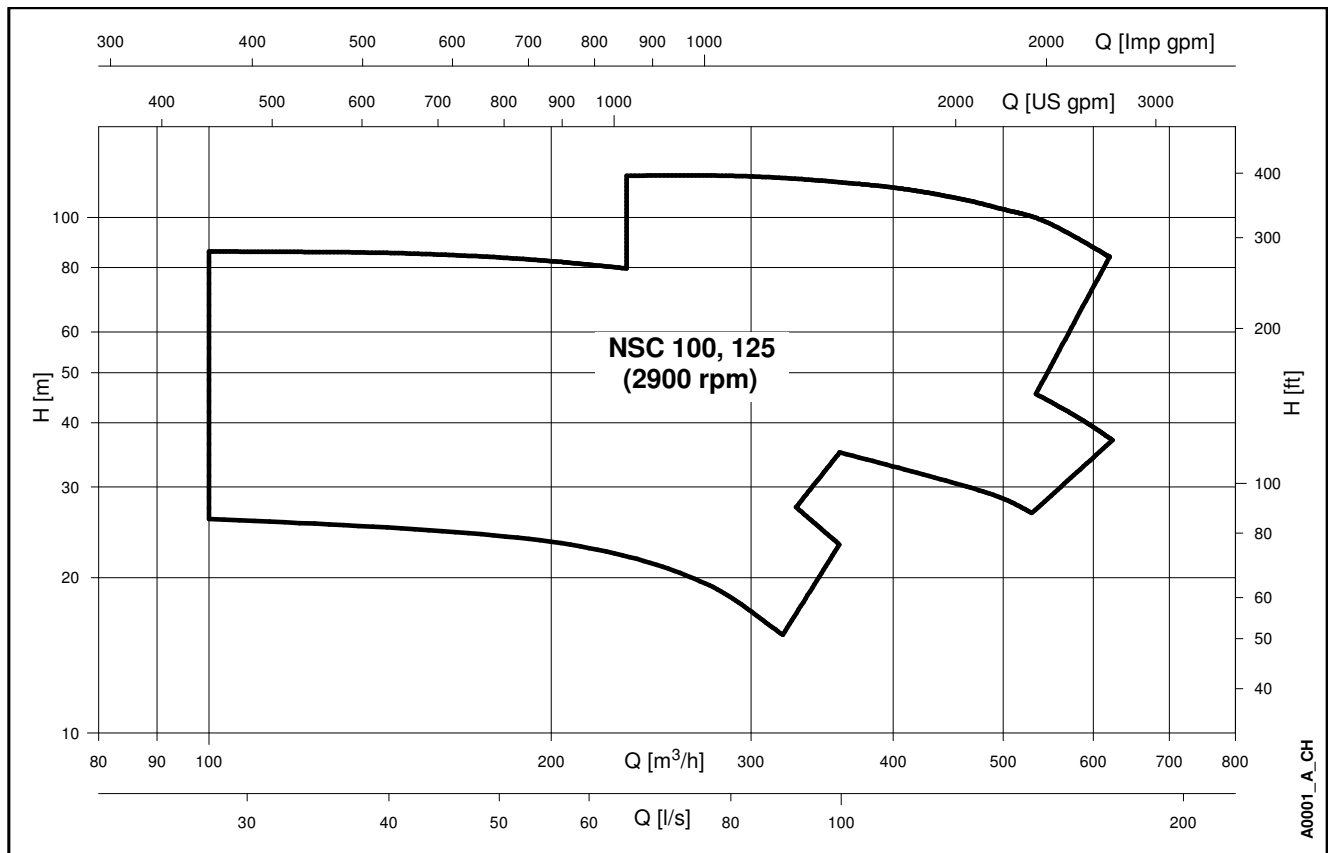
The Lowara e-NSC series, for the models in the scope of the regulations above, is ErP compliant, having an index MEI equal or higher than 0,4 and IE3 motor efficiency.

CONTENTS

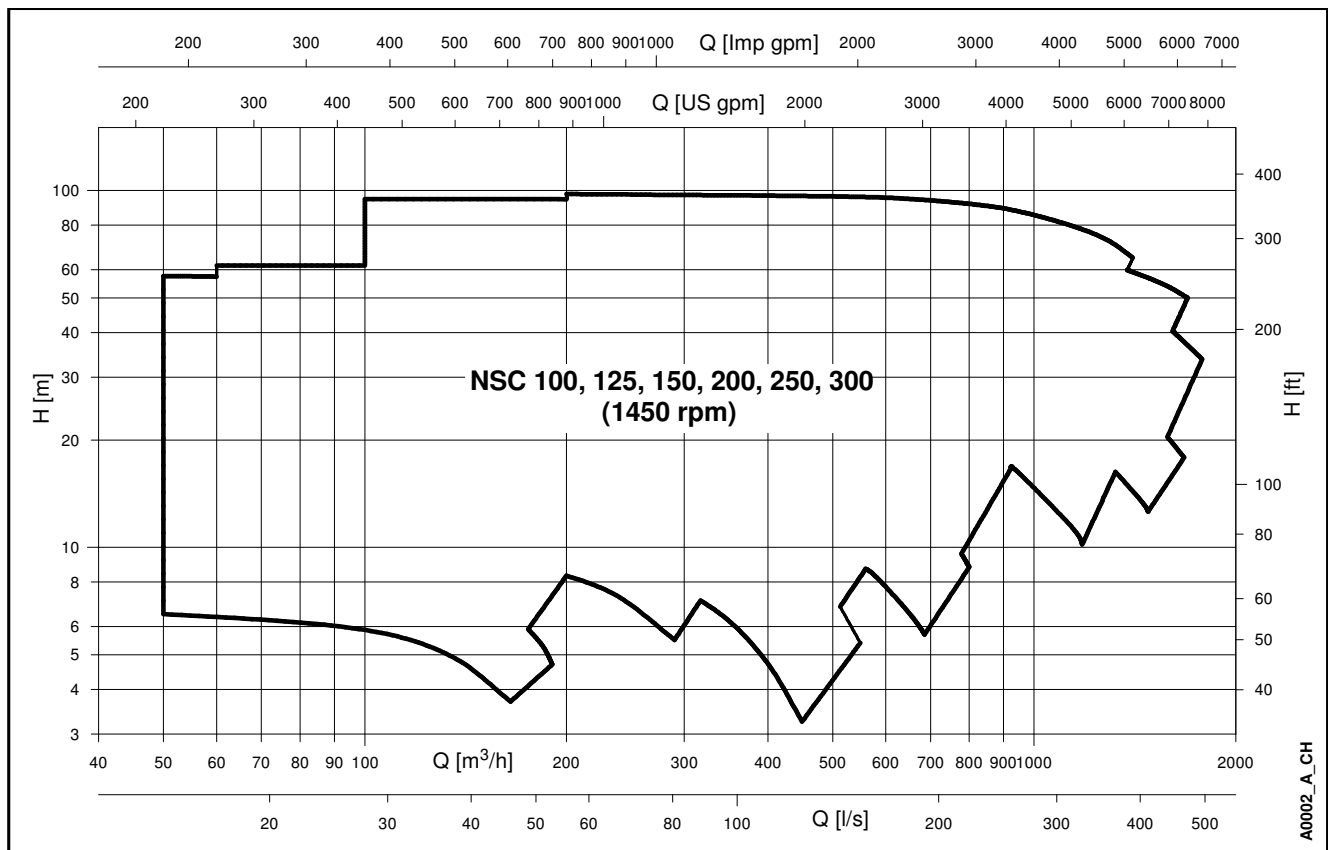
General Introduction	5
Applications	6
Identification code	8
Rating plate	9
List of Models at 50 Hz, 2 poles	10
List of Models at 50 Hz, 4 poles	11
Pump cross-section and main components	12
Mechanical seals	15
Motors (ErP 2009/125/EC).....	16
Pumps (ErP 2009/125/EC).....	22
Minimum efficiency index (MEI)	23
Hydraulic performance at 50 Hz, 2 poles	24
Table of hydraulic performances at 50 Hz, 2 poles	25
Hydraulic performance at 50 Hz, 4 poles	26
Table of hydraulic performances at 50 Hz, 4 poles	27
Operating characteristics at 50 Hz, 2 poles	29
Operating characteristics at 50 Hz, 4 poles	34
Dimensions and weights	59
NSC..H (e-NSC with HYDROVAR)	73
Accessories	76
Report and declarations	80
Technical appendix	83

e-NSC SERIES

HYDRAULIC PERFORMANCE RANGE AT 50 Hz, 2 POLES



HYDRAULIC PERFORMANCE RANGE AT 50 Hz, 4 POLES



e-NSC SERIES

GENERAL INTRODUCTION

The new **Lowara e-NSC Series** is the result of the close collaboration between our customers and us; the new range has been redesigned and improved to meet the Commercial Building Services (CBS) requirements, in terms of performances and energy saving.

In addition the new **Lowara e-NSC Series** can be customized to meet the needs of the Industry, keeping the quality in the production and the continuous reliability and robustness in the operation.

Pump design

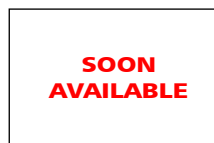
The new **Lowara e-NSC Series** is a centrifugal end-suction electro-pump, single stage, axial flanged suction port, radial flanged discharge and horizontal shaft.

The pumps have cast iron casing and impeller as standard but can be available on demand other materials like stainless steel or duplex.

The pumps are equipped with interchangeable mechanical seals, IE3 efficiency motors and a back pull-out design according to the following main construction:

Extended shaft

close-coupled by means of an adaptor bracket with an impeller keyed directly to the special motor shaft extension.



Stub shaft

Rigid-coupled with a bracket, an adaptor and a rigid coupling keyed to the standard motor shaft extension.



Frame mounted

flexible-coupled with bracket, support, flexing coupling (special version with spacer on demand), aligning and anchoring base.



Bare shaft pump

version without driver suitable to be coupled with a standard electric motor.



Hydraulic specifications

- Maximum delivery: **640** m³/h for 2 poles range.
1800 m³/h for 4 poles range.
- Maximum head: **115** m for 2 poles range.
100 m for 4 poles range.
- Hydraulic performance compliant with ISO 9906:2012 – Grade 3B.
- Fluid temperature range:
standard version (EPDM gasket) **-20 to +140 °C**
version on request (FPM* gasket) **-10 to +140 °C**
- Maximum operating pressure:
standard version (cast iron casing)
16 bar @ 120 °C and **14,9 bar @ 140 °C**
version on request (cast ductile iron casing)
16 bar @ 120 °C and **15,6 bar @ 140 °C**
version on request (cast stainless steel casing)
16 bar @ 50 °C and **14,8 bar @ 140 °C**
version on request (cast duplex casing)
16 bar @ 140 °C

* Fluoro-elastomer: FPM (old ISO), FKM (ASTM & new ISO).

Motor specifications

- Squirrel cage in short circuit enclosed construction with external ventilation (TEFC).
- 2-pole and 4-pole ranges.
- **IP55** protection degree as motor (EN 60034-5), IPX5 as electro-pump (EN 60529).
- Performances according to EN 60034-1.
- **IE3** efficiency level (three-phase 0,75 to 375 kW).
- **155 (F)** insulation class.
- Standard voltage:
3 x 380-415/660-690 V, 50 Hz
- Maximum ambient temperature: 40 °C.

Note

- Anti-clockwise rotation when facing pump's suction port.
- Pump does not include counter-flanges.

List of the main Directives and technical norms:

- Machinery Directive MD 2006/42/EC, EN 809, EN 60204-1
- Electromagnetic Compatibility Directive EMCD 2004/108/EC, EN 61000-6-1, EN 61000-6-3
- Ecodesign requirements for energy-related products ErP 2009/125/EC
- Hydraulic efficiency compliant with Commission Regulation (EU) No 547/2012
- Motor efficiency compliant with Commission Regulation (EC) No 640/2009, Commission Regulation (EU) No 4/2014, EN 60034-30:2009, IEC 60034-30-1:2014
- Mechanical seals according to EN 12756
- Flanges according to EN 1092-2 (cast iron and cast ductile iron), EN 1092-1 (stainless steel and duplex)
- Connection dimensions according to EN 733 for models 100-200, 100-250, 100-315, 100-400, 125-250, 125-315, 125-400, 150-315, 150-400.

e-NSC SERIES

COMMERCIAL BUILDING SERVICES (CBS)

APPLICATIONS & BENEFITS

Applications

The Lowara e-NSC Series is suitable for many different applications demanding variable duty points, reliable and efficient products and cost saving operation.

The Lowara e-NSC Series can be used for the following CBS applications:

- **HVAC**
 - Liquid transfer in heating systems.
 - Liquid transfer in air-conditioning systems.
 - Liquid transfer in ventilation systems.
- **Water Supply**
 - Pressure boosting in commercial buildings.
 - Irrigation systems.
 - Water transfer for green houses.
- **Fire Fighting**



Benefits

The Lowara e-NSC Series permit to achieve the following benefits.

- **Performances:** the e-NSC pumps are ErP 2015 compliant, equipped with IE3 motors and with the right hydraulic coverage for CBS applications. The standard full cast iron version with PN16, 140 °C maximum fluid temperature and EPDM elastomer is exactly what the CBS Market needs.
- **Reliability:** the high quality in production, the robust construction and operation, the interchangeable mechanical seals and wear rings guarantee a continuous operation without faults and a shorter down time for maintenance.
- **Versatility:** beside the standard offer, the Lowara e-NSC series is available in many different configurations for casing, impeller and elastomer materials, motor configurations. That helps in addressing a wide range of applications.
- **Total cost ownership:** the best hydraulic and electric efficiency, the optional HYDROVAR-equipped versions, the easy and quick maintenance, permit to reduce the operation and maintenance cost and to save energy when the pump is working.
- **Pre-post sales support:** we are continuously working close to our customers to help them in selecting the right pump for the specific application. An user-friendly selection software improved with many selection tools is available on the website, on DVD or on Apps for mobile phones. Experienced engineers are fully dedicated to big projects for Municipality.

e-NSC SERIES INDUSTRY APPLICATIONS & BENEFITS

Applications

The e-NSC series and the different available configurations and standard options have been designed for a wide range of applications in industry from process cooling and heating, to washing and cleaning, thru heat recovery, water transport, water boosting and water treatment.

The e-NSC series can be installed in machines where compactness and high performances are a must or within industrial processes where the user looks for a robust and reliable design for the handling of many different liquids.

Benefits

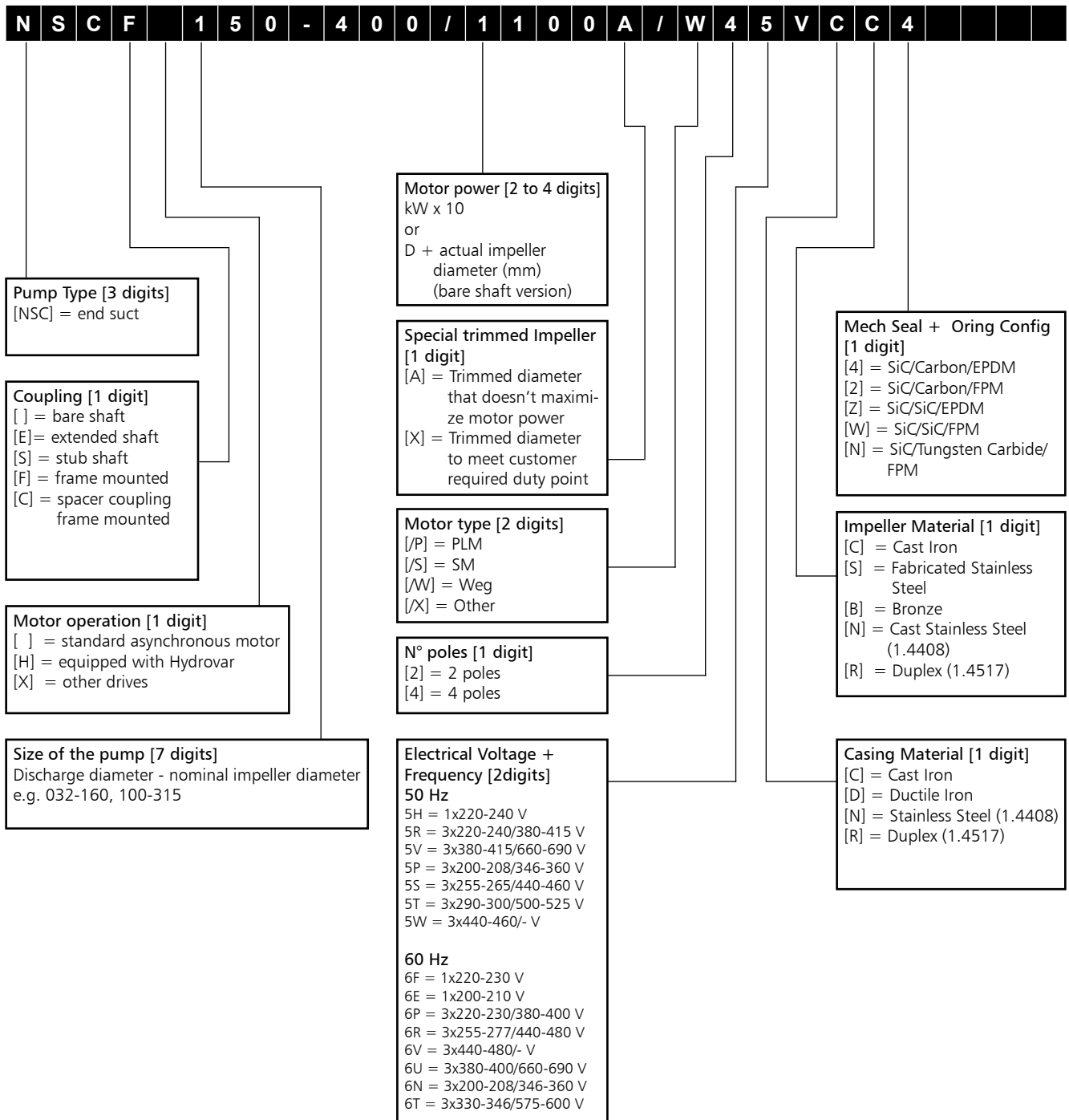
- **Efficiency:** new designed high efficiency hydraulics, IE3 motors and the option with variable speed by the HYDROVAR drive set the basis for very low operation costs.
- **Reliability:** various mechanical seal materials and options are available to optimize the configuration. The e-NSC is also designed for easy maintenance and all service points are easy reachable to reduce down-time.
- **Know How:** the perfect configuration for an application can be made with the selection tool by all users or by consulting our industrial experienced employees.
- **A global platform:** the e-NSC series are assembled in different factories across the world to make the e-NSC always closer to our customer. Beyond our commitment to reduce the carbon footprint of e-NSC, this global platform secures the availability of the same design with the same quality processes everywhere.



Features

- Sizes DN100, 125, 150, 200, 250, 300.
- Wide performance range up to 115 m head and 1800 m³/h flow.
- Nominal pressure 16 bar.
- Wide range of temperatures for pumped liquids: -20°C to +140°C.
- Wide range of materials for many different kinds of pumped liquid.
- Wide range of voltages.
- High performance IE3 motors.
- Variable speed by optional HYDROVAR drive.

**e-NSC SERIES
IDENTIFICATION CODE**



EXAMPLES

NSCS 100-250/900/W25RCC4

End-suction, electric pump with stub shaft coupling, DN 100 nominal discharge port, 250 mm nominal impeller diameter, 90 kW rated motor power, WEG IE3 model, 2-pole, 50 Hz 220-240/380-415 V, cast iron casing, cast iron impeller, Silicon carbide/Carbon/EPDM mechanical seal.

NSCF 150-400/1100A/W45VCC4

End-suction, electric pump with frame mounted coupling, DN 150 nominal discharge port, 400 mm nominal impeller diameter, 110 kW rated motor power, trimmed impeller, WEG IE3 model, 4-pole, 50 Hz 380-415/660-690 V, cast iron casing, cast iron impeller, Silicon carbide/Carbon/EPDM mechanical seal.

NSC 150-400/D423CCZ

End-suction, bare shaft pump, DN 150 nominal discharge port, 400 mm nominal impeller diameter, 423 mm actual impeller diameter, cast iron casing, cast iron impeller, Silicon carbide/ Silicon carbide/EPDM mechanical seal.

e-NSC SERIES RATING PLATE

ELECTRIC PUMP

1 - Pump / electric pump unit type
2 - Pump code / electric pump unit code
3 - Flow range
4 - Head range
5 - Nominal or maximum pump power
6 - Speed
7 - Serial number or order number
8 - Order position number
9 - Full impeller diameter (only filled in for trimmed impellers)
10 - Trimmed impeller diameter (only filled in for trimmed impellers)
11 - Minimum head
12 - Maximum operating liquid temperature
13 - Maximum operating pressure
14 - Hydraulic efficiency in best efficiency point
15 - Minimum efficiency index MEI (Regulation (EU) No 547/2012)
16 - Year of production
17 - Motor single or three phase indication
18 - Motor type indication

PUMP ONLY (NSC)

1 - Pump / electric pump unit type
2 - Pump code / electric pump unit code
3 - Flow range
4 - Head range
5 - Nominal or maximum pump power
6 - Speed
7 - Serial number or order number
8 - Order position number
9 - Full impeller diameter (only filled in for trimmed impellers)
10 - Trimmed impeller diameter (only filled in for trimmed impellers)
11 - Minimum head
12 - Maximum operating liquid temperature
13 - Maximum operating pressure
14 - Hydraulic efficiency in best efficiency point
15 - Minimum efficiency index MEI (Regulation (EU) No 547/2012)
16 - Year of production
17 - Motor single or three phase indication
18 - Motor type indication

LEGEND

- 1 - Pump / electric pump unit type
- 2 - Pump code / electric pump unit code
- 3 - Flow range
- 4 - Head range
- 5 - Nominal or maximum pump power
- 6 - Speed
- 7 - Serial number or order number
- 8 - Order position number
- 9 - Full impeller diameter (only filled in for trimmed impellers)
- 10 - Trimmed impeller diameter (only filled in for trimmed impellers)
- 11 - Minimum head
- 12 - Maximum operating liquid temperature
- 13 - Maximum operating pressure
- 14 - Hydraulic efficiency in best efficiency point
- 15 - Minimum efficiency index MEI (Regulation (EU) No 547/2012)
- 16 - Year of production
- 17 - Motor single or three phase indication
- 18 - Motor type indication

Note for electric pump unit: refer to motor data plate for electrical data.

e-NSC SERIES

LIST OF MODELS AT 50 Hz, 2 POLES

SIZE NSC	kW	VERSION			
		NSCE	NSCS	NSCF	NSCC
100-160/150	15	-	•	•	•
100-160/185	18,5	-	•	•	•
100-160/220	22	-	•	•	•
100-160/300	30	-	•	•	•
100-200/300	30	-	-	•	•
100-200/370	37	-	•	•	•
100-200/450	45	-	•	•	•
100-200/550	55	-	•	•	•
100-250/450	45	-	-	•	•
100-250/550	55	-	-	•	•
100-250/750	75	-	•	•	•
100-250/900	90	-	•	•	•
125-200/450	45	-	•	•	•
125-200/550	55	-	•	•	•
125-200/750	75	-	•	•	•
125-200/900	90	-	•	•	•
125-315/1100	110	-	-	•	•
125-315/1320	132	-	-	•	•
125-315/1600	160	-	-	•	•
125-315/2000	200	-	-	•	•

• = Available

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LEGEND

NSCE : Extended shaft.

NSCS : Stub shaft.

NSCF : Frame mounted.

NSCC : Frame mounted with spacer coupling.

e-NSC SERIES

LIST OF MODELS AT 50 Hz, 4 POLES

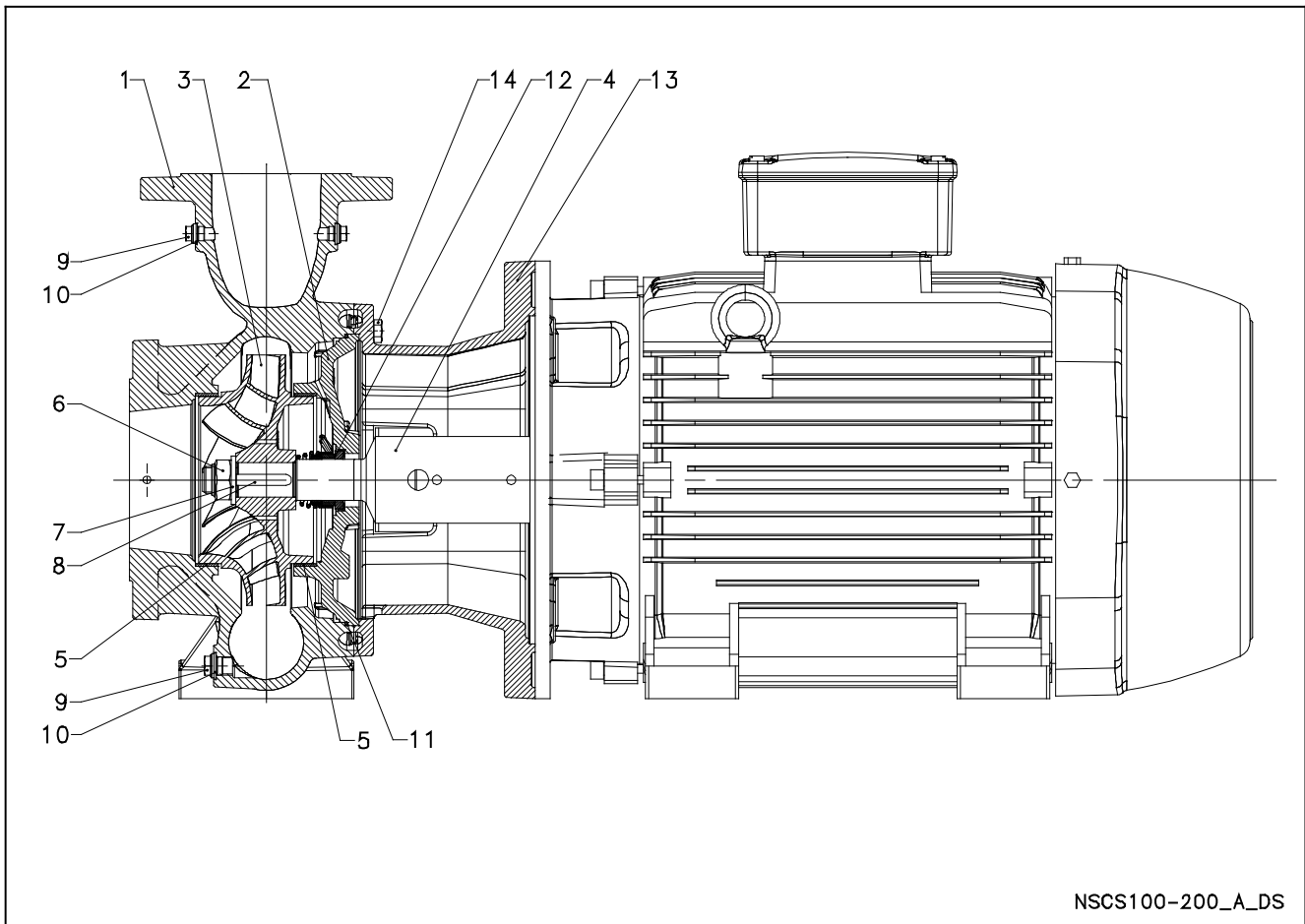
SIZE NSC	kW	VERSION			
		NSCE	NSCS	NSCF	NSCC
100-160/22A	2,2	-	•	•	•
100-160/22	2,2	-	•	•	•
100-160/30	3	-	•	•	•
100-160/40	4	-	•	•	•
100-200/40	4	-	-	•	•
100-200/55	5,5	-	•	•	•
100-200/75	7,5	-	•	•	•
100-250/55	5,5	-	-	•	•
100-250/75	7,5	-	•	•	•
100-250/110	11	-	•	•	•
100-315/110	11	-	•	•	•
100-315/150	15	-	•	•	•
100-315/185	18,5	-	•	•	•
100-315/220	22	-	•	•	•
100-315/300	30	-	•	•	•
100-400/300	30	-	•	•	•
100-400/370	37	-	•	•	•
100-400/450	45	-	•	•	•
125-200/55	5,5	-	•	•	•
125-200/75	7,5	-	•	•	•
125-200/110	11	-	•	•	•
125-250/75	7,5	-	-	•	•
125-250/110	11	-	•	•	•
125-250/150	15	-	•	•	•
125-315/185	18,5	-	•	•	•
125-315/220	22	-	•	•	•
125-315/300	30	-	•	•	•
125-315/370	37	-	•	•	•
125-400/370	37	-	•	•	•
125-400/450	45	-	•	•	•
125-400/550	55	-	•	•	•
125-400/750	75	-	•	•	•
150-200/110A	11	-	•	•	•
150-200/110	11	-	•	•	•
150-200/150A	15	-	•	•	•
150-200/150	15	-	•	•	•
150-250/150	15	-	•	•	•
150-250/185	18,5	-	•	•	•
150-250/220	22	-	•	•	•
150-250/300	30	-	•	•	•
150-315/300	30	-	•	•	•
150-315/370	37	-	•	•	•
150-315/450	45	-	•	•	•
150-400/450	45	-	-	•	•
150-400/550	55	-	•	•	•
150-400/750	75	-	•	•	•
150-400/900	90	-	•	•	•
150-400/1100	110	-	-	•	•
150-500/900	90	-	-	•	•
150-500/1100	110	-	-	•	•
150-500/1320	132	-	-	•	•
150-500/1600	160	-	-	•	•
150-500/2000	200	-	-	•	•

• = Available

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SIZE NSC	kW	VERSION			
		NSCE	NSCS	NSCF	NSCC
200-250/185	18,5	-	•	•	•
200-250/220	22	-	•	•	•
200-250/300A	30	-	•	•	•
200-250/300	30	-	•	•	•
200-315/300	30	-	-	•	•
200-315/370	37	-	•	•	•
200-315/450	45	-	•	•	•
200-315/550	55	-	•	•	•
200-315/750	75	-	-	•	•
200-400/750A	75	-	-	•	•
200-400/750	75	-	-	•	•
200-400/900	90	-	-	•	•
200-400/1100	110	-	-	•	•
200-400/1320	132	-	-	•	•
200-500/1320	132	-	-	•	•
200-500/1600	160	-	-	•	•
200-500/2000	200	-	-	•	•
200-500/2500	250	-	-	•	•
200-500/3150	315	-	-	•	•
250-315/370	37	-	•	•	•
250-315/450	45	-	•	•	•
250-315/550	55	-	•	•	•
250-315/750	75	-	•	•	•
250-400/750	75	-	-	•	•
250-400/900	90	-	-	•	•
250-400/1100	110	-	-	•	•
250-400/1320	132	-	-	•	•
250-400/1600	160	-	-	•	•
250-400/2000	200	-	-	•	•
250-500/1600	160	-	-	•	•
250-500/2000	200	-	-	•	•
250-500/2500	250	-	-	•	•
250-500/3150	315	-	-	•	•
250-500/3550	355	-	-	•	•
300-350/750A	75	-	-	•	•
300-350/750	75	-	-	•	•
300-350/900	90	-	-	•	•
300-350/1100	110	-	-	•	•
300-400/1100	110	-	-	•	•
300-400/1320	132	-	-	•	•
300-400/1600	160	-	-	•	•
300-400/2000	200	-	-	•	•
300-400/2500	250	-	-	•	•
300-450/1600	160	-	-	•	•
300-450/2000	200	-	-	•	•
300-450/2500	250	-	-	•	•
300-450/3150	315	-	-	•	•

NSCS SERIES ELECTRIC PUMP CROSS-SECTION AND MAIN COMPONENTS

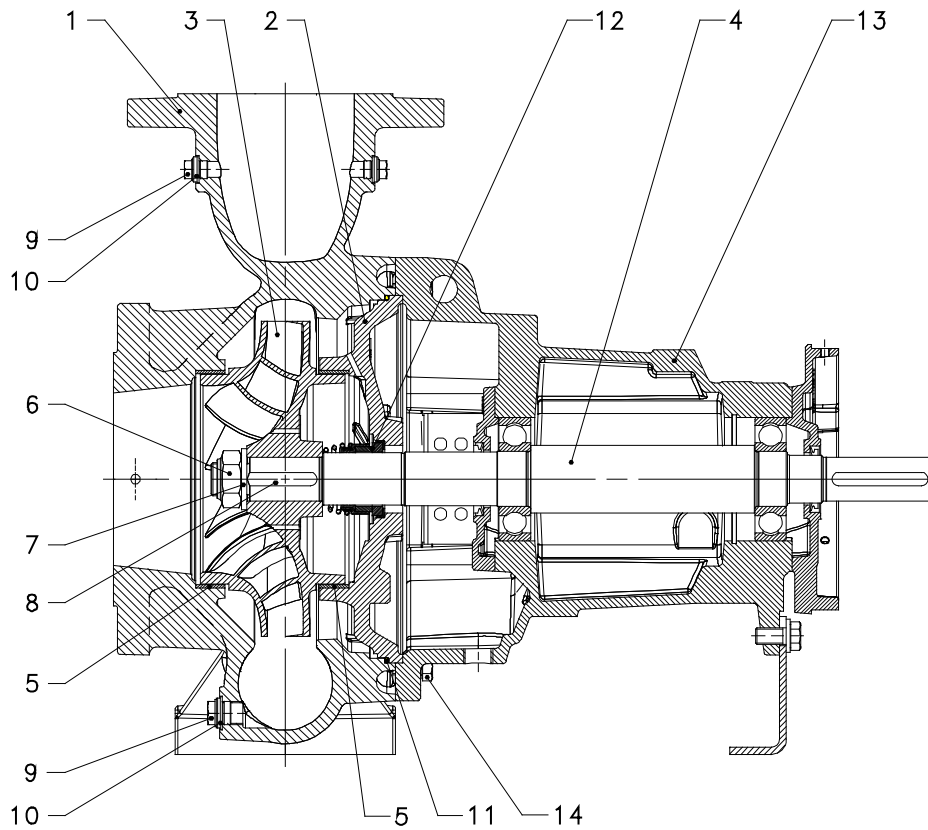


REF. N.	PART	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Volute casing	Cast iron	EN 1561 - GJL-250 (JL1040)	ASTM Class 35
	Volute casing (200-250, 200-315, 250/315)	Cast ductile iron	EN 1563 - EN-GJS400-15 (EN-JS1030)	ASTM A536 40-60-18
2	Casing cover	Cast iron	EN 1561 - GJL-250 (JL1040)	ASTM Class 35
	Casing cover (200-250, 200-315, 250/315)	Cast ductile iron	EN 1563 - EN-GJS400-15 (EN-JS1030)	ASTM A536 40-60-18
3	Impeller	Cast iron	EN 1561 - GJL-200 (JL1030)	ASTM Class 30
	Impeller	Bronze	EN 1982 - CuSn10-C (CC480K)	UNS C90700
4	Stub shaft	Stainless steel	EN 10088 - X17CrNi16-2 (1.4057)	AISI 431
5	Wear ring	Stainless steel	EN 10088 - X5CrNi18-10 (1.4301)	AISI 304
6	Impeller nut	Stainless steel	A4 (~ 1.4401)	
7	Impeller washer	Stainless steel	A4 (~ 1.4401)	
8	Impeller key	Stainless steel	EN 10088 - X6CrNiMo17-12-2 (1.4571)	AISI 316Ti
9	Plug	Stainless steel	EN 10088 - X6CrNiMo17-12-2 (1.4571)	AISI 316Ti
10	Gasket	Asbestos-free synthetic fiber AFM 34		
11	O-Ring	EPDM (standard version)		
12	Mechanical seal	Carbon / Silicon carbide / EPDM (standard version)		
13	Motor adapter	Cast iron	EN 1561 - GJL-250 (JL1040)	ASTM Class 35
14	Volute - casing fastening screws	Carbon steel		

Nscs100-200-en_a_tm

NSC, NSCF, NSCC SERIES PUMP CROSS-SECTION AND MAIN COMPONENTS

PUMP SIZE
100-160
100-200
100-250
100-315
100-400
125-200
125-250
125-315
125-400
150-200
150-250
150-315
150-400
200-250
200-315
250-315

