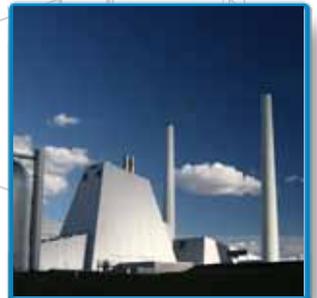


MORE SAFETY LESS EMISSIONS



FUEL OIL



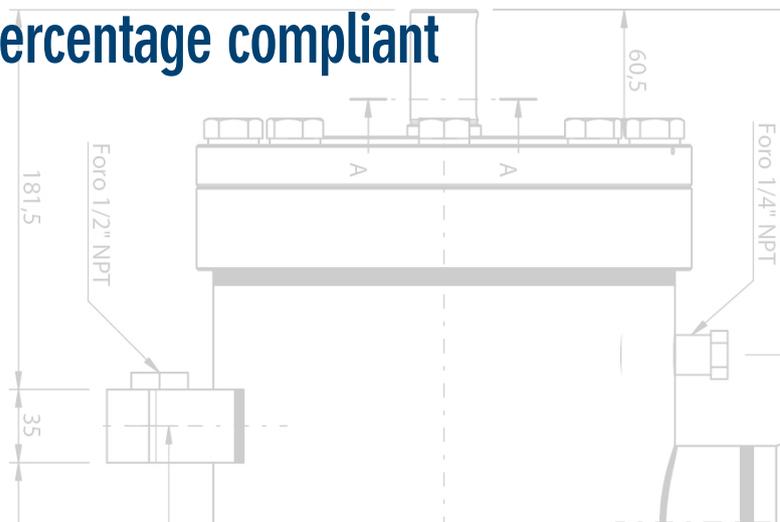
POWER



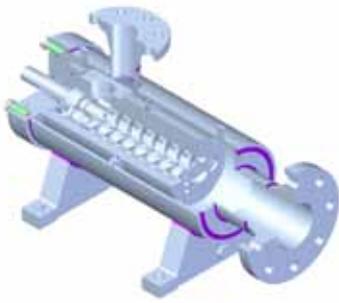
OIL & GAS

SMAPI Series

Three screw pumps API676 & ISO8217
for low sulphur percentage compliant



SMAPI Pump series



SMAPI is a casing three screw pumps designed and manufactured following the API676 regulation and also suitable for the ISO8217, which regulates the level of sulphur percentage in the fluid in case of marine applications.

The quality of Settima screws, with more than 35 years of experience and more than 1 million pumps installed around the world, ensures high performances, reliability and very low level of acoustic emissions and pulsations.

Settima SMAPI pump is a three screw pump that is fitted inside an external case. Matching all of the possible applications it can be manufactured with different structural shapes, installation possibilities and materials.

The external case can be delivered in ASME carbon steel and inox, in accordance with international norms such as API. The internal cartridge can be manufactured in cast iron, steel and hardened steel, while the screws are made by steel for the primary screw and cast iron for the secondary screws.

The three screws rotate inside the pump body and the design of the screws avoids any axial load. The functional pressure develops some tolerance between the balancing piston of the main screw and the surrounding body.

This creates a balancing hydrodynamic force on the screws and, at the same time, lubricates and cools down the sealing ports. The torque needed to move the lateral screws is transmitted hydraulically by the pumped fluid, which means that the screws rotate with no possibilities of wearing.

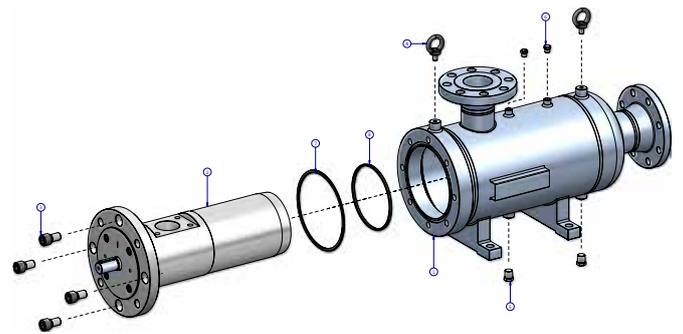
SMAPI pumps can always ensure flow and pressure matching to your current requirements, since it is always available a customized version. **SMAPI** pumps simplify your eventual necessity of maintenance: just remove the installed cartridge (n.1) without disconnecting the part (n.2) from the system.

Main areas of applications are Oil & Gas, Marine, Offshore and Power Gen industrial sectors. **SMAPI** is applied to deliver different fluids such as crude oil, diesel fuel, engines oil, petrol, naphta and many others.

SETTIMA can deliver a package of motor, **SMAPI** pump and base plate according to the customer needs.

SMAPI pump can be installed horizontally (motor + pump unit + skid or feet base) or vertically (motor + pump unit).

The maintenance of the pump cartridge can be operated without the disconnection of external case from the system.



Magnetic coupling sealless pump - FGM option

SMAPI pump can be equipped with a magnetic coupling if required. The hermetically sealed magnetic coupling is a permanent magnetic synchronous coupling able to transmit torque through magnetic forces between the internal and external rotor. Applying a magnetic coupling, the drive and the driven sides are hermetically separated. In case of critical media the magnetic coupling is a reliable seal and avoids any serious leaking.

The magnetic coupling is the containment shroud that is fixed to the driven sided power unit and separates internal and external rotor from each other. Due to the absence of mechanical connection the vibration torque transmission are very low, with completely leak-proof separation of product and atmosphere.

The magnetic coupling is used to ensure no media leaking or when working in environments with potentially explosive atmospheres.



Applications

OIL & GAS

Pipe-line for off-shore platform.

Heating oil delivery and pipe-line for refineries and petrochemical industry.

Off-line filters, coolant lubrication for transmissions.

Off-line filters for engine oil.



POWER

Lube service and off-line filtration for engines.

Lube and cooling systems for turbo-machinery.

Transmission lube for generator.

Oil Jacking.



FUEL OIL HANDLING

Heavy fuel oil, fuels, marine distillate fuels, marine residual fuels for engine and boilers.

DMX (according to latest ISO8217), DMA, DMB, DMC, DMZ .

