

# Introduction

Flowserve is the recognized world leader in supplying pumps, valves, seals, automation, and services to the power, oil, gas, chemical, and other industries. With more than 16,000 employees in more than 50 countries, we combine our global reach with a local presence. Flowserve has a history that is long and distinct, tracing its history to 1840 with the earliest application of steam pumping engines. Flowserve has grown into a driving force in the pump marketplace. No other pump company has the depth or breadth of expertise in successful application of pre-engineers, engineered, and special purpose pumps and systems. Flowserve's success across markets and regions worldwide demonstrates our continued strength throughout various industries.

Flowserve can provide all aspects for the pump life cycle from inquiry to installation, startup and aftermarket support. Aftermarket support for pumping equipment can be a critical consideration during the evaluation process. As outlined in this document, Flowserve maintains a network of technical support engineers, service and repair centers, fast response centers, and regional parts services offices, assuring the highest available level of service in the world. This far-reaching network provides:

- Customer service technicians on call 24 / 7 to respond to customer needs and to provide reliable solutions
- Immediate shipment of inventoried components
- Quick turnaround manufacturing for all non-stock components

To summarize, the benefits of a partnership with Flowserve include:

- Advanced technology solutions
- Outstanding product reliability
- World class products
- Service and support throughout the equipment life cycle
- Application expertise
- Competitive price and delivery

Flowserve looks forward to working with you on this Project. As a complete company, you can count on Flowserve to manage your fluid handling requirements today, while anticipating your needs for tomorrow.

# Introduction

## *Heritage Names of Distinction*

### Pumping Systems

ACEC™ Centrifugal Pumps  
Aldrich™ Pumps  
Byron Jackson® Pumps  
Calder™ Energy Recovery Devices  
Cameron™ Pumps  
Durco® Process Pumps  
Flowserve® Pumps  
IDP® Pumps  
Lawrence Pumps®  
Niigata Worthington™ Pumps  
Pacific® Pumps  
Pleuger® Pumps  
Scienco™ Pumps  
Sier-Bath® Rotary Pumps  
SIHI® Pumps  
TKL™ Pumps  
United Centrifugal® Pumps  
Western Land Roller™ Irrigation Pumps  
Wilson-Snyder® Pumps  
Worthington® Pumps  
Worthington Simpson™ Pumps

### Flow Control Products

Accord™	NAF™
Anchor Darling™	NAVEL™
Argus™	Noble Alloy™
Atomac™	Norbro™
Automax™	Nordstrom Audco™
Durco™	PMV™
Edward™	Schmidt Armaturen™
Gestra™	Serck Audco™
Kammer™	Valbart™
Limitorque™	Valtek™
Logix™	Vogt™
MARPAC™	Worcester Controls™
McCANNA™	

### Sealing Solutions

BW Seals®	Interseal™
Durametallic®	Pacific Wietz™
Five Star Seal™	Pac-Seal®
HTO Hydro Technik™	

*For more information regarding Flowserve Corporation, please visit our website at [www.flowserve.com](http://www.flowserve.com).*

# Technical Details

This section may contain the following Technical details for each Item:

Completed Customer Data Sheets

Scope of Supply Sheet

Pump Performance Curve & Characteristics

Preliminary General Arrangement Drawing

Pump Cross-Sectional Drawing

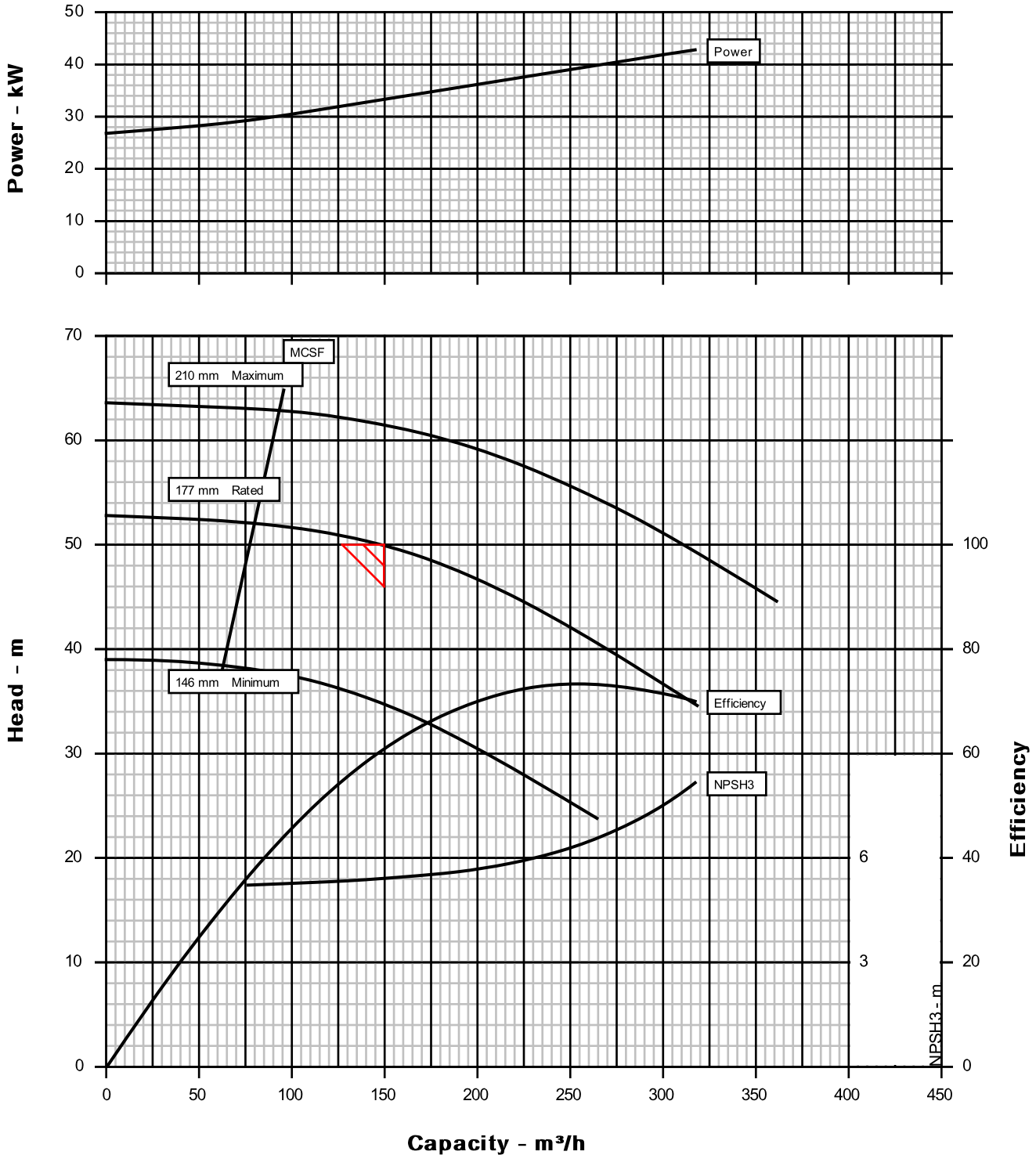
Pump Forces & Moments



Pump size & type : 2K125-100-200A-OP  
Based on curve no. : E591/0109/1  
Number of stages : 1

Capacity : 150.0 m<sup>3</sup>/h  
Head : 50.00 m  
Density / Specific gravity : 998.16 kg/m<sup>3</sup> / 0.999  
Pump speed : 2960 rpm  
Test tolerance : ISO 9906 Grade 2B

CURVES ARE APPROXIMATE, PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS; CAPACITY, HEAD, AND EFFICIENCY.

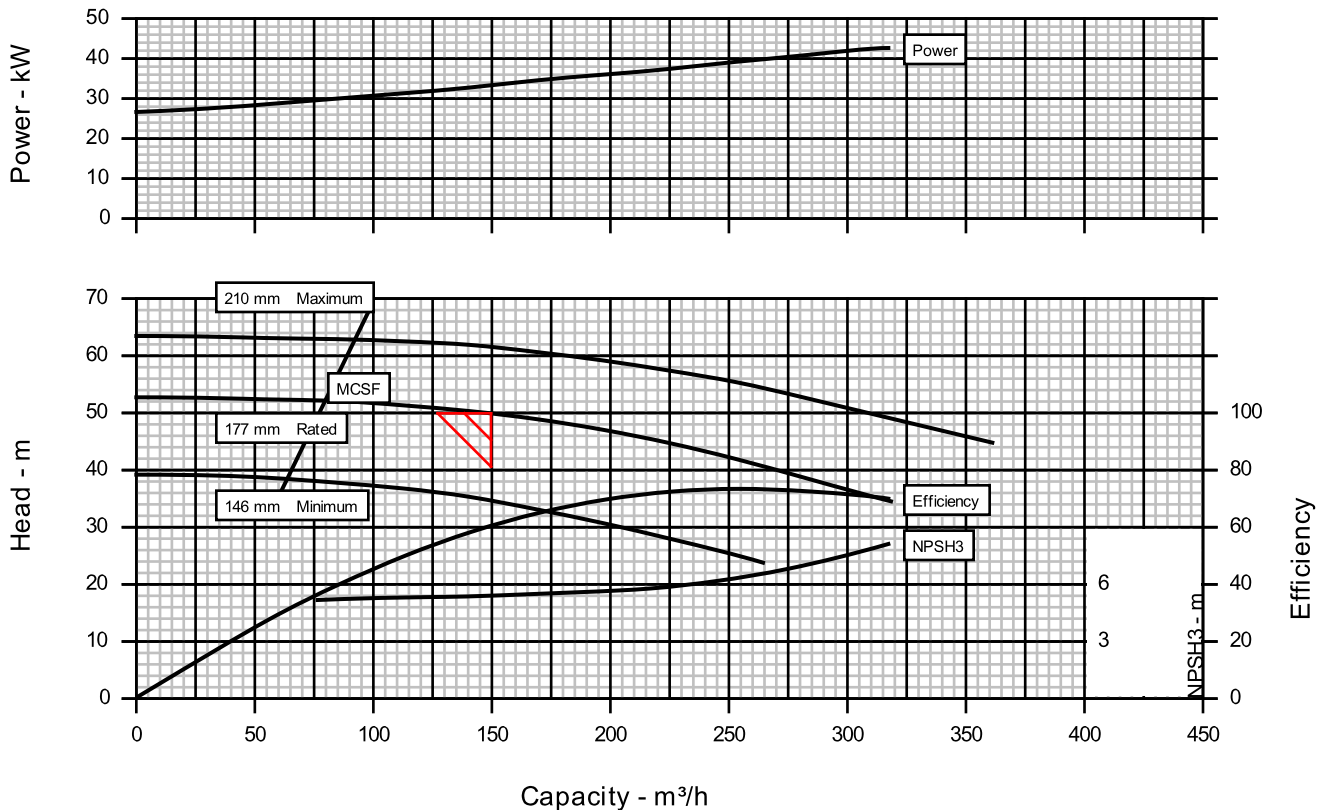


Pump / Stages : 2K125-100-200A-OP / 1  
 Based on curve no. : E591/0109/1  
 Flowserve reference : 683707171  
 Date : September 12, 2016

Operating Conditions		Materials / Specification	
Capacity (rated/normal)	: 150.0 m <sup>3</sup> /h / -	Material column code	: DI
Water capacity (CQ=1.00)	: -	Pump specification	: -
Total developed head	: 50.00 m	Other Requirements	
Water head (CH=1.00)	: -	Hydraulic selection	: No specification
NPSHa/NPSHa less margin	: 10.2 m / -	Construction	: No specification
Maximum suction pressure	: 0.0 barg	Test tolerance	: ISO 9906 Grade 2B
Liquid		Driver Sizing	: ISO 5199
Liquid type	: Fresh water	Performance data based on	standard impeller
Liquid description	:	Seal configuration	: Single Seal
Temperature	: 16 °C		
Density / Specific gravity	: 998.16 kg/m <sup>3</sup> / 0.999		
Solid Size - Actual / Limit	: 0 mm / 13 mm		
Viscosity / Vapor pressure	: 1.00 cP / 0.02 bara		