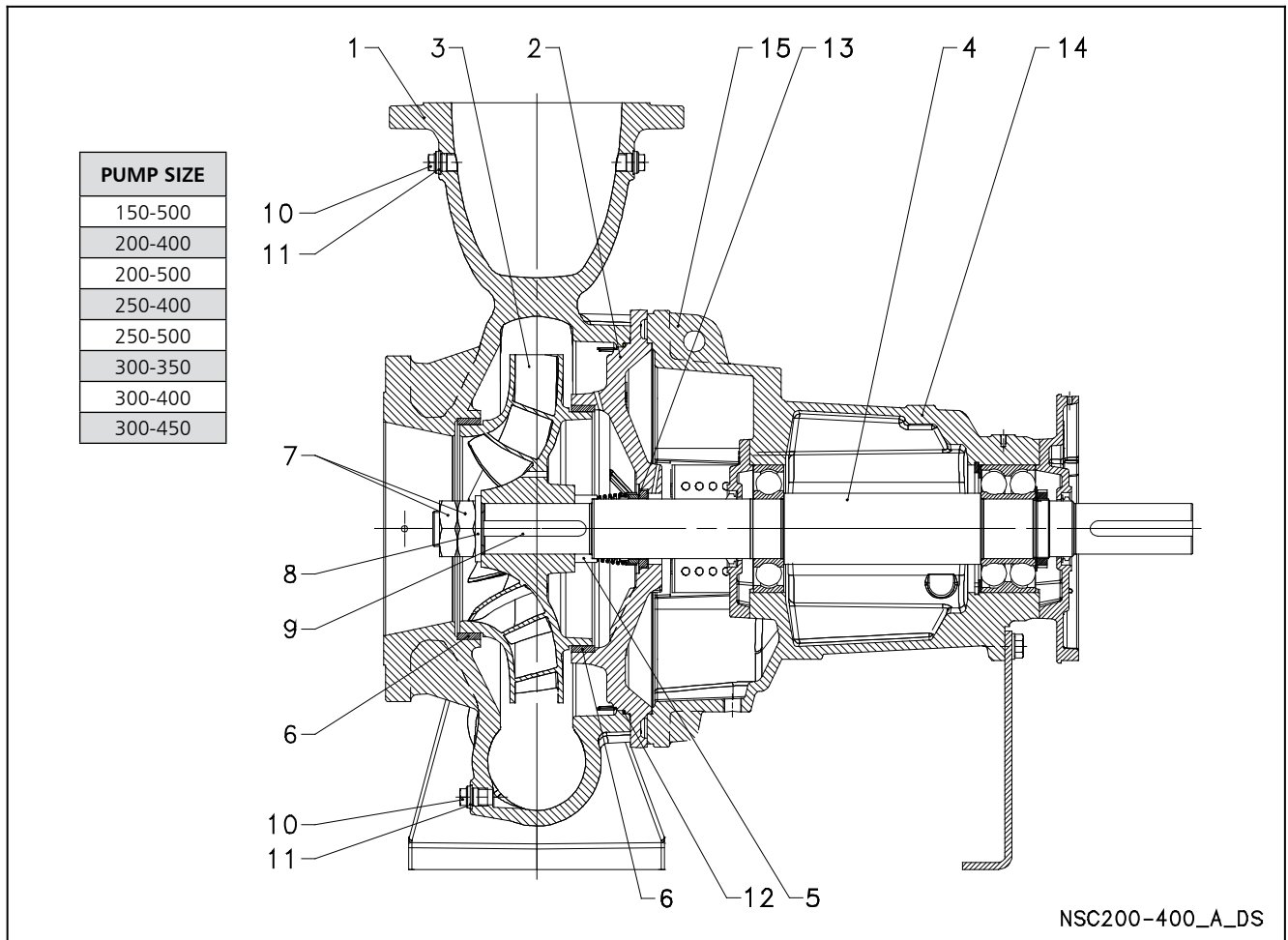


NSC100-200_A_DS

REF. N.	PART	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Volute casing	Cast iron	EN 1561 - GJL-250 (JL1040)	ASTM Class 35
	Volute casing (200-250, 200-315, 250/315)	Cast ductile iron	EN 1563 - EN-GJS400-15 (EN-JS1030)	ASTM A536 40-60-18
2	Casing cover	Cast iron	EN 1561 - GJL-250 (JL1040)	ASTM Class 35
	Casing cover (200-250, 200-315, 250/315)	Cast ductile iron	EN 1563 - EN-GJS400-15 (EN-JS1030)	ASTM A536 40-60-18
3	Impeller	Cast iron	EN 1561 - GJL-200 (JL1030)	ASTM Class 30
	Impeller	Bronze	EN 1982 - CuSn10-C (CC480K)	UNS C90700
4	Shaft	Stainless steel	EN 10088 - X17CrNi16-2 (1.4057)	AISI 431
5	Wear ring	Stainless steel	EN 10088 - X5CrNi18-10 (1.4301)	AISI 304
6	Impeller nut	Stainless steel	A4 (~ 1.4401)	
7	Impeller washer	Stainless steel	A4 (~ 1.4401)	
8	Impeller key	Stainless steel	EN 10088 - X6CrNiMo17-12-2 (1.4571)	AISI 316Ti
9	Plug	Stainless steel	EN 10088 - X6CrNiMo17-12-2 (1.4571)	AISI 316Ti
10	Gasket	Asbestos-free synthetic fiber AFM 34		
11	O-Ring	EPDM (standard version)		
12	Mechanical seal	Carbon / Silicon carbide / EPDM (standard version)		
13	Bearing bracket	Cast iron	EN 1561 - GJL-250 (JL1040)	ASTM Class 35
14	Volute - casing fastening screws	Carbon steel		

Nsc100-200-en_a_tm

NSC, NSCF, NSCC SERIES PUMP CROSS-SECTION AND MAIN COMPONENTS

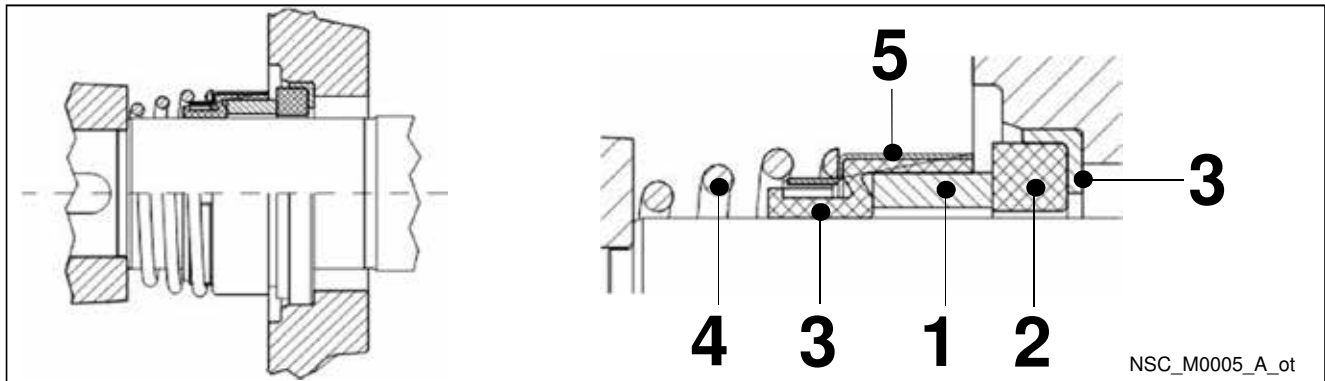


REF. N.	PART	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Volute casing	Cast ductile iron	EN 1563 - EN-GJS400-15 (EN-JS1030)	ASTM A536 40-60-18
2	Casing cover	Cast ductile iron	EN 1563 - EN-GJS400-15 (EN-JS1030)	ASTM A536 40-60-18
3	Impeller	Cast iron	EN 1561 - GJL-200 (JL1030)	ASTM Class 30
	Impeller	Bronze	EN 1982 - CuSn10-C (CC480K)	UNS C90700
4	Shaft	Stainless steel	EN 10088 - X17CrNi16-2 (1.4057)	AISI 431
5	Spacer ring	Stainless steel	EN 10088 - X17CrNi16-2 (1.4057)	AISI 431
6	Wear ring	Stainless steel	EN 10088 - X5CrNi18-10 (1.4301)	AISI 304
7	Impeller nut	Stainless steel	A4 (~ 1.4401)	
8	Impeller washer	Stainless steel	A4 (~ 1.4401)	
9	Impeller key	Stainless steel	EN 10088 - X6CrNiMo17-12-2 (1.4571)	AISI 316Ti
10	Plug	Stainless steel	EN 10088 - X6CrNiMo17-12-2 (1.4571)	AISI 316Ti
11	Gasket	Asbestos-free synthetic fiber AFM 34		
12	O-Ring	EPDM (standard version)		
13	Mechanical seal	Carbon / Silicon carbide / EPDM (standard version)		
14	Bearing bracket	Cast iron	EN 1561 - GJL-250 (JL1040)	ASTM Class 35
15	Volute - casing fastening screws	Carbon steel		

Nsc200-400-en_a_tm

e-NSC SERIES MECHANICAL SEALS

Mechanical seal with mounting dimensions according to EN 12756 and ISO 3069.



LIST OF MATERIALS

POSITION 1 - 2	POSITION 3	POSITION 4 - 5
B : Resin impregnated carbon	E : EPDM	G : AISI 316
Q ₁ : Silicon carbide	V : FKM*	

* Fluoro-elastomer: FPM (old ISO), FKM (ASTM & new ISO)

Nsc_ten-mec-en_a_tm

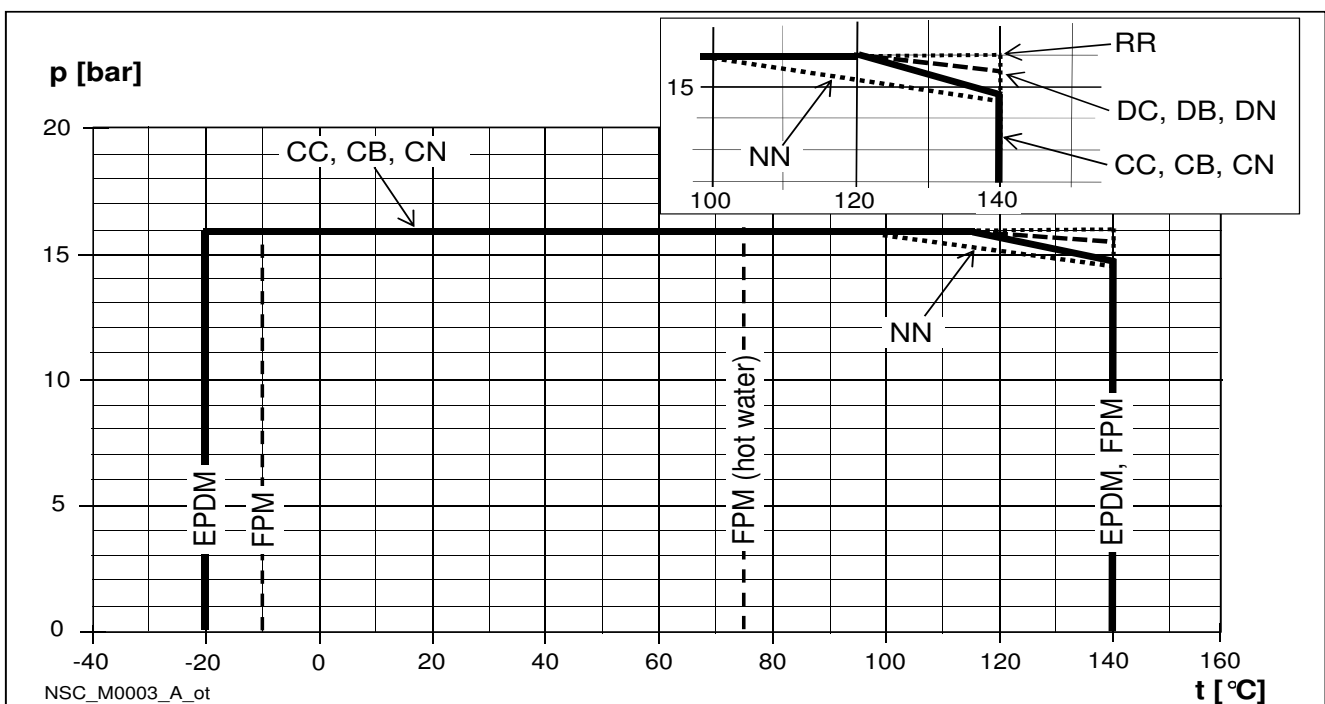
TYPE OF SEAL

TYPE	POSITION					TEMPERATURE °C
	1 ROTATING ASSEMBLY	2 FIXED ASSEMBLY	3 ELASTOMERS	4 SPRINGS	5 OTHER COMPONENTS	
STANDARD MECHANICAL SEAL						
B Q ₁ E G G	B	Q ₁	E	G	G	-20 ... +140
OTHER TYPES OF MECHANICAL SEAL						
B Q ₁ V G G	B	Q ₁	V	G	G	-10 ... +140 ^{*)}
Q ₁ Q ₁ V G G	Q ₁	Q ₁	V	G	G	-10 ... +140 ^{*)}
Q ₁ Q ₁ E G G	Q ₁	Q ₁	E	G	G	-20 ... +140

^{*)} for hot water: +75 °C

Nsc_tipi-ten-mec-en_a_tc

PRESSURE/TEMPERATURE APPLICATION LIMITS FOR COMPLETE PUMP



e-NSC SERIES MOTORS

Over last decade the European Commission with the 'Energy Efficiency Plan' pushed the European Parliament and the Council to adopt specific measures to the purpose of reducing energy consumption and further negative environmental impacts.

Through the Directives 2005/32/EC, energy-using products (EuP), and 2009/125/EC, energy-related products (ErP) a framework for ecodesign requirements was established.

The Commission Regulations (EC) No 640/2009 and (EU) No 4/2014 have implemented two directives with regard to ecodesign requirements for electric motors placed on the market and put into service inside EU zone as self-alone units or integrated in other products.

The various types considered include **three-phase 50 Hz surface motors** with power outputs ranging **from 0,75 to 375 kW included**.

Regulations also establish the following deadlines.

from	kW	minimum level of efficiency (IE)
16 June 2011	0,75 ÷ 375	IE2
27 July 2014	0,75 ÷ 375	new exclusion criteria
1 January 2015	< 7,5	IE2
	7,5 ÷ 375	IE3
		IE2 fitted with variable speed drive
1 January 2017	0,75 ÷ 375	IE3
		IE2 fitted with variable speed drive

- Squirrel cage in short circuit enclosed construction with external ventilation (TEFC).
- Rated power 15 to 200 kW for 2-pole range and 2,2 to 355 kW for 4-pole range.
- Standard voltage:
3 x 380-415/660-690 V, 50 Hz
- **IP55** protection degree.
- **155 (F)** insulation class.
- **Standard** three-phase surface motors
≥ 0,75 kW supplied as **IE3**.
- IE efficiency level according to EN 60034-30:2009 and IEC 60034-30-1:2014 (≥ 0,75 kW).
- Electrical performances according to EN 60034-1.
- Cable gland with metric according to EN 50262.
- **PTC included** (one per phase, 155°C).
- Overload protection to be provided by the user.
- Maximum ambient temperature: 40 °C.

NSCS SERIES

THREE-PHASE MOTORS AT 50 Hz, 2 POLES

P _N kW	Efficiency η_N									IE	Year of manufacture
	%										
	Δ 380 V Y 660 V			Δ 400 V Y 690 V			Δ 415 V				
	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4		
15	92,6	92,5	91,8	92,9	92,5	91,5	93,0	92,4	91,2	3	from 06/2011
18,5	93,0	92,9	92,4	93,2	92,9	92,0	93,3	92,8	91,6		
22	93,4	93,2	92,7	93,7	93,3	92,5	93,8	93,3	92,3		
30	94,0	94,0	93,1	94,1	94,0	92,8	94,2	93,9	92,6		
37	94,4	94,0	93,5	94,6	94,0	93,3	94,7	93,9	93,1		
45	94,8	94,9	94,6	95,1	95,1	94,6	95,3	95,2	94,5		
55	95,1	95,0	94,9	95,4	95,3	94,9	95,5	95,3	94,8		
75	95,4	95,2	94,6	95,6	95,3	94,5	95,7	95,3	94,4		
90	95,6	95,5	94,9	95,8	95,6	94,8	95,9	95,6	94,7		

P _N kW	Manufacturer	IEC SIZE	Construction Design	N. of Poles	f _N Hz	Data for 400 V / 50 Hz Voltage				
	WEG Equipamentos Elétricos S.A. Reg. No. 07.175.725/0010-50 Jaraguá do Sul - SC (Brazil)					cos ϕ	I _s / I _N	T _N Nm	T _s /T _N	T _m /T _N
	Model									
15	W22 160M2-B35 15kW	160	B35	2	50	0,86	8,00	48,60	2,60	3,30
18,5	W22 160L2-B35 18,5kW	160				0,86	8,40	59,90	2,80	3,60
22	W22 180M2-B35 22kW	180				0,87	8,00	71,10	2,50	3,30
30	W22 200L2-B35 30kW	200				0,86	7,30	96,60	2,60	2,90
37	W22 200L2-B35 37kW	200				0,86	7,30	119,2	2,60	2,90
45	W22 225S/M2-B35 45kW	225				0,88	8,00	144,7	2,70	3,20
55	W22 250S/M2-B35 55kW	250				0,89	7,90	177,1	2,80	2,90
75	W22280S/M2-B35 75kW	280				0,90	7,60	240,3	2,30	2,90
90	W22 280S/M2-B35 90kW	280				0,90	7,40	288,4	2,20	2,80

P _N kW	Voltage U _N V					n _N min ⁻¹	See note.	Operating conditions **		
	Δ			Y				Altitude Above Sea Level (m)	T. amb min/max °C	ATEX
	380 V	400 V	415 V	660 V	690 V					
	I _N (A)									
15	28,00	27,10	26,70	16,10	15,70	2945 ÷ 2955		≤ 1000	-15 / 40	No
18,5	34,30	33,30	32,80	19,70	19,30	2945 ÷ 2955				
22	40,70	39,00	37,90	23,40	22,60	2950 ÷ 2960				
30	55,10	53,50	52,70	31,70	31,00	2960 ÷ 2970				
37	67,70	65,60	64,70	39,00	38,00	2960 ÷ 2970				
45	80,10	77,60	74,60	46,10	45,00	2965 ÷ 2970				
55	97,60	93,50	91,00	56,20	54,20	2960 ÷ 2965				
75	131,0	126,0	121,0	75,40	73,00	2975 ÷ 2980				
90	159,0	151,0	145,0	91,50	87,50	2975 ÷ 2980				

** Operating conditions to be referred to motor only. About electric pump, refer to limits in user's manual.

Nscs-mott90-2p50-en_a_te

Note: Observe the regulations and codes locally in force regarding sorted waste disposal.

NSCF-NSCC SERIES

THREE-PHASE MOTORS AT 50 Hz, 2 POLES

P _N kW	Efficiency η_N %									IE	Year of manufacture
	Δ 380 V Y 660 V			Δ 400 V Y 690 V			Δ 415 V				
	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4		
15	92,6	92,5	91,8	92,9	92,5	91,5	93,0	92,4	91,2	3	from 06/2011
18,5	93,0	92,9	92,4	93,2	92,9	92,0	93,3	92,8	91,6		
22	93,4	93,2	92,7	93,7	93,3	92,5	93,8	93,3	92,3		
30	94,0	94,0	93,1	94,1	94,0	92,8	94,2	93,9	92,6		
37	94,4	94,0	93,5	94,6	94,0	93,3	94,7	93,9	93,1		
45	94,8	94,9	94,6	95,1	95,1	94,6	95,3	95,2	94,5		
55	95,1	95,0	94,9	95,4	95,3	94,9	95,5	95,3	94,8		
75	95,4	95,2	94,6	95,6	95,3	94,5	95,7	95,3	94,4		
90	95,6	95,5	94,9	95,8	95,6	94,8	95,9	95,6	94,7		
110	96,0	95,7	94,8	96,1	95,7	94,7	96,1	95,7	94,6		
132	96,1	95,8	95,3	96,3	95,9	95,2	96,4	95,9	95,1		
160	96,4	96,1	95,7	96,6	96,2	95,6	96,7	96,2	95,5		
200	96,5	96,4	96,0	96,7	96,5	96,0	96,8	96,5	95,9		

P _N kW	Manufacturer		IEC SIZE	Construction Design	N. of Poles	f _N Hz	Data for 400 V / 50 Hz Voltage				
	WEG Equipamentos Eletricos S.A. Reg. No. 07.175.725/0010-50 Jaragua do Sul - SC (Brazil)						cosφ	Is / I _N	T _N Nm	Ts/T _N	Tm/Tn
	Model										
15	W22 160M2-B3 15kW		160	B3	2	50	0,86	8,00	48,60	2,60	3,30
18,5	W22 160L2-B3 18,5kW		160				0,86	8,40	59,90	2,80	3,60
22	W22 180M2-B3 22kW		180				0,87	8,00	71,10	2,50	3,30
30	W22 200L2-B3 30kW		200				0,86	7,30	96,60	2,60	2,90
37	W22 200L2-B3 37kW		200				0,86	7,30	119,2	2,60	2,90
45	W22 225S/M2-B3 45kW		225				0,88	8,00	144,7	2,70	3,20
55	W22 250S/M2-B3 55kW		250				0,89	7,90	177,1	2,80	2,90
75	W22 280S/M2-B3 75kW		280				0,90	7,60	240,3	2,30	2,90
90	W22 280S/M2-B3 90kW		280				0,90	7,40	288,4	2,20	2,80
110	W22 315S/M2-B3 110kW		315				0,89	7,60	352,5	2,50	3,00
132	W22 315S/M2-B3 132kW		315				0,90	7,50	423,0	2,10	2,80
160	W22 315S/M2-B3 160kW		315				0,91	7,90	512,7	2,30	2,80
200	W22 315L2-B3 200kW		315				0,90	8,20	640,9	2,60	2,80

P _N kW	Voltage U _N V					n _N min ⁻¹	See note.	Operating conditions **		
	Δ			Y				Altitude Above Sea Level (m)	T. amb min/max °C	ATEX
	380 V	400 V	415 V	660 V	690 V					
	I _N (A)									
15	28,00	27,10	26,70	16,10	15,70	2945 ÷ 2955		≤ 1000	-15 /+ 40	No
18,5	34,30	33,30	32,80	19,70	19,30	2945 ÷ 2955				
22	40,70	39,00	37,90	23,40	22,60	2950 ÷ 2960				
30	55,10	53,50	52,70	31,70	31,00	2960 ÷ 2970				
37	67,70	65,60	64,70	39,00	38,00	2960 ÷ 2970				
45	80,10	77,60	74,60	46,10	45,00	2965 ÷ 2970				
55	97,60	93,50	91,00	56,20	54,20	2960 ÷ 2965				
75	131,0	126,0	121,0	75,40	73,00	2975 ÷ 2980				
90	159,0	151,0	145,0	91,50	87,50	2975 ÷ 2980				
110	193,0	186,0	181,0	111,0	108,0	2975 ÷ 2980				
132	232,0	220,0	212,0	134,0	128,0	2975 ÷ 2980				
160	274,0	263,0	253,0	158,0	152,0	2975 ÷ 2980				
200	346,0	332,0	319,0	199,0	192,0	2975 ÷ 2980				

** Operating conditions to be referred to motor only. About electric pump, refer to limits in user's manual.

Nscf-mott200-2p50-en_a_te

Note: Observe the regulations and codes locally in force regarding sorted waste disposal.

NSCS SERIES

THREE-PHASE MOTORS AT 50 Hz, 4 POLES

P _N kW	Efficiency η_N %									IE	Year of manufacture
	Δ 380 V Y 660 V			Δ 400 V Y 690 V			Δ 415 V				
	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4		
2,2	86,7	78,1	87,2	87,0	87,0	86,5	87,2	86,8	85,7	3	from 06/2011
3	87,7	88,0	87,7	88,0	88,0	87,0	88,1	87,7	86,3		
4	88,6	89,0	89,3	89,1	89,1	88,7	89,3	88,9	88,2		
5,5	90,3	90,7	90,4	90,7	90,7	90,0	90,8	90,7	89,6		
7,5	91,2	91,5	91,4	91,5	91,5	91,0	91,7	91,4	90,5		
11	91,7	91,7	91,3	92,2	91,8	91,0	92,3	91,7	90,7		
15	93,0	92,5	92,2	93,0	92,5	91,8	93,0	92,4	91,4		
18,5	93,1	92,9	92,5	93,3	92,9	92,2	93,4	92,8	91,8		
22	93,4	93,1	92,8	93,6	93,0	92,4	93,6	92,8	91,9		
30	94,1	94,1	93,5	94,2	94,0	93,0	94,2	93,9	92,5		
37	94,3	94,5	94,1	94,6	94,6	94,0	94,7	94,6	93,8		
45	94,7	94,7	94,3	94,8	94,8	94,2	94,8	94,8	94,0		
55	95,1	94,9	94,7	95,3	95,0	94,6	95,4	94,9	94,4		
75	95,4	95,2	94,8	95,6	95,2	94,7	95,7	95,2	94,6		
90	95,6	95,4	95,1	95,8	95,5	95,0	95,9	95,5	94,9		

P _N kW	Manufacturer		IEC SIZE	Construction Design	N. of Poles	f _N Hz	Data for 400 V / 50 Hz Voltage				
	WEG Equipamentos Eletricos S.A. Reg. No. 07.175.725/0010-50 Jaragua do Sul - SC (Brazil)						cosφ	Is / I _N	T _N Nm	Ts/T _N	Tm/Tn
	Model										
2,2	W22 100L4-B5 2,2kW		100	B5	4	50	0,80	7,40	14,60	3,20	3,50
3	W22 100L4-B5 3kW		100				0,80	7,80	19,90	3,50	3,70
4	W22 112M4-B5 4kW		112				0,79	7,00	26,30	2,30	3,10
5,5	W22 132S4-B5 5,5kW		132				0,85	8,50	35,85	2,40	3,40
7,5	W22 132M4-B5 7,5kW		132				0,84	8,50	48,90	2,50	3,40
11	W22 160M4-B35 11kW		160	B35			0,83	7,00	71,45	2,50	3,00
15	W22 160L4-B35 15kW		160				0,82	7,30	97,40	2,70	3,20
18,5	W22 180M4-B35 18.5kW		180				0,82	7,30	120,20	2,70	3,00
22	W22 180L4-B35 22kW		180				0,83	7,30	142,90	2,80	3,30
30	W22 200L4-B35 30kW		200				0,82	7,30	193,60	2,50	3,00
37	W22 225S/M4-B35 37kW		225				0,86	7,80	238,70	2,70	3,00
45	W22 225S/M4-B35 45kW		225				0,85	7,90	290,40	2,80	3,20
55	W22 250S/M4-B35 55kW		250				0,86	7,90	354,90	2,80	3,30
75	W22 280S/M4-B35 75kW		280				0,87	7,60	482,30	2,30	2,80
90	W22 280S/M4-B35 90kW		280				0,86	7,40	578,80	2,30	2,80

P _N kW	Voltage U _N V					n _N min ⁻¹	See note.	Operating conditions **		
	Δ			Y				Altitude Above Sea Level (m)	T. amb min/max °C	ATEX
	380 V	400 V	415 V	660 V	690 V					
	I _N (A)									
2,2	4,66	4,56	4,50	2,68	2,64	1435		≤ 1000	-15 / +40	No
3	6,26	6,15	6,07	3,60	3,57	1440				
4	8,00	8,00	8,00	4,61	4,64	1450				
5,5	10,60	10,30	10,20	6,10	5,97	1465				
7,5	14,40	13,90	13,50	8,29	8,06	1465				
11	21,10	20,70	20,50	12,10	12,00	1470				
15	29,20	28,40	28,00	16,80	16,50	1470				
18,5	35,90	34,90	34,40	20,70	20,20	1470				
22	42,10	40,90	40,40	24,20	23,70	1470				
30	57,70	56,10	55,40	33,20	32,50	1480				
37	68,50	65,60	63,90	39,40	38,00	1480				
45	83,90	79,40	78,60	48,30	46,00	1480				
55	100,0	96,90	94,40	57,60	56,20	1480				
75	136,0	130,0	127,0	78,30	75,40	1485				
90	164,0	158,0	154,0	94,40	91,60	1485				

** Operating conditions to be referred to motor only. About electric pump, refer to limits in user's manual.

Nscs-mott90-4p50-en_a_te

Note: Observe the regulations and codes locally in force regarding sorted waste disposal.

MOTOR NOISE

The tables below show the mean sound pressure levels (Lp) measured at 1 meter's distance in a free field according to the A curve (ISO 1680 standard).

The noise values are measured with idling 50 Hz motor with a tolerance of 3 dB (A).

NSCS MOTORS 2 POLES 50 Hz

POWER	MOTOR TYPE	NOISE
kW	IEC SIZE	LpA dB
15	160	67
18,5	160	67
22	180	67
30	200	69
37	200	69
45	225	74
55	250	74
75	280	77
90	280	77

NSCF-NSCC MOTORS 2 POLES 50 Hz

POWER	MOTOR TYPE	NOISE
kW	IEC SIZE	LpA dB
15	160	67
18,5	160	67
22	180	67
30	200	69
37	200	69
45	225	74
55	250	74
75	280	77
90	280	77
110	315	77
132	315	77
160	315	77
200	315	80

NSCS MOTORS 4 POLES 50 Hz

POWER	MOTOR TYPE	NOISE
kW	IEC SIZE	LpA dB
2,2	100	53
3	100	53
4	112	56
5,5	132	56
7,5	132	56
11	160	61
15	160	61
18,5	180	61
22	180	61
30	200	63
37	225	63
45	225	63
55	250	64
75	280	69
90	280	69

NSCF-NSCC MOTORS 4 POLES 50 Hz

POWER	MOTOR TYPE	NOISE
kW	IEC SIZE	LpA dB
2,2	100	53
3	100	53
4	112	56
5,5	132	56
7,5	132	56
11	160	61
15	160	61
18,5	180	61
22	180	61
30	200	63
37	225	63
45	225	63
55	250	64
75	280	69
90	280	69
110	315	71
132	315	71
160	315	71
200	315	73
250	315	73
280	355	74
315	355	74
355	355	74

Nscs-Nscf_mott-en_a_tr

e-NSC SERIES PUMPS

Over last decade the European Commission with the 'Energy Efficiency Plan' pushed the European Parliament and the Council to adopt specific measures to the purpose of reducing energy consumption and further negative environmental impacts. Through the Directives 2005/32/EC, energy-using products (EuP), and 2009/125/EC, energy-related products (ErP) a framework for ecodesign requirements was established.

The **Commission Regulation (EU) No 547/2012** has implemented two directives with regard to ecodesign requirements for **some types of clean water pumps** placed on the market and put into service inside EU zone as self-alone units or integrated in other products.

For end-suction close-coupled pumps (ESCC for the Regulation) and end-suction own-bearing pumps (ESOB for the Regulation) the efficiency assessment refers to:

- just the pump and not the pump and motor assembly (electric or combustion);
- pumps with just one impeller;
- pumps with a nominal pressure PN not higher than 16 bar (1600 kPa);
- pumps with a minimum nominal flow not less than 6 m³/h;
- pumps with a maximum nominal power at the shaft not higher than 150 kW;
- pumps designed to operate at a speed of 2900 min⁻¹ (for electric pumps this means 50 Hz 2-pole electric motors) and with a head not greater than 140 metres;
- pumps designed to operate at a speed of 1450 min⁻¹ (for electric pumps this means 50 Hz 4-pole electric motors) and with a head not greater than 90 metres;
- use with clean water at a temperature ranging from -10°C to 120°C (the test is performed with cold water at a temperature not higher than 40°C).

According to the definitions established in the Regulation NSCE and NSCS versions correspond to the "end-suction close-coupled pump" while NSC, NSCF and NSCC versions correspond to the "end-suction own bearing pump". This regulation states that water pumps shall have a minimum index MEI coming from a dedicated formula which considers hydraulic efficiency values at 'best efficiency point' (BEP), 75 % of the flow at BEP (Part load – PL) and 110 % of the flow at BEP (Over load – OL).