Fuel oil supply.

Low pressure diesel oil delivery for industrial burners.

Fuel oil transfer for filtration, loading & unloading.

Fuel oil ignition & supply for booster modules.

Biodiesel applications.



Test and certifications

Title	Description	Released by
Static test	Pressure test @ 1.5 times the working pressure	Settima
Dynamic test	Running test at working conditions	Settima
Material certification	EN10204 3.1b	Settima
Atex certification	Area: CE eX II 2 GD ck T3	Settima
Standard ISO	ISO 9001:2008 – DNV	Settima
Statement of fact, type approval, witnessed test		ABS, BV, DNV, LLOYD, RINA, CCS, RS, GL, KR, NK

Technical characteristics / Caratteristiche tecniche

Models Modelli	20 – 25 – 32 – 40 – 45 – 55 – 60 – 70 – 80 – 90 - 110 - 125 - 150 - 180	
Installation Installazioni	Vertical, horizontal <i>Verticale, orizzontale</i>	
Connections Conessioni	SAE, DIN, ANSI	
Drive loading Carichi	No axial or radial loads <i>Nessun carico assiale o trasversale</i>	
Shaft rotation Rotazione albero	Clockwise (from shaft end) , (suitable also for counter clockwise rotation, please contact Settima) <i>Destra (disponibile anche per rotazione sinistra, contattare Settima)</i>	
Shaft speed Velocità di rotazione	From 300 to 3.600 rpm* <i>Da 300 a 3.600 rpm*</i>	
Flows Portate	From 4 up to 1.800 L/min (at 2.950 rpm) - From 1.800 to 3.200 L/min pump must be over-busted, contact Settima <i>Da 4 a 1.800 L/min (a 2.950 rpm) - Da 1.800 a 3.200 L/min la pompa deve essere sovralimentata in aspirazione</i>	
Outlet pressure Pressione di mandata	60 bar continuous – 80 bar intermittent <i>60 bar continuo – 80 bar ad intermittenza</i>	
Inlet pressure Pressione di aspirazione	Min. -0.7 bar max 9 bar ** (with mechanical seal) <i>Min. -0.7 bar max 9 bar ** (con tenuta meccanica)</i>	
Fluids Fluidi	<ul style="list-style-type: none"> - Mineral oil HLP e HVLP - Ecologic fluids HETG, HEPG, HEE - Synthetic fluid or emulsion: HFA oil-water emulsion, HFB water-oil emulsion 40% of volume, HFC water/glycole – water max 35 to 55%, HFDR phosphate ester - Lubrication high viscosity oils *** - Special synthetic fluid: MIL-H, SKYDROL **** - Fuel oil: MGO, MDO, Low sulfur MDO and HFO - DMX (ISO8217), DMA, DMB, DMC, DMZ - MAZUT, bunker oil, furnace oil, engines oil, heating oil, hydraulics oils DIN 51524 - Naphta, petrol 	<ul style="list-style-type: none"> - Oli minerali HLP e HVLP - Fluidi ecologici HETG, HEPG, HEE - Fluidi sintetici o emulsioni: HFA emulsione olio-acqua, HFB emulsione acqua-olio 40% dl volume, HFC acqua/glycole – acqua max 35 to 55%, HFDR phosphate ester - Olio ad alta viscosità per lubrificazione *** - Fluidi speciali sintetici: MIL-H, SKYDROL **** - Fuel oil: MGO, MDO, Basso livello di zolfo MDO and HFO - DMX (ISO8217), DMA, DMB, DMC, DMZ - MAZUT, bunker oil, furnace oil, olio per motori, heating oil, olio idraulico DIN 51524 - Naphta, benzina
Viscosity Viscosità	From 1 up to 10.000 cSt <i>Da 1 fino a 10.000 cSt</i>	
API Seals Guarnizioni standard API	Mechanical seal: non-API, API 682 , single and double. Mechanical seal flushing system (optional) according to API PLAN 53B . Magnetic coupling available. Seal polymer materials: NBR, FKM, FPM, EPDM ***** <i>Tenuta meccanica: non API, API 682, singola e doppia. Sistema di flussaggio della tenuta meccanica (opzionale): a norme API PLAN 53B. Giunti magnetici disponibili. Polimeri delle tenute: NBR, FKM, FPM, EPDM *****</i>	
Acoustic emissions Emissioni acustiche	From 52 up to 68 db(A) at 2.950 rpm <i>Da 52 fino a 68 db(A) at 2.950 rpm</i>	
External case Corpo esterno	ASME carbon steel, inox <i>Acciaio ASME, inox</i>	
Cartridge Cartuccia interna	Aluminum, cast iron, steel <i>Alluminio, ghisa, acciaio</i>	
Screws Viti	Steel for main screw , idler cast iron <i>Acciaio vite principale, ghisa viti secondarie</i>	
Environment temperature Temperatura ambiente	From -20° up to +60°C <i>Da -20° a +60°C</i>	
Hydraulic Temperature Temperatura Olio	From -20°C up to +180°C <i>Da -20°C a +180°C</i>	
Filtration Filtraazione	Permissible degree of fluid contamination NAS to 1638 class 10 or ISO DIS 4406 – 19/16. Recommended filtration $\beta_{25} \geq 75$ <i>Contaminazione NAS tipo 1638 classe 10 o ISO DIS 4406 – 19/16 . Filtraazione raccomandata $\beta_{25} \geq 75$</i>	

* Please, see GR125, 150, 180 SMT16B&SMAP series catalogue. *Vedere il catalogo GR125, 150, 180 SMT16B&SMAP.*

** For higher pressure please contact Settima. *Per pressioni maggiori contattare Settima.*

*** For high viscosity applications and/or oil-air emulsions, please contact Settima. *Per applicazioni ad alta viscosità e/o emulsioni olio-aria contattare Settima.*