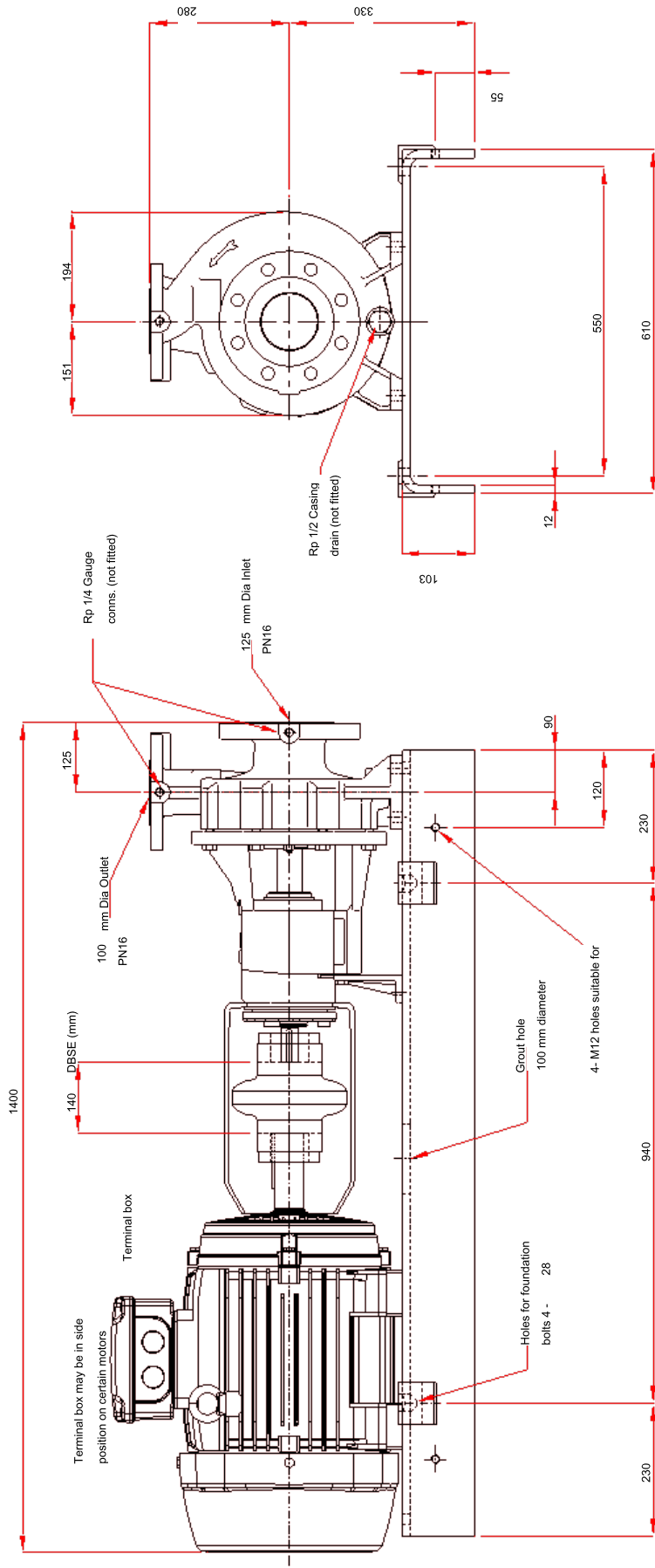
Performance			
Hydraulic power	: 20.4 kW	Impeller diameter	
Pump speed	: 2,960 rpm	Rated	: 177 mm
Pump overall efficiency (CE=1.00)	: 61.2 %	Maximum	: 210 mm
NPSH required (NPSH3)	: 5.4 m	Minimum	: 146 mm
Rated power	: 33.3 kW	Suction specific speed	: 10,130 (US units)
		Minimum continuous flow	: 77.8 m <sup>3</sup> /h
Maximum power	: 42.9 kW	Maximum head at rated diameter	: 52.72 m
Driver power	: 45.0 kW / 60.3 hp	Flow at BEP	: 254.0 m <sup>3</sup> /h
Casing working pressure	: 5.2 barg	Flow as % of BEP	: 59.1 %
(based on shut off @ cut dia/rated SG)		Efficiency at normal flow	: -
Maximum allowable	: 16.0 barg	Impeller diameter ratio (rated/max)	: 84.3 %
Hydrostatic test pressure	: 24.0 barg	Head rise to shut off	: 5.4 %
Estimated rated seal chamber pressure	: 2.2 barg	Total head ratio (rated/max)	: 81.2 %

CURVES ARE APPROXIMATE, PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS; CAPACITY, HEAD, AND EFFICIENCY.