The Regulation also establishes the following deadlines.

from	minimum efficiency index (MEI)
1st January 2013	MEI ≥ 0,1
1st January 2015	MEI ≥ 0,4

Regulation (EU) n. 547/2012 – Annex II – point 2 (Product information requirements)

- 1) Minimum efficiency index: see MEI values in specific tables on following page.
- 2) "The benchmark for most efficient water pumps is MEI ≥ 0,70".
- 3) Year of manufacture: from May 2014.
- 4) Manufacturer: Xylem Service Italia Srl - Reg. No 07520560967 - Montecchio Maggiore, Vicenza, Italy.
- 5) Product type: see the PUMP TYPE column in the tables in the *Hydraulic performance* section.
- 6) Hydraulic pump efficiency with trimmed impeller: see η_p and $\varnothing T$ columns in the tables in the *Hydraulic performance* section.
- 7) Pump performance curves, including the performance curve: see the *Operating Characteristics* graphs in the following pages.
- 8) "The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index (MEI) is based on the full impeller diameter".
- 9) "The operation of this water pump with variable duty points may be more efficient and economic when controlled, for example, by the use of a variable speed drive that matches the pump duty to the system".
- 10) Information relevant for disassembly, recycling or disposal at end-of-life: observe the current laws and by-laws governing sorted waste disposal. Consult the product operating manual.
- 11) "Designed for use below – 10 °C only": note not applicable to these products.
- 12) "Designed for use above 120 °C only": note not applicable to these products.
- 13) Specific instructions for pumps as per points 11 and 12: not applicable to these products.
- 14) "Information on benchmark efficiency is available at": www.europump.org (Ecodesign section).
- 15) The benchmark efficiency graphs with MEI = 0.7 and MEI = 0.4 are available at www.europump.org/efficiencycharts (refer to "ESCC 1450 rpm", "ESCC 2900 rpm", "ESOB 1450 rpm", "ESOB 2900 rpm").

e-NSC SERIES

MINIMUM EFFICIENCY INDEX (MEI)

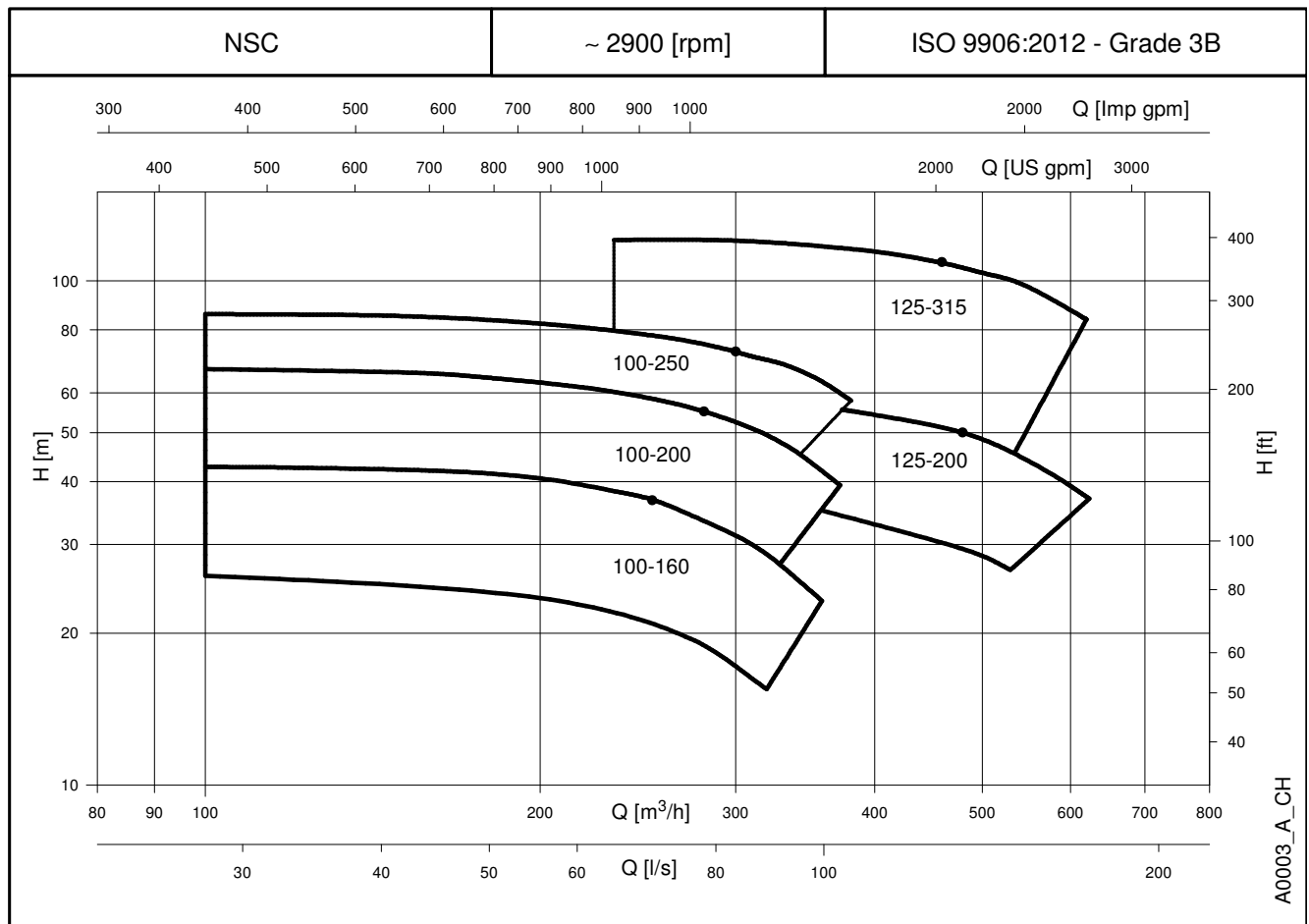
[illegible]

4-POLE		
PUMP SIZE	NSC, NSCE NSCF, NSCC	NSCS
100-160/190	>0,70	>0,70
100-200/227	0,64	0,69
100-250/259	>0,70	>0,70
100-315/334	0,64	0,69
100-400/420	0,50	0,55
125-200/225	0,66	>0,70
125-250/259	>0,70	>0,70
125-315/334	>0,70	>0,70
125-400/422	0,66	>0,70
150-200/237	0,69	>0,70
150-250/282	0,64	0,68
150-315/330	0,53	0,58
150-400/423	>0,70	>0,70
150-500/516	---	---
200-250/271	0,65	0,70
200-315/333	0,51	0,56
200-400/409	0,50	---
200-500/523	---	---
250-315/316	0,62	0,66
250-400/425	---	---
250-500/523	---	---
300-350/354	>0,70	---
300-400/425	---	---
300-450/470	---	---

Nsc-MEI-en_a_sc

e-NSC SERIES

HYDRAULIC PERFORMANCE RANGE AT 50 Hz, 2 POLES



e-NSC SERIES

HYDRAULIC PERFORMANCE TABLE AT 50 Hz, 2 POLES

PUMP TYPE	P _N kW	ØF (1)	ηp % (2)	ØT (3)	Q = DELIVERY													
					l/min 0	673	1264	1854	2444	3035	3625	4215	4805	5396	5986	6576	7167	
					m³/h 0	40	76	111	147	182	217	253	288	324	359	395	430	
	H = TOTAL HEAD METRES COLUMN OF WATER																	
100-160/150	15		76,7	144	24,7	24,8	24,7	24,1	22,9	21,2	18,8	15,8	12,1					
100-160/185	18,5		79,7	156	29,1		28,7	28,4	27,5	25,9	23,5	20,4	16,6					
100-160/220	22		80,5	167	34,1		33,4	33,0	32,1	30,5	28,2	25,0	21,2	16,8				
100-160/300	30	187	83,8		44,1		42,8	42,1	41,2	39,8	37,8	35,1	31,6	27,2	21,8			
100-200/300	30		79,7	188	46,5		45,8	45,2	43,7	41,2	37,5	32,9	27,4	21,2				
100-200/370	37		82,0	202	53,9		53,4	53,0	52,0	49,9	46,8	42,6	37,3	31,1				
100-200/450	45		83,4	213	60,4		59,8	59,7	58,9	57,2	54,5	50,6	45,7	39,9	33,1			
100-200/550	55	227	84,6		69,2		68,9	68,5	67,5	65,9	63,6	60,3	56,1	50,7	44,3	36,6		
100-250/450	45		80,4	213	58,7		59,3	59,0	58,0	56,1	53,1	49,2	44,3	38,6	32,4			
100-250/550	55		83,1	227	67,3		67,9	67,8	67,0	65,5	63,0	59,5	55,1	49,7	43,5			
100-250/750	75		84,3	249	82,4		83,2	83,1	82,4	81,1	78,9	75,9	71,9	67,1	61,3	54,6		
100-250/900	90	259	85,0		89,9		90,6	90,4	89,6	88,2	86,1	83,1	79,2	74,4	68,7	62,0	54,3	

PUMP TYPE	P _N kW	ØF (1)	ηp % (2)	ØT (3)	Q = DELIVERY												
					l/min 0	1412	2253	3094	3936	4777	5618	6460	7301	8143	8984	9825	10667
					m³/h 0	85	135	186	236	287	337	388	438	489	539	590	640
	H = TOTAL HEAD METRES COLUMN OF WATER																
125-200/450	45		80,4	179	35,0	34,4	34,1	34,1	34,2	34,3	33,7	32,2	29,6	26,1	22,2		
125-200/550	55		83,1	195	43,2		43,0	43,1	42,9	42,3	41,0	39,0	36,2	32,6	28,4		
125-200/750	75		84,4	215	55,1		54,9	55,0	54,9	54,4	53,3	51,6	49,2	46,0	42,0	37,2	
125-200/900	90	225	85,7		61,8		61,5	61,6	61,5	60,9	59,9	58,3	55,9	52,9	49,1	44,6	39,4
125-315/1100	110		81,1	250	84,8		84,4	84,4	83,6	81,7	78,4	73,3	66,3	57,1			
125-315/1320	132		82,4	266	96,2		96,1	96,2	95,7	94,2	91,3	86,9	80,6	72,2			
125-315/1600	160		82,6	280	106,3		107,1	106,9	106,5	105,5	103,6	100,3	95,1	87,8	78,2		
125-315/2000	200	290	83,1		114,9		115,7	115,8	115,6	114,7	113,0	109,9	105,3	98,9	90,5	80,0	

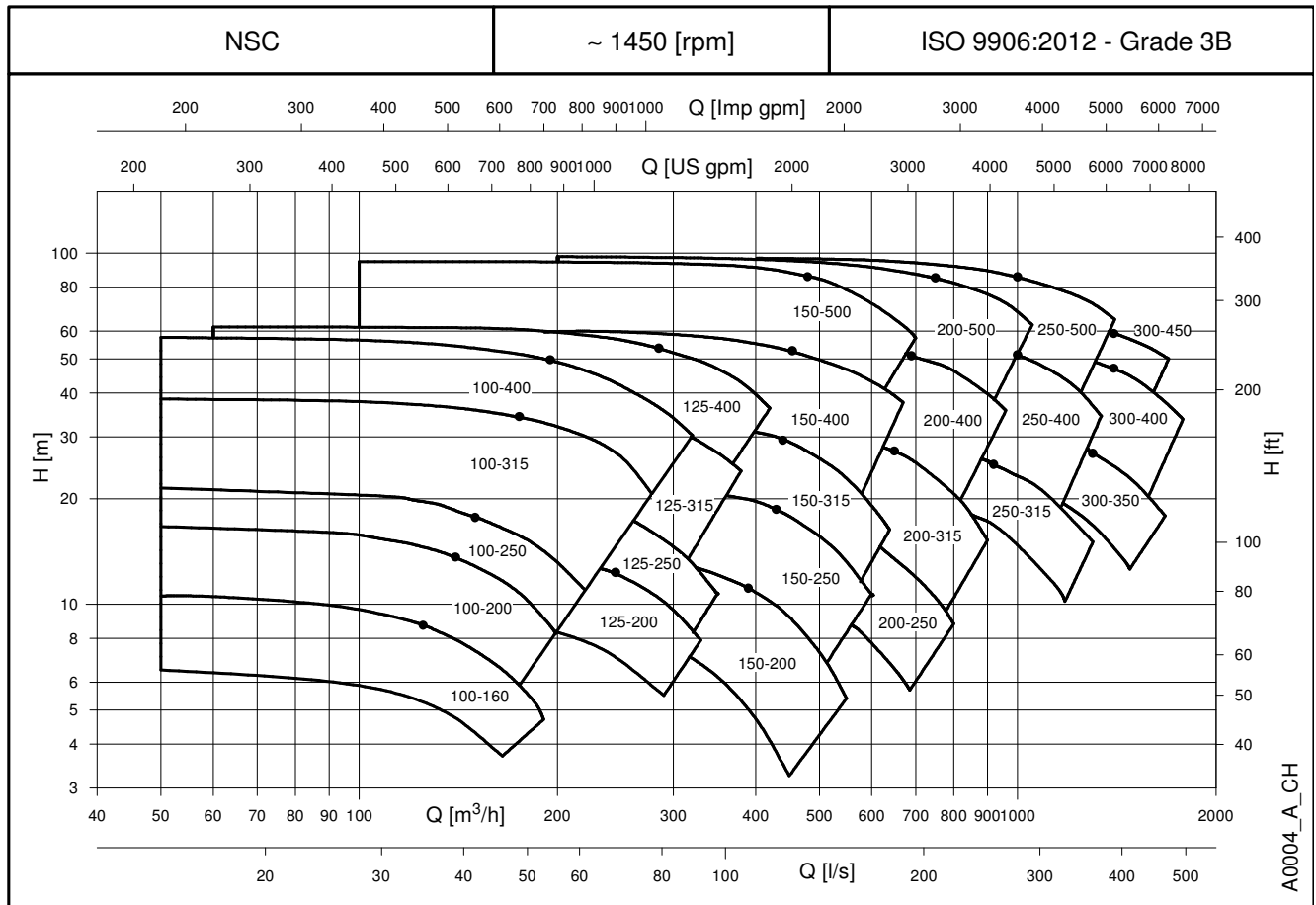
Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

Nsc-100-125_2p50-en_a_th

(1) External diameter of full impeller (2) Hydraulic efficiency of pump (3) External diameter of trimmed impeller

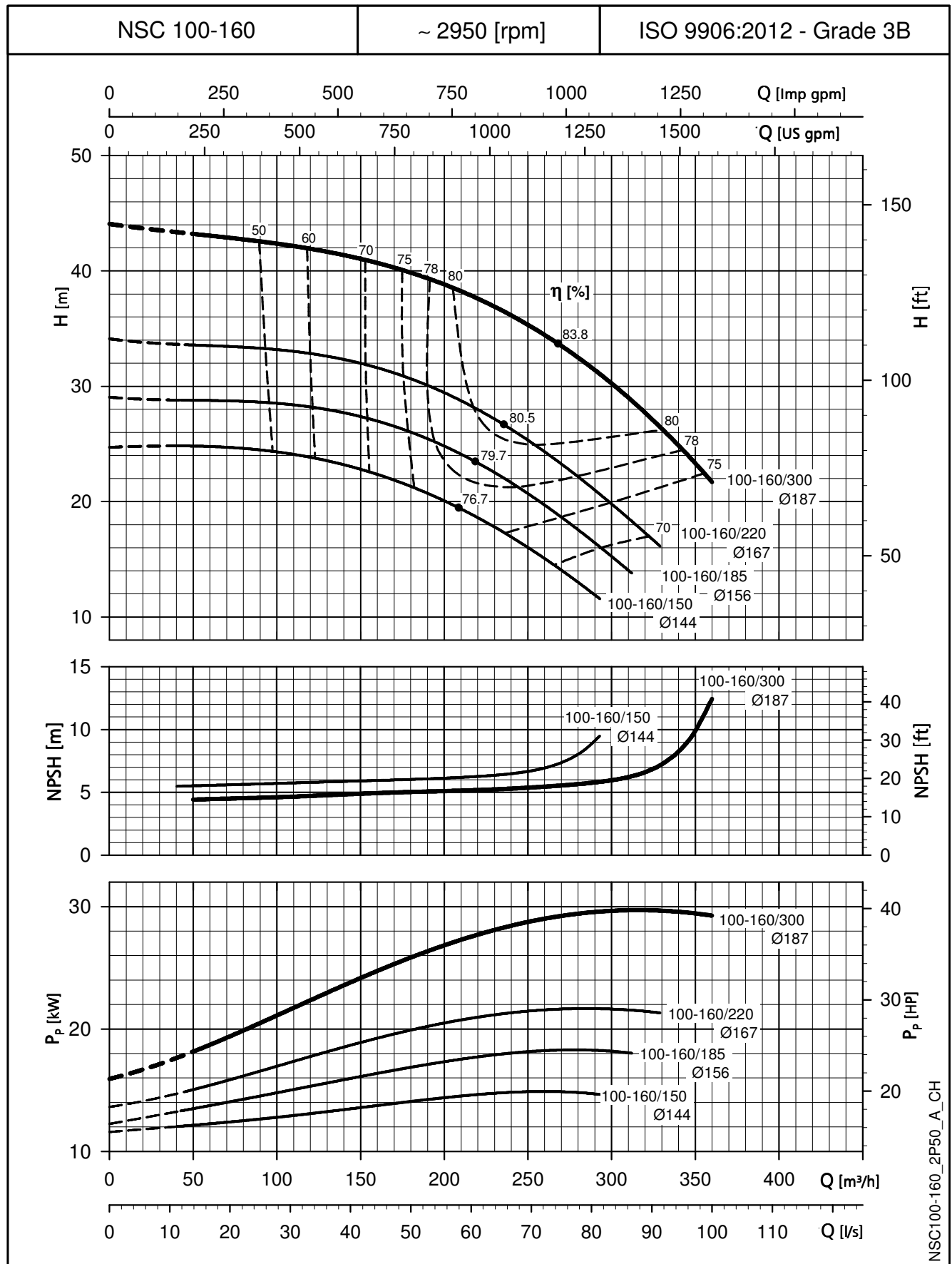
e-NSC SERIES

HYDRAULIC PERFORMANCE RANGE AT 50 Hz, 4 POLES



e-NSC SERIES

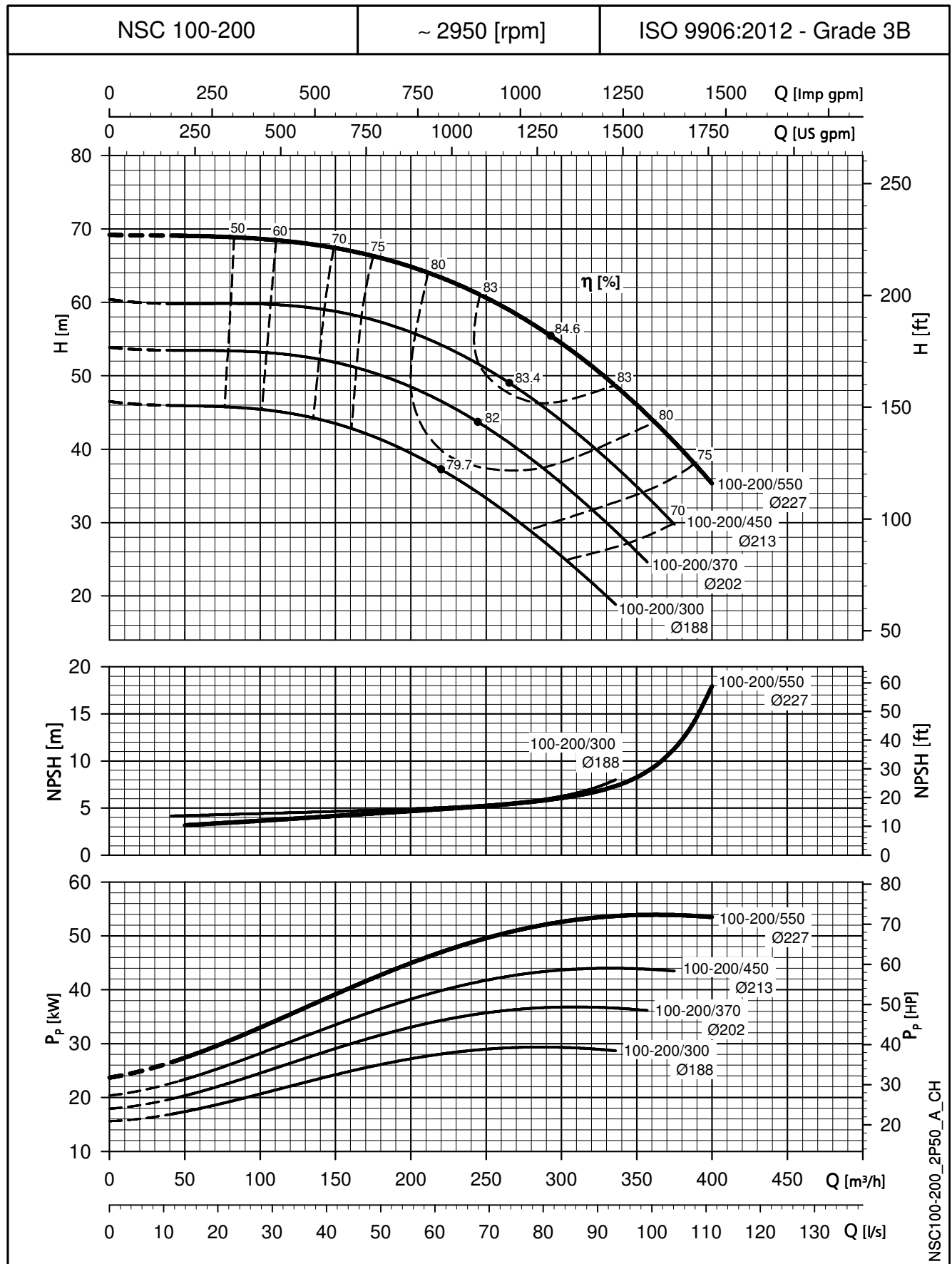
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES



The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.
 These performances are valid for liquids with density $\rho = 1,0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

e-NSC SERIES

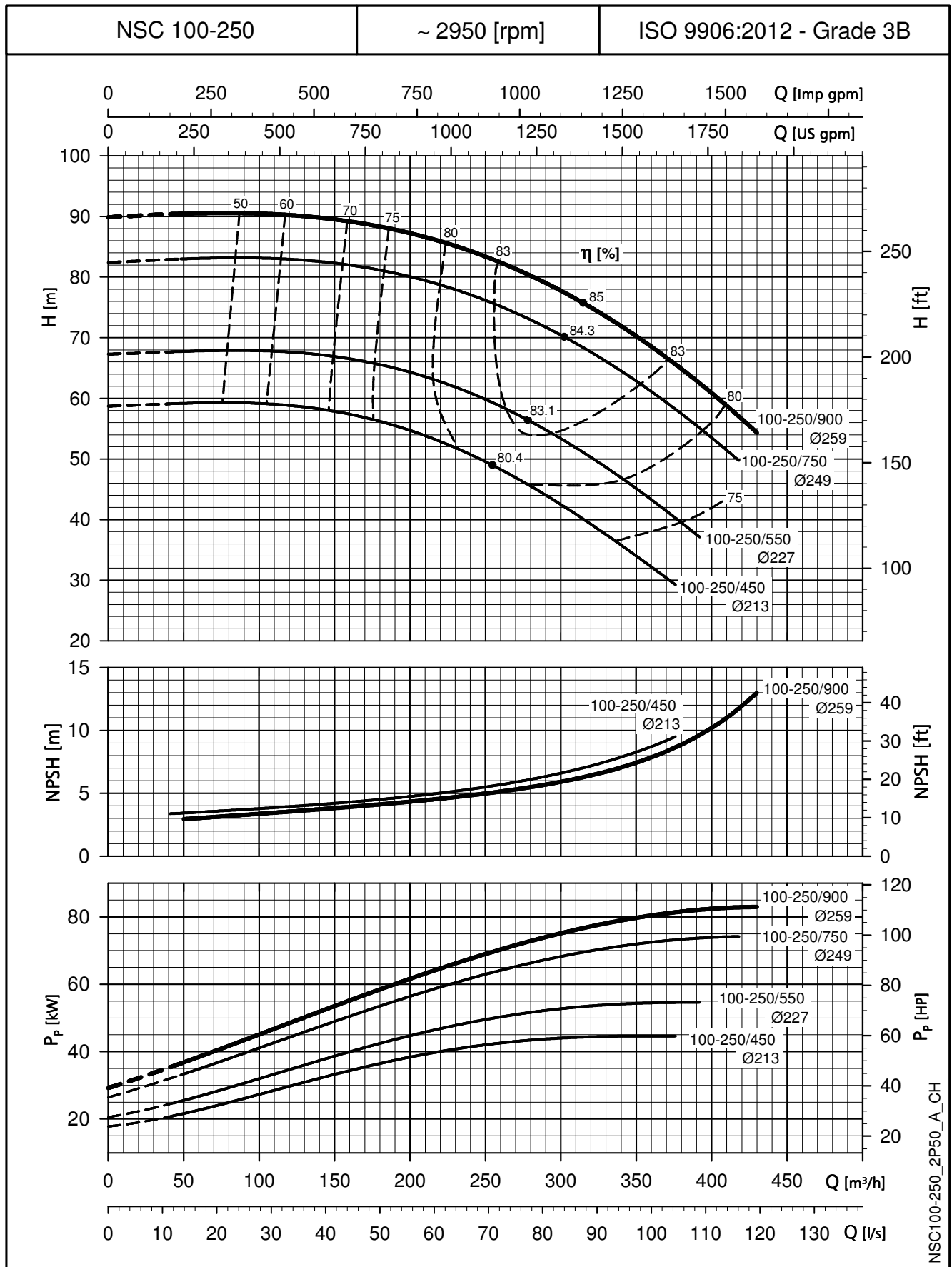
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES



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e-NSC SERIES

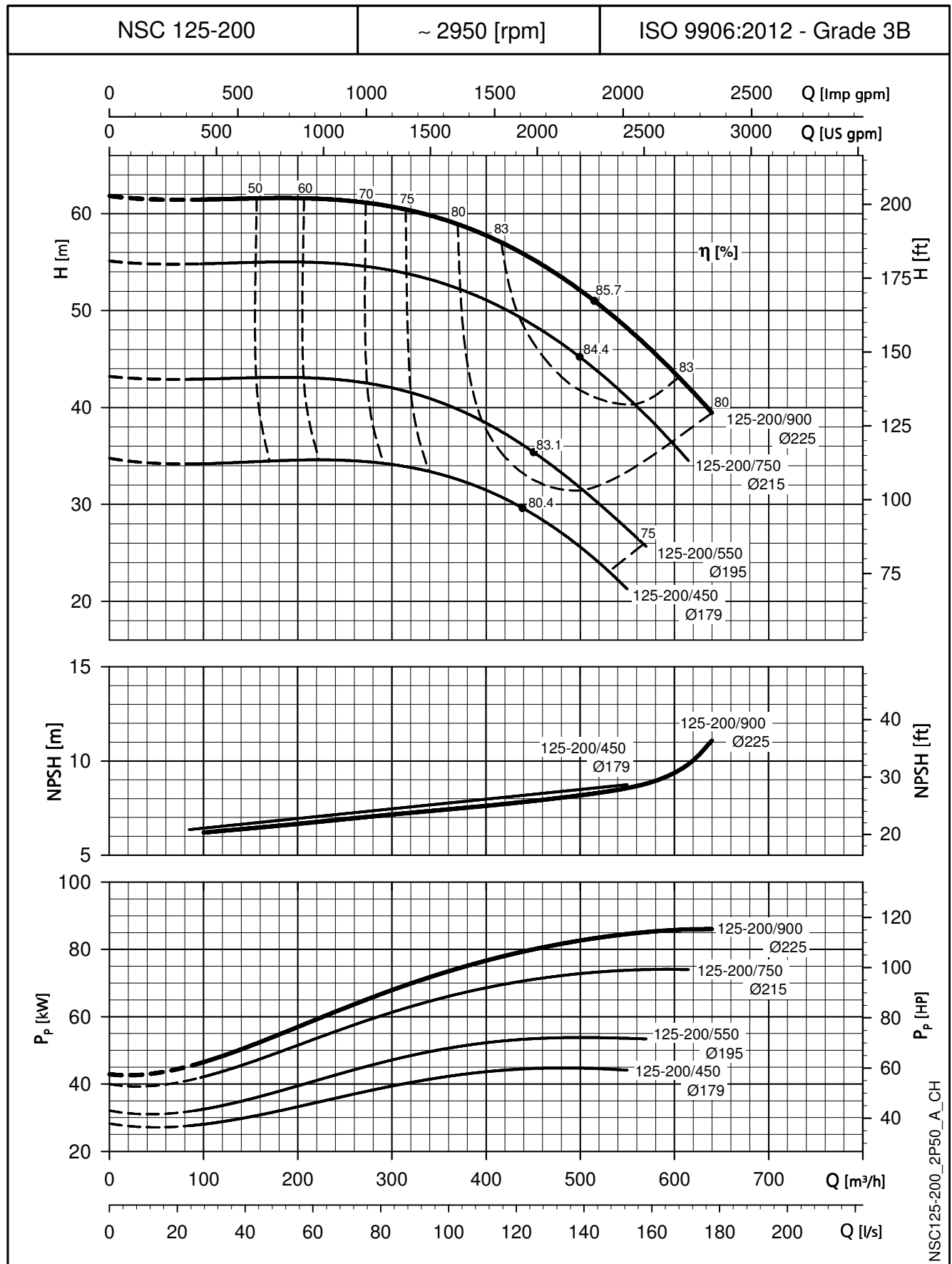
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES



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e-NSC SERIES

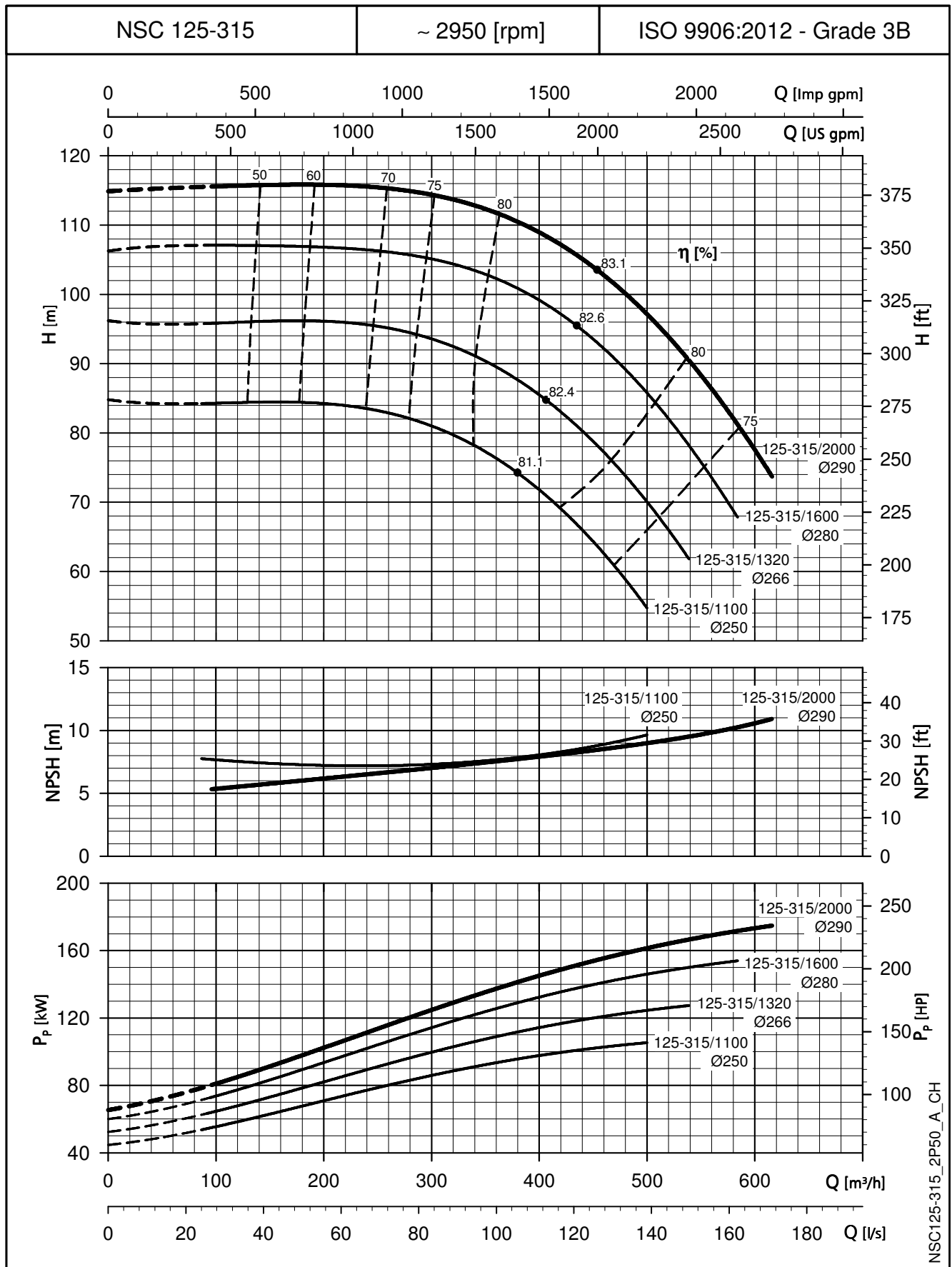
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES



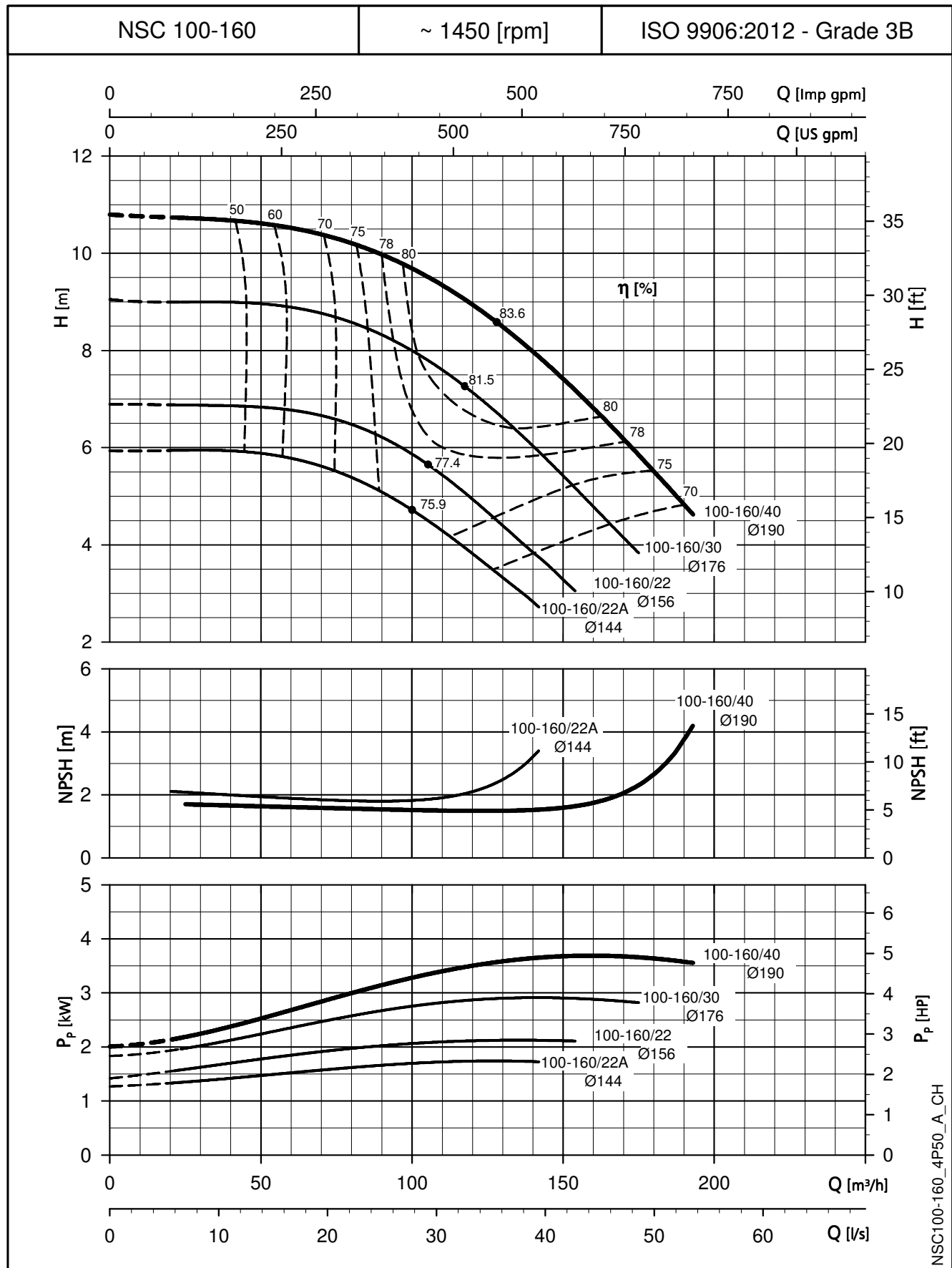
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e-NSC SERIES

OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES



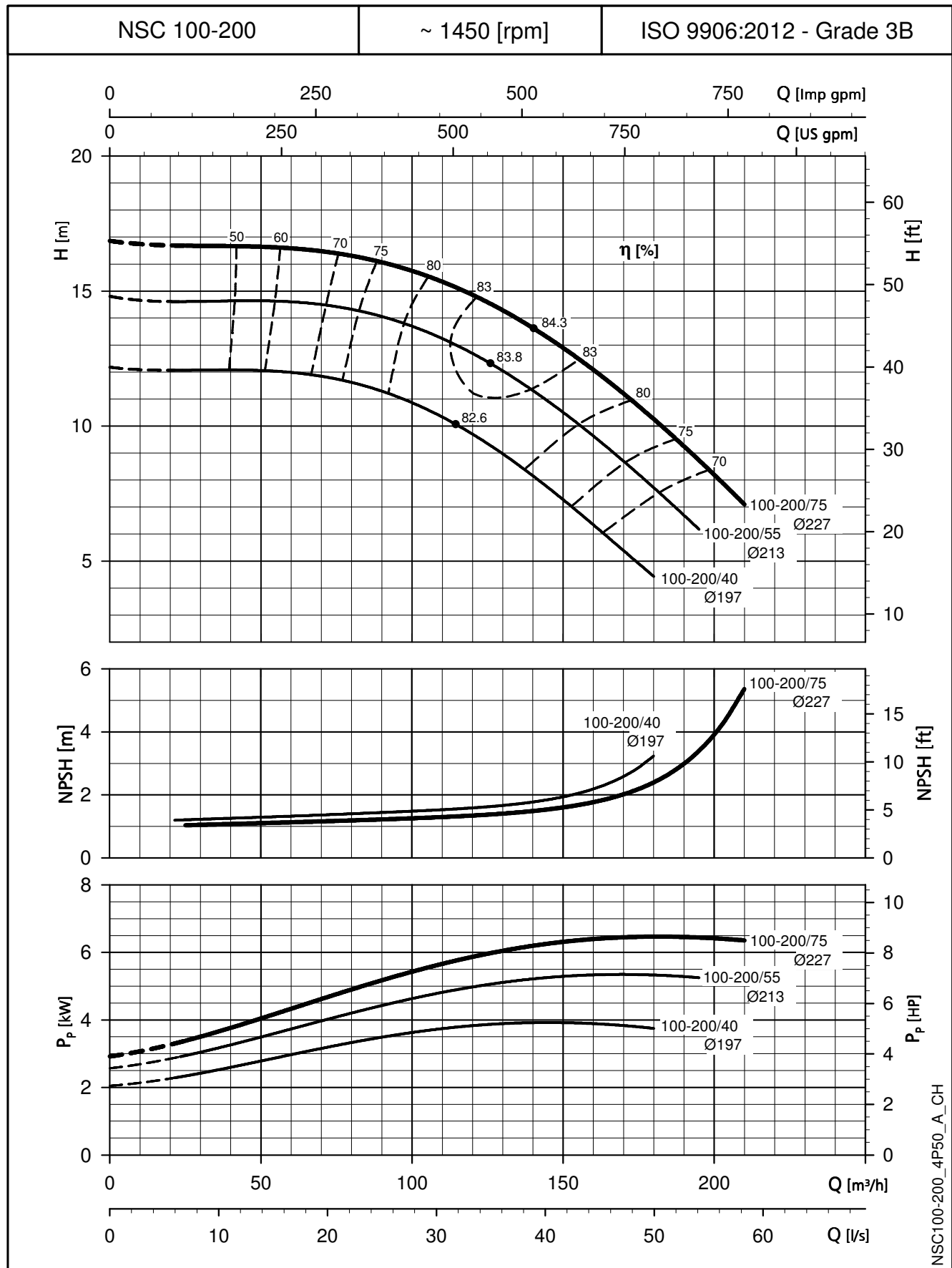
The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.
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e-NSC SERIES
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES


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e-NSC SERIES

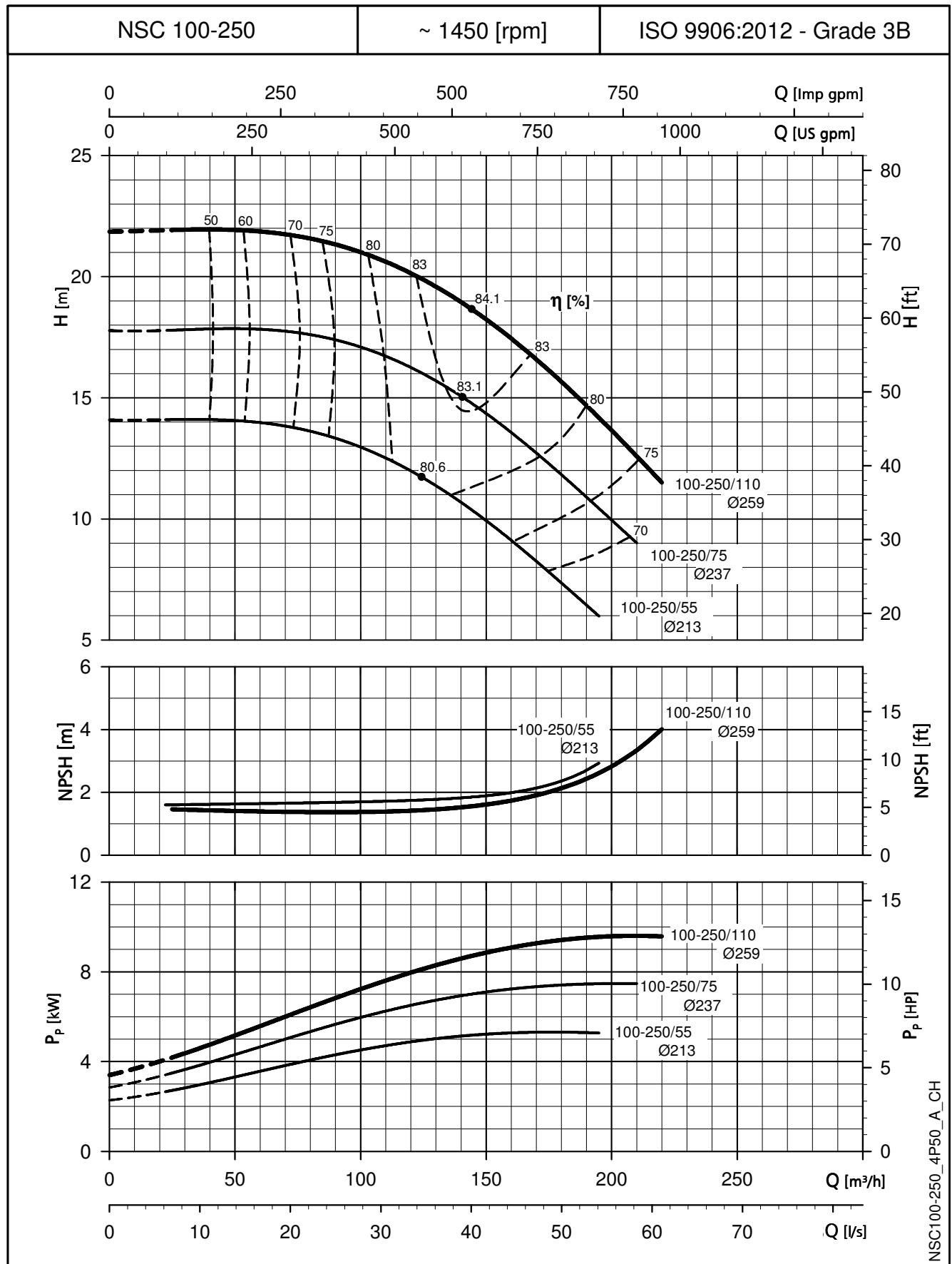
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



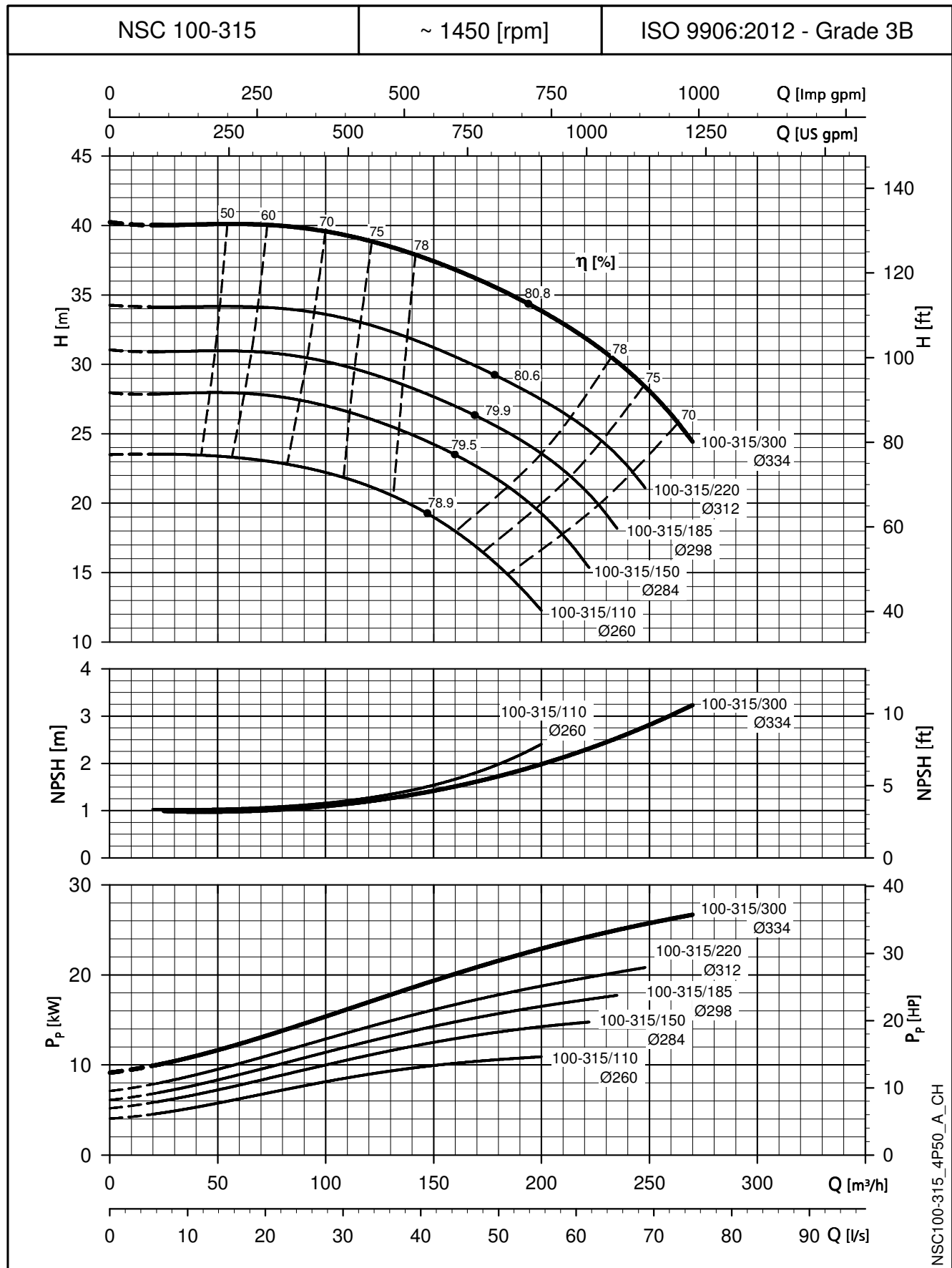
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e-NSC SERIES

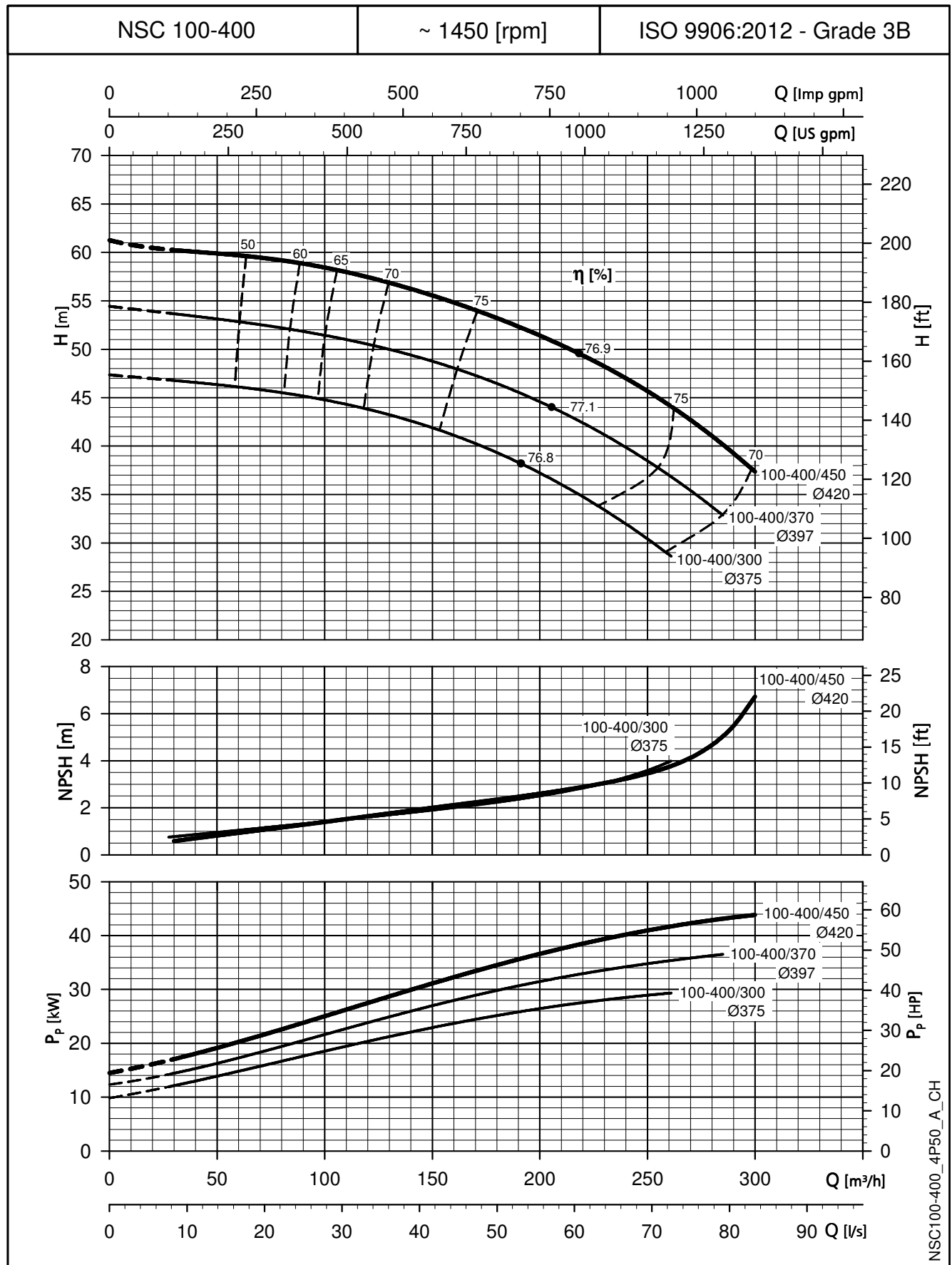
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES


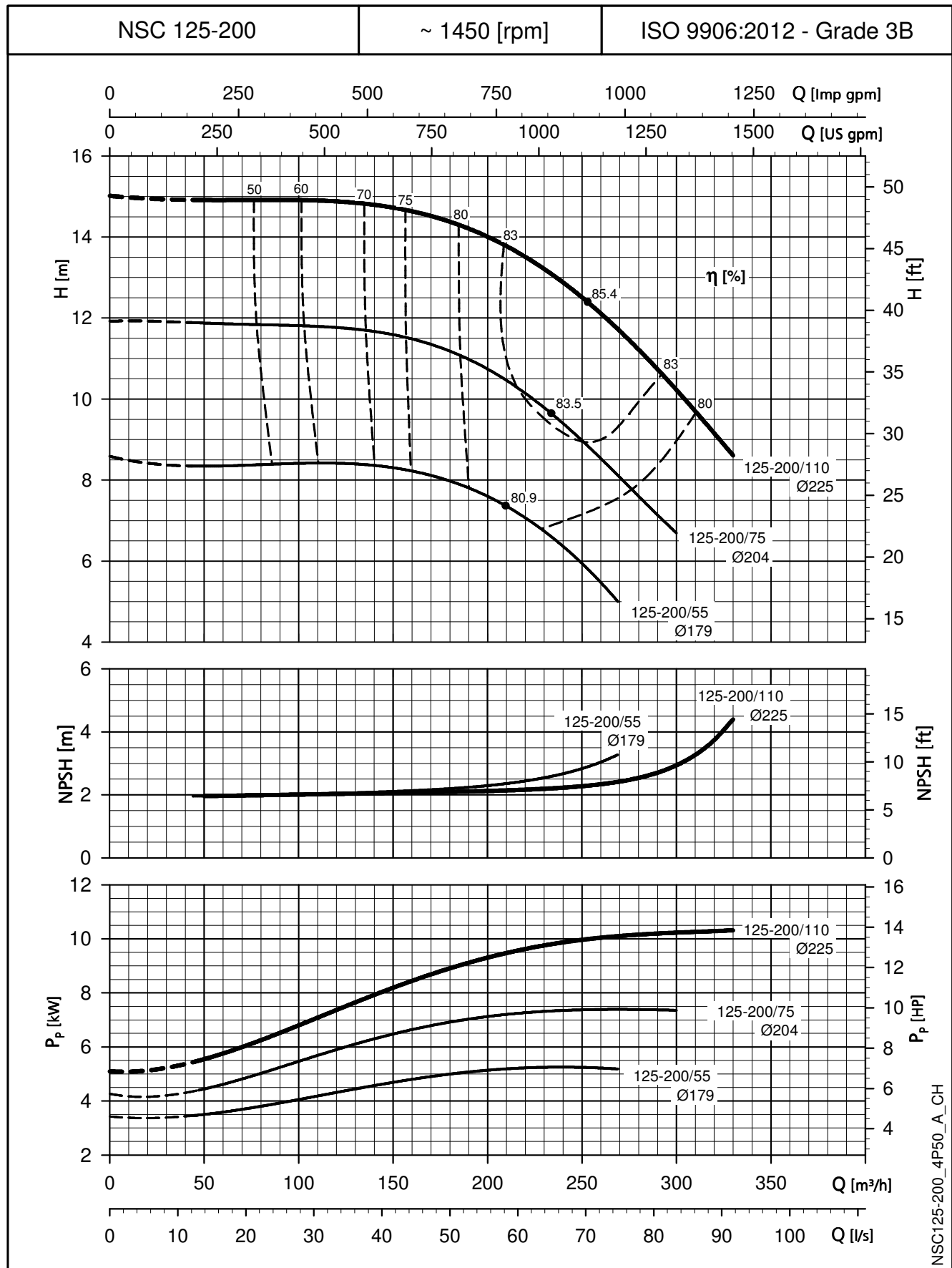
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e-NSC SERIES

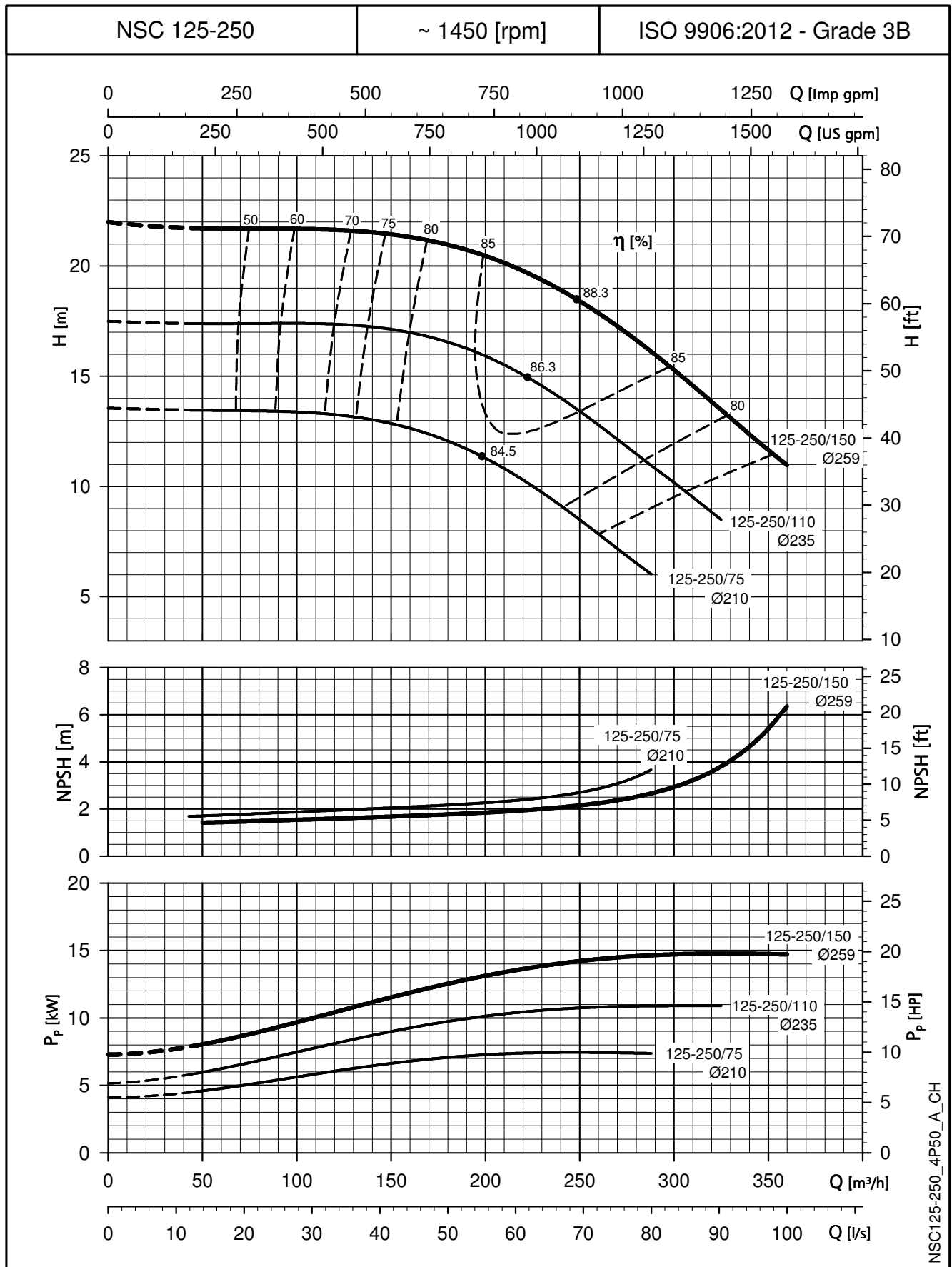
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

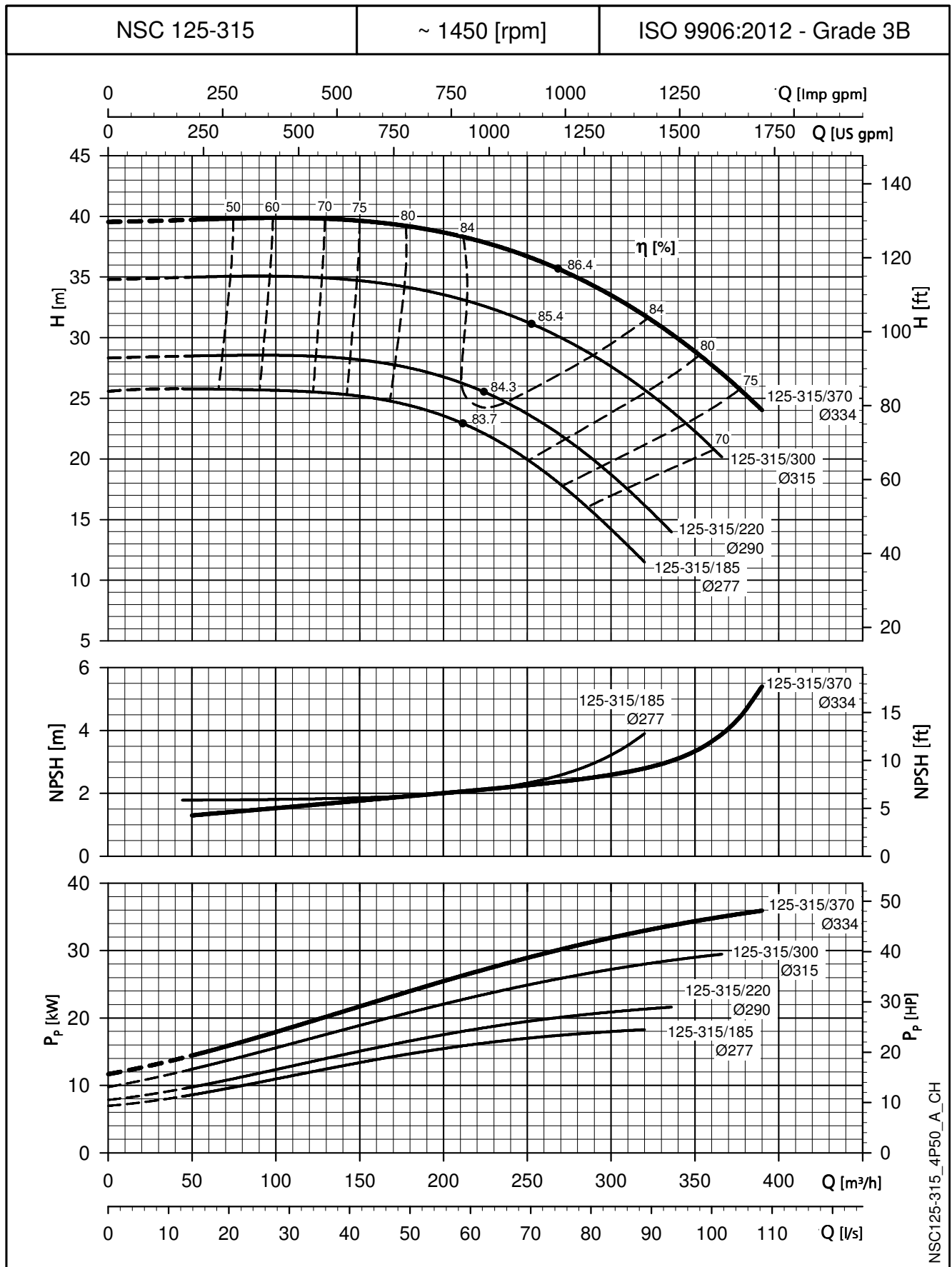
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

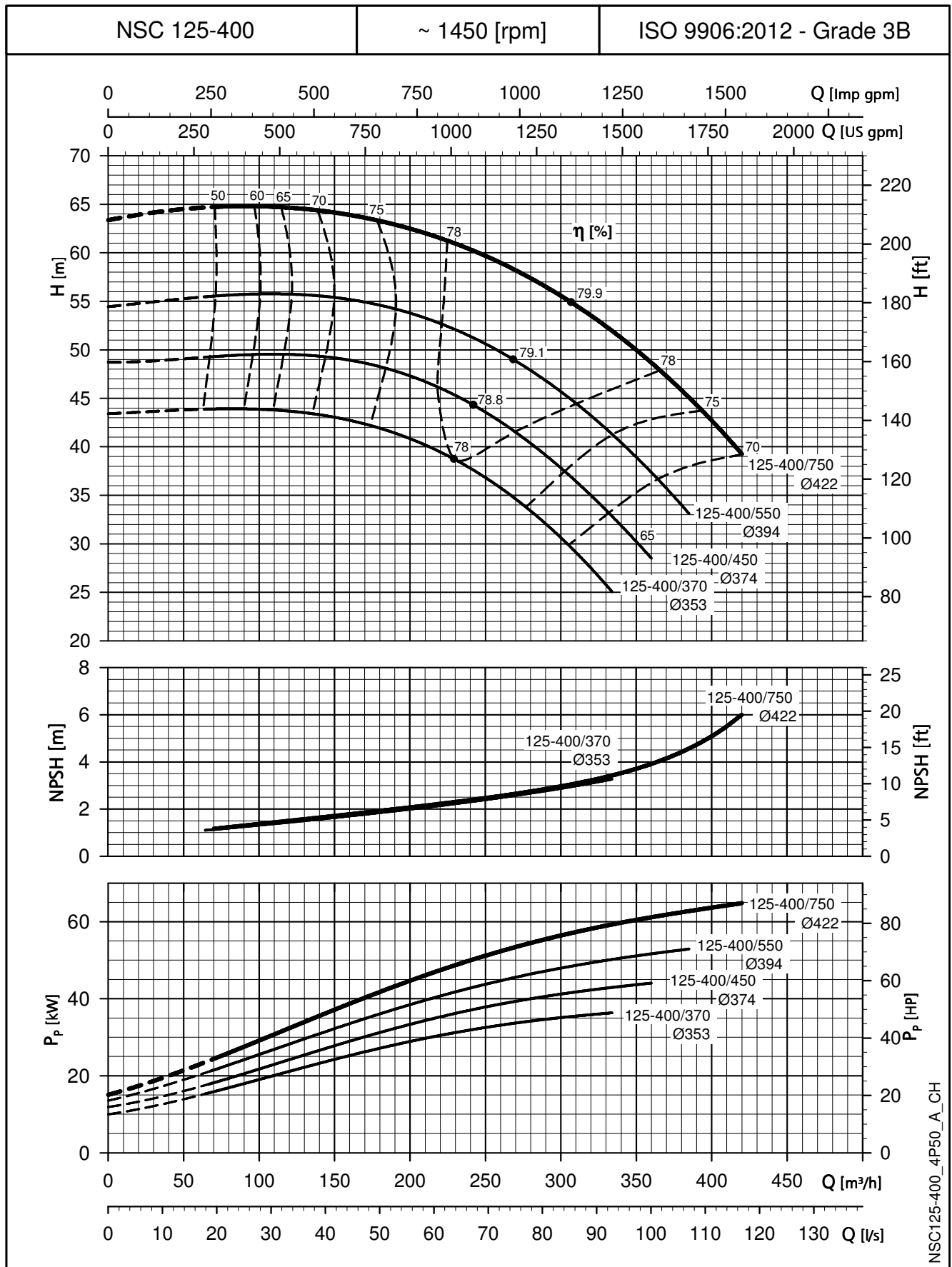
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

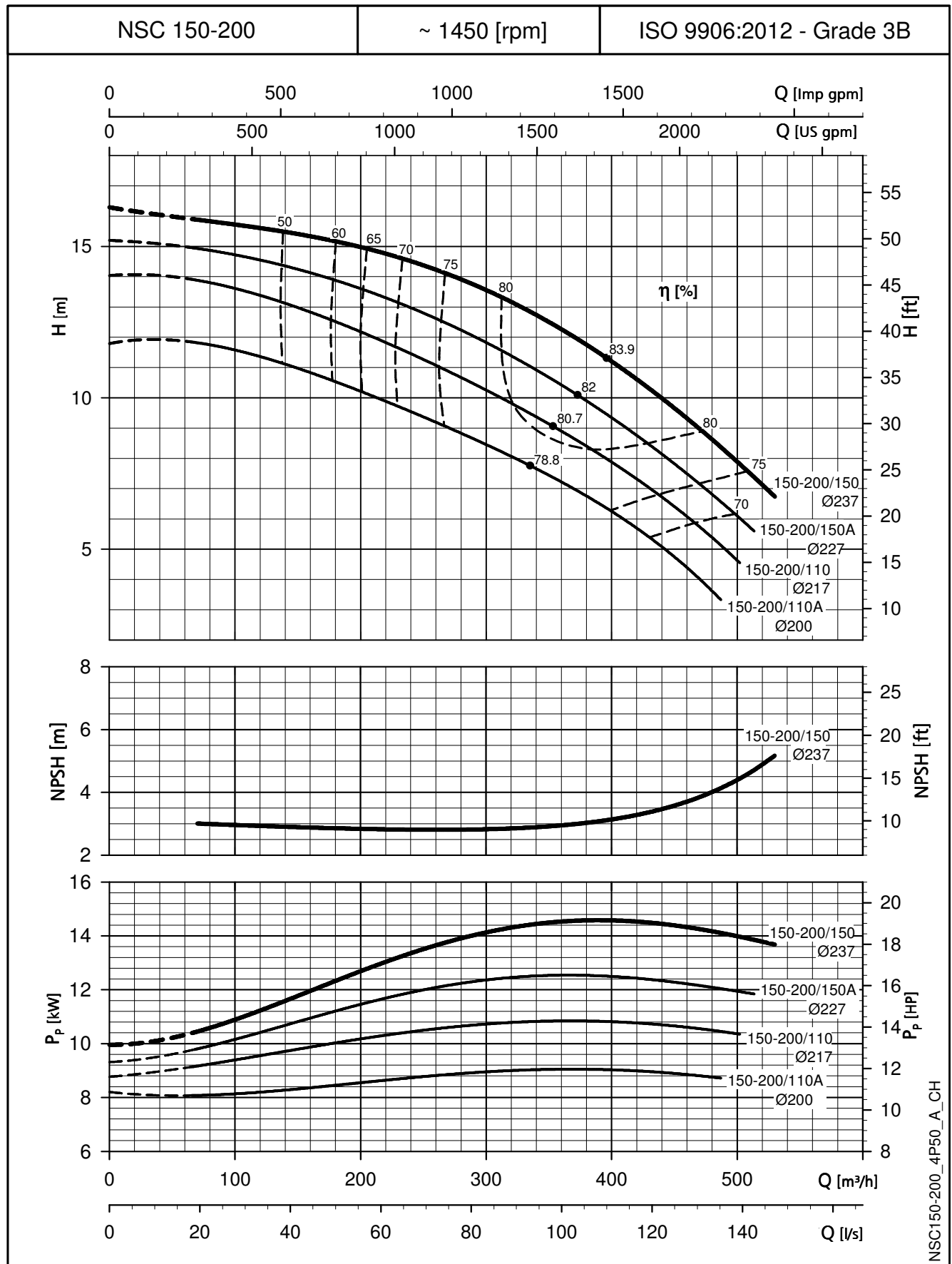
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

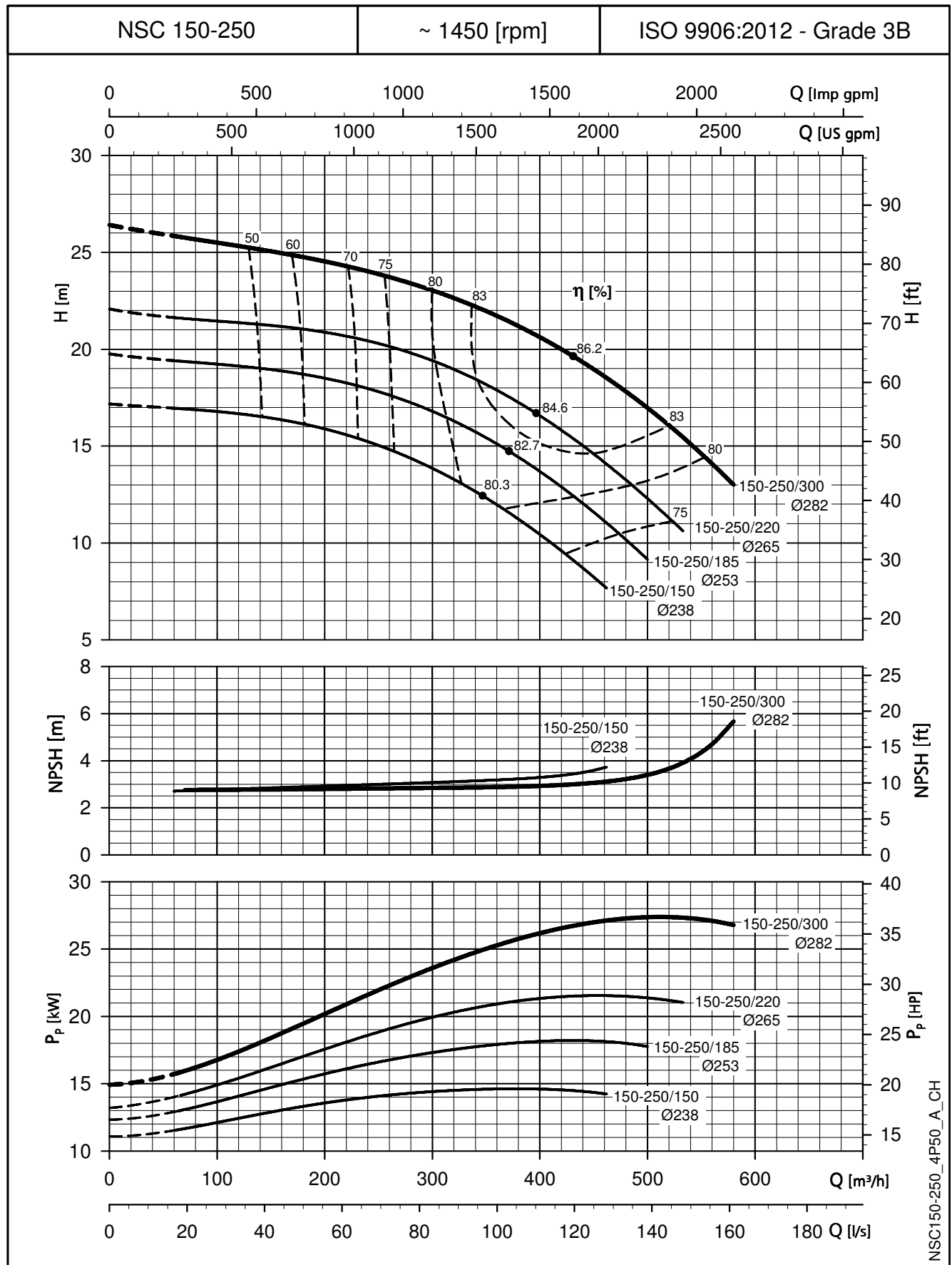
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

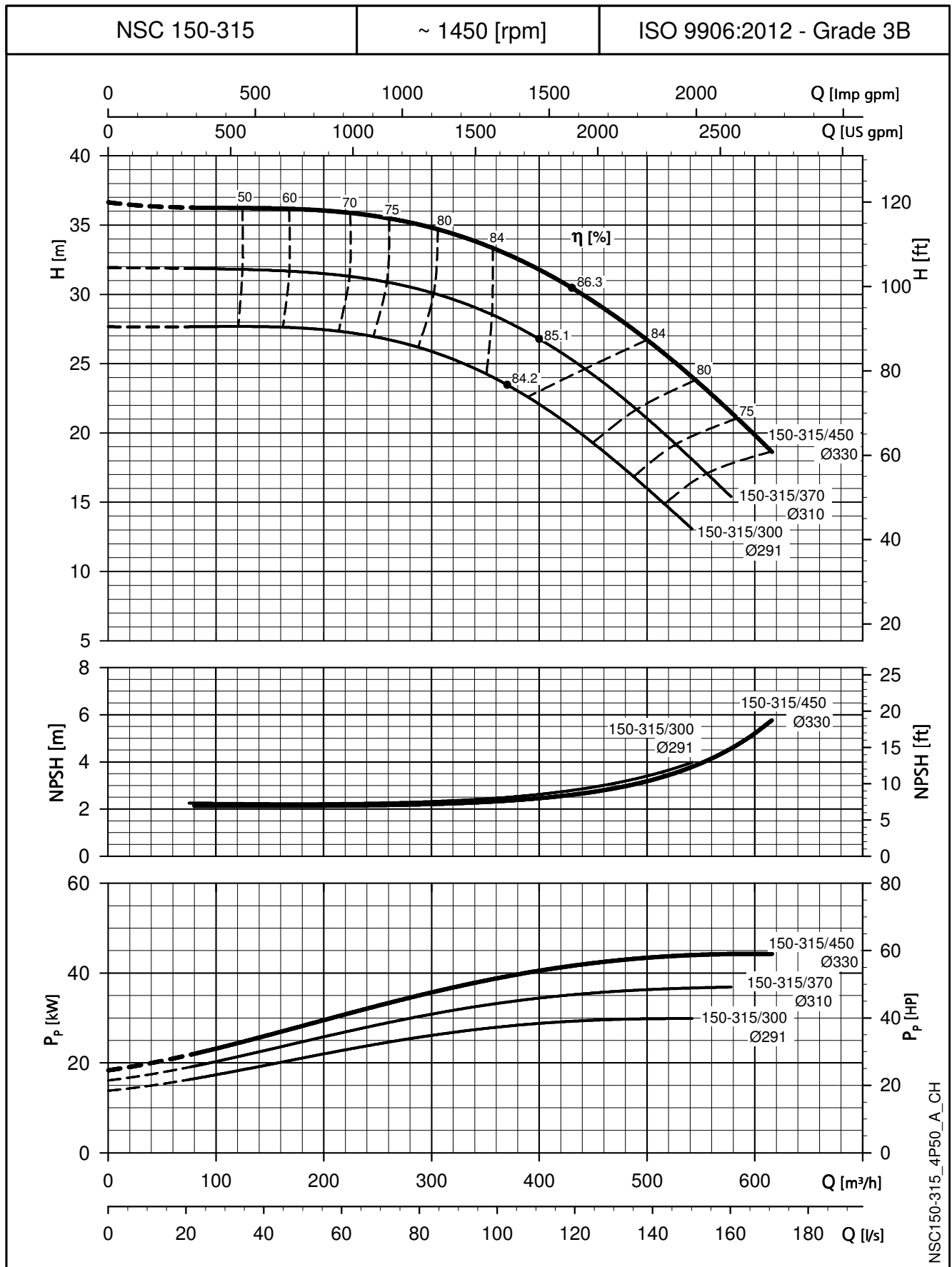
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