**** Special synthetic fluids on request. *Altri fluidi sintetici a richiesta.*

***** For special seals contact Settima. *Per tenute speciali contattare Settima.*

Configurations



Motor + pump unit + SKID
Horizontal installation



Single pump
Vertical installation



Motor + pump unit
Vertical installation

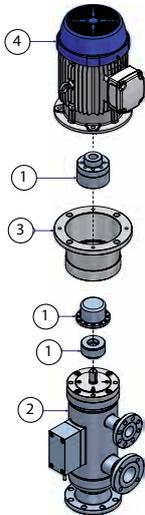


Single pump
Horizontal installation

Components

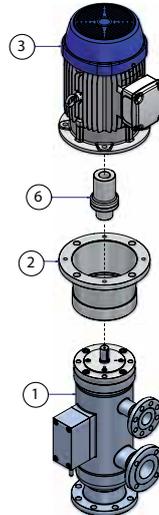
VERTICAL ASSEMBLY

MOTOR PUMP GROUP / MAGNETIC COUPLING



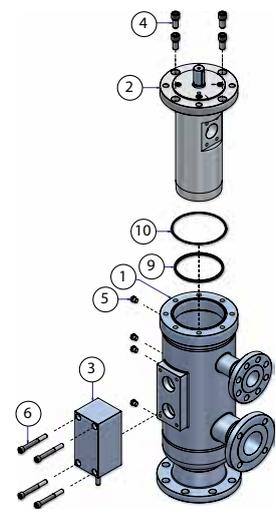
VERTICAL ASSEMBLY

MOTOR PUMP GROUP / STANDARD COUPLING



VERTICAL ASSEMBLY

PUMP



N°	PARTS DESCRIPTION	MATERIAL
1	Magnetic coupling	On request
2	SMAPI pump	
3	Bell house	On request
4	Electric motor	On request

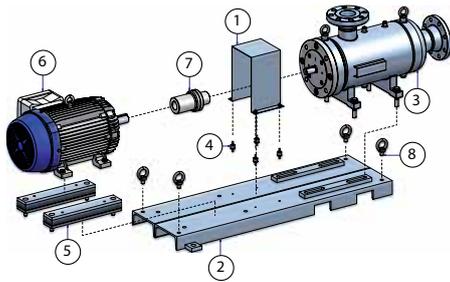
All fixing screws are steel UNI-5739 M16x40 – 8.8

N°	PARTS DESCRIPTION	MATERIAL
1	SMAPI pump	
2	Bell house	On request
3	Electric motor	On request
6	Elastic coupling	On request

All fixing screws are steel UNI-5739 M16x40 – 8.8

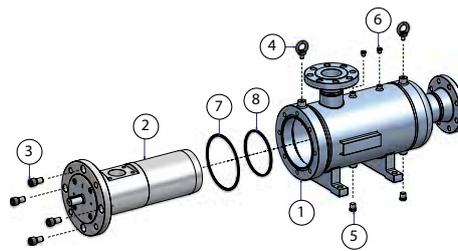
N°	PARTS DESCRIPTION	MATERIAL
1	Case V-ZN	
2	Internal cartridge	
3	RP external valve	
4	Screw	On request
5	Vent	On request
6	Screw	On request
9	Internal O-ring	On request
10	Internal O-ring	On request

HORIZONTAL ASSEMBLY MOTOR PUMP GROUP



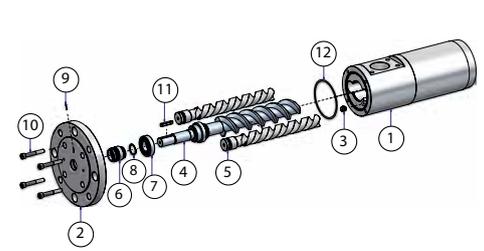
N°	PARTS DESCRIPTION	MATERIAL
1	Carter	On request
2	SKID	On request
3	SMAPI pump	
4	Vibration stopper	On request
5	Shock absorber	On request
6	Electric motor	On request
7	Coupling	On request
8	Golfare	On request

HORIZONTAL ASSEMBLY PUMP



N°	PARTS DESCRIPTION	MATERIAL
1	External Case	
2	Cartridge	
3	Screw	On request
4	Golfare	On request
5	Drainer	On request
6	Vent	On request
7	Internal O-ring	On request
8	Internal O-ring	On request

HORIZONTAL ASSEMBLY CARTRIDGE



N°	PARTS DESCRIPTION	MATERIAL
1	Body pump	On request
2	Flange	On request
3	Bushing	On request
4	Main screw	On request
5	Idler screw	On request
6	Mechanical seal	
7	Ball bearing	On request
8	Seeger	On request
9	Pin	On request
10	Screw	On request
11	Key	On request
12	Internal O-ring	On request

Shaft seal flushing system

Settima can supply shaft seal flushing systems. The system can be designed according to API rules (i.e. **API Plan 53B**)

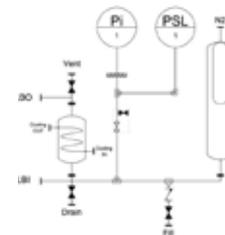


The external piping provides fluid for the outer seal of a pressurized dual seal arrangement.

Pre-pressurized bladder accumulator provides pressure to the circulation system. Flow is maintained by an internal pumping ring. Heat is removed from the circulation system by an air-cooled or water-cooled heat exchanger. This plan is used with an Arrangement 3 seal.

The following table shows an example of a possible configuration:

- 1.0 Bladder Accumulator
- 2.0 Heat exchanger
- 3.0 Pressure Switch
- 4.0 Pressure Gauge
- 5.0 Pressure gauge protector
- 6.0 Instrument valves for PG/PT
- 7.0 Isolating Valve
- 8.0 Supporting frame
- 9.0 Piping Material
- 10.0 Quick connector including check valves