					Pump / Stages	: 2K125-100-200A-OP / 1		
					Based on curve no.	: E591/0109/1		
					Flowserve reference	: 683707171		
					Date	: September 12, 2016		
Construction					Driver Information			
Nozzles	Size	Rating	Face	Position	Manufacturer	: ABB		
Suction	125 mm	PN16	RF	End	Power	: 45.0 kW / 60.3 hp		
Discharge	100 mm	PN16	-	Top	Service factor (requested / actual)	: 1.0 / -		
Casing mounting					: Foot	Synchronous speed	: 3000 rpm	
Casing split					: Radial	Orientation / Mounting	: Horizontal / Foot	
Impeller type					: Semi Open	Driver type	: IEC	
Bearing type (radial)					: Ball	Frame-size / material	: 225M / Cast Iron	
Bearing number (radial)					: 6309	Enclosure	: -	
Bearing type (thrust)					: Dbl.Ball	Hazardous area class	: -	
Bearing number (thrust)					: 3309	Explosion 'T' rating	: -	
Bearing lubrication					: Flood	Volts / Phase / Hz	: 400 / 3 / 50 Hz	
Rotation (view from driver)					: CW per Hyd. Institute	Amps-full load/locked rotor	: - / -	
Materials					Motor starting		: Direct on line (DOL)	
Casing					: Ductile Iron	Insulation	: F	
Impeller					: Duplex St. St	Temperature rise	: 80 C	
Seal chamber					: Ductile Iron	Bearings	: -	
Shaft					: SS316	Lubrication	: -	
Sleeve					: No sleeve fitted	Motor mounted by	: FPD	
Baseplate, Coupling and Guard					Sound Pressure (dBA @ 1.0 m)			
Baseplate type					: Folded base	Driver, expected	: 76.0 dBA	
Baseplate material					: Mild steel	Pump & driver, estimated	: -	
Baseplate size					: ISO 3661 No7	Seal Information		
Coupling manufacturer					: FPD Choice	Arrangement	: Cartridge	
Coupling size					: FPD-S7	Size	: 45 mm	
Coupling / Shaft guard					: ClearGuard	Manufacturer / Type	: Flowserve / -	
Shaft / seal guard					: St St	Material code (Man'f/API)	: C2CPXM045ECXVX / -	
Weights (Approx.)					Internal neck bushing		: -	
Bareshaft pump (net)					: 90.0 kg	Gland		
Baseplate (net)					: 107.0 kg	Gland material	: -	
Driver (net)					: 287.0 kg	Flush	: -	
Shipping gross weight/volume					: 629.2 kg / 0.90 m³	Vent	: -	
Testing					Drain		: -	
Hydrostatic test					: Non witnessed	Auxiliary seal device		: -
Performance test					: None	Piping		
NPSH test					: None	Seal flush plan	: Other	
Paint and Package					Seal flush construction		: -	
Pump paint					: 1 Coat Epoxy ESS 261	Seal flush material	: -	
Base grout surface prep					: -	Aux seal flush plan	: -	
Shipment type					: -	Aux seal flush construction	: -	
					Aux seal flush material		: -	
Notes								
Sound Pressure Levels								
- Subject to 3 dBA tolerance								
-								
-								
-								
ver. 11-6-15								

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Not To Scale

Certified Drawing available with order

Pump size & type Pump speed / Stages Flow / Head Driver power / Frame Volts / Phase / Hz	: 2K125-100-200A-OP : 2,960 rpm / 1 : 150.0 m <sup>3</sup> /h / 50.00 m : 45.0 kW / 60.3 hp / 225M : 400 / 3 / 50 Hz	
	Drawing number Date Certified by / Date Seal type Seal flush plan	: - : September 12, 2016 : - : - : Other