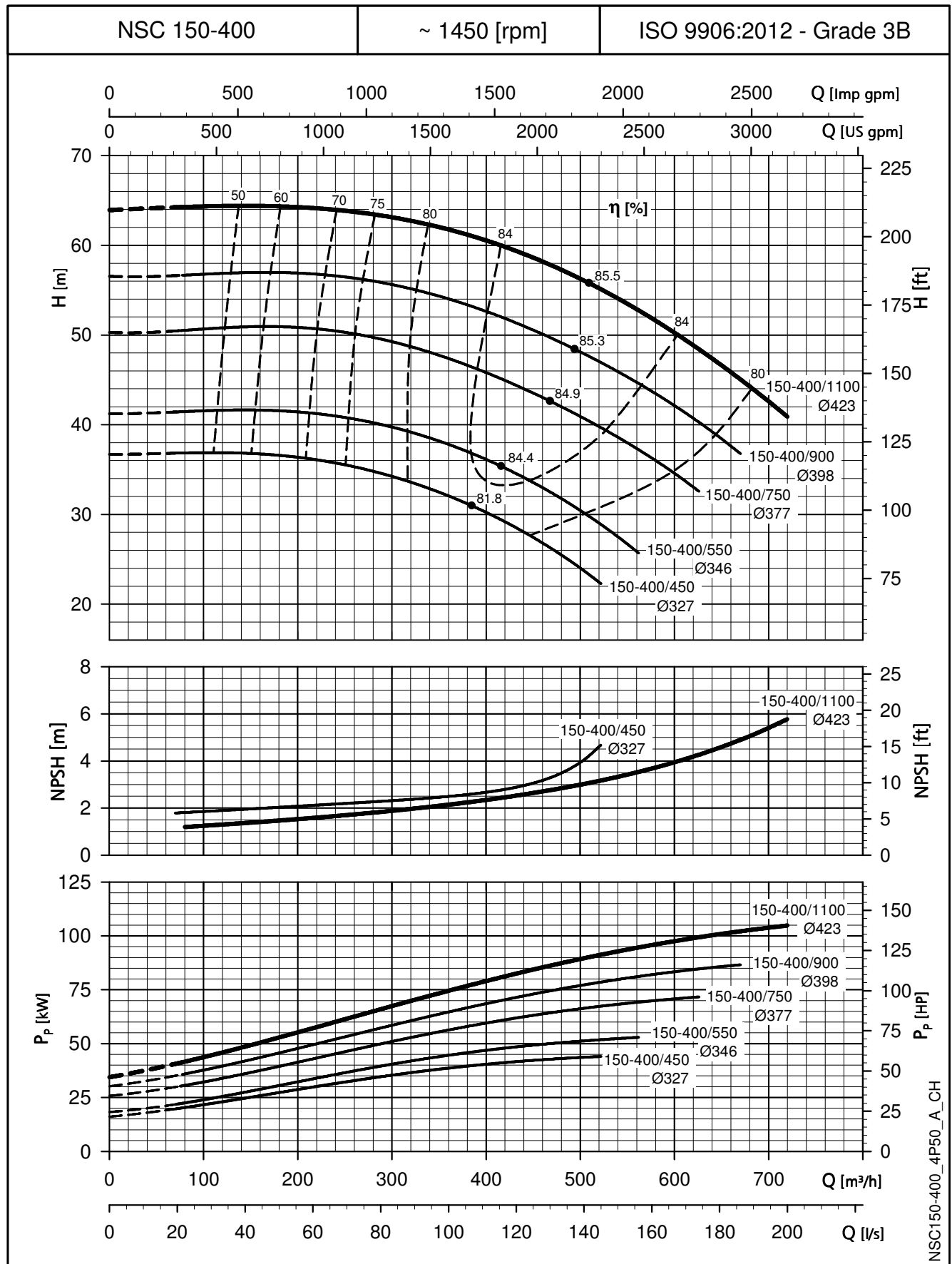
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

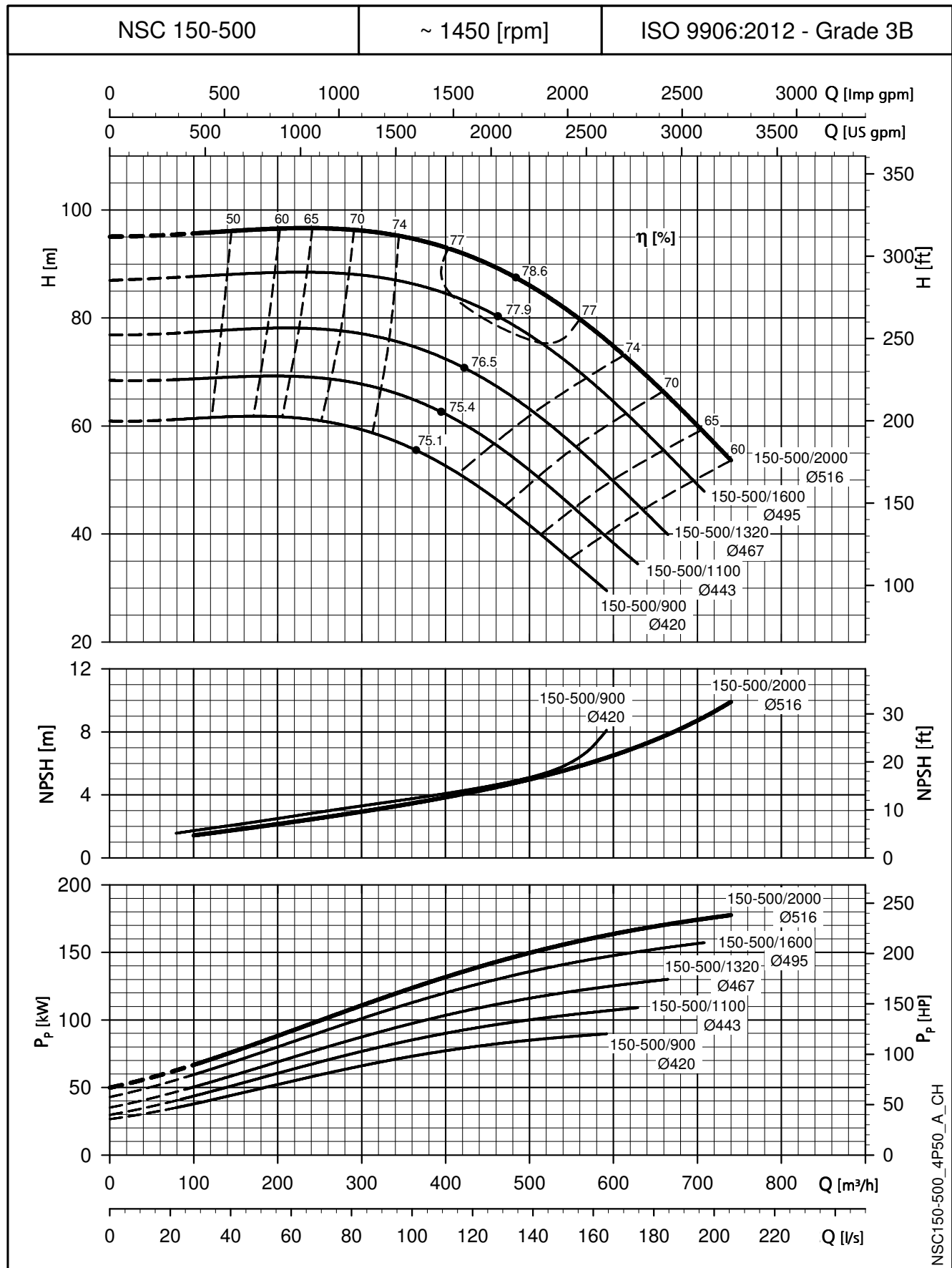
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

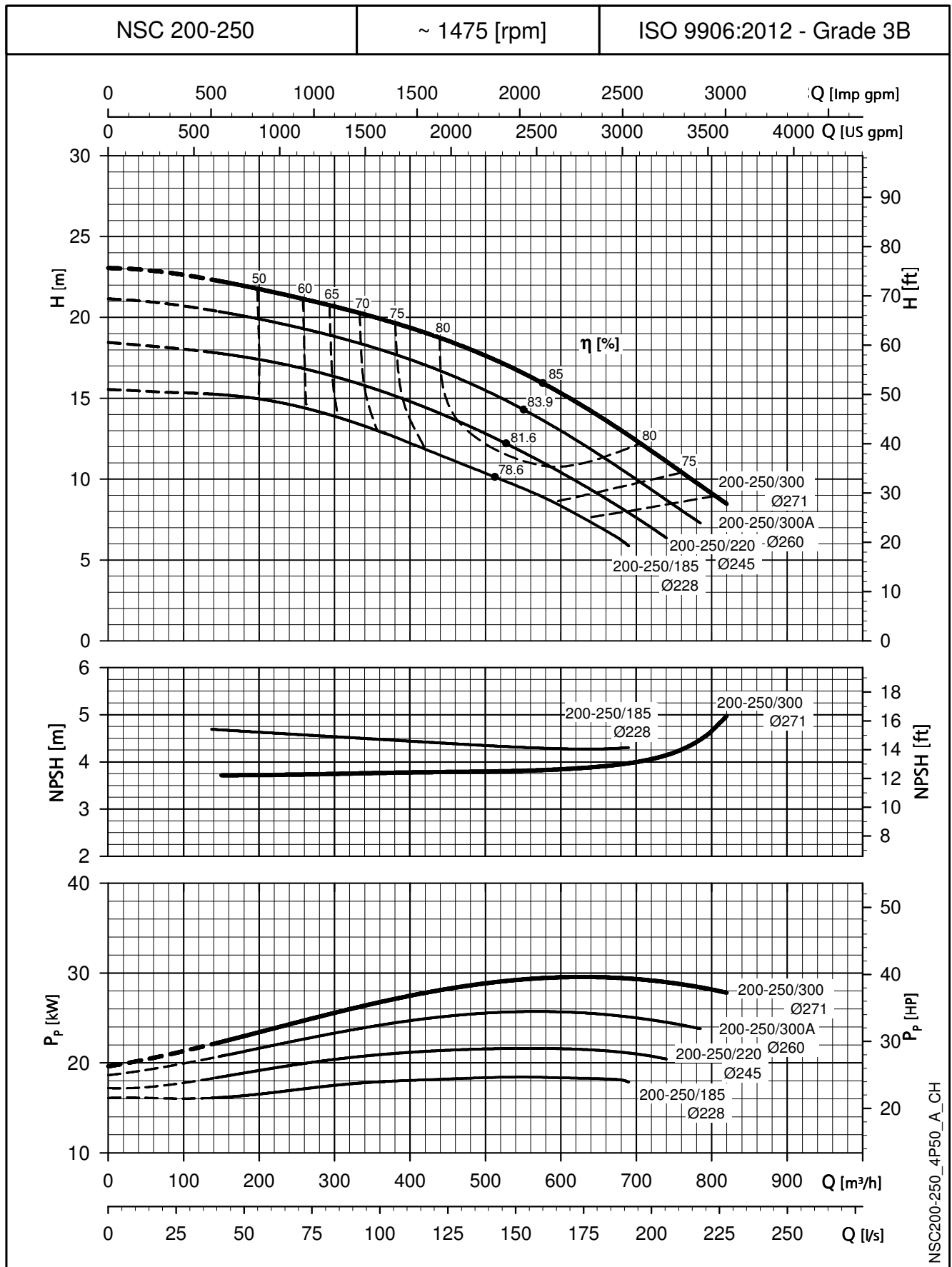
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

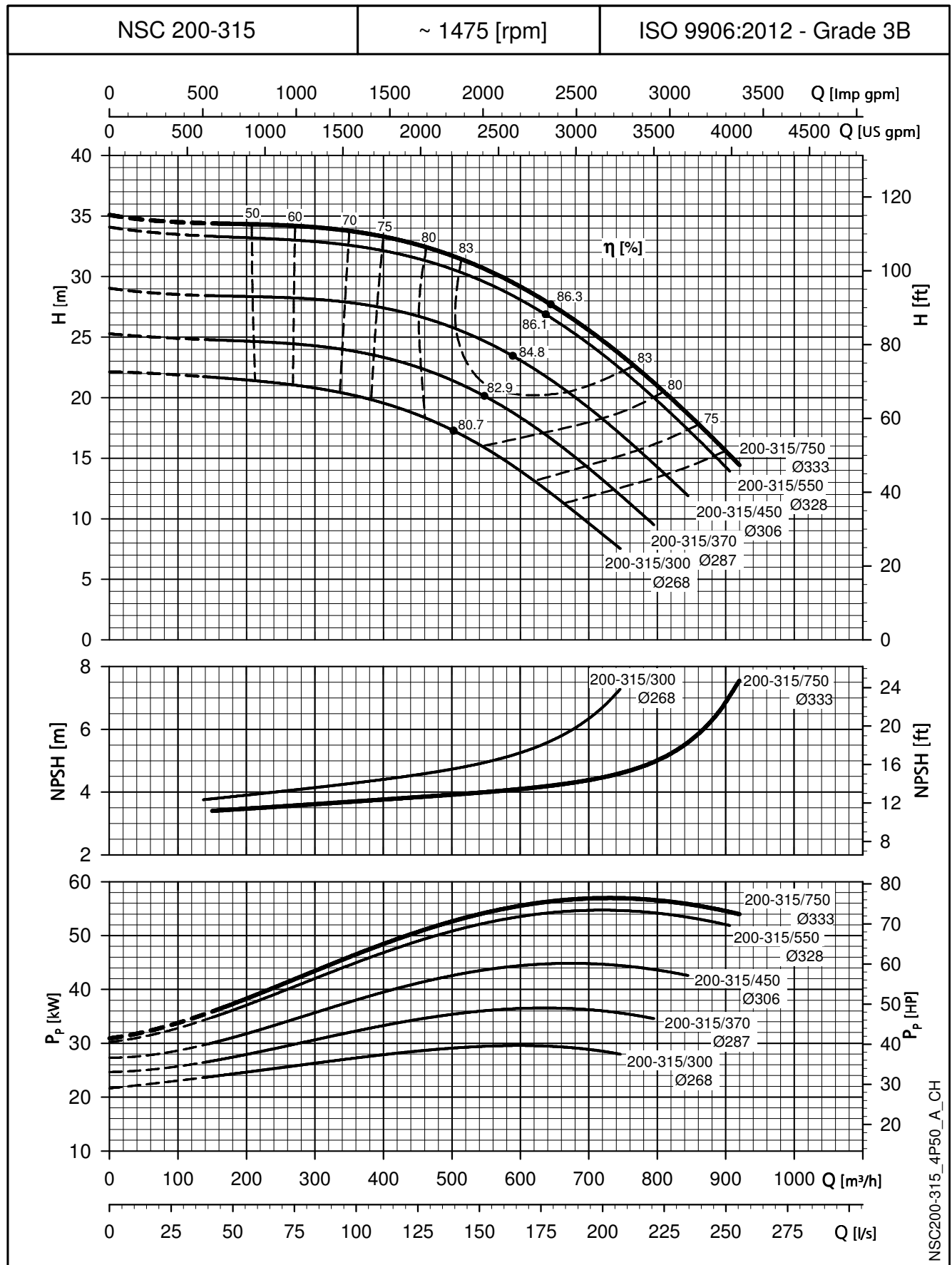
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

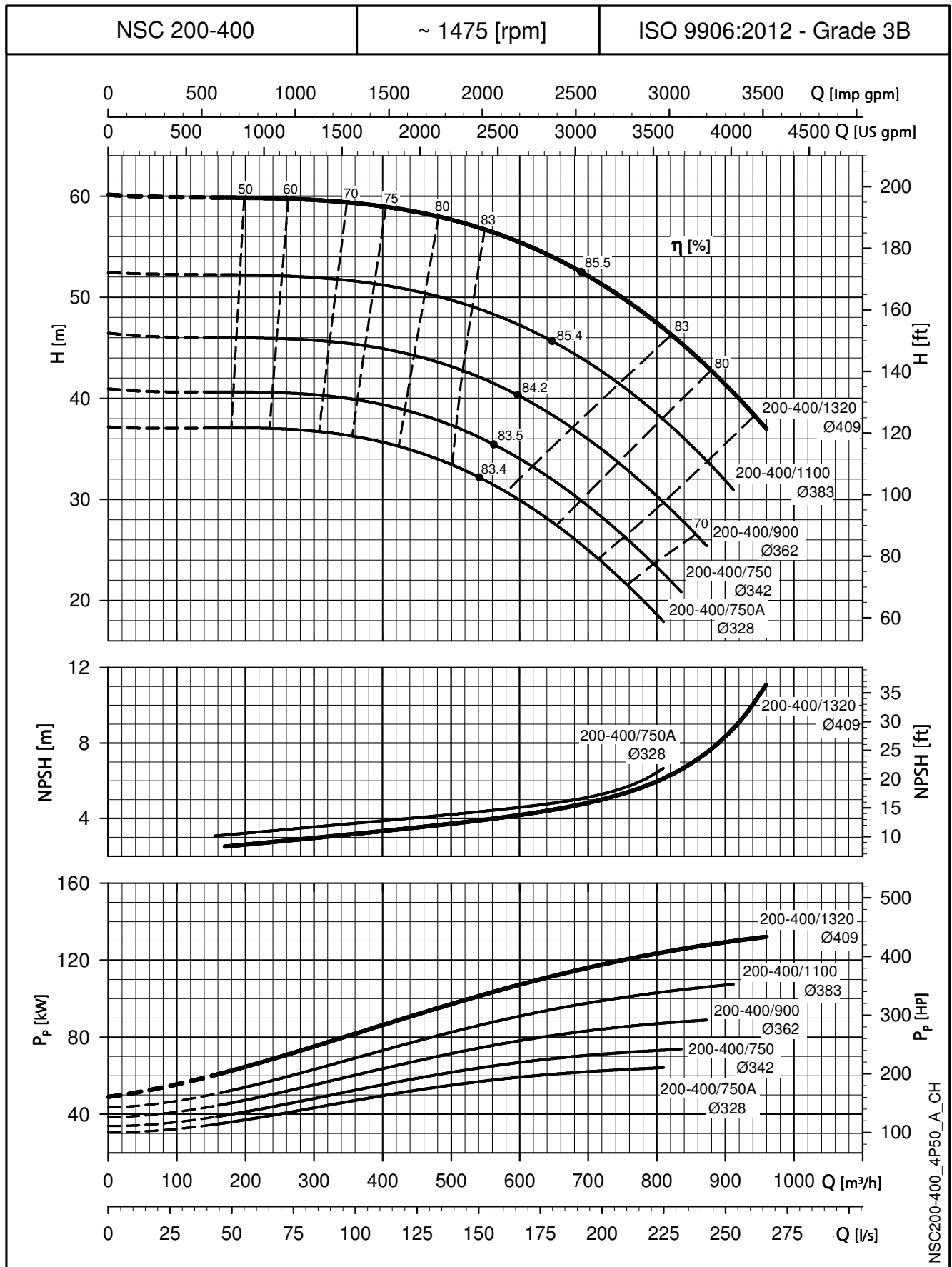
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

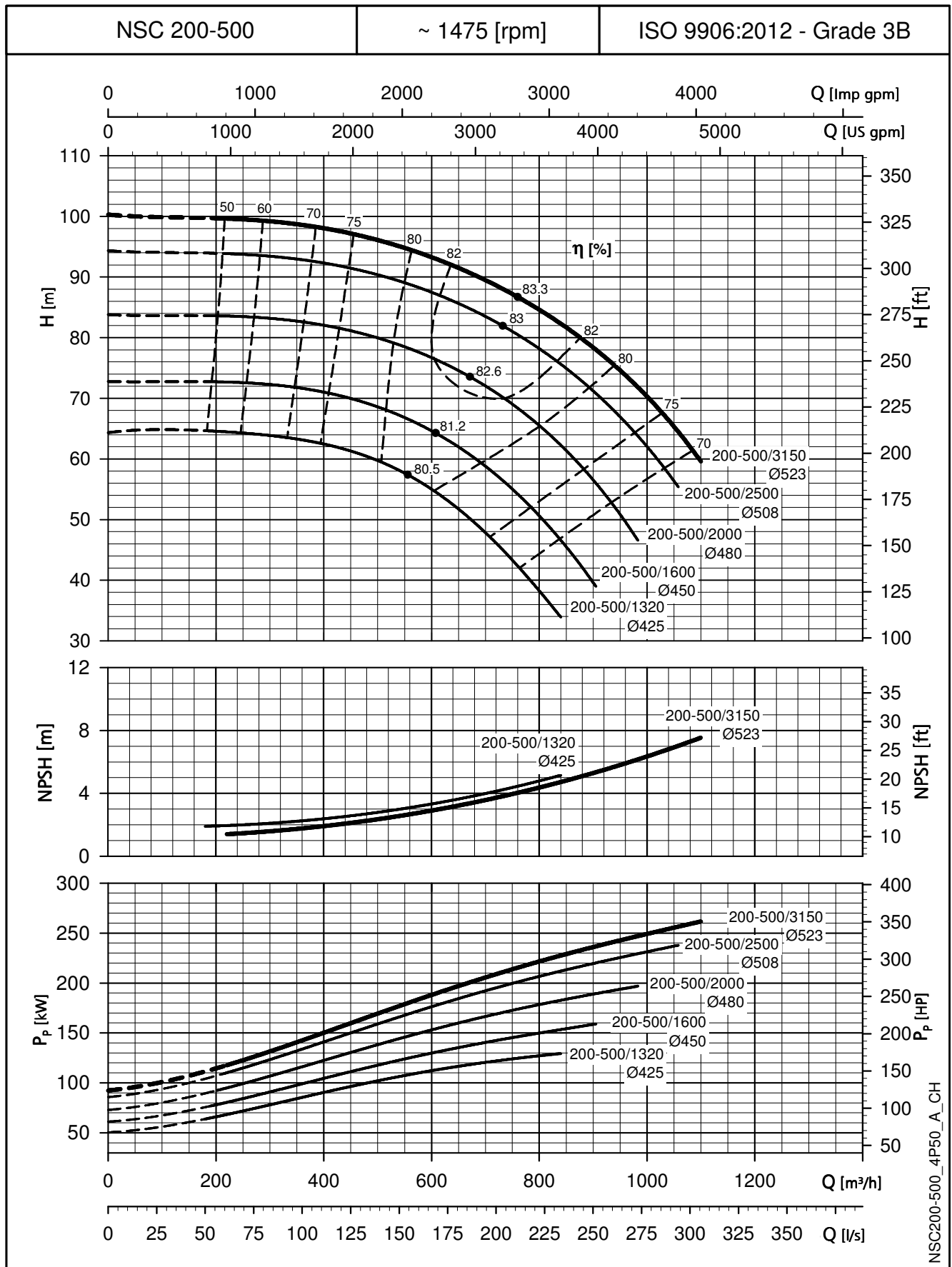
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

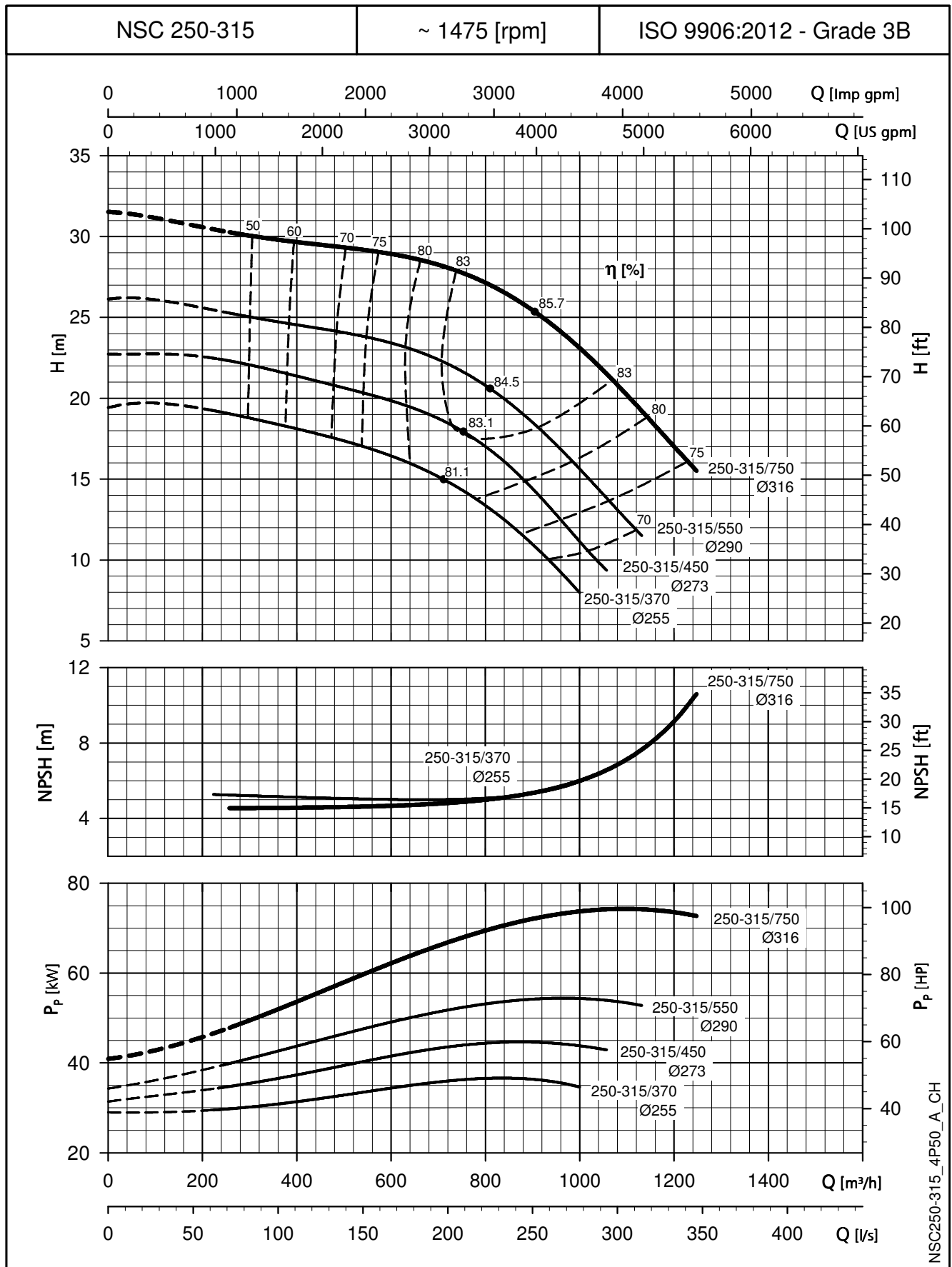
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

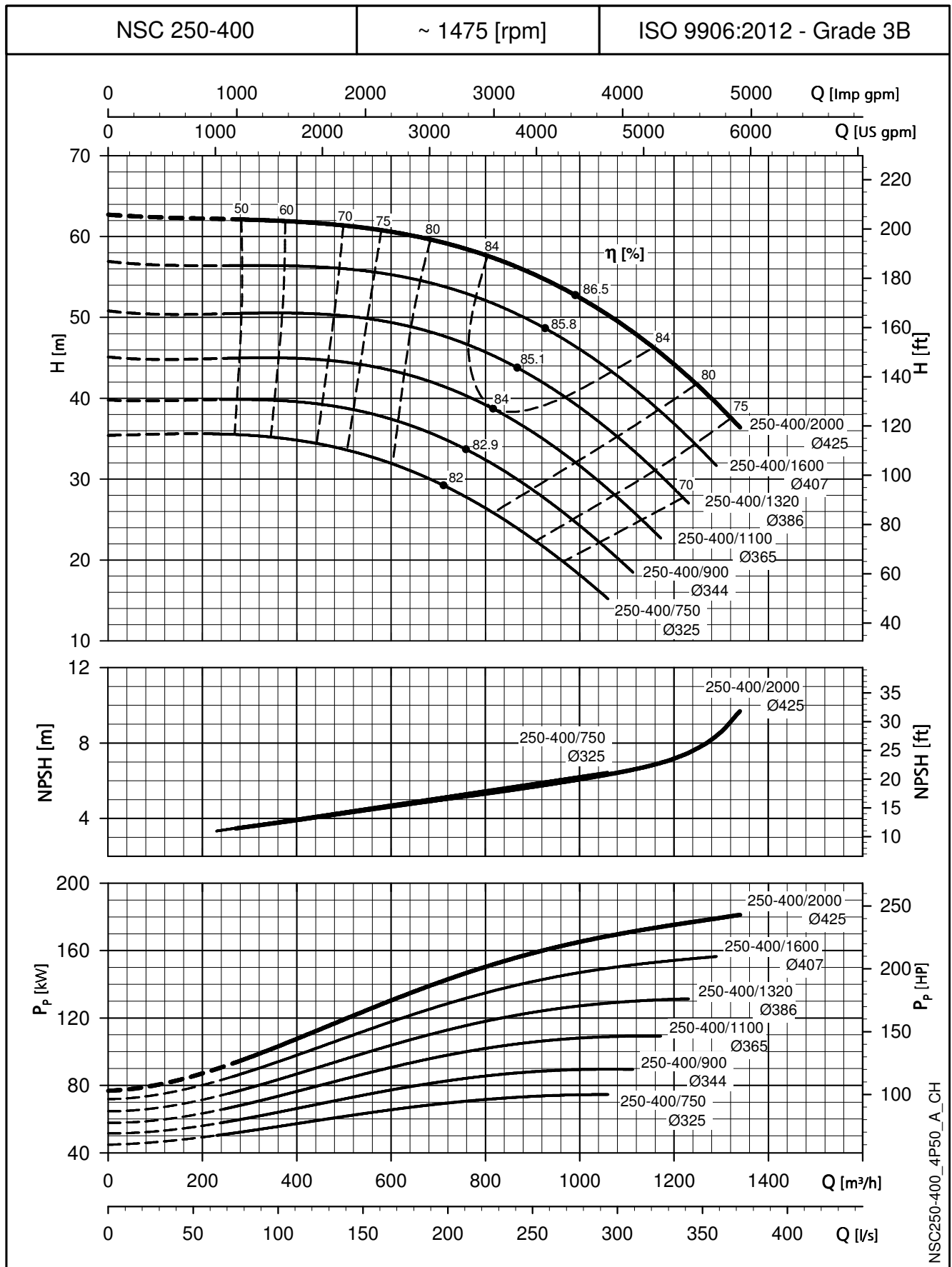
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



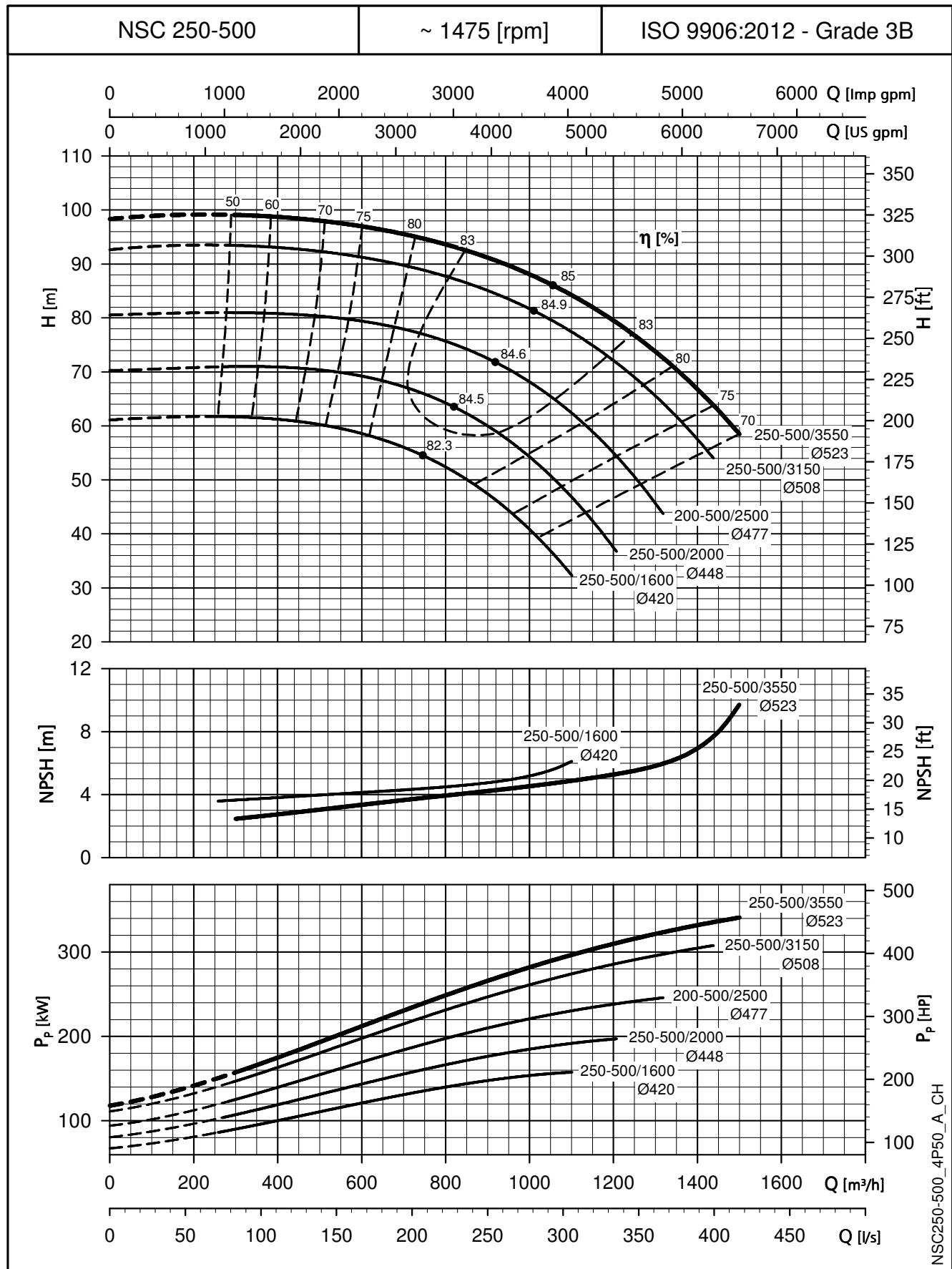
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e-NSC SERIES

OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



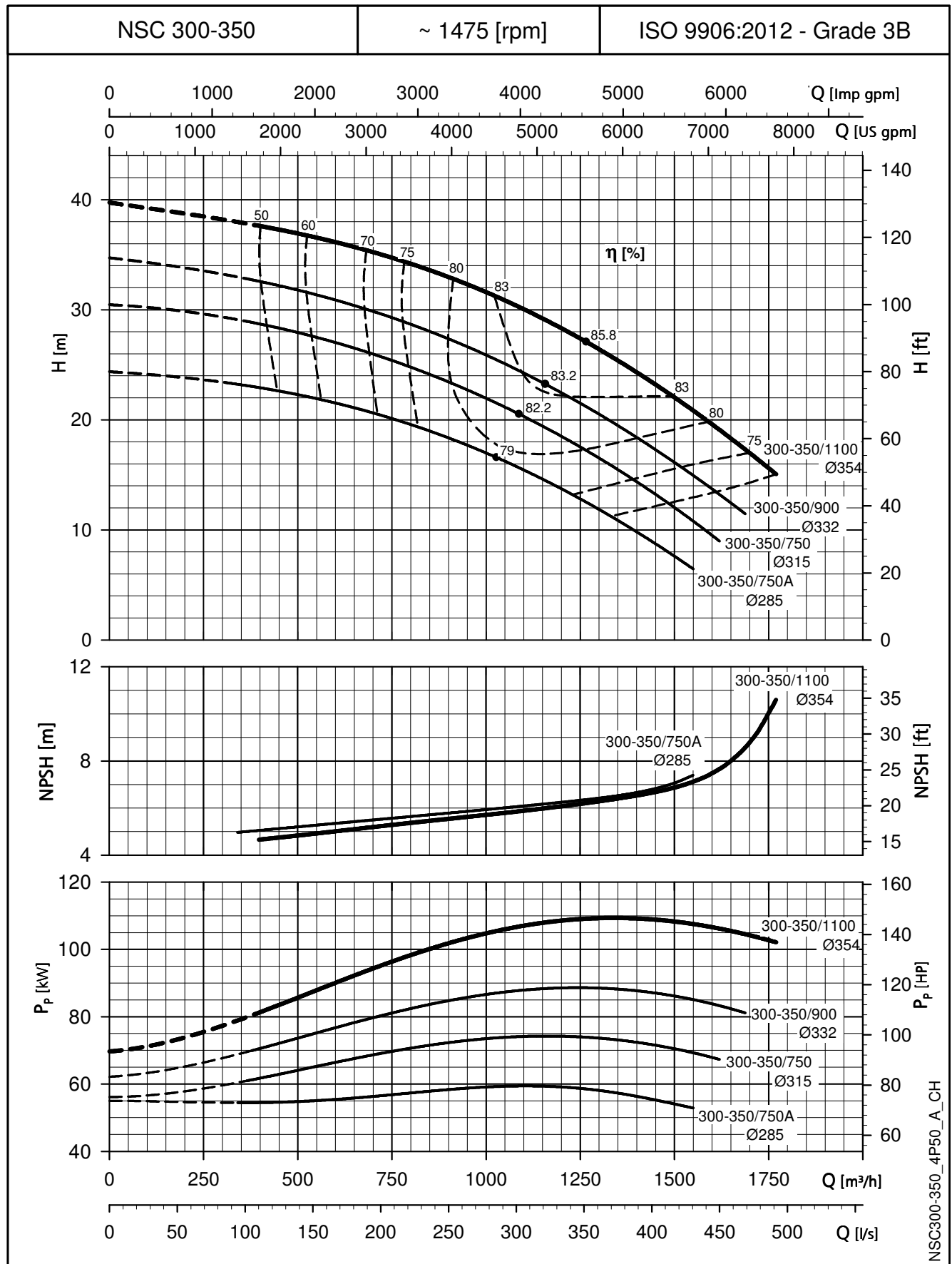
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e-NSC SERIES
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES


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e-NSC SERIES

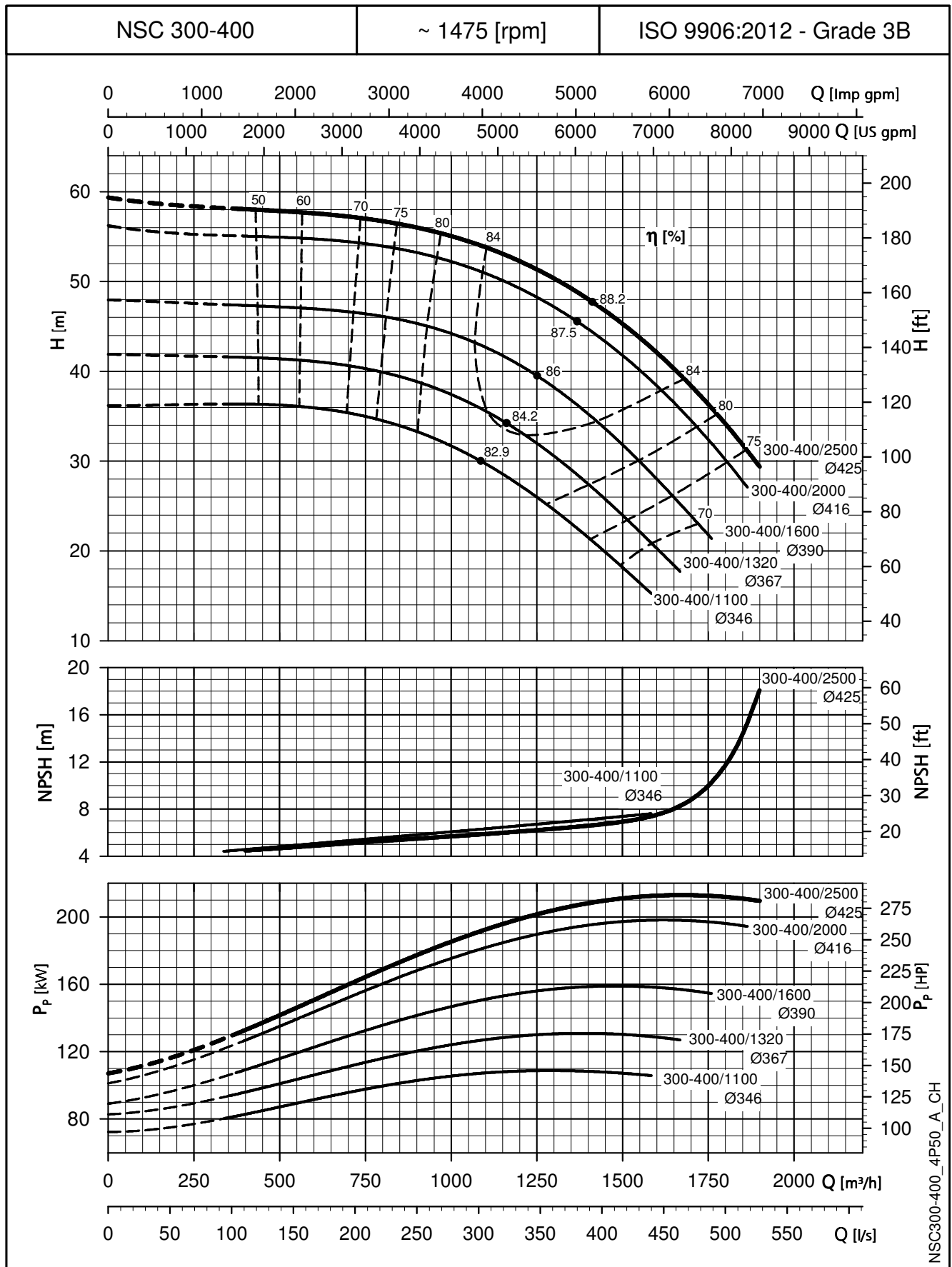
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

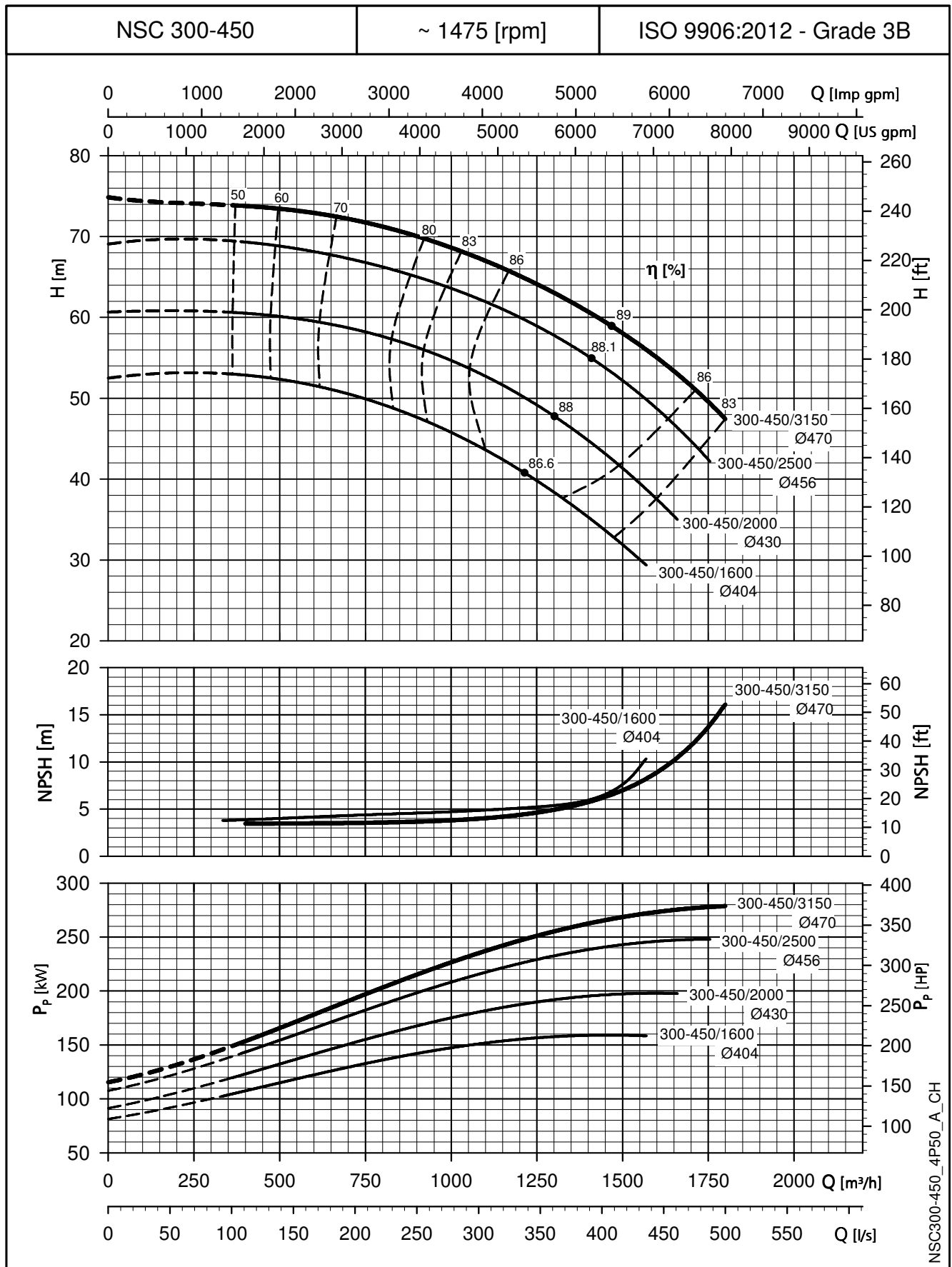
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES



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e-NSC SERIES

OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES

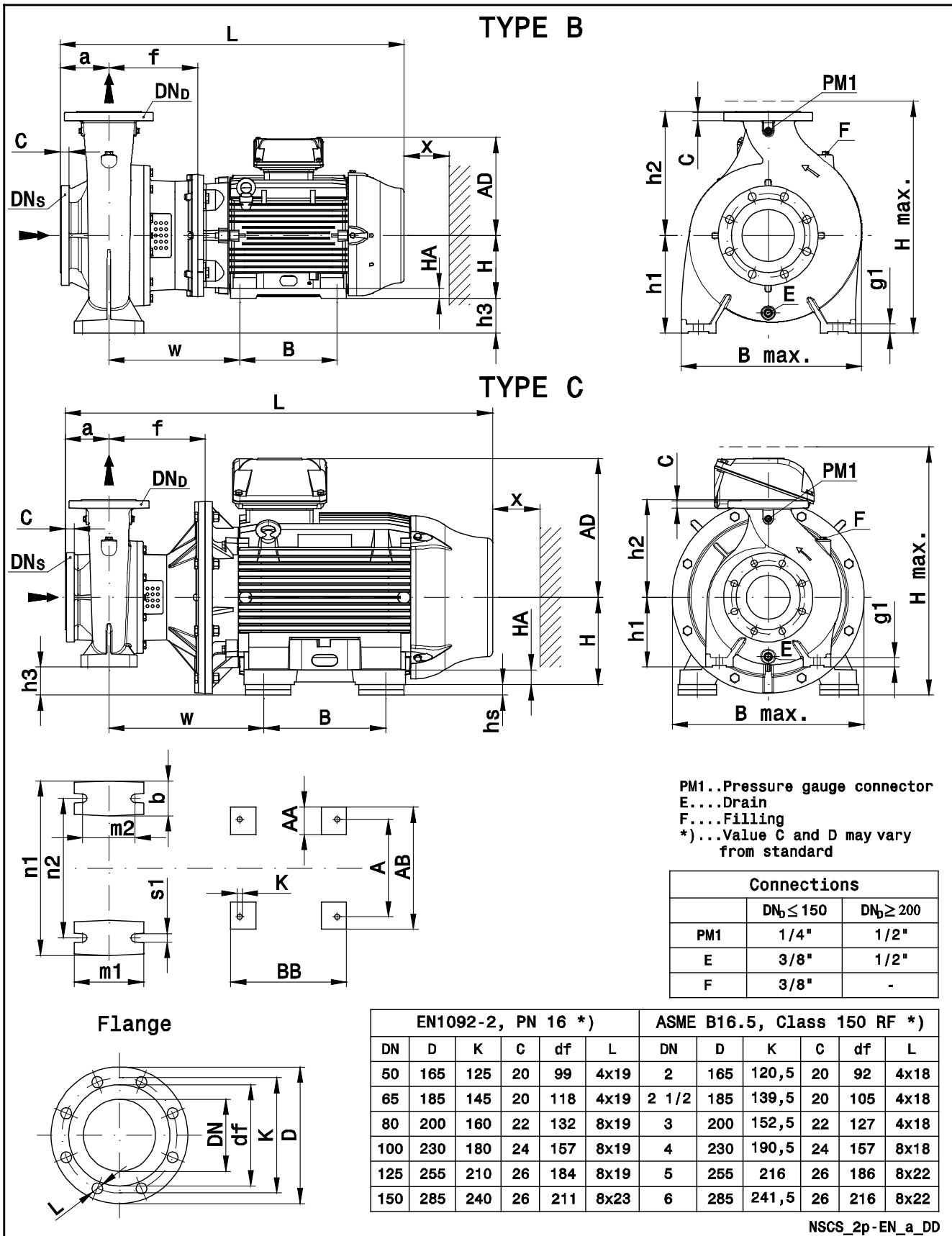


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 These performances are valid for liquids with density $\rho = 1,0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.



DIMENSIONS AND WEIGHTS

NSCS SERIES
DIMENSIONS AND WEIGHTS AT 50 Hz, 2 POLES



NSCS_2p-EN_a_DD

NSCS SERIES

DIMENSIONS AND WEIGHTS AT 50 Hz, 2 POLES

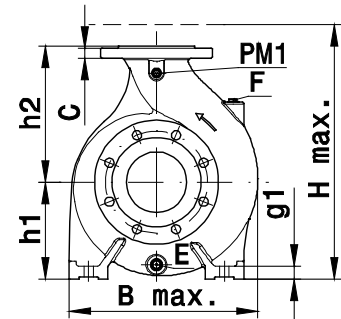
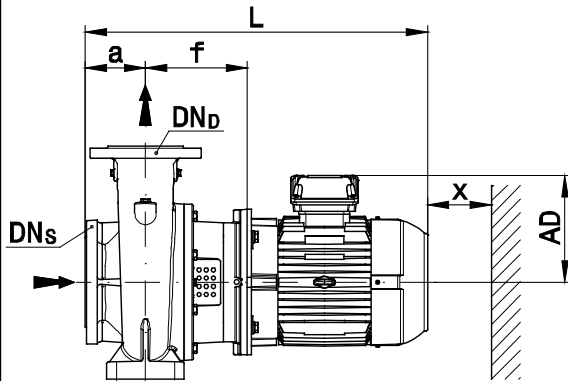
PUMP TYPE NSCS	TYPE	DIMENSIONS (mm)																															WEIGHT (kg) G
		Pump																	Motor														
		DNS	DND	a	f	x	w	h1	h2	g1	h3	hs	n1	n2	m1	m2	s1	b	A	AA	AB	AD	B	BB	H	HA	K	B max	H max	L			
100-160/150/W	B	125	100	125	240	140	348	200	280	26	40	-	360	280	160	120	19	80	254	64	308	264	210	254	160	22	15	388	480	853	195		
100-160/185/W	B	125	100	125	240	140	348	200	280	26	40	-	360	280	160	120	19	80	254	64	308	264	254	298	160	22	15	388	480	897	199		
100-160/220/W	B	125	100	125	240	140	361	200	280	26	20	-	360	280	160	120	19	80	279	78	350	279	241	294	180	28	15	388	480	919	256		
100-160/300/W	B	125	100	125	246	140	379	200	280	26	0	-	360	280	160	120	19	80	318	82	385	317	305	370	200	30	19	400	517	1028	329		
100-200/370/W	B	125	100	125	246	140	379	200	280	26	0	-	360	280	160	120	19	80	318	82	385	317	305	370	200	30	19	400	517	1028	348		
100-200/450/W	C	125	100	125	246	140	395	200	280	26	25	-	360	280	160	120	19	80	356	80	436	408	311	412	225	34	19	450	633	1117	504		
100-200/550/W	C	125	100	125	276	140	444	200	280	26	80	30	360	280	160	120	19	80	406	100	506	408	349	467	250	43	24	550	688	1226	586		
100-250/750/W	C	125	100	140	276	140	466	225	280	26	55	-	400	315	160	120	19	80	457	100	557	442	368	517	280	42	24	550	722	1347	839		
100-250/900/W	C	125	100	140	276	140	466	225	280	26	55	-	400	315	160	120	19	80	457	100	557	442	419	517	280	42	24	550	722	1347	874		
125-200/450/W	B	150	125	140	246	140	395	250	315	26	25	-	400	315	160	120	19	80	356	80	436	408	311	412	225	34	19	468	658	1132	531		
125-200/550/W	C	150	125	140	276	140	444	250	315	26	30	30	400	315	160	120	19	80	406	100	506	408	349	467	250	43	24	550	688	1241	612		
125-200/750/W	C	150	125	140	276	140	466	250	315	26	30	-	400	315	160	120	19	80	457	100	557	442	368	517	280	42	24	550	722	1347	855		
125-200/900/W	C	150	125	140	276	140	466	250	315	26	30	-	400	315	160	120	19	80	457	100	557	442	419	517	280	42	24	550	722	1347	890		

NOTE: Pumps with flanges according to EN 1092-2 as standard; available ASME B16.5 version on request.

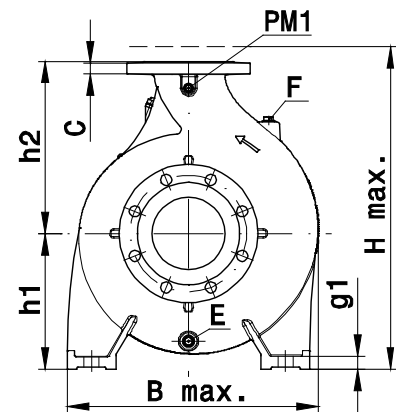
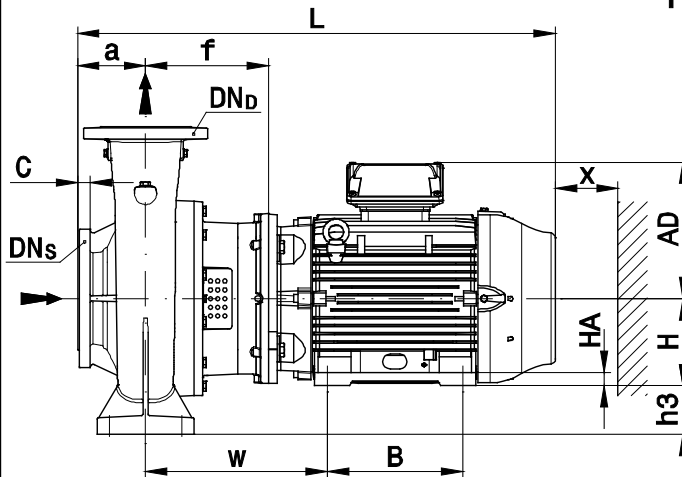
Nscs-2p50-en_a_ld

NSCS SERIES
DIMENSIONS AND WEIGHTS AT 50 Hz, 4 POLES

TYPE A

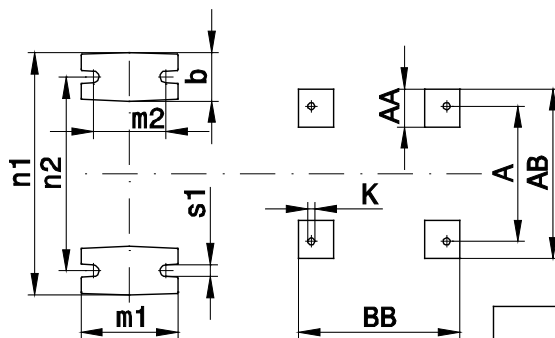


TYPE B

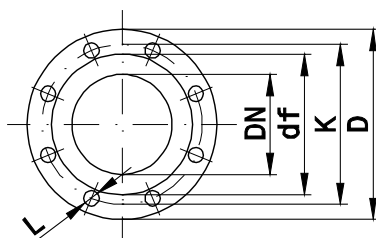


PM1...Pressure gauge connector
E....Drain
F....Filling
*)...Value C and D may vary from standard

Connections		
	DN _D ≤ 150	DN _D ≥ 200
PM1	1/4"	1/2"
E	3/8"	1/2"
F	3/8"	-



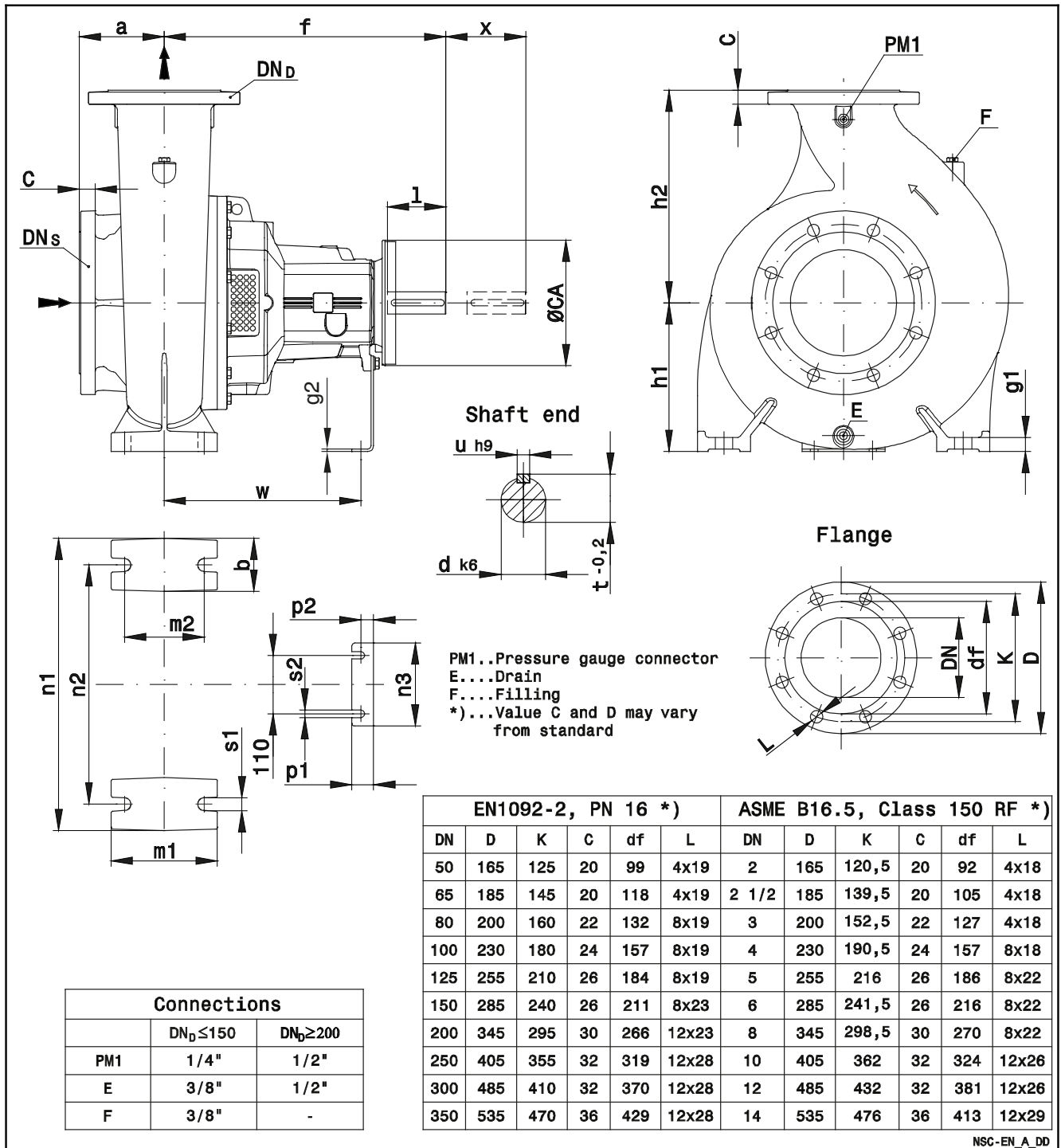
Flange



EN1092-2, PN 16 *)						ASME B16.5, Class 150 RF *)					
DN	D	K	C	df	L	DN	D	K	C	df	L
50	165	125	20	99	4x19	2	165	120,5	20	92	4x18
65	185	145	20	118	4x19	2 1/2	185	139,5	20	105	4x18
80	200	160	22	132	8x19	3	200	152,5	22	127	4x18
100	230	180	24	157	8x19	4	230	190,5	24	157	8x18
125	255	210	26	184	8x19	5	255	216	26	186	8x22
150	285	240	26	211	8x23	6	285	241,5	26	216	8x22
200	345	295	30	266	12x23	8	345	298,5	30	270	8x22
250	405	355	32	319	12x28	10	405	362	32	324	12x26
300	485	410	32	370	12x28	12	485	432	32	381	12x26

NSCS_4p-EN_a_DD

NSC SERIES (BARE SHAFT) DIMENSIONS AND WEIGHTS



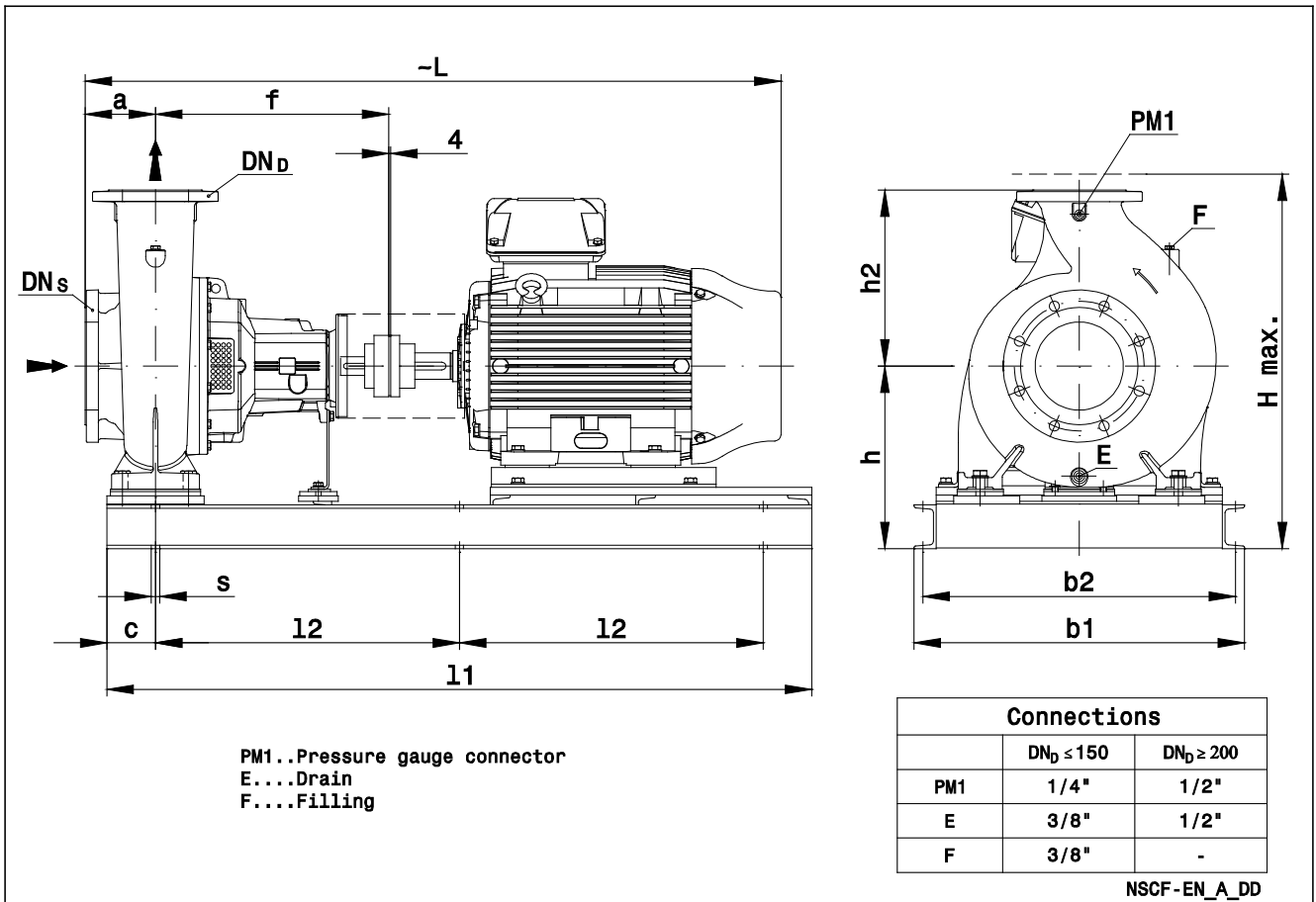
NSC SERIES (BARE SHAFT) DIMENSIONS AND WEIGHTS

PUMP TYPE NSC (BARE SHAFT)	PUMP DIMENSIONS (mm)																								WEIGHT (kg) G	
	PUMP																				SHAFT					
	DNS	DND	a	f	w	h1	h2	x	m1	m2	n1	n2	n3	p1	p2	g1	g2	s1	s2	b	ØCA	d	l	t	u	
100-160	125	100	125	470	340	200	280	140	160	120	360	280	156	41	24	26	5	19	14	80	190	32	80	35	10	82
100-200	125	100	125	470	340	200	280	140	160	120	360	280	156	41	24	26	5	19	14	80	190	32	80	35	10	90
100-250	125	100	140	470	340	225	280	140	160	120	400	315	156	41	24	26	5	19	14	80	190	32	80	35	10	100
100-315	125	100	140	470	340	250	315	140	160	120	400	315	156	41	24	26	5	19	14	80	190	32	80	35	10	116
100-400	125	100	140	530	370	280	355	140	200	150	500	400	156	41	24	26	5	23	14	100	230	42	110	45	12	178
125-200	150	125	140	470	340	250	315	140	160	120	400	315	156	41	24	26	5	19	14	80	190	32	80	35	10	112
125-250	150	125	140	470	340	250	355	140	160	120	400	315	156	41	24	26	5	19	14	80	190	32	80	35	10	112
125-315	150	125	140	530	370	280	355	140	200	150	500	400	156	41	24	26	5	23	14	100	230	42	110	45	12	152
125-400	150	125	140	530	370	315	400	140	200	150	500	400	156	41	24	26	5	23	14	100	230	42	110	45	12	200
150-200	200	150	160	470	340	280	400	140	200	150	550	450	156	41	24	26	5	23	14	100	190	32	80	35	10	166
150-250	200	150	160	530	370	280	400	140	200	150	500	400	156	41	24	26	5	23	14	100	230	42	110	45	12	180
150-315	200	150	160	530	370	280	400	140	200	150	550	450	156	41	24	26	5	23	14	100	230	42	110	45	12	186
150-400	200	150	160	530	370	315	450	140	200	150	550	450	156	41	24	26	5	23	14	100	230	42	110	45	12	228
150-500	200	150	180	770	525	400	500	250	300	250	710	600	170	58	33	35	8	28	18	110	310	60	140	64	18	408
200-250	250	200	180	530	370	355	475	200	200	150	550	450	156	41	24	26	5	23	14	100	230	42	110	45	12	230
200-315	250	200	180	530	370	355	450	200	200	150	550	450	156	41	24	26	5	23	14	100	230	42	110	45	12	234
200-400	250	200	180	770	525	400	500	250	300	250	710	600	170	58	33	35	8	28	18	110	310	60	140	64	18	363
200-500	250	200	200	770	525	450	560	250	300	250	710	600	170	58	33	35	8	28	18	110	310	60	140	64	18	400
250-315	300	250	250	530	370	400	500	200	300	250	710	600	156	41	24	35	5	28	14	110	230	42	110	45	12	316
250-400	300	250	200	770	525	400	500	250	300	250	710	600	170	58	33	35	8	28	18	110	310	60	140	64	18	400
250-500	300	250	200	770	525	450	670	250	300	250	710	600	170	58	33	35	8	28	18	110	310	60	140	64	18	451
300-350	350	300	250	800	555	450	600	300	350	290	800	670	170	58	33	41	8	32	18	130	310	60	140	64	18	544
300-400	350	300	250	800	555	450	600	300	350	290	800	670	170	58	33	41	8	32	18	130	310	60	140	64	18	548
300-450	350	300	250	800	555	475	630	300	350	290	800	670	170	58	33	41	8	32	18	130	310	60	140	64	18	578

NOTE: Pumps with flanges according to EN 1092-2 as standard; available ASME B16.5 version on request.

Nsc100-300bs-en_a_td

NSCF SERIES (MOUNTED ON BASE) DIMENSIONS AND WEIGHTS AT 50 Hz, 2 POLES

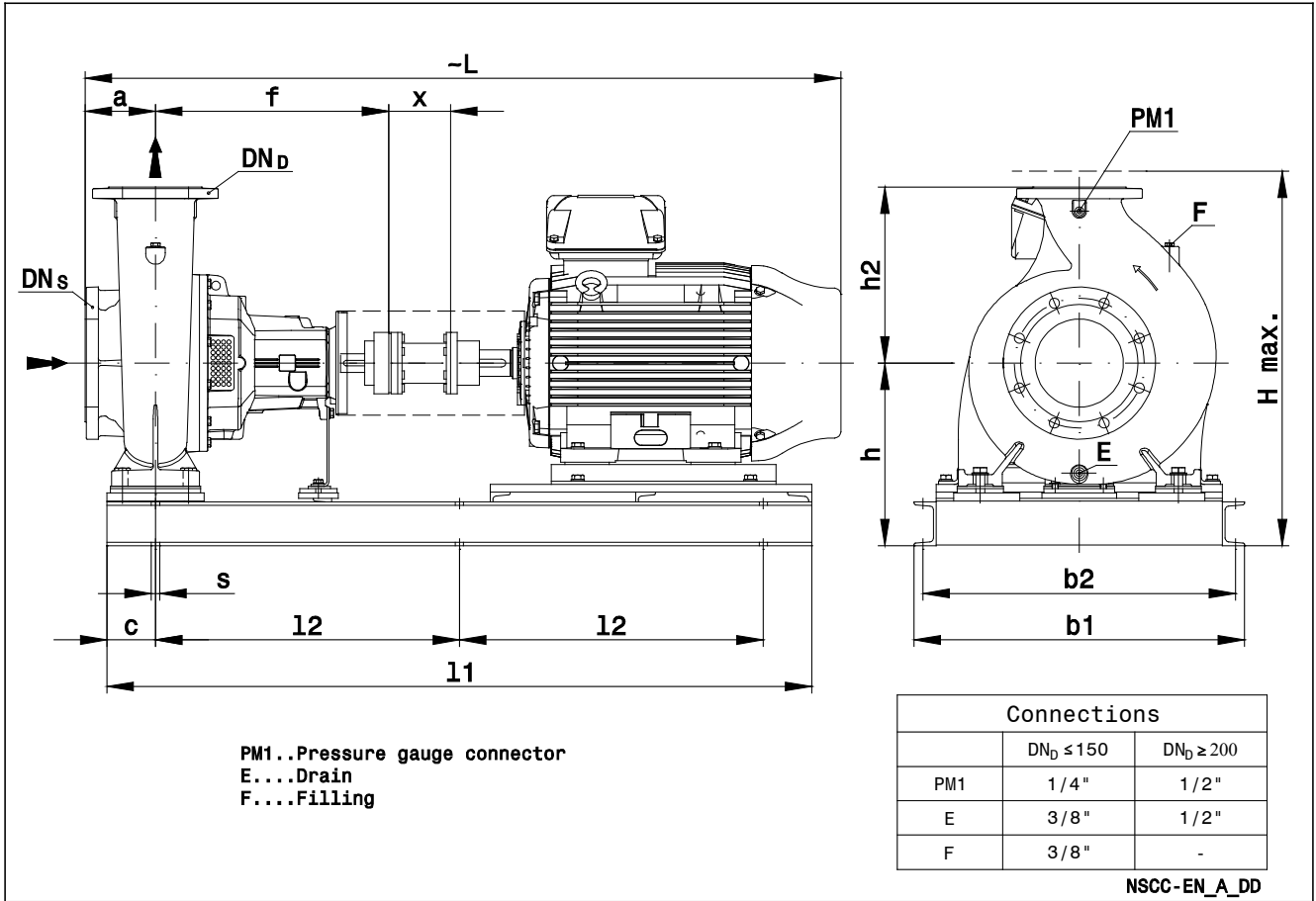


PUMP TYPE NSCF	DIMENSIONS (mm)														WEIGHT (kg)	IEC MOTOR	COUPLING TYPE
	DNS	DND	a	f	b1	b2	l1	l2	c	L	h	h2	Hmax	s	G	FRAME	
100-160/150/W	125	100	125	470	670	630	1330	555	110	1197	365	280	645	6xØ19 (M16)	321	160M	B95E
100-160/185/W	125	100	125	470	670	630	1330	555	110	1241	365	280	645	6xØ19 (M16)	338	160L	B95E
100-160/220/W	125	100	125	470	670	630	1330	555	110	1263	385	280	665	6xØ19 (M16)	385	180M	B110B
100-160/300/W	125	100	125	470	560	520	1350	565	110	1366	330	280	647	6xØ19 (M16)	422	200L	B125A
100-200/300/W	125	100	125	470	560	520	1350	565	110	1366	330	280	647	6xØ19 (M16)	430	200L	B125A
100-200/370/W	125	100	125	470	560	520	1350	565	110	1366	330	280	647	6xØ19 (M16)	451	200L	B125A
100-200/450/W	125	100	125	470	560	520	1350	565	110	1455	355	280	763	6xØ19 (M16)	610	225S/M	B125B
100-200/550/W	125	100	125	470	750	710	1550	665	110	1455	405	280	813	6xØ19 (M16)	735	250S/M	B140A
100-250/450/W	125	100	140	470	560	520	1350	565	110	1470	355	280	763	6xØ19 (M16)	612	225S/M	B125B
100-250/550/W	125	100	140	470	750	710	1550	665	110	1579	405	280	813	6xØ19 (M16)	738	250S/M	B140A
100-250/750/W	125	100	140	470	750	710	1550	665	110	1685	390	280	832	6xØ19 (M16)	956	280S/M	B160A
100-250/900/W	125	100	140	470	750	710	1550	665	110	1685	390	280	832	6xØ19 (M16)	991	280S/M	B160A
125-200/450/W	150	125	140	470	560	520	1350	565	110	1470	355	315	763	6xØ19 (M16)	617	225S/M	B125B
125-200/550/W	150	125	140	470	750	710	1550	665	110	1579	405	315	813	6xØ19 (M16)	743	250S/M	B140A
125-200/750/W	150	125	140	470	750	710	1550	665	110	1685	405	315	847	6xØ19 (M16)	970	280S/M	B160A
125-200/900/W	150	125	140	470	750	710	1550	665	110	1685	405	315	847	6xØ19 (M16)	1005	280S/M	B160A
125-315/1100/W	150	125	140	530	860	810	1850	815	110	1918	505	355	1030	6xØ26 (M20)	1342	315S/M	B160B
125-315/1320/W	150	125	140	530	860	810	1850	815	110	1918	505	355	1030	6xØ26 (M20)	1428	315S/M	B160B
125-315/1600/W	150	125	140	530	860	810	1850	815	110	1918	505	355	1030	6xØ26 (M20)	1509	315S/M	B160B
125-315/2000/W	150	125	140	530	860	810	1850	815	110	2027	505	355	1094	6xØ26 (M20)	1690	315L	B180A

NOTE: Pumps with flanges according to EN 1092-2 as standard; available ASME B16.5 version on request. For flanges dimensions see drawing on page 64.