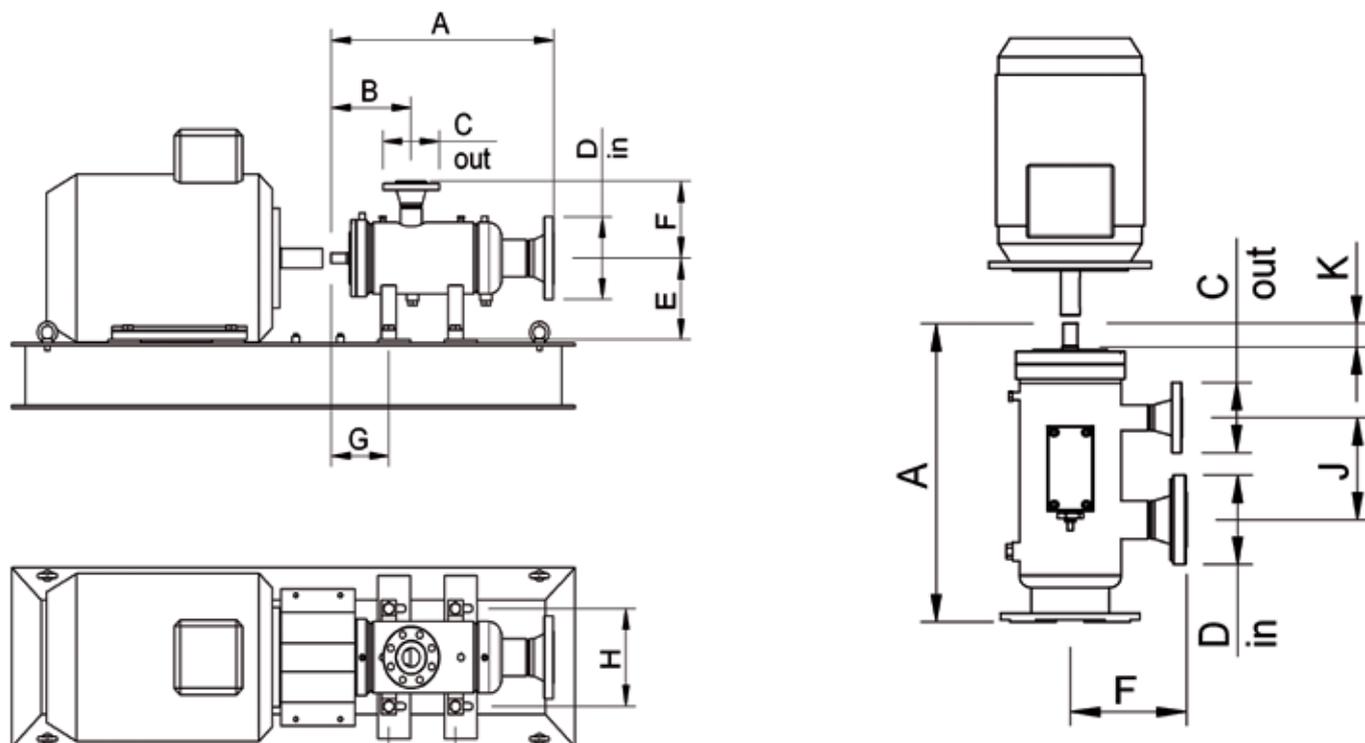
Shaft seal

Mechanical seals can be supplied according to **API 682** rules. As an alternative to rotating seals, the pump can be equipped with a magnetic coupling. The magnetic coupling ensures no possible leaking due to the rotating seals wearing or to contaminated fluids.

Standard dimensions

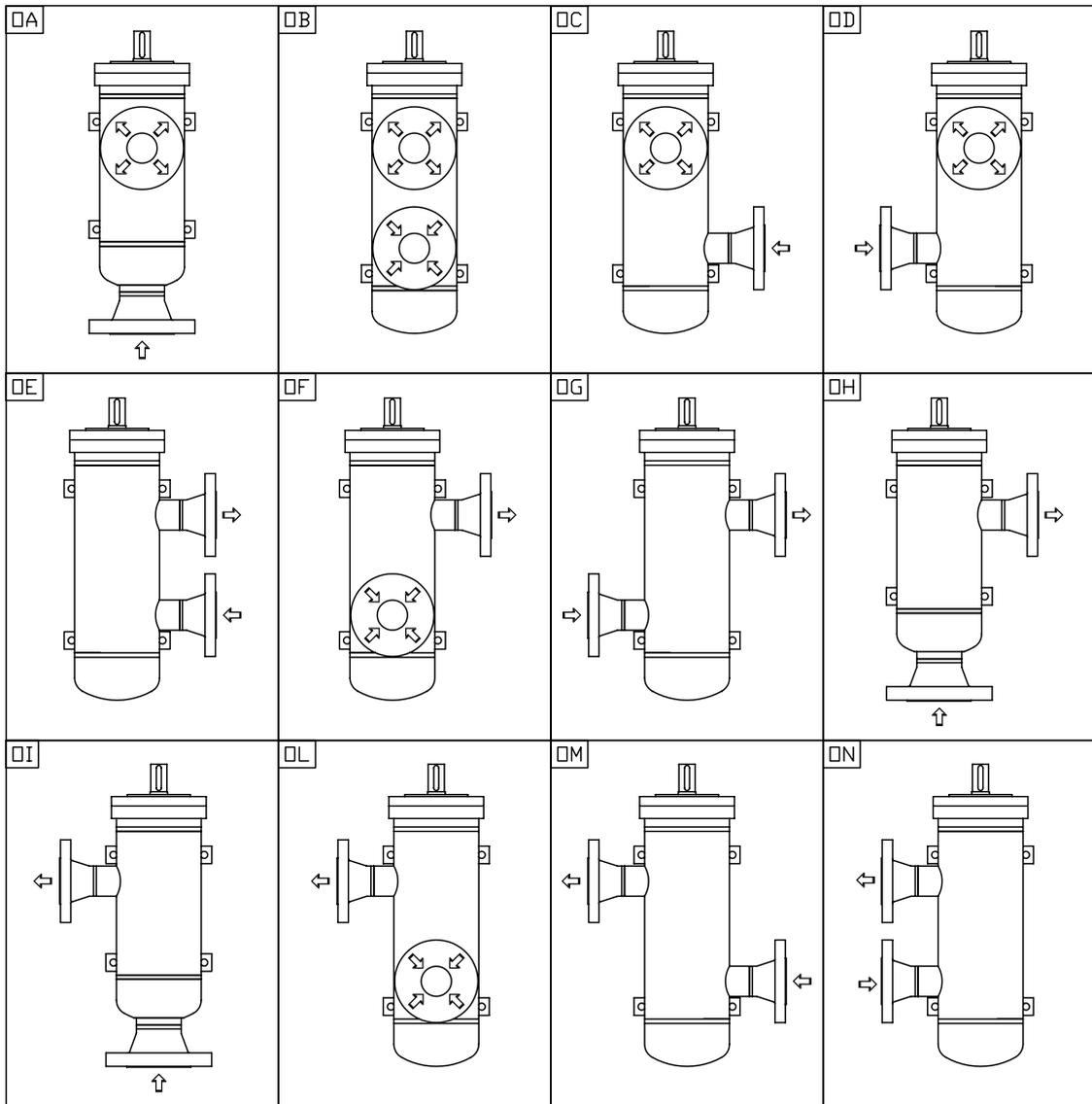
Pump	Dimensions		Flanges Ø				Dimensions						
			ANSI		DN								
			150, 300, 600		PN 10, 16, 25, 40								
	A	B	D (in) inches	C (out) inches	D (in) mm	C (out) mm	E	F	G	H	I	J	K
GR20	305	130	1	1"	25	25	106	160	80	144	90	135	36
GR25	354	165	1	1"	25	25	106	160	85	144	90	135	36
GR32	359	170	1 ½	1", 1 ½"	40	25, 40	106	160	144	144	160	135	36
GR40	521	186	1 ½, 2, 3"	1" ½, 2"	40, 50, 80	40, 50	119	185	155	144	150	140	36
GR45	600	208	2", 3"	1" ½, 2"	50, 80	40, 50	150	195	180	180	215	170	55
GR55	670	245	3", 4"	2", 3"	80, 100	50, 80	160	220	199	180	245	190	55
GR60	750	270	3", 4"	3"	80, 100	80	190	230	190	300	335	230	55
GR70	820	290	3", 4"	3", 4"	80, 100	80, 100	200	260	200	300	400	275	55
GR80	900	325	4", 6"	3", 4"	100, 150	80, 100	215	285	205	300	470	280	60
GR90	990	370	6"	4"	150	100	225	320	265	300	490	300	110
GR110	1190	410	6"	4"	150	100	260	345	270	370	550	415	110
GR125	Please, see the GR125, 150, 180 SMT16B&SMAPI catalogue. / <i>Vedere il catalogo GR125, 150, 180 SMT16B&SMAPI.</i>												
GR150													
GR180													