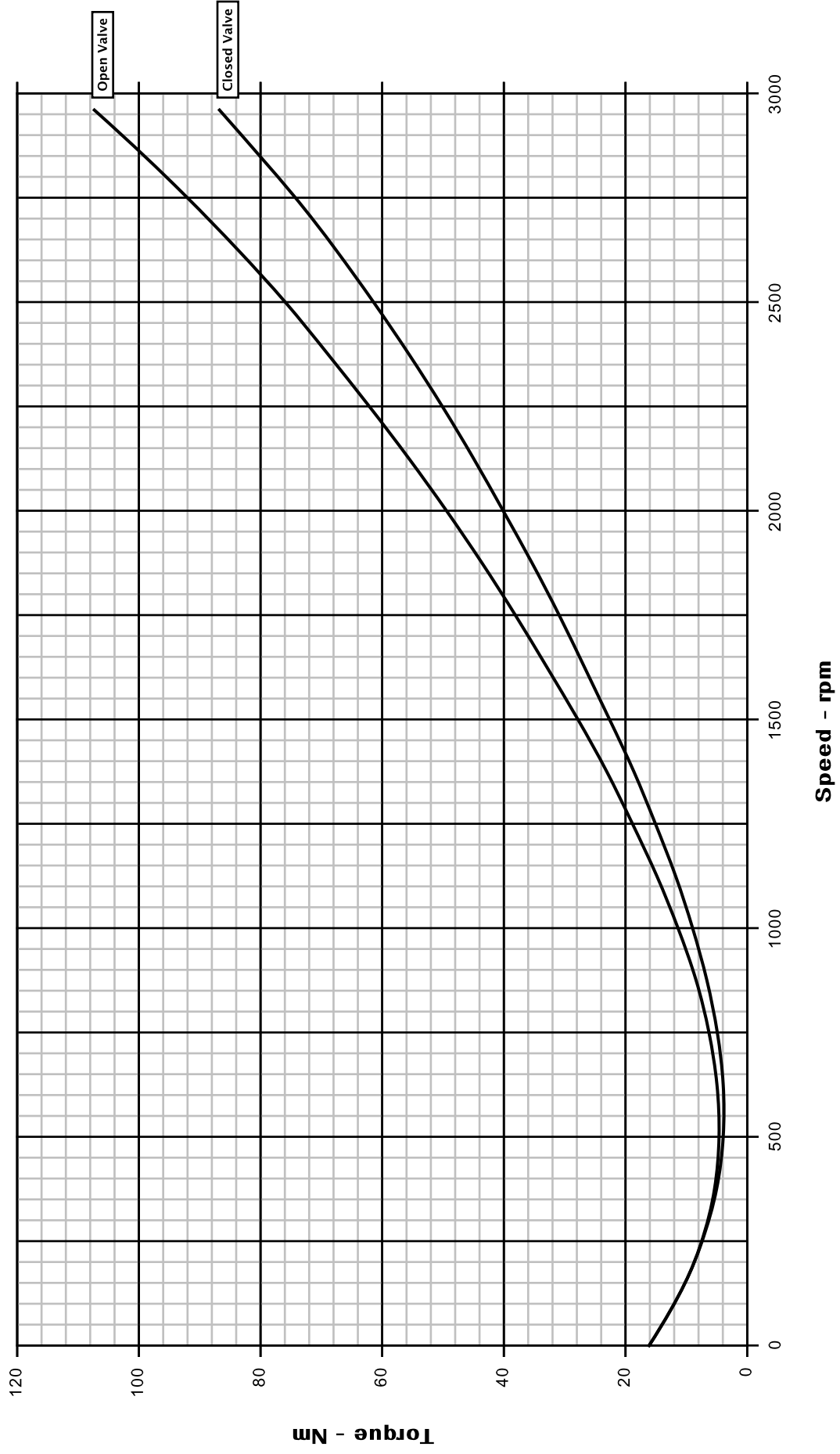


Capacity : 150.0 m<sup>3</sup>/h  
Head : 50.00 m

Density / Specific gravity : 998.16 kg/m<sup>3</sup> / 0.999  
Pump speed : 2960 rpm

Pump size & type : 2K125-100-200A-OP  
Based on curve no. : E591/0109/1  
Number of stages : 1

CURVES ARE APPROXIMATE. PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS; CAPACITY, HEAD, AND EFFICIENCY.

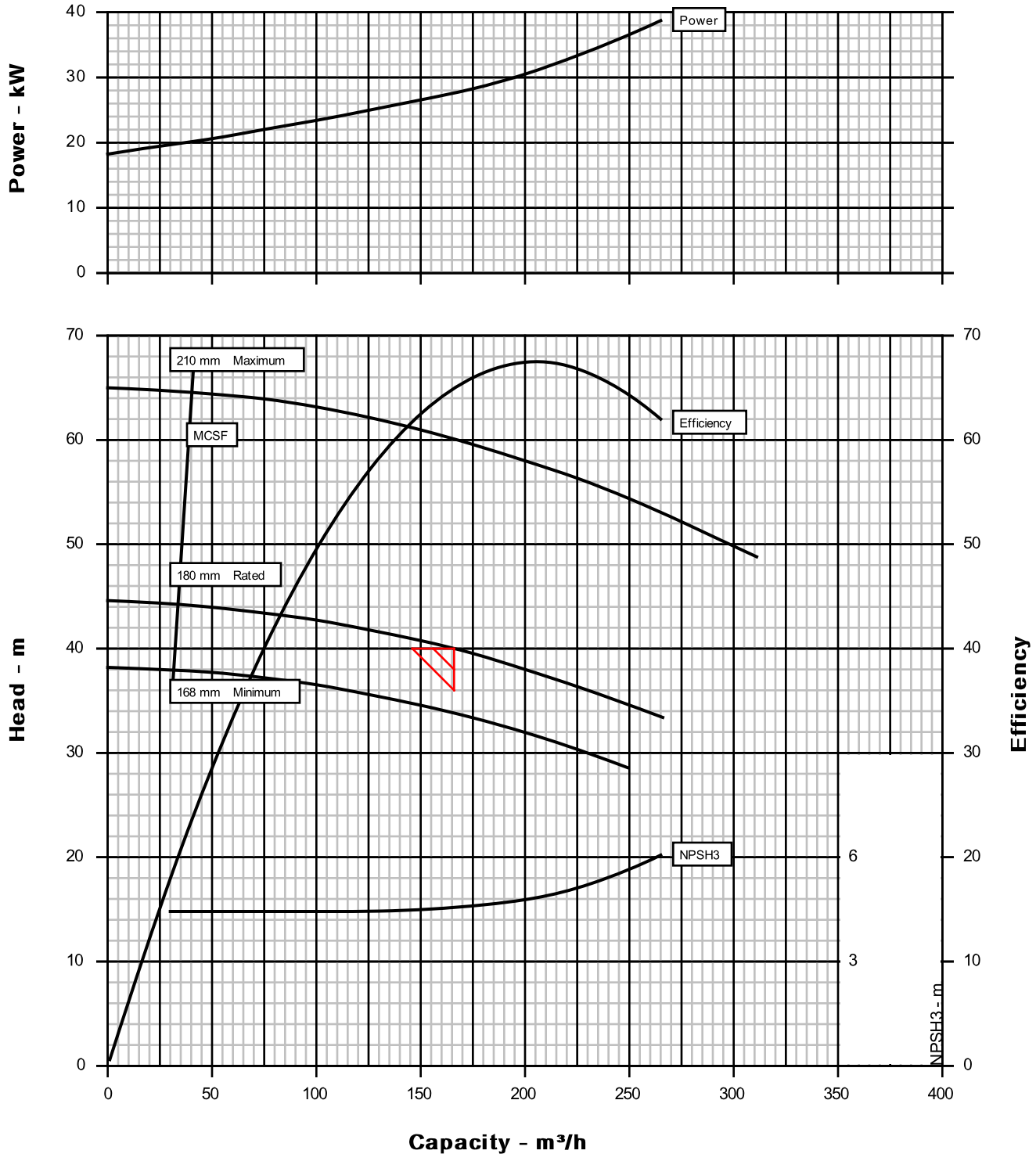




Pump size & type : 2K125-100-200B-OP  
 Based on curve no. : E591/0426  
 Number of stages : 1

Capacity : 166.0 m<sup>3</sup>/h  
 Head : 40.00 m  
 Density / Specific gravity : 998.16 kg/m<sup>3</sup> / 0.999  
 Pump speed : 2960 rpm  
 Test tolerance : ISO 9906 Grade 2B

CURVES ARE APPROXIMATE, PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS; CAPACITY, HEAD, AND EFFICIENCY.