Nscf-2p50-en_a_td

NSCC SERIES (SPACER COUPLING) DIMENSIONS AND WEIGHTS AT 50 Hz, 2 POLES

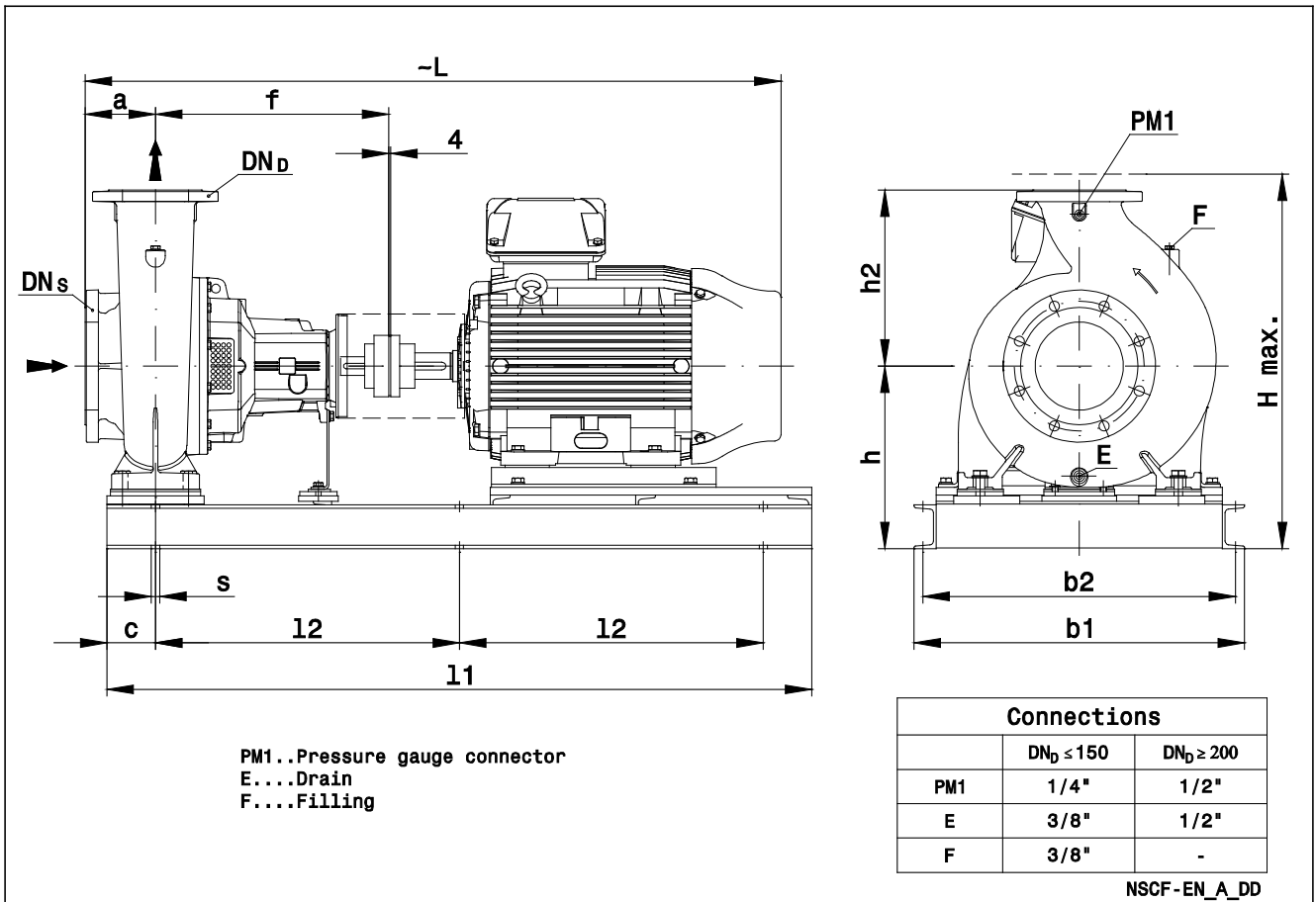


PUMP TYPE NSCC	DIMENSIONS (mm)															WEIGHT (kg) G	IEC MOTOR FRAME	COUPLING TYPE
	DN _s	DN _D	a	f	x	b1	b2	l1	l2	c	L	h	h2	Hmax	s			
100-160/150/W	125	100	125	470	140	670	630	1330	555	110	1333	365	280	645	6xØ19 (M16)	323	160M	H95E
100-160/185/W	125	100	125	470	140	670	630	1330	555	110	1377	365	280	645	6xØ19 (M16)	340	160L	H95E
100-160/220/W	125	100	125	470	140	670	630	1330	555	110	1399	385	280	665	6xØ19 (M16)	388	180M	H110B
100-160/300/W	125	100	125	470	140	560	520	1350	565	110	1502	330	280	647	6xØ19 (M16)	426	200L	H125B
100-200/300/W	125	100	125	470	140	560	520	1350	565	110	1502	330	280	647	6xØ19 (M16)	434	200L	H125B
100-200/370/W	125	100	125	470	140	560	520	1350	565	110	1502	330	280	647	6xØ19 (M16)	455	200L	H125B
100-200/450/W	125	100	125	470	140	560	520	1350	565	110	1591	355	280	763	6xØ19 (M16)	613	225S/M	H125C
100-200/550/W	125	100	125	470	140	750	710	1550	665	110	1700	405	280	813	6xØ19 (M16)	741	250S/M	H140A
100-250/450/W	125	100	140	470	140	560	520	1350	565	110	1606	355	280	763	6xØ19 (M16)	616	225S/M	H125C
100-250/550/W	125	100	140	470	140	750	710	1550	665	110	1715	405	280	813	6xØ19 (M16)	744	250S/M	H140A
100-250/750/W	125	100	140	470	140	750	710	1550	665	110	1821	390	280	832	6xØ19 (M16)	962	280S/M	H160A
100-250/900/W	125	100	140	470	140	750	710	1550	665	110	1821	390	280	832	6xØ19 (M16)	997	280S/M	H160A
125-200/450/W	150	125	140	470	140	560	520	1350	565	110	1606	355	315	763	6xØ19 (M16)	621	225S/M	H125C
125-200/550/W	150	125	140	470	140	750	710	1550	665	110	1715	405	315	813	6xØ19 (M16)	748	250S/M	H140A
125-200/750/W	150	125	140	470	140	750	710	1550	665	110	1821	405	315	847	6xØ19 (M16)	977	280S/M	H160A
125-200/900/W	150	125	140	470	140	750	710	1550	665	110	1821	405	315	847	6xØ19 (M16)	1012	280S/M	H160A
125-315/1100/W	150	125	140	530	140	860	810	1850	815	110	2054	505	355	1030	6xØ26 (M20)	1349	315S/M	H160B
125-315/1320/W	150	125	140	530	140	860	810	1850	815	110	2054	505	355	1030	6xØ26 (M20)	1435	315S/M	H160B
125-315/1600/W	150	125	140	530	140	860	810	1850	815	110	2054	505	355	1030	6xØ26 (M20)	1516	315S/M	H160B
125-315/2000/W	150	125	140	530	140	860	810	1850	815	110	2163	505	355	1094	6xØ26 (M20)	1698	315L	H180A

NOTE: Pumps with flanges according to EN 1092-2 as standard; available ASME B16.5 version on request. For flanges dimensions see drawing on page 64.

Nscc-2p50-en_a_td

NSCF SERIES (MOUNTED ON BASE) DIMENSIONS AND WEIGHTS AT 50 Hz, 4 POLES

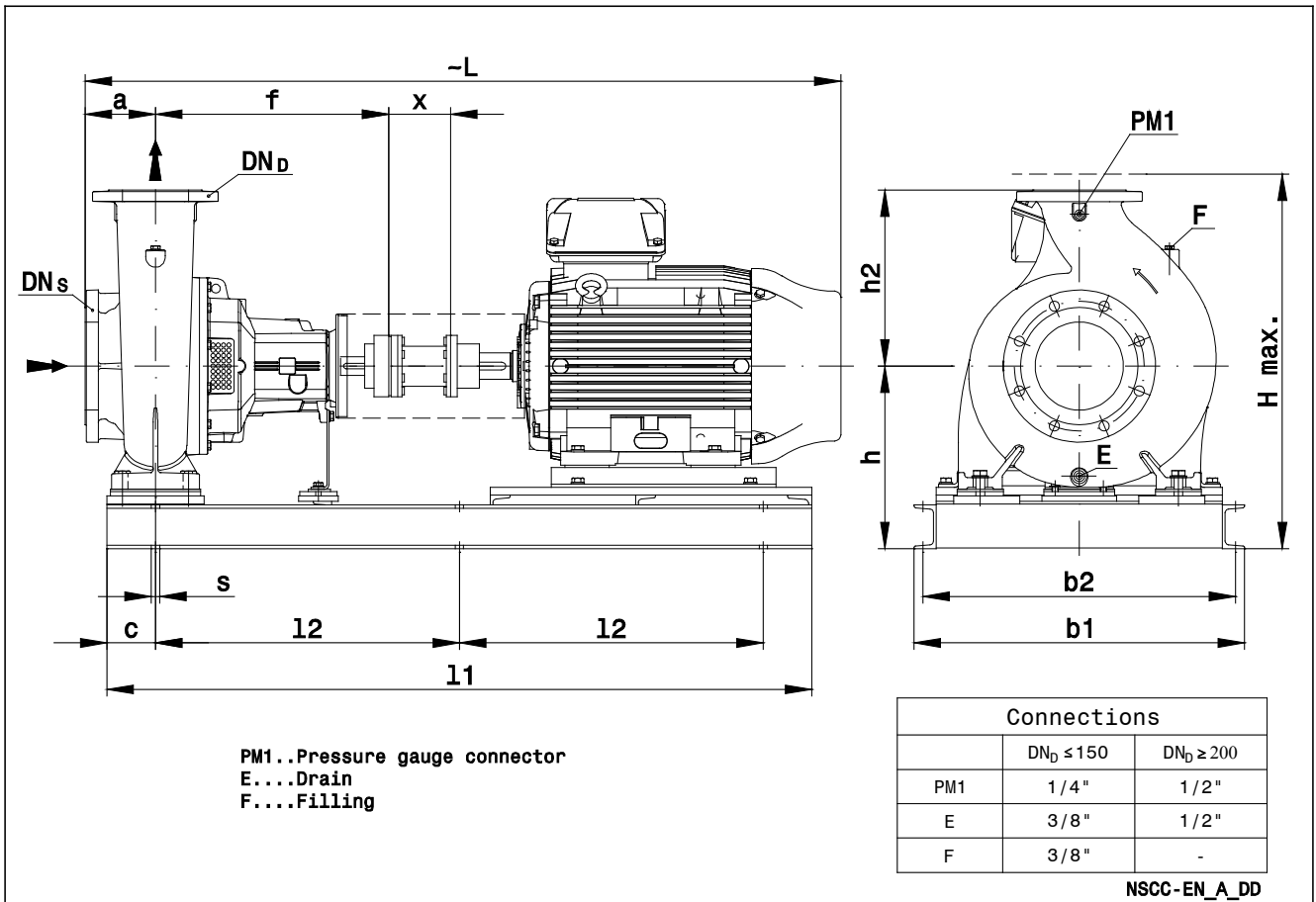


PUMP TYPE NSCF..4	DIMENSIONS (mm)														WEIGHT (kg) G	IEC MOTOR FRAME	COUPLING TYPE
	DN _S	DN _D	a	f	b1	b2	l1	l2	c	L	h	h2	Hmax	s			
100-160/22A/W	125	100	125	470	670	630	1100	440	110	975	355	280	635	6xØ19 (M16)	218	100L	B95C
100-160/22/W	125	100	125	470	670	630	1100	440	110	975	355	280	635	6xØ19 (M16)	218	100L	B95C
100-160/30/W	125	100	125	470	670	630	1100	440	110	1019	355	280	635	6xØ19 (M16)	218	L100L	B95C
100-160/40/W	125	100	125	470	670	630	1100	440	110	992	365	280	645	6xØ19 (M16)	228	112M	B95C
100-200/40/W	125	100	125	470	670	630	1100	440	110	992	365	280	645	6xØ19 (M16)	236	112M	B95C
100-200/55/W	125	100	125	470	670	630	1100	440	110	1051	385	280	665	6xØ19 (M16)	267	132S	B95D
100-200/75/W	125	100	125	470	670	630	1100	440	110	1089	385	280	665	6xØ19 (M16)	276	132M	B95D
100-250/55/W	125	100	140	470	670	630	1100	440	110	1066	385	280	665	6xØ19 (M16)	269	132S	B95D
100-250/75/W	125	100	140	470	670	630	1100	440	110	1104	385	280	665	6xØ19 (M16)	278	132M	B95D
100-250/110/W	125	100	140	470	670	630	1330	555	110	1212	365	280	645	6xØ19 (M16)	336	160M	B95E
100-315/110/W	125	100	140	470	670	630	1330	555	110	1212	365	315	680	6xØ19 (M16)	345	160M	B95E
100-315/150/W	125	100	140	470	670	630	1330	555	110	1256	365	315	680	6xØ19 (M16)	367	160L	B95E
100-315/185/W	125	100	140	470	670	630	1330	555	110	1278	385	315	700	6xØ19 (M16)	408	180M	B110B
100-315/220/W	125	100	140	470	670	630	1330	555	110	1316	385	315	700	6xØ19 (M16)	426	180L	B110B
100-315/300/W	125	100	140	470	560	520	1350	565	110	1381	355	315	672	6xØ19 (M16)	454	200L	B125B
100-400/300/W	125	100	140	530	670	630	1430	605	110	1441	420	355	775	6xØ19 (M16)	543	200L	B125C
100-400/370/W	125	100	140	530	750	710	1600	690	110	1560	415	355	823	6xØ19 (M16)	727	225S	B140B
100-400/450/W	125	100	140	530	750	710	1600	690	110	1560	415	355	823	6xØ19 (M16)	755	225M	B140B
125-200/55/W	150	125	140	470	670	630	1100	440	110	1066	385	315	700	6xØ19 (M16)	274	132S	B95D
125-200/75/W	150	125	140	470	670	630	1100	440	110	1104	385	315	700	6xØ19 (M16)	283	132M	B95D
125-200/110/W	150	125	140	470	670	630	1330	555	110	1212	365	315	680	6xØ19 (M16)	341	160M	B95E
125-250/75/W	150	125	140	470	670	630	1100	440	110	1104	385	355	740	6xØ19 (M16)	283	132M	B95D
125-250/110/W	150	125	140	470	670	630	1330	555	110	1212	365	355	720	6xØ19 (M16)	341	160M	B95E
125-250/150/W	150	125	140	470	670	630	1330	555	110	1256	365	355	720	6xØ19 (M16)	363	160L	B95E
125-315/185/W	150	125	140	530	670	630	1430	605	110	1338	400	355	755	6xØ19 (M16)	444	180M	B110D
125-315/220/W	150	125	140	530	670	630	1430	605	110	1376	400	355	755	6xØ19 (M16)	462	180L	B110D
125-315/300/W	150	125	140	530	670	630	1430	605	110	1441	420	355	775	6xØ19 (M16)	517	200L	B125C
125-315/370/W	150	125	140	530	750	710	1600	690	110	1560	415	355	823	6xØ19 (M16)	701	225S	B140B
125-400/370/W	150	125	140	530	750	710	1600	690	110	1560	440	400	848	6xØ19 (M16)	751	225S	B140B
125-400/450/W	150	125	140	530	750	710	1600	690	110	1560	440	400	848	6xØ19 (M16)	779	225M	B140B
125-400/550/W	150	125	140	530	750	710	1600	690	110	1639	440	400	848	6xØ19 (M16)	864	250M	B160B
125-400/750/W	150	125	140	530	750	710	1600	690	110	1745	440	400	882	6xØ19 (M16)	1074	280S	B180B

NOTE: Pumps with flanges according to EN 1092-2 as standard; available ASME B16.5 version on request. For flanges dimensions see drawing on page 64.

Nscf1-4p50-en_a_t0

NSCC SERIES (SPACER COUPLING) DIMENSIONS AND WEIGHTS AT 50 Hz, 4 POLES



PUMP TYPE NSCC..4	DIMENSIONS (mm)															WEIGHT (kg) G	IEC MOTOR FRAME	COUPLING TYPE
	DN _S	DN _D	a	f	x	b ₁	b ₂	l ₁	l ₂	c	L	h	h ₂	H _{max}	s			
100-160/22A/W	125	100	125	470	140	670	630	1100	440	110	1111	355	280	635	6xØ19 (M16)	221	100L	H95C
100-160/22/W	125	100	125	470	140	670	630	1100	440	110	1111	355	280	635	6xØ19 (M16)	221	100L	H95C
100-160/30/W	125	100	125	470	140	670	630	1100	440	110	1155	355	280	635	6xØ19 (M16)	221	L100L	H95C
100-160/40/W	125	100	125	470	140	670	630	1100	440	110	1128	365	280	645	6xØ19 (M16)	230	112M	H95C
100-200/40/W	125	100	125	470	140	670	630	1100	440	110	1128	365	280	645	6xØ19 (M16)	238	112M	H95C
100-200/55/W	125	100	125	470	140	670	630	1100	440	110	1187	385	280	665	6xØ19 (M16)	269	132S	H95D
100-200/75/W	125	100	125	470	140	670	630	1100	440	110	1225	385	280	665	6xØ19 (M16)	278	132M	H95D
100-250/55/W	125	100	140	470	140	670	630	1100	440	110	1202	385	280	665	6xØ19 (M16)	272	132S	H95D
100-250/75/W	125	100	140	470	140	670	630	1100	440	110	1240	385	280	665	6xØ19 (M16)	281	132M	H95D
100-250/110/W	125	100	140	470	140	670	630	1330	555	110	1348	365	280	645	6xØ19 (M16)	338	160M	H95E
100-315/110/W	125	100	140	470	140	670	630	1330	555	110	1348	365	315	680	6xØ19 (M16)	347	160M	H95E
100-315/150/W	125	100	140	470	140	670	630	1330	555	110	1392	365	315	680	6xØ19 (M16)	369	160L	H95E
100-315/185/W	125	100	140	470	140	670	630	1330	555	110	1414	385	315	700	6xØ19 (M16)	411	180M	H110B
100-315/220/W	125	100	140	470	140	670	630	1330	555	110	1452	385	315	700	6xØ19 (M16)	429	180L	H110B
100-315/300/W	125	100	140	470	140	560	520	1350	565	110	1517	355	315	672	6xØ19 (M16)	458	200L	H125C
100-400/300/W	125	100	140	530	140	670	630	1430	605	110	1577	420	355	775	6xØ19 (M16)	547	200L	H125D
100-400/370/W	125	100	140	530	140	750	710	1600	690	110	1696	415	355	823	6xØ19 (M16)	733	225S	H140B
100-400/450/W	125	100	140	530	140	750	710	1600	690	110	1696	415	355	823	6xØ19 (M16)	761	225M	H140B
125-200/55/W	150	125	140	470	140	670	630	1100	440	110	1202	385	315	700	6xØ19 (M16)	277	132S	H95D
125-200/75/W	150	125	140	470	140	670	630	1100	440	110	1240	385	315	700	6xØ19 (M16)	286	132M	H95D
125-200/110/W	150	125	140	470	140	670	630	1330	555	110	1348	365	315	680	6xØ19 (M16)	343	160M	H95E
125-250/75/W	150	125	140	470	140	670	630	1100	440	110	1240	385	355	740	6xØ19 (M16)	286	132M	H95D
125-250/110/W	150	125	140	470	140	670	630	1330	555	110	1348	365	355	720	6xØ19 (M16)	343	160M	H95E
125-250/150/W	150	125	140	470	140	670	630	1330	555	110	1392	365	355	720	6xØ19 (M16)	365	160L	H95E
125-315/185/W	150	125	140	530	140	670	630	1430	605	110	1474	400	355	755	6xØ19 (M16)	447	180M	H110C
125-315/220/W	150	125	140	530	140	670	630	1430	605	110	1512	400	355	755	6xØ19 (M16)	465	180L	H110C
125-315/300/W	150	125	140	530	140	670	630	1430	605	110	1577	420	355	775	6xØ19 (M16)	521	200L	H125D
125-315/370/W	150	125	140	530	140	750	710	1600	690	110	1696	415	355	823	6xØ19 (M16)	707	225S	H140B
125-400/370/W	150	125	140	530	140	750	710	1600	690	110	1696	440	400	848	6xØ19 (M16)	757	225S	H140B
125-400/450/W	150	125	140	530	140	750	710	1600	690	110	1696	440	400	848	6xØ19 (M16)	785	225M	H140B
125-400/550/W	150	125	140	530	140	750	710	1600	690	110	1775	440	400	848	6xØ19 (M16)	871	250M	H160B
125-400/750/W	150	125	140	530	140	750	710	1600	690	110	1881	440	400	882	6xØ19 (M16)	1081	280S	H180B

NOTE: Pumps with flanges according to EN 1092-2 as standard; available ASME B16.5 version on request. For flanges dimensions see drawing on page 64.

Nscc1-4p50-en_a_td

NSC..H

(e-NSC WITH HYDROVAR)

NSC..H SERIES (e-NSC WITH HYDROVAR)

Background and context

In all areas of application, such as building services, industry, agriculture and air-handling, the demand for intelligent pumping systems is constantly growing. There are many advantages: reduced cost for pump life cycle, lower environmental impact, longer lifetime of pipes and unions. That's why Lowara has developed the NSC..H: an intelligent pumping system which assures high level performance with energy consumption tailored to demand.

Benefits of NSC with HYDROVAR

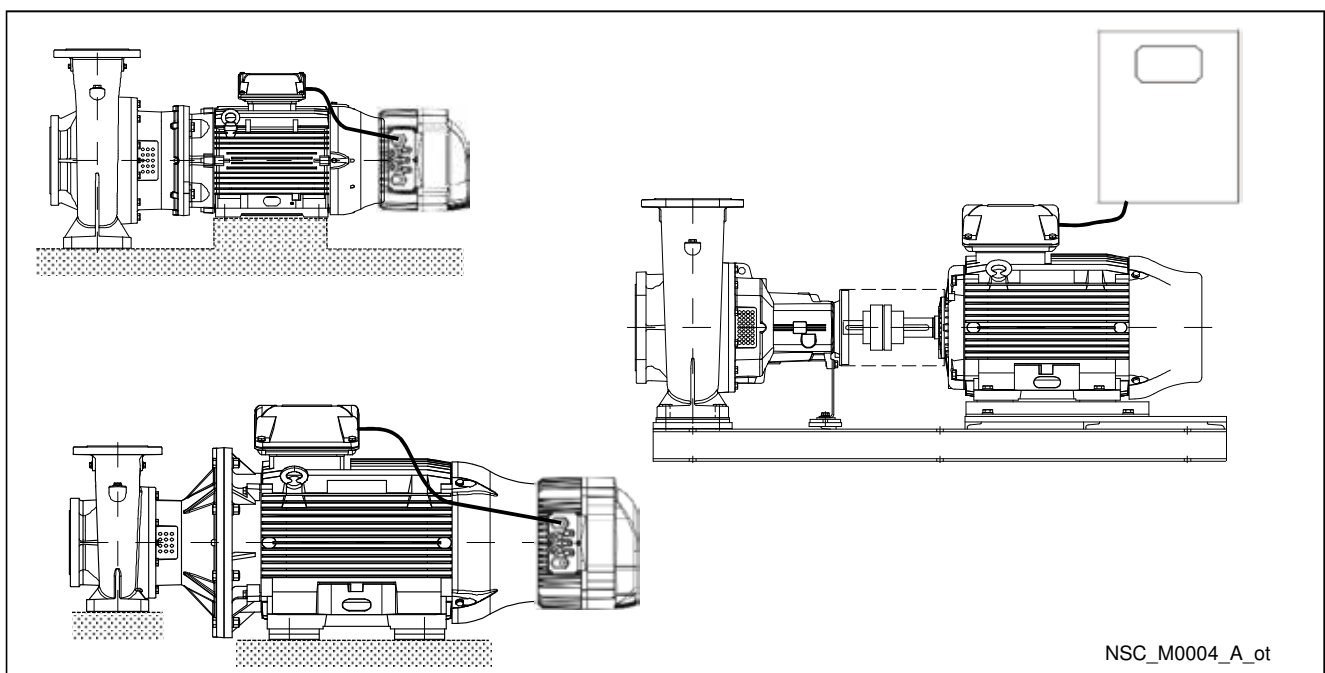
Saving: NSC..H transforms NSC pumps into variable speed intelligent pumping systems. Thanks to the HYDROVAR system, the speed of each pump varies so as to maintain a constant flow or pressure or differential pressure. The pump only receives the energy required, thus allowing considerable savings, especially for those systems in which demands varies during the day.

Easy installation and space-saving: NSC..H saves time and space during installation. Installed directly on the motor (up to 22 kW), which cools it down, and does not require a further control panel. , only fuses on the supply line (will depend upon any local electrical installation regulations). The wall-mounted HYDROVAR version is available for higher power outputs (up to 45 kW).

Standard motors: NSC..H models are fitted with three-phase standard TEFC motors with insulation class 155 (F).

Special features / benefits

- **There is no need for additional pressure sensors:** NSC..H are fitted with a pressure transmitter or differential pressure transmitters, depending on the application.
- **There is no need for special pumps or motors.**
- **There is no need for bypass or safety systems:** with HYDROVAR the pump immediately switches off when demand drops to zero or when it exceeds maximum pump capacity. This makes it unnecessary to install additional safety devices.
- **Anti-condensation device:** all units are fitted with anti-condensation devices which switch on when the pump is in standby in order to prevent condensation forming in the unit.



NSC..H SERIES (e-NSC WITH HYDROVAR)

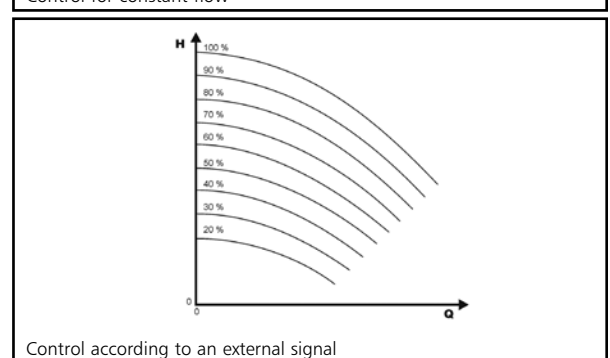
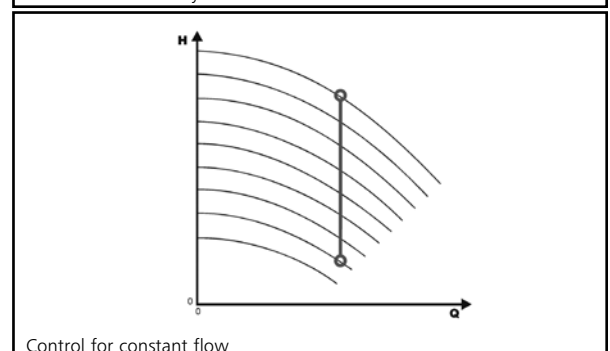
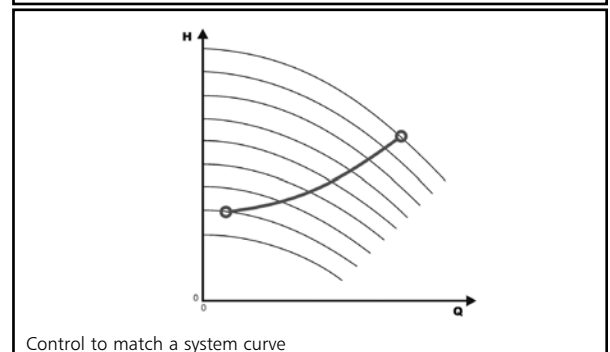
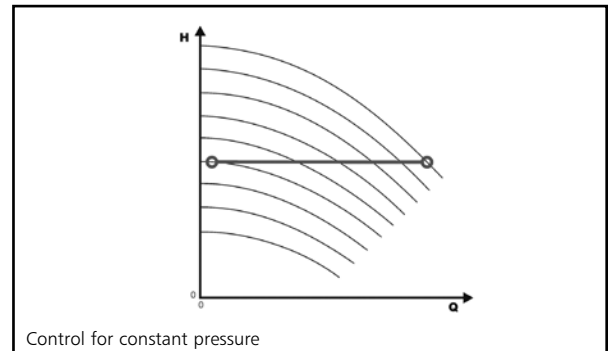
The basic function of the HYDROVAR device is to control the pump to meet the system demands.

HYDROVAR performs these functions by:

- 1) Measuring the system pressure or flow via a transmitter mounted on the pump's delivery side.
- 2) Calculating the motor speed to maintain the correct flow or pressure.
- 3) Sending out a signal to the pump to start the motor, increase speed, decrease speed or stop.
- 4) In the case of multiple pump installations, HYDROVAR will automatically provide for the cyclic changeover of the pumps' starting sequence.

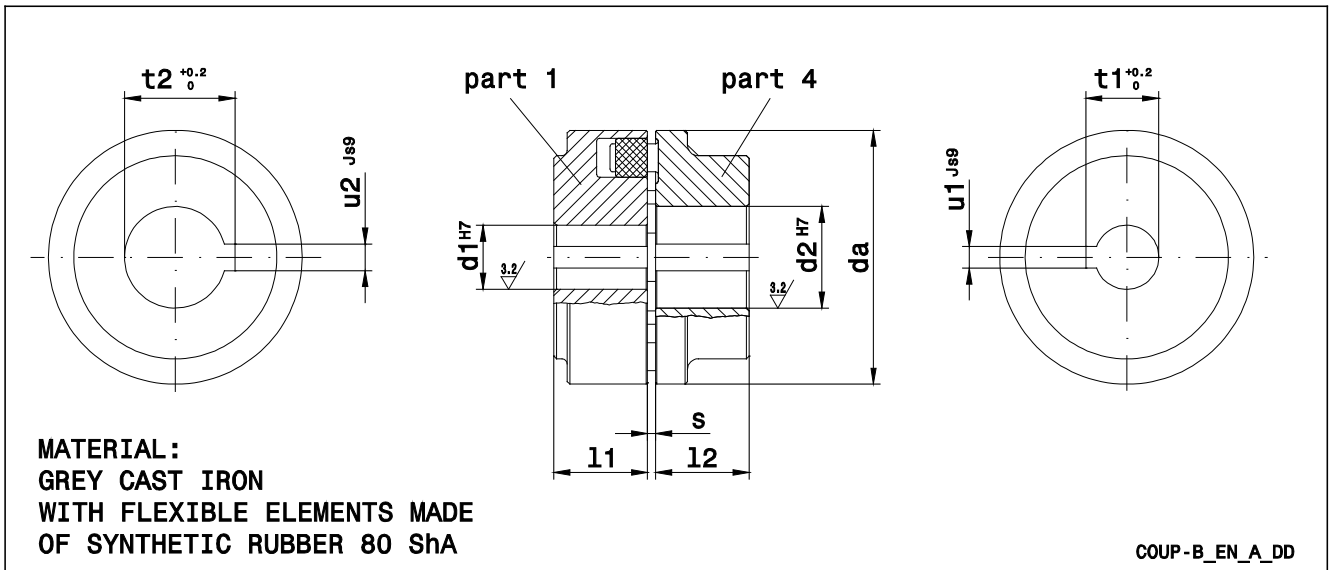
In addition to these basic functions, HYDROVAR can do things only by the most advanced computerised control systems, such as:

- Stop the pump(s) at zero demand.
- Stop the pump(s) in case of water failure on the suction side (protection against dry running).
- Stop the pump if the required delivery exceeds the pump's capacity (protection against cavitation caused by excessive demand), or automatically switch on the next pump in a multiple series.
- Protect the pump and motor from overvoltage, undervoltage, overload and earth fault.
- Vary the pump speed acceleration and deceleration time.
- Compensate for increased flow resistance at high flow rates.
- Conduct automatic test starts at set intervals.
- Monitor the converter and motor operating hours.
- Display all functions on an LCD in different languages (Italian, English, French, German, Spanish, Portuguese, Dutch).
- Send a signal to a remote control system which is proportional to the pressure and frequency.
- Communicate with another HYDROVAR or control system via an RS 485 interface.