All above dimensions are indicative and can change without prior information.



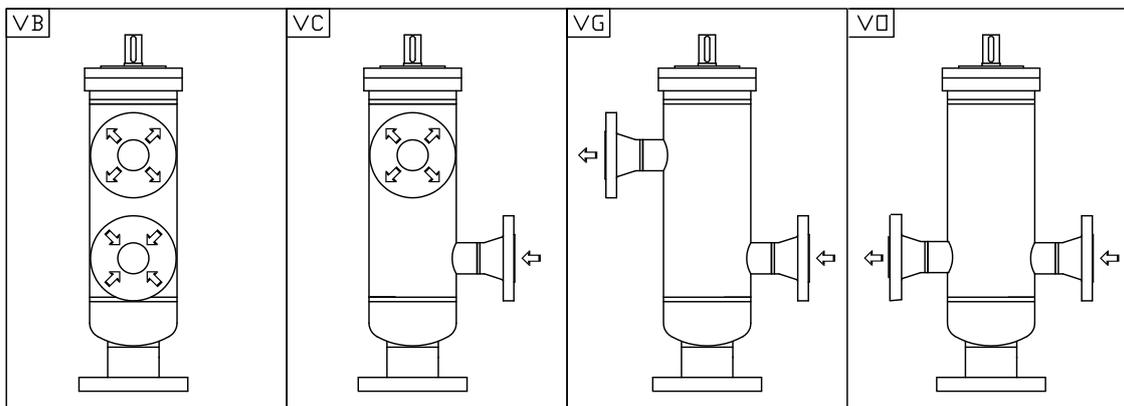
All our SMAPI pumps can be customised with specific and/or special parts dimensions according to customer requirements.

HORIZONTAL PUMP CONFIGURATION



View from top.

VERTICAL PUMP CONFIGURATION



Side view.

Product range – Ordering code of SMAPI pumps

Pump type	Pump model	Nominal flow (L/min)	Pump body	Shaft seal	Screws treatment	Seals type	Ports type		Port configurations	Rotation								
							A = IN	M = OUT										
									O= Horizontal V= Vertical									
GR20	SMAPI	8L, 12L, 15L, 20L, 23L	Standard Aluminium (none)	Standard NBR (none)	Standard Steel & cast iron (none)	TM mechanical seal for oil	ANSI 150 300 600 A*	(ANSI) M*	OA	Standard								
GR25		25L, 30L									OC							
GR32		35L, 45L, 55L, 75																
GR40		100L, 125L, 150L	Optional GZ Cast Iron Internal coating								Optional HA Core hardened steel	Optional TMK mechanical seal for water and glycole and coolant fluids	DN 10 16 25 40 A**	(DN) M**	OB	OD	Clockwise (none)	
GR45		180L, 210L																OE
GR55		250L, 300L, 330L, 380L																
GR60		440L, 500L	Optional AZ Carbon steel Internal coating	Optional V (FKM)	Optional TMZ mechanical seal for fuel oil	OM	ON	OG	OH	Optional SX Counter clockwise								
GR70		560L, 600L, 660L, 800L									OI							
GR80		1.000L, 1.200L																
GR90		1.500L, 1.700L, 2.000L, 2.200L	Optional G Cast iron	Optional E (EPDM)	Optional FGM magnetic sealless coupling	VB	VC	VG	VO	Check at pag. 8								
GR110		2.300L, 2.500L, 2.800L, 3.200L									VD							
GR125		1.750L, 1.900L, 2.100L, 2.250L																
GR150		2.550L, 2.700L, 2.900L, 3.100L, 3.300L	Optional A Carbon steel															
GR180		3.500L, 3.700L, 4.000L, 4.300L, 4.600L, 4.900L																

*Please check table pag. 7 to chose the right dimensions for your needs for ANSI standard.