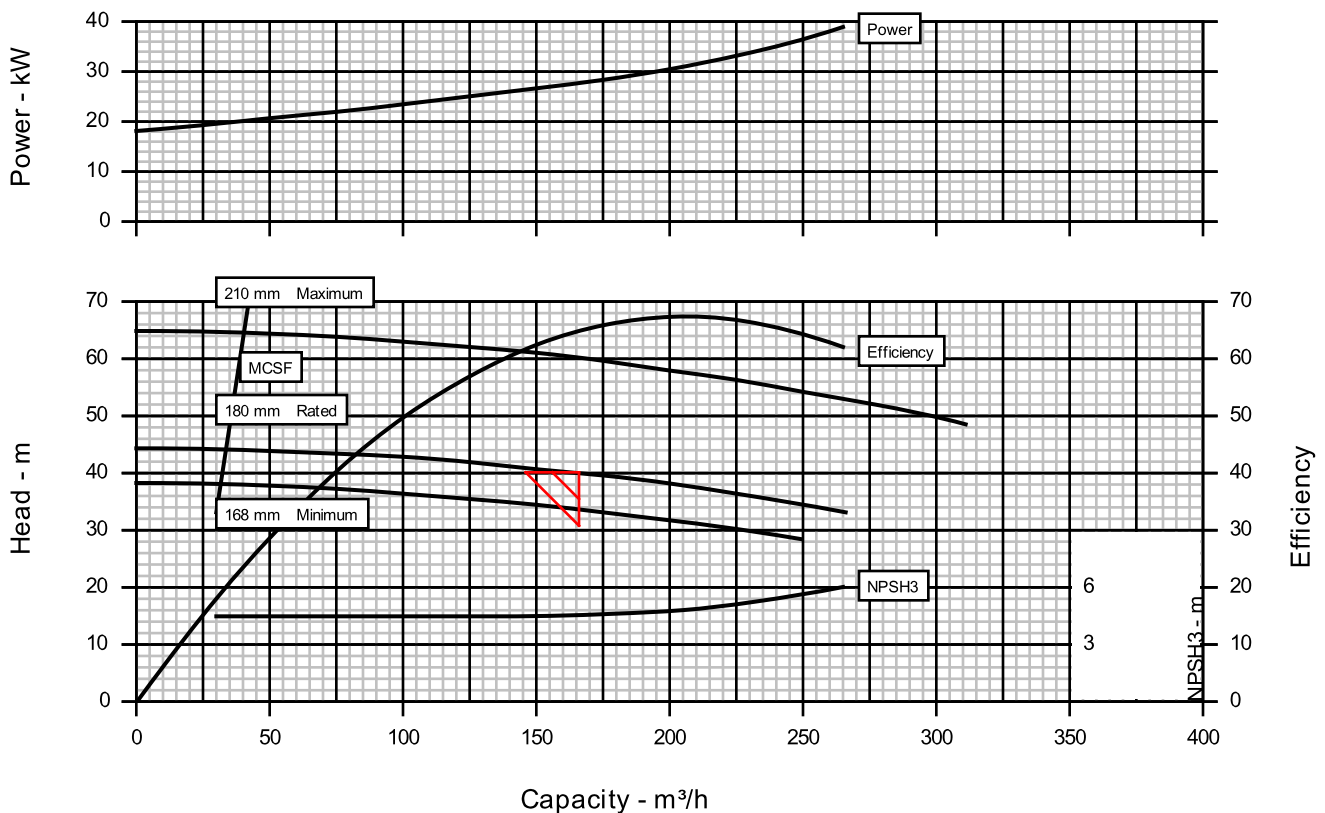


Pump / Stages : 2K125-100-200B-OP / 1  
 Based on curve no. : E591/0426  
 Flowserve reference : 683707171  
 Date : September 12, 2016

Operating Conditions		Materials / Specification	
Capacity (rated/normal)	: 166.0 m <sup>3</sup> /h / -	Material column code	: DI
Water capacity (CQ=1.00)	: -	Pump specification	: -
Total developed head	: 40.00 m	Other Requirements	
Water head (CH=1.00)	: -	Hydraulic selection	: No specification
NPSHa/NPSHa less margin	: 10.2 m / -	Construction	: No specification
Maximum suction pressure	: 0.0 barg	Test tolerance	: ISO 9906 Grade 2B
Liquid		Driver Sizing	: ISO 5199
Liquid type	: Fresh water	Performance data based on	standard impeller
Liquid description	:	Seal configuration	: Single Seal
Temperature	: 16 °C		
Density / Specific gravity	: 998.16 kg/m <sup>3</sup> / 0.999		
Solid Size - Actual / Limit	: 0 mm / 13 mm		
Viscosity / Vapor pressure	: 1.00 cP / 0.02 bara		