ACCESSORIES

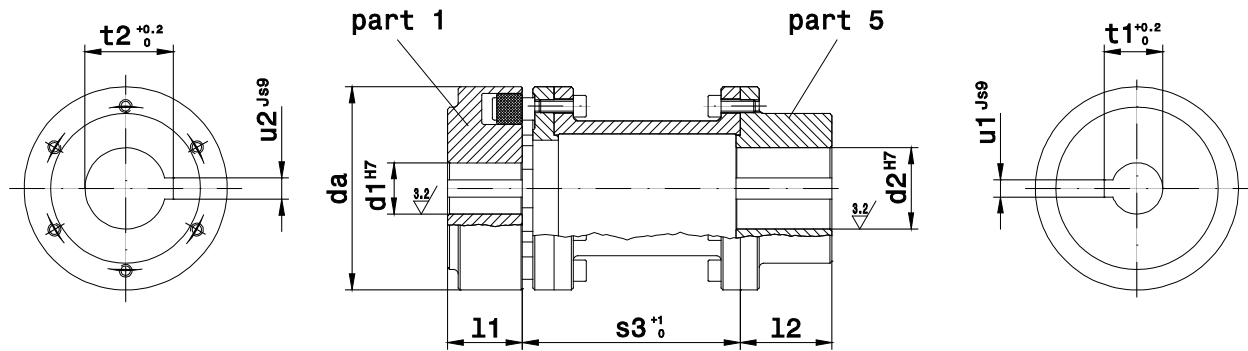
FLEXIBLE COUPLING DIMENSIONS



REF.	DENOMINATION	DIMENSIONS (mm)									
		d _a	PART 1					PART 4			
	SIZE x d ₁ x d ₂		PUMP-SIDE HALF COUPLING					MOTOR-SIDE HALF COUPLING			
			d ₁ ^{H7}	l ₁	u ₁ ^{js9}	t ₁ ^{+0.2}	s	d ₂ ^{H7}	l ₂	u ₂ ^{js9}	t ₂ ^{+0.2}
B68A	B 68 x 24 x 14	68	24	20	8	27,3	2 ÷ 4	14	20	5	16,3
B68B	B 68 x 24 x 19	68	24	20	8	27,3	2 ÷ 4	19	20	6	21,8
B68C	B 68 x 24 x 24	68	24	20	8	27,3	2 ÷ 4	24	20	8	27,3
B80A	B 80 x 24 x 28	80	24	30	8	27,3	2 ÷ 4	28	30	8	31,3
B95A	B 95 x 24 x 38	95	24	35	8	27,3	2 ÷ 4	38	35	10	41,3
B95B	B 95 x 24 x 42	95	24	35	8	27,3	2 ÷ 4	42	35	12	45,3
B95C	B 95 x 32 x 28	95	32	35	10	35,3	2 ÷ 4	28	35	8	31,3
B95D	B 95 x 32 x 38	95	32	35	10	35,3	2 ÷ 4	38	35	10	41,3
B95E	B 95 x 32 x 42	95	32	35	10	35,3	2 ÷ 4	42	35	12	45,3
B95F	B 95 x 42 x 42	95	42	35	12	45,3	2 ÷ 4	42	35	12	45,3
B110A	B 110 x 24 x 48	110	24	40	8	27,3	2 ÷ 4	48	40	14	51,8
B110B	B 110 x 32 x 48	110	32	40	10	35,3	2 ÷ 4	48	40	14	51,8
B110C	B 110 x 42 x 42	110	42	40	12	45,3	2 ÷ 4	42	40	12	45,3
B110D	B 110 x 42 x 48	110	42	40	12	45,3	2 ÷ 4	48	40	14	51,8
B125A	B 125 x 32 x 48	125	32	50	10	35,3	2 ÷ 4	48	50	14	51,8
B125B	B 125 x 32 x 55	125	32	50	10	35,3	2 ÷ 4	55	50	16	59,3
B125C	B 125 x 42 x 55	125	42	50	12	45,3	2 ÷ 4	55	50	16	59,3
B140A	B 140 x 32 x 60	140	32	55	10	35,3	2 ÷ 4	60	55	18	64,4
B140B	B 140 x 42 x 60	140	42	55	12	45,3	2 ÷ 4	60	55	18	64,4
B160A	B 160 x 32 x 65	160	32	60	10	35,3	2 ÷ 6	65	60	18	69,4
B160B	B 160 x 42 x 65	160	42	60	12	45,3	2 ÷ 6	65	60	18	69,4
B160C	B 160 x 60 x 65	160	60	60	18	64,4	2 ÷ 6	65	60	18	69,4
B180A	B 180 x 42 x 65	180	42	70	12	45,3	2 ÷ 6	65	60	18	69,4
B180B	B 180 x 42 x 75	180	42	70	12	45,3	2 ÷ 6	75	70	20	79,9
B180C	B 180 x 60 x 75	180	60	70	18	64,4	2 ÷ 6	75	70	20	79,9
B200A	B 200 x 60 x 80	200	60	80	18	64,4	2 ÷ 6	80	80	22	85,4
B225A	B 225 x 60 x 80	225	60	90	18	64,4	2 ÷ 6	80	90	22	85,4
B250A	B 250 x 60 x 100	250	60	100	18	64,4	3 ÷ 8	100	100	28	106,4

Coup-b_en_a_td

SPACER COUPLING DIMENSIONS



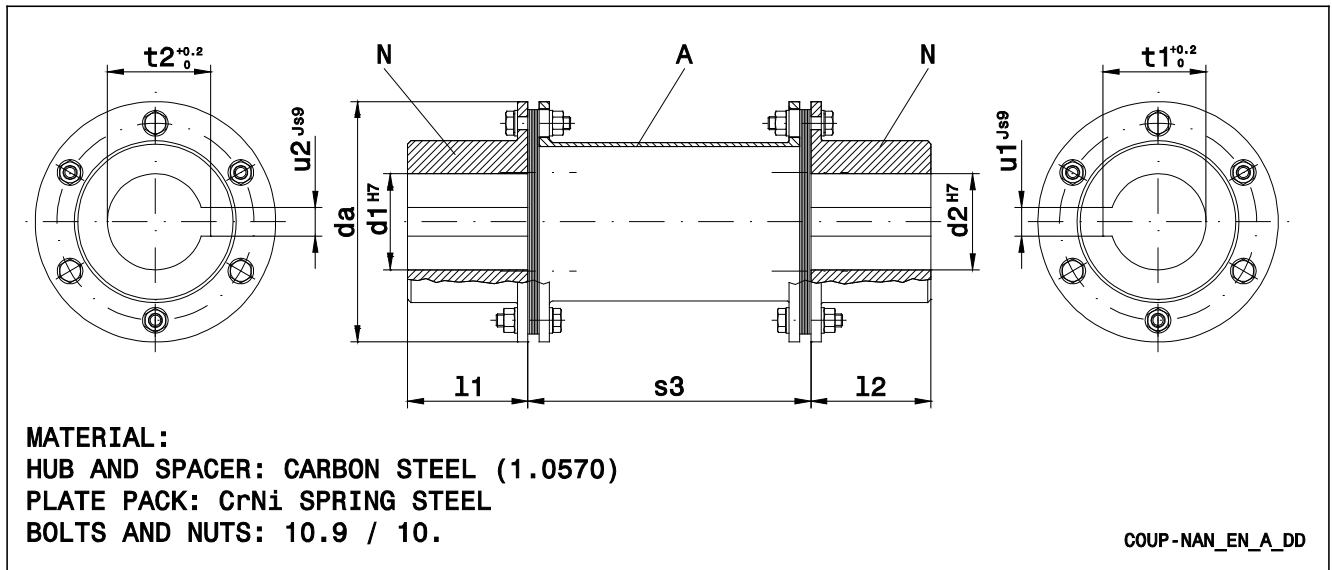
MATERIAL:
GREY CAST IRON
WITH FLEXIBLE ELEMENTS MADE
OF SYNTHETIC RUBBER 80 ShA

COUP-H_EN_A_DD

REF.	DENOMINATION	DIMENSIONS (mm)									
		da	$s_3 \begin{smallmatrix} 0 \\ +1 \end{smallmatrix}$	PART 1				PART 5			
	SIZE x l x d ₁ x d ₂			PUMP-SIDE HALF COUPLING				MOTOR-SIDE HALF COUPLING			
				d ₁ ^{H7}	l ₁	u ₁ ^{js9}	t ₁ 0 ^{+0.2}	d ₂ ^{H7}	l ₂	u ₂ ^{js9}	t ₂ 0 ^{+0.2}
H80A	H 80-100 x 24 x 19	80	100	24	30	8	27,3	19	45	6	21,8
H80B	H 80-100 x 24 x 24	80	100	24	30	8	27,3	24	45	8	27,3
H80C	H 80-100 x 24 x 28	80	100	24	30	8	27,3	28	45	8	31,3
H95A	H 95-100 x 24 x 38	95	100	24	35	8	27,3	38	45	10	41,3
H95B	H 95-100 x 24 x 42	95	100	24	35	8	27,3	42	45	12	45,3
H95C	H 95-140 x 32 x 28	95	140	32	35	10	35,3	28	45	8	31,3
H95D	H 95-140 x 32 x 38	95	140	32	35	10	35,3	38	45	10	41,3
H95E	H 95-140 x 32 x 42	95	140	32	35	10	35,3	42	45	12	45,3
H95F	H 95-140 x 42 x 42	95	140	42	35	12	45,3	42	45	12	45,3
H110A	H 110-100 x 24 x 48	110	100	24	40	8	27,3	48	50	14	51,8
H110B	H 110-140 x 32 x 48	110	140	32	40	10	35,3	48	50	14	51,8
H110C	H 110-140 x 42 x 48	110	140	42	40	12	45,3	48	50	14	51,8
H125A	H 125-100 x 24 x 55	125	100	24	50	8	27,3	55	50	16	59,3
H125B	H 125-140 x 32 x 48	125	140	32	50	10	35,3	48	50	14	51,8
H125C	H 125-140 x 32 x 55	125	140	32	50	10	35,3	55	50	16	59,3
H125D	H 125-140 x 42 x 55	125	140	42	50	12	45,3	55	50	16	59,3
H125E	H 125-200 x 42 x 48	125	200	42	50	12	45,3	48	70	14	51,8
H125F	H 125-200 x 42 x 55	125	200	42	50	12	45,3	55	70	16	59,3
H140A	H 140-140 x 32 x 60	140	140	32	55	10	35,3	60	65	18	64,4
H140B	H 140-140 x 42 x 60	140	140	42	55	12	45,3	60	65	18	64,4
H140C	H 140-200 x 42 x 60	140	200	42	55	12	45,3	60	65	18	64,4
H160A	H 160-140 x 32 x 65	160	140	32	60	10	35,3	65	70	18	69,4
H160B	H 160-140 x 42 x 65	160	140	42	60	12	45,3	65	70	18	69,4
H160C	H 160-200 x 42 x 65	160	200	42	60	12	45,3	65	70	18	69,4
H160D	H 160-250 x 60 x 65	160	250	60	60	18	64,4	65	80	18	69,4
H180A	H 180-140 x 42 x 65	180	140	42	70	12	45,3	65	80	18	69,4
H180B	H 180-140 x 42 x 75	180	140	42	70	12	45,3	75	80	20	79,9
H180C	H 180-200 x 42 x 75	180	200	42	70	12	45,3	75	80	20	79,9
H180D	H 180-250 x 60 x 75	180	250	60	70	18	64,4	75	80	20	79,9
H200A	H 200-250 x 60 x 80	200	250	60	80	18	64,4	80	90	22	85,4
H225A	H 225-250 x 60 x 80	225	250	60	90	18	64,4	80	100	22	85,4
H250A	H 250-250 x 60 x 100	250	250	60	100	18	64,4	100	110	28	106,4

Coup-h_en_a_td

SPACER COUPLING DIMENSIONS



REF.	DENOMINATION	DIMENSIONS (mm)									
		da	s ₃	N				N			
	SIZE x l x d ₁ x d ₂			PUMP-SIDE HALF COUPLING				MOTOR-SIDE HALF COUPLING			
				d ₁ ^{H7}	l ₁	u ₁ ^{js9}	t _{1 0} ^{+0.2}	d ₂ ^{H7}	l ₂	u ₂ ^{js9}	t _{2 0} ^{+0.2}
N150A	NAN 150-6 x 300 x 60 x 75	150	300	60	75	18	64,4	75	75	20	79,9
N176A	NAN 176-6 x 300 x 60 x 80	176	300	60	85	18	64,4	80	85	22	85,4
N185A	NAN 185-6 x 300 x 60 x 80	185	300	60	90	18	64,4	80	90	22	85,4
N212A	NAN 212-6 x 300 x 60 x 100	212	300	60	100	18	64,4	100	100	28	106,4

Coup-nan-en_a_td

NOTE: other accessories soon available.

REPORTS AND DECLARATIONS

REPORTS AND DECLARATIONS

i) Test reports

- a) **Factory Test Report** (Lowara identity code: 1A)
(not available for all pump types; contact Customer Service in advance)
 - Test report compiled at the end of the assembly line, including flow-head performance test (ISO 9906:2012 – Grade 3B) and tightness test.
- b) **Audit Test Report** (Lowara identity code: 1B)
 - Test report for electric pumps compiled in the test room, comprising flow-head-pump input-pump efficiency performance test (ISO 9906:2012 – Grade 3B)
- c) **NPSH Test Report** (Lowara identity code: 1A / CTF-NP)
(unavailable for submerged or submersible pumps)
 - Test report for electric pumps compiled in the test room, comprising flow-NPSH performance test (ISO 9906:2012 – Grade 3B)
- d) **Noise Test Report** (Lowara identity code: 1A / CTF-RM)
(unavailable for submerged pumps)
 - Report indicating sound pressure and power measurements (EN ISO 20361, EN ISO 11203, EN ISO 4871) using the
 - intensimetric (EN ISO 9614-1, EN ISO 9614-2), or
 - phonometric method.
- e) **Vibration Test Report**
(unavailable for submerged or submersible pumps)
 - Report indicating vibration measurements (ISO 10816-1)

ii) Declaration of product conformity with the technical requirements indicated in the order

- a) **EN 10204:2004 - type 2.1** (Lowara identity code: CTF-21)
 - does not include test results on supplied or similar products.
- b) **EN 10204:2004 - type 2.2** (Lowara identity code: CTF-22)
 - includes test results (materials certificates) on similar products.
- c) **EN 10204:2004 - type 3.1** (Lowara identity code: 1A / CTF-31 or 1B / CTF-31)
 - includes test report (*Factory Test Report* or *Audit Test Report*), list of materials, EC Declaration of Conformity (in addition to the one accompanying the product), certificates / declarations concerning materials in contact with water.

iii) Issue of a further EC Declaration of Conformity,

- in addition to the one accompanying the product, it comprises references to European law and the main technical standards (e.g.: MD 2006/42/EC, EMCD 2004/108/EC, ErP 2009/125/EC).

N.B.: if the request is made after receipt of the product, communicate the code (name) and serial number (date + progressive number).

iv) Manufacturer's declaration of conformity

- relative to one of more types of products without indicating specific codes and serial numbers.

v) Other certificates and/or documentation on request

- subject to availability or feasibility.

vi) Duplication of certificates and/or documentation on request

- subject to availability or feasibility.

TECHNICAL APPENDIX

NPSH

The minimum operating values that can be reached at the pump suction end are limited by the onset of cavitation.

Cavitation is the formation of vapour-filled cavities within liquids where the pressure is locally reduced to a critical value, or where the local pressure is equal to, or just below the vapour pressure of the liquid.

The vapour-filled cavities flow with the current and when they reach a higher pressure area the vapour contained in the cavities condenses. The cavities collide, generating pressure waves that are transmitted to the walls. These, being subjected to stress cycles, gradually become deformed and yield due to fatigue. This phenomenon, characterized by a metallic noise produced by the hammering on the pipe walls, is called incipient cavitation.

The damage caused by cavitation may be magnified by electrochemical corrosion and a local rise in temperature due to the plastic deformation of the walls. The materials that offer the highest resistance to heat and corrosion are alloy steels, especially austenitic steel. The conditions that trigger cavitation may be assessed by calculating the total net suction head, referred to in technical literature with the acronym NPSH (Net Positive Suction Head).

The NPSH represents the total energy (expressed in m.) of the liquid measured at suction under conditions of incipient cavitation, excluding the vapour pressure (expressed in m.) that the liquid has at the pump inlet.

To find the static height h_z at which to install the machine under safe conditions, the following formula must be verified:

$$h_p + h_z \geq (\text{NPSHr} + 0.5) + h_f + h_{pv} \quad (1)$$

where:

- h_p** is the absolute pressure applied to the free liquid surface in the suction tank, expressed in m. of liquid; h_p is the quotient between the barometric pressure and the specific weight of the liquid.
- h_z** is the suction lift between the pump axis and the free liquid surface in the suction tank, expressed in m.; h_z is negative when the liquid level is lower than the pump axis.
- h_f** is the flow resistance in the suction line and its accessories, such as: fittings, foot valve, gate valve, elbows, etc.
- h_{pv}** is the vapour pressure of the liquid at the operating temperature, expressed in m. of liquid. h_{pv} is the quotient between the P_v vapour pressure and the liquid's specific weight.
- 0,5** is the safety factor.

The maximum possible suction head for installation depends on the value of the atmospheric pressure (i.e. the elevation above sea level at which the pump is installed) and the temperature of the liquid.

To help the user, with reference to water temperature (4° C) and to the elevation above sea level, the following tables show the drop in hydraulic pressure head in relation to the elevation above sea level, and the suction loss in relation to temperature.

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

Elevation 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

Friction loss is shown in the tables at pages 86-87 of this catalogue. To reduce it to a minimum, especially in cases of high suction head (over 4-5 m.) or within the operating limits with high flow rates, we recommend using a suction line having a larger diameter than that of the pump's suction port. It is always a good idea to position the pump as close as possible to the liquid to be pumped.

Make the following calculation:

Liquid: water at ~15°C $\gamma = 1 \text{ kg/dm}^3$

Flow rate required: 25 m³/h

Head for required delivery: 70 m.

Suction lift: 3,5 m.

The selection is an 33SV3G075T pump whose NPSH required value is, at 25 m³/h, of 2 m.

For water at 15 °C

$$h_p = P_a / \gamma = 10,33\text{m}, h_{pv} = P_v / \gamma = 0,174\text{m} (0,01701 \text{ bar})$$

The H_f flow resistance in the suction line with foot valves is ~ 1,2 m.

By substituting the parameters in formula (1) with the numeric values above, we have:

$$10,33 + (-3,5) \geq (2 + 0,5) + 1,2 + 0,17$$

from which we have: 6,8 > 3,9

The relation is therefore verified.

VAPOUR PRESSURE

VAPOUR PRESSURE p_s AND ρ DENSITY OF WATER TABLE

t °C	T K	p_s bar	ρ kg/dm ³	t °C	T K	p_s bar	ρ kg/dm ³	t °C	T K	p_s bar	ρ kg/dm ³
0	273,15	0,00611	0,9998	55	328,15	0,15741	0,9857	120	393,15	1,9854	0,9429
1	274,15	0,00657	0,9999	56	329,15	0,16511	0,9852	122	395,15	2,1145	0,9412
2	275,15	0,00706	0,9999	57	330,15	0,17313	0,9846	124	397,15	2,2504	0,9396
3	276,15	0,00758	0,9999	58	331,15	0,18147	0,9842	126	399,15	2,3933	0,9379
4	277,15	0,00813	1,0000	59	332,15	0,19016	0,9837	128	401,15	2,5435	0,9362
5	278,15	0,00872	1,0000	60	333,15	0,1992	0,9832	130	403,15	2,7013	0,9346
6	279,15	0,00935	1,0000	61	334,15	0,2086	0,9826	132	405,15	2,867	0,9328
7	280,15	0,01001	0,9999	62	335,15	0,2184	0,9821	134	407,15	3,041	0,9311
8	281,15	0,01072	0,9999	63	336,15	0,2286	0,9816	136	409,15	3,223	0,9294
9	282,15	0,01147	0,9998	64	337,15	0,2391	0,9811	138	411,15	3,414	0,9276
10	283,15	0,01227	0,9997	65	338,15	0,2501	0,9805	140	413,15	3,614	0,9258
11	284,15	0,01312	0,9997	66	339,15	0,2615	0,9799	145	418,15	4,155	0,9214
12	285,15	0,01401	0,9996	67	340,15	0,2733	0,9793	155	428,15	5,433	0,9121
13	286,15	0,01497	0,9994	68	341,15	0,2856	0,9788	160	433,15	6,181	0,9073
14	287,15	0,01597	0,9993	69	342,15	0,2984	0,9782	165	438,15	7,008	0,9024
15	288,15	0,01704	0,9992	70	343,15	0,3116	0,9777	170	443,15	7,920	0,8973
16	289,15	0,01817	0,9990	71	344,15	0,3253	0,9770	175	448,15	8,924	0,8921
17	290,15	0,01936	0,9988	72	345,15	0,3396	0,9765	180	453,15	10,027	0,8869
18	291,15	0,02062	0,9987	73	346,15	0,3543	0,9760	185	458,15	11,233	0,8815
19	292,15	0,02196	0,9985	74	347,15	0,3696	0,9753	190	463,15	12,551	0,8760
20	293,15	0,02337	0,9983	75	348,15	0,3855	0,9748	195	468,15	13,987	0,8704
21	294,15	0,24850	0,9981	76	349,15	0,4019	0,9741	200	473,15	15,550	0,8647
22	295,15	0,02642	0,9978	77	350,15	0,4189	0,9735	205	478,15	17,243	0,8588
23	296,15	0,02808	0,9976	78	351,15	0,4365	0,9729	210	483,15	19,077	0,8528
24	297,15	0,02982	0,9974	79	352,15	0,4547	0,9723	215	488,15	21,060	0,8467
25	298,15	0,03166	0,9971	80	353,15	0,4736	0,9716	220	493,15	23,198	0,8403
26	299,15	0,03360	0,9968	81	354,15	0,4931	0,9710	225	498,15	25,501	0,8339
27	300,15	0,03564	0,9966	82	355,15	0,5133	0,9704	230	503,15	27,976	0,8273
28	301,15	0,03778	0,9963	83	356,15	0,5342	0,9697	235	508,15	30,632	0,8205
29	302,15	0,04004	0,9960	84	357,15	0,5557	0,9691	240	513,15	33,478	0,8136
30	303,15	0,04241	0,9957	85	358,15	0,5780	0,9684	245	518,15	36,523	0,8065
31	304,15	0,04491	0,9954	86	359,15	0,6011	0,9678	250	523,15	39,776	0,7992
32	305,15	0,04753	0,9951	87	360,15	0,6249	0,9671	255	528,15	43,246	0,7916
33	306,15	0,05029	0,9947	88	361,15	0,6495	0,9665	260	533,15	46,943	0,7839
34	307,15	0,05318	0,9944	89	362,15	0,6749	0,9658	265	538,15	50,877	0,7759
35	308,15	0,05622	0,9940	90	363,15	0,7011	0,9652	270	543,15	55,058	0,7678
36	309,15	0,05940	0,9937	91	364,15	0,7281	0,9644	275	548,15	59,496	0,7593
37	310,15	0,06274	0,9933	92	365,15	0,7561	0,9638	280	553,15	64,202	0,7505
38	311,15	0,06624	0,9930	93	366,15	0,7849	0,9630	285	558,15	69,186	0,7415
39	312,15	0,06991	0,9927	94	367,15	0,8146	0,9624	290	563,15	74,461	0,7321
40	313,15	0,07375	0,9923	95	368,15	0,8453	0,9616	295	568,15	80,037	0,7223
41	314,15	0,07777	0,9919	96	369,15	0,8769	0,9610	300	573,15	85,927	0,7122
42	315,15	0,08198	0,9915	97	370,15	0,9094	0,9602	305	578,15	92,144	0,7017
43	316,15	0,09639	0,9911	98	371,15	0,9430	0,9596	310	583,15	98,70	0,6906
44	317,15	0,09100	0,9907	99	372,15	0,9776	0,9586	315	588,15	105,61	0,6791
45	318,15	0,09582	0,9902	100	373,15	1,0133	0,9581	320	593,15	112,89	0,6669
46	319,15	0,10086	0,9898	102	375,15	1,0878	0,9567	325	598,15	120,56	0,6541
47	320,15	0,10612	0,9894	104	377,15	1,1668	0,9552	330	603,15	128,63	0,6404
48	321,15	0,11162	0,9889	106	379,15	1,2504	0,9537	340	613,15	146,05	0,6102
49	322,15	0,11736	0,9884	108	381,15	1,3390	0,9522	350	623,15	165,35	0,5743
50	323,15	0,12335	0,9880	110	383,15	1,4327	0,9507	360	633,15	186,75	0,5275
51	324,15	0,12961	0,9876	112	385,15	1,5316	0,9491	370	643,15	210,54	0,4518
52	325,15	0,13613	0,9871	114	387,15	1,6362	0,9476	374,15	647,30	221,20	0,3154
53	326,15	0,14293	0,9862	116	389,15	1,7465	0,9460				
54	327,15	0,15002	0,9862	118	391,15	1,8628	0,9445				

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FLOW RESISTANCE

TABLE OF FLOW RESISTANCE IN BENDS, VALVES AND GATES

The flow resistance is calculated using the equivalent pipeline length method according to the table below:

ACCESSORY TYPE	DN											
	25	32	40	50	65	80	100	125	150	200	250	300
	Equivalent pipeline length (m)											
45° bend	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° bend	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° smooth bend	0,4	0,4	0,4	0,6	0,9	1,1	1,3	1,7	1,9	2,8	3,4	3,9
Union tee or cross	1,1	1,3	1,7	2,1	2,6	3,2	4,3	5,3	6,4	7,5	10,7	12,8
Gate	-	-	-	0,2	0,2	0,2	0,4	0,4	0,6	0,9	1,1	1,3
Non return 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

G-a-pcv-en_a_th

The table is valid for the Hazen Williams coefficient $C=100$ (cast iron pipework);

for steel pipework, multiply the values by 1,41;

for stainless steel, copper and coated cast iron pipework, multiply the values by 1,85;

When the **equivalent pipeline length** has been determined, the flow resistance is obtained from the table of flow resistance.

The values given are guideline values which are bound to vary slightly according to the model, especially for gate valves and non-return valves, for which it is a good idea to check the values supplied by manufacturers.

VOLUMETRIC CAPACITY

Litres per minute l/min	Cubic metres per hour m ³ /h	Cubic feet per hour ft ³ /h	Cubic feet per minute ft ³ /min	Imperial gallon per minute Imp. gal/min	U.S. gallon per minute US gal/min
1,0000	0,0600	2,1189	0,0353	0,2200	0,2642
16,6667	1,0000	35,3147	0,5886	3,6662	4,4029
0,4719	0,0283	1,0000	0,0167	0,1038	0,1247
28,3168	1,6990	60,0000	1,0000	6,2288	7,4805
4,5461	0,2728	9,6326	0,1605	1,0000	1,2009
3,7854	0,2271	8,0208	0,1337	0,8327	1,0000

PRESSURE AND HEAD

Newton per square metre N/m ²	kilo Pascal kPa	bar bar	Pound force per square inch psi	Metre of water m H ₂ O	Millimetre of mercury mm Hg
1,0000	0,0010	1 x 10 ⁻⁵	1,45 x 10 ⁻⁴	1,02 x 10 ⁻⁴	0,0075
1 000,0000	1,0000	0,0100	0,1450	0,1020	7,5006
1 x 10 ⁵	100,0000	1,0000	14,5038	10,1972	750,0638
6 894,7570	6,8948	0,0689	1,0000	0,7031	51,7151
9 806,6500	9,8067	0,0981	1,4223	1,0000	73,5561
133,3220	0,1333	0,0013	0,0193	0,0136	1,0000

LENGTH

Millimetre mm	Centimetre cm	Metre m	Inch in	Foot ft	Yard yd
1,0000	0,1000	0,0010	0,0394	0,0033	0,0011
10,0000	1,0000	0,0100	0,3937	0,0328	0,0109
1 000,0000	100,0000	1,0000	39,3701	3,2808	1,0936
25,4000	2,5400	0,0254	1,0000	0,0833	0,0278
304,8000	30,4800	0,3048	12,0000	1,0000	0,3333
914,4000	91,4400	0,9144	36,0000	3,0000	1,0000

VOLUME

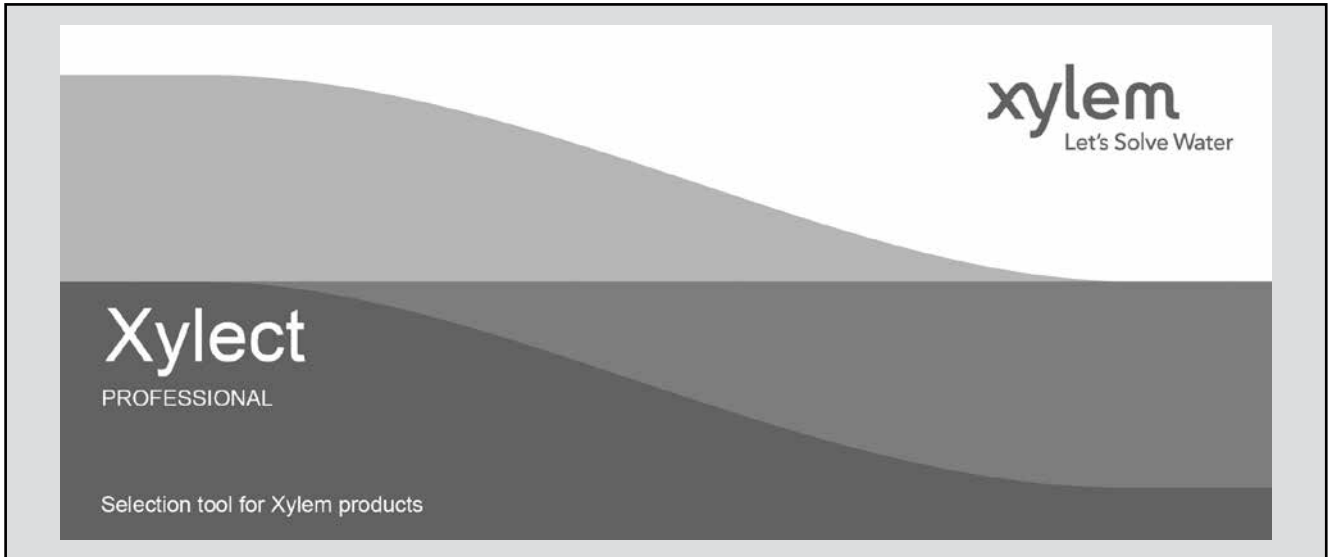
Cubic metre m ³	Litre L	Millilitre ml	Imperial gallon imp. gal.	U.S. gallon US gal.	Cubic foot ft ³
1,0000	1 000,0000	1 x 10 ⁶	219,9694	264,1720	35,3147
0,0010	1,0000	1 000,0000	0,2200	0,2642	0,0353
1 x 10 ⁻⁶	0,0010	1,0000	2,2 x 10 ⁻⁴	2,642 x 10 ⁻⁴	3,53 x 10 ⁻⁵
0,0045	4,5461	4 546,0870	1,0000	1,2009	0,1605
0,0038	3,7854	3 785,4120	0,8327	1,0000	0,1337
0,0283	28,3168	28 316,8466	6,2288	7,4805	1,0000

TEMPERATURE

Water	Kelvin K	Celsius °C	Fahrenheit °F	$^{\circ}\text{F} = ^{\circ}\text{C} \times \frac{9}{5} + 32$ $^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times \frac{5}{9}$
icing	273,1500	0,0000	32,0000	
boiling	373,1500	100,0000	212,0000	

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FURTHER PRODUCT SELECTION AND DOCUMENTATION Xylect™



Xylect™ is pump solution selection software with an extensive online database of product information across the entire Lowara, and Vogel range of pumps and related products, with multiple search options and helpful project management facilities. The system holds up-to-date product information on thousands of products and accessories.

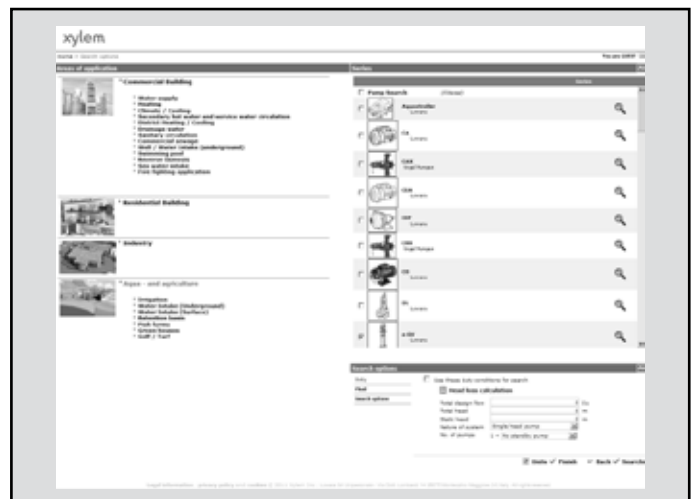
The possibility to search by applications and the detailed information output given makes it easy to make the optimal selection without having detailed knowledge about the Lowara and Vogel products.

The search can be made by:

- Application
- Product type
- Duty point

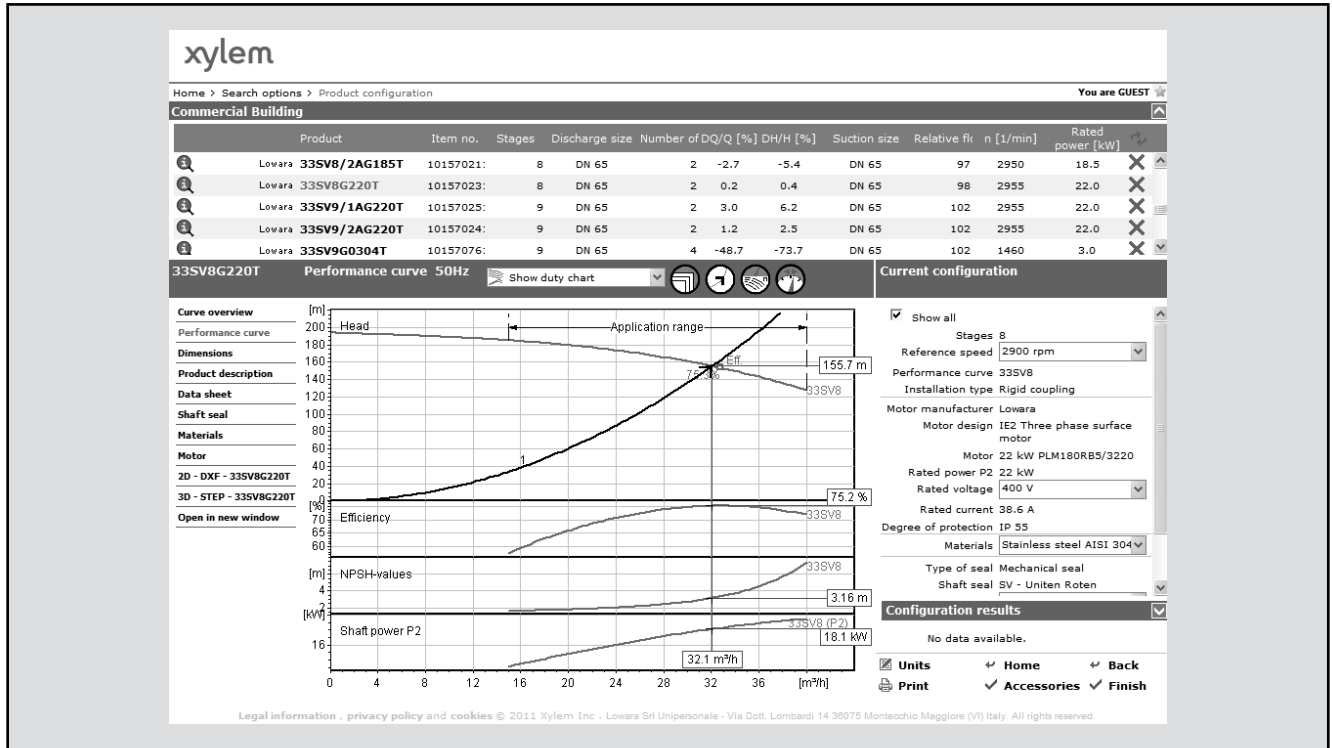
Xylect™ gives a detailed output:

- List with search results
- Performance curves (flow, head, power, efficiency, NPSH)
- Motor data
- Dimensional drawings
- Options
- Data sheet printouts
- Document downloads incl dxf files



The search by application guides users not familiar with the product range to the right choice.

FURTHER PRODUCT SELECTION AND DOCUMENTATION Xylect™



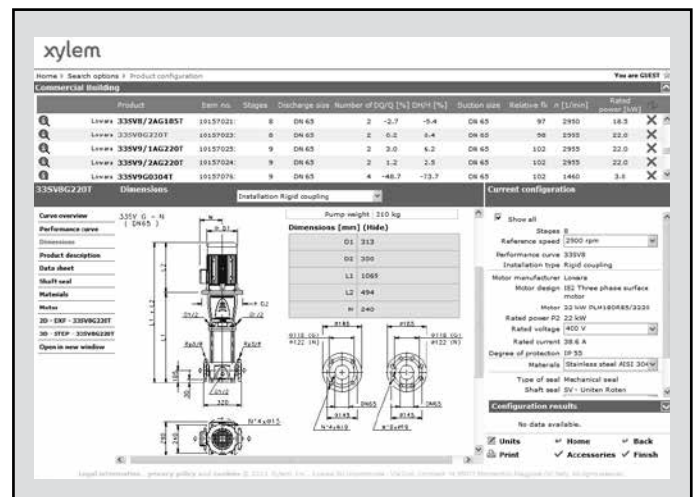
The detailed output makes it easy to select the optimal pump from the given alternatives.

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- Set own standard units
- Create and save projects
- Share projects with other Xylect™ users

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Dimensional drawings appear on the screen and can be downloaded in dxf format.

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- 2) a leading global water technology company.

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