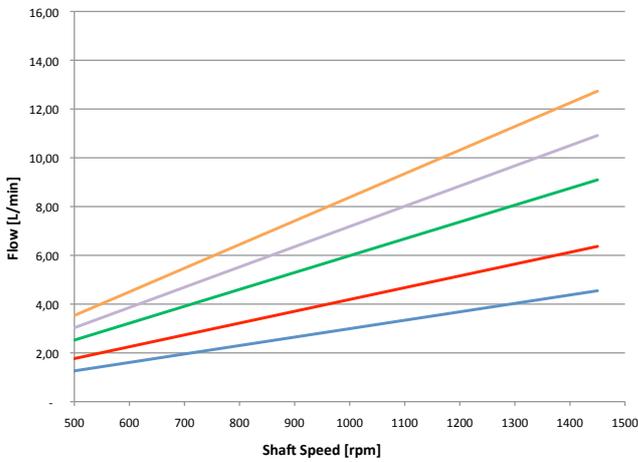
**Please check table at pag. 7 to chose the right dimensions for you need for DN standards.

Examples of order code: GR40 SMAPI 150L G V HD TM ANSI150 A3 M2 VB
GR40 SMAPI 150L G V HD TM DN10 A40 M40 VB SX

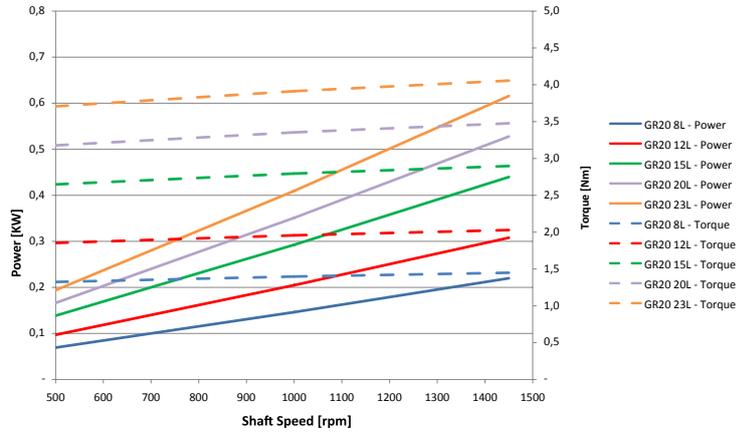
Flow & power performances 4 poles motor – 50 HZ