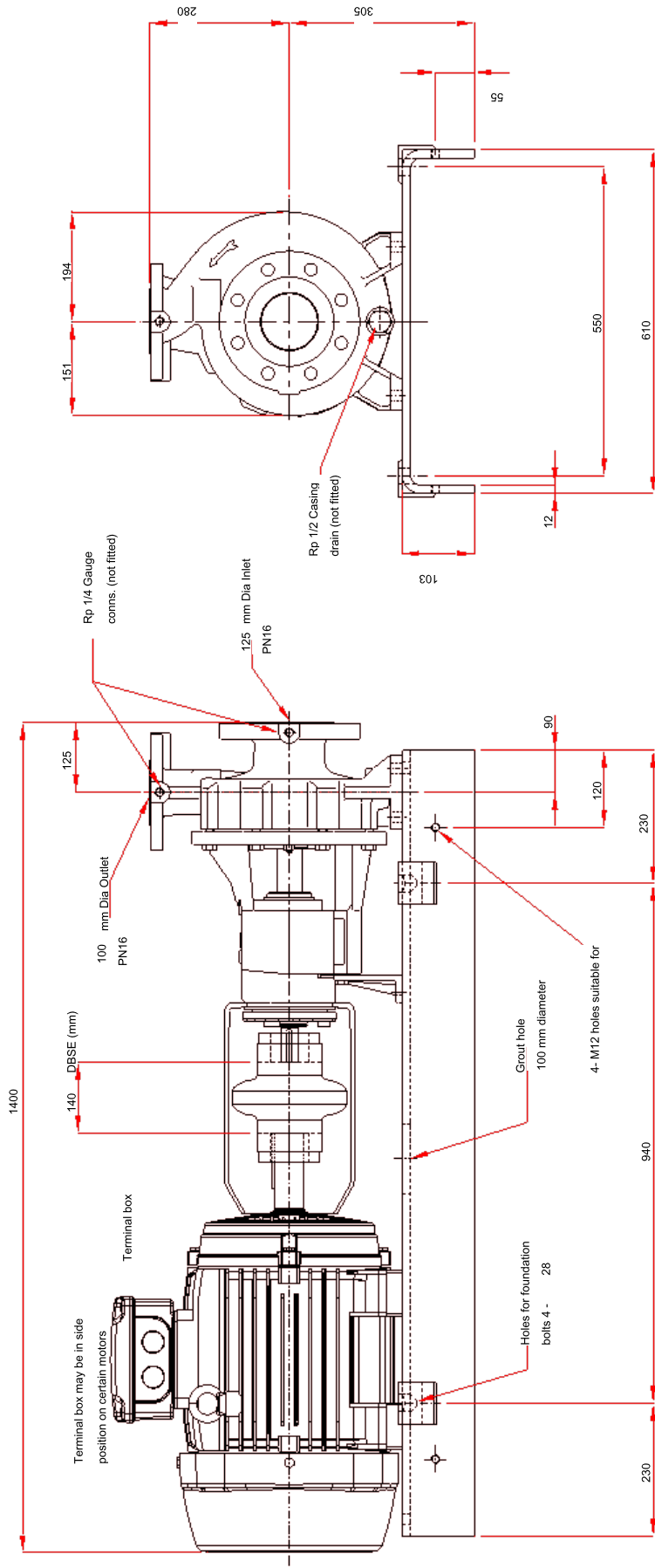
Performance			
Hydraulic power	: 18.0 kW	Impeller diameter	
Pump speed	: 2,960 rpm	Rated	: 180 mm
Pump overall efficiency (CE=1.00)	: 65.3 %	Maximum	: 210 mm
NPSH required (NPSH3)	: 4.5 m	Minimum	: 168 mm
Rated power	: 27.6 kW	Suction specific speed	: 11,220 (US units)
		Minimum continuous flow	: 34.2 m <sup>3</sup> /h
Maximum power	: 39.0 kW	Maximum head at rated diameter	: 44.54 m
Driver power	: 37.0 kW / 49.6 hp	Flow at BEP	: 205.8 m <sup>3</sup> /h
Casing working pressure	: 4.4 barg	Flow as % of BEP	: 80.7 %
(based on shut off @ cut dia/rated SG)		Efficiency at normal flow	: -
Maximum allowable	: 16.0 barg	Impeller diameter ratio (rated/max)	: 85.7 %
Hydrostatic test pressure	: 24.0 barg	Head rise to shut off	: 11.3 %
Estimated rated seal chamber pressure	: 1.8 barg	Total head ratio (rated/max)	: 66.5 %

CURVES ARE APPROXIMATE, PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS; CAPACITY, HEAD, AND EFFICIENCY.



					Pump / Stages	: 2K125-100-200B-OP	/ 1
					Based on curve no.	: E591/0426	
					Flowserve reference	: 683707171	
					Date	: September 12, 2016	
Construction					Driver Information		
Nozzles	Size	Rating	Face	Position	Manufacturer	: ABB	
Suction	125 mm	PN16	RF	End	Power	: 37.0 kW / 49.6 hp	
Discharge	100 mm	PN16	-	Top	Service factor (requested / actual)	: 1.0 / -	
Casing mounting					: Foot		
Casing split					: Radial		
Impeller type					: Semi Open		
Bearing type (radial)					: Ball		
Bearing number (radial)					: 6309		
Bearing type (thrust)					: Dbl.Ball		
Bearing number (thrust)					: 3309		
Bearing lubrication					: Flood		
Rotation (view from driver)					: CW per Hyd. Institute		
Materials					Synchronous speed		
Casing					: Ductile Iron		
Impeller					: Duplex St. St		
Seal chamber					: Ductile Iron		
Shaft					: SS316		
Sleeve					: No sleeve fitted		
Baseplate, Coupling and Guard					Orientation / Mounting		
Baseplate type					: Folded base		
Baseplate material					: Mild steel		
Baseplate size					: ISO 3661 No7		
Coupling manufacturer					: FPD Choice		
Coupling size					: FPD-S7		
Coupling / Shaft guard					: ClearGuard		
Shaft / seal guard					: St St		
Weights (Approx.)					Driver type		
Bareshaft pump (net)					: 90.0 kg		
Baseplate (net)					: 107.0 kg		
Driver (net)					: 257.0 kg		
Shipping gross weight/volume					: 590.2 kg / 0.87 m³		
Testing					Frame-size / material		
Hydrostatic test					: Non witnessed		
Performance test					: None		
NPSH test					: None		
Paint and Package					Enclosure		
Pump paint					: 1 Coat Epoxy ESS 261		
Base grout surface prep					: -		
Shipment type					: -		
					Hazardous area class		
					: -		
					Explosion 'T' rating		
					: -		
					Volts / Phase / Hz		
					: 400 / 3 / 50 Hz		
					Amps-full load/locked rotor		
					: - / -		
					Motor starting		
					: Direct on line (DOL)		
					Insulation		
					: F		
					Temperature rise		
					: 80 C		
					Bearings		
					: -		
					Lubrication		
					: -		
					Motor mounted by		
					: FPD		
					Sound Pressure (dBA @ 1.0 m)		
					Driver, expected		
					: 73.0 dBA		
					Pump & driver, estimated		
					: -		
					Seal Information		
					Arrangement		
					: Cartridge		
					Size		
					: 45 mm		
					Manufacturer / Type		
					: Flowserve / -		
					Material code (Man'f/API)		
					: C2CPXM045ECXVX / -		
					Internal neck bushing		
					: -		
					Gland		
					Gland material		
					: -		
					Flush		
					: -		
					Vent		
					: -		
					Drain		
					: -		
					Auxiliary seal device		
					: -		
					Piping		
					Seal flush plan		
					: Other		
					Seal flush construction		
					: -		
					Seal flush material		
					: -		
					Aux seal flush plan		
					: -		
					Aux seal flush construction		
					: -		
					Aux seal flush material		
					: -		
Notes							
Sound Pressure Levels							
- Subject to 3 dBA tolerance							
-							
-							
-							
ver. 11-6-15							