20 bar, 46 cSt

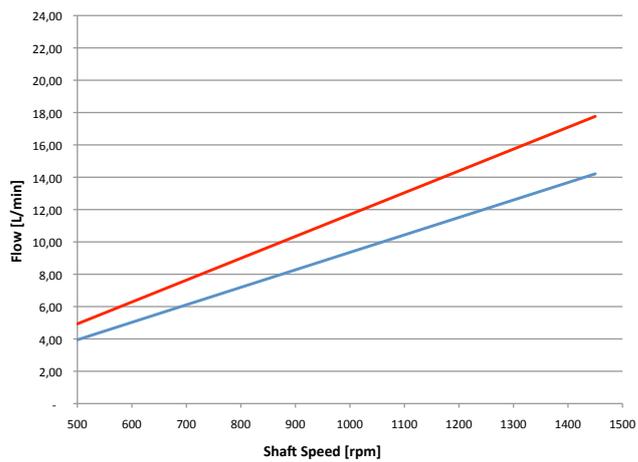
GR20



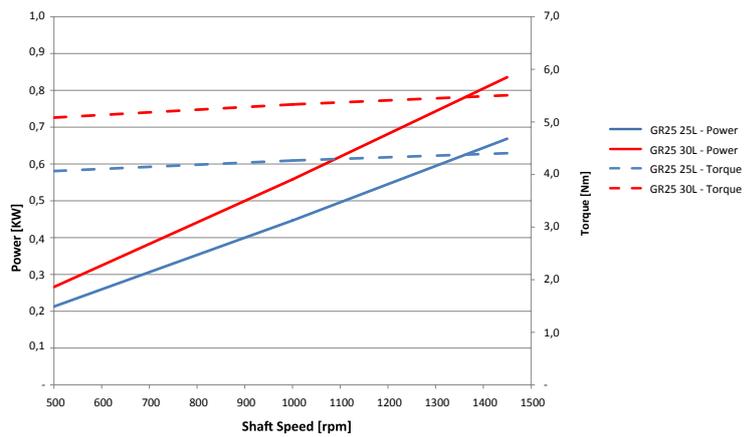
GR20



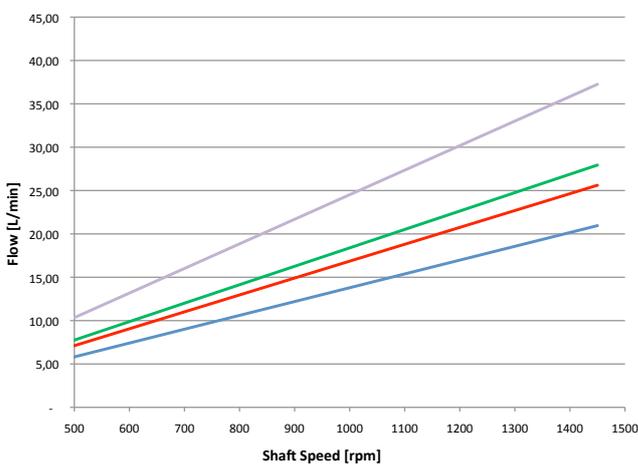
GR25



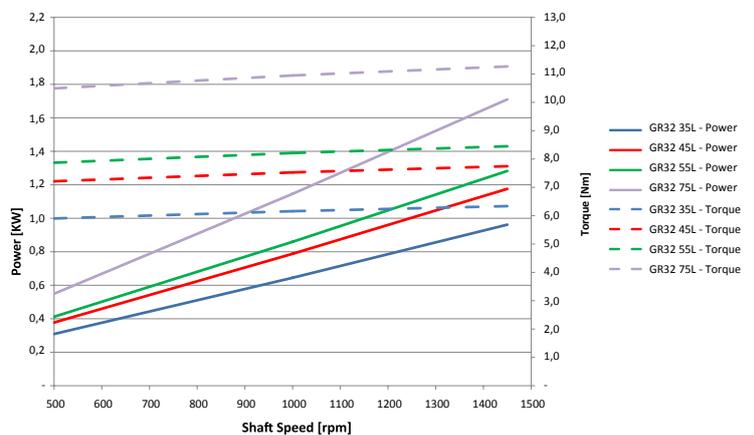
GR25



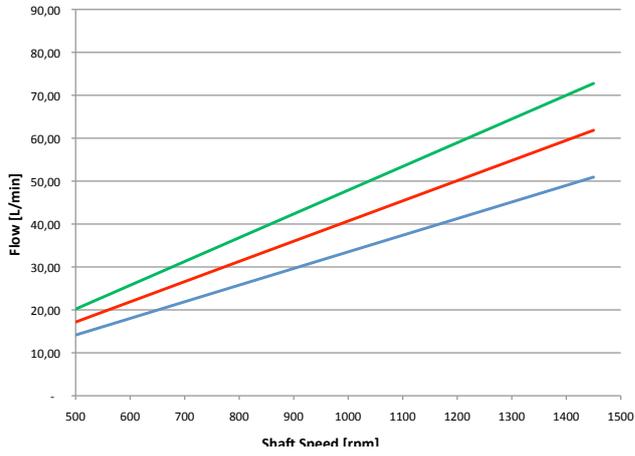
GR32



GR32

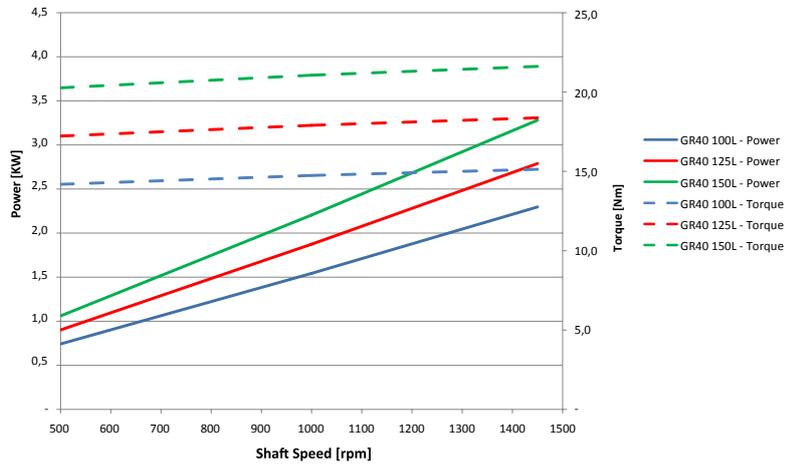


GR40



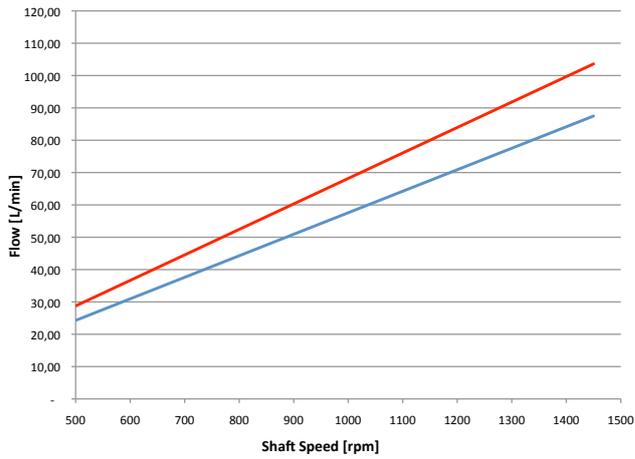
GR40 100L
GR40 125L
GR40 150L

GR40



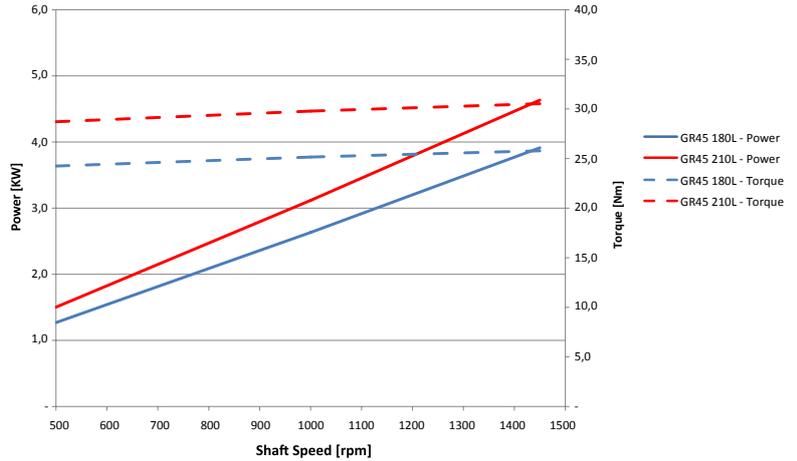
GR40 100L - Power
GR40 125L - Power
GR40 150L - Power
GR40 100L - Torque
GR40 125L - Torque
GR40 150L - Torque

GR45



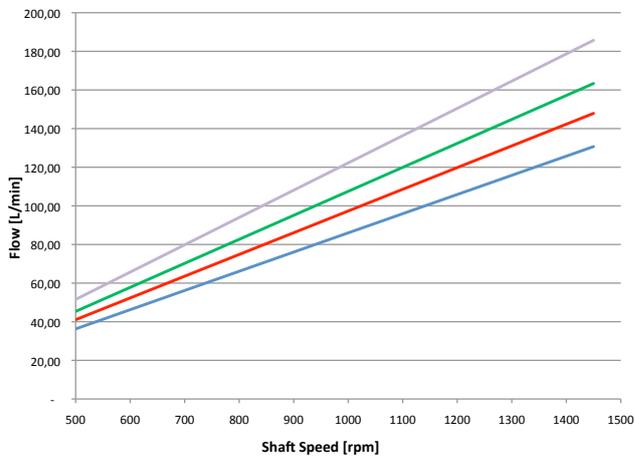
GR45 180L
GR45 210L

GR45



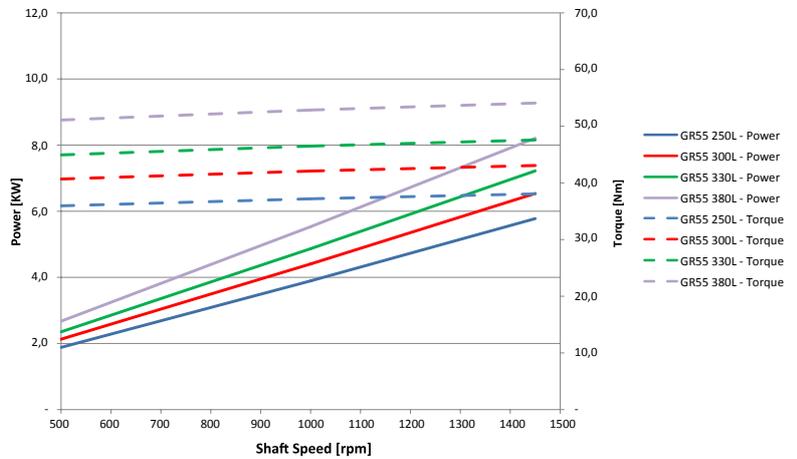
GR45 180L - Power
GR45 210L - Power
GR45 180L - Torque
GR45 210L - Torque

GR55



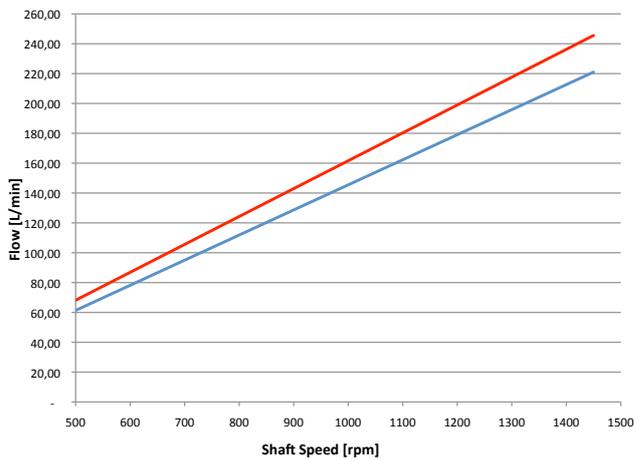
GR55 250L
GR55 300L
GR55 330L
GR55 380L

GR55



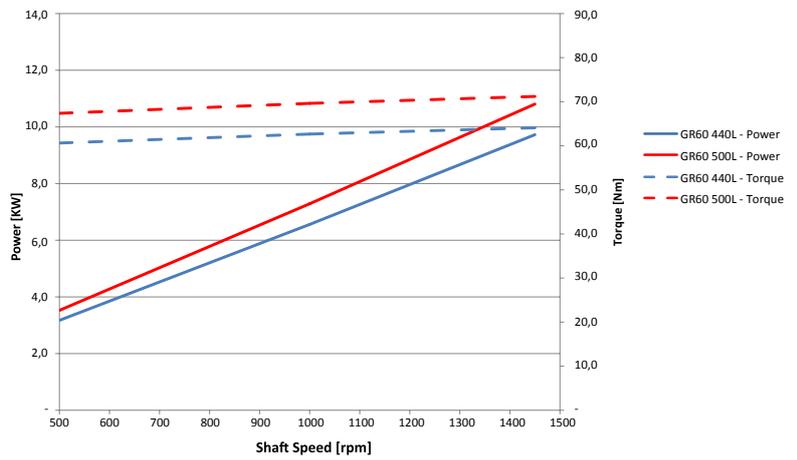
GR55 250L - Power
GR55 300L - Power
GR55 330L - Power
GR55 380L - Power
GR55 250L - Torque
GR55 300L - Torque
GR55 330L - Torque
GR55 380L - Torque

GR60



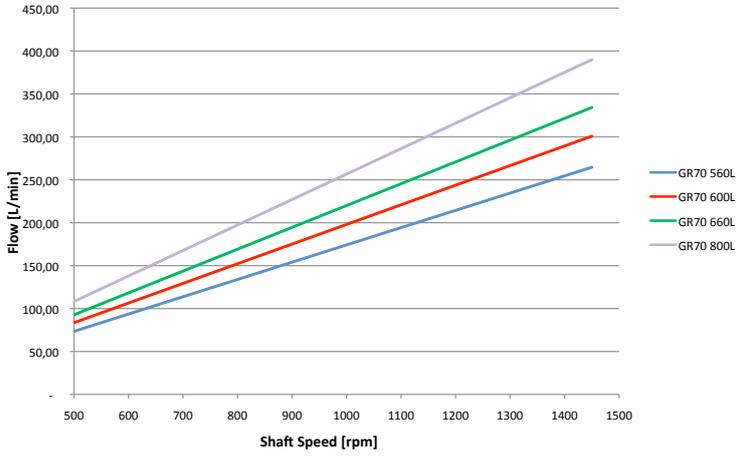
GR60 440L
GR60 500L

GR60

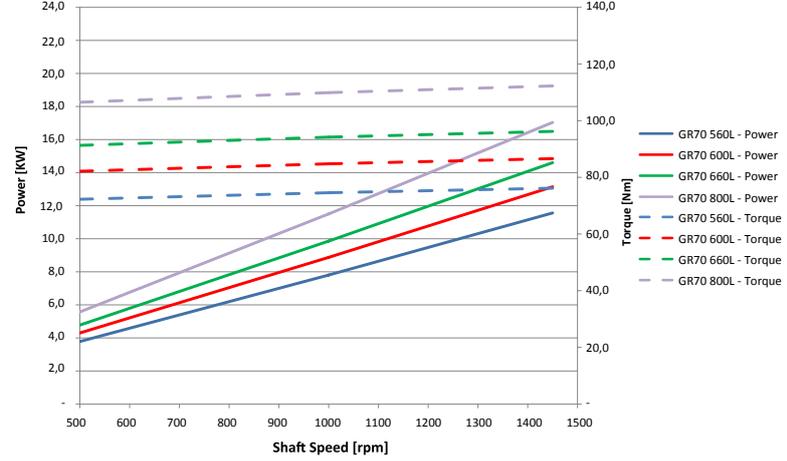


GR60 440L - Power
GR60 500L - Power
GR60 440L - Torque
GR60 500L - Torque