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Not To Scale

Certified Drawing available with order

<b>Pump size &amp; type</b> : 2K125-100-200B-OP <b>Pump speed / Stages</b> : 2,960 rpm / 1 <b>Flow / Head</b> : 166.0 m <sup>3</sup> /h / 40.00 m <b>Driver power / Frame</b> : 37.0 kW / 49.6 hp / 200L <b>Volts / Phase / Hz</b> : 400 / 3 / 50 Hz	<b>Drawing number</b> : -
	<b>Date</b> : September 12, 2016 <b>Certified by / Date</b> : - <b>Seal type</b> : - <b>Seal flush plan</b> : Other

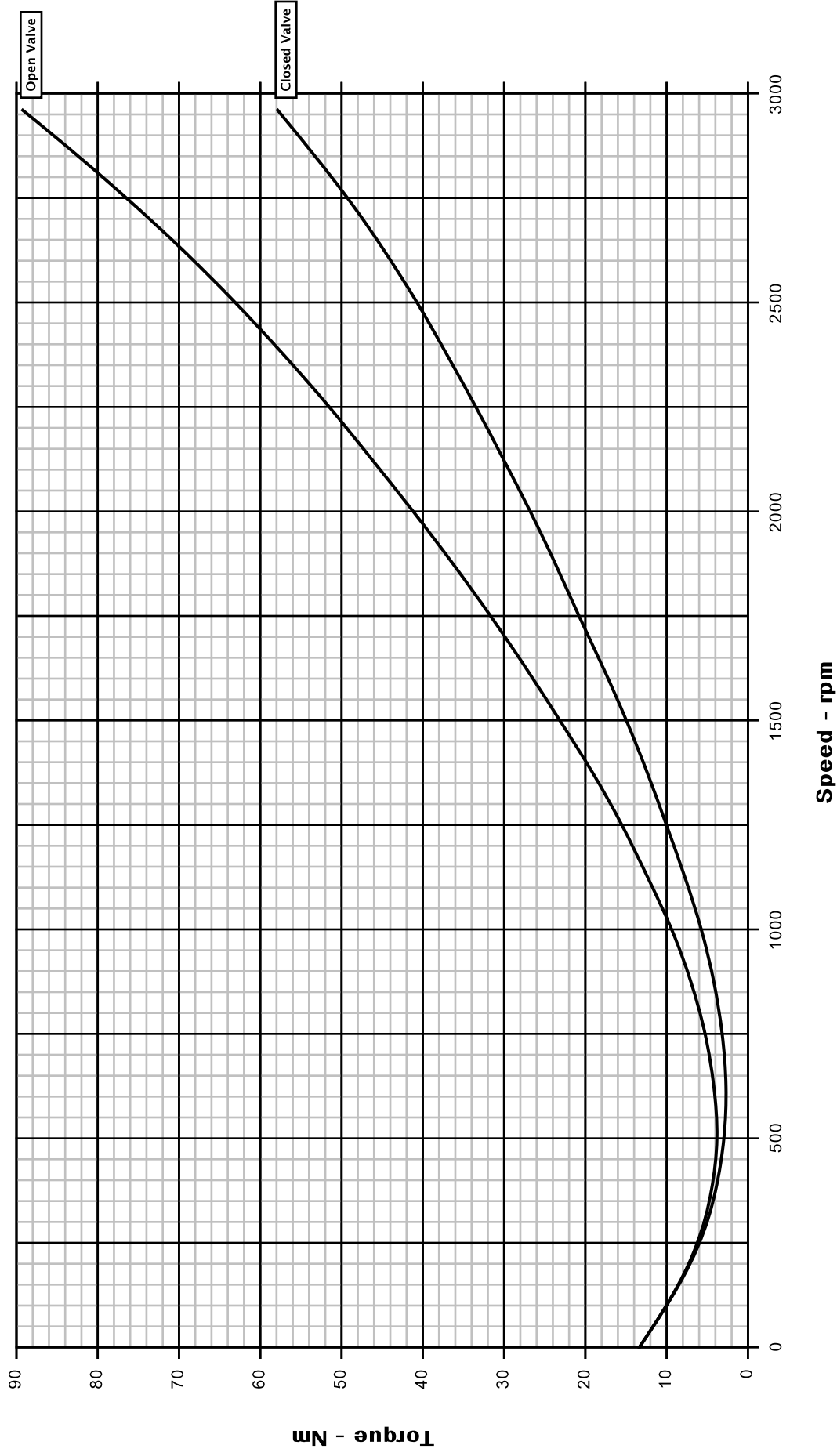


Capacity : 166.0 m<sup>3</sup>/h  
Head : 40.00 m

Density / Specific gravity : 998.16 kg/m<sup>3</sup> / 0.999  
Pump speed : 2960 rpm

Pump size & type : 2K125-100-200B-OP  
Based on curve no. : E591/0426  
Number of stages : 1

CURVES ARE APPROXIMATE. PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS; CAPACITY, HEAD, AND EFFICIENCY.



## Technical Comments & Clarifications

This section contains comments, clarifications, and in some cases exceptions to any applicable project specifications. Any specifications which have not been included in this section are considered either non-applicable or not in our possession. Flowserve reserves the right to revise our proposal should any specifications be added or modified to this project subsequent to the submittal of this proposal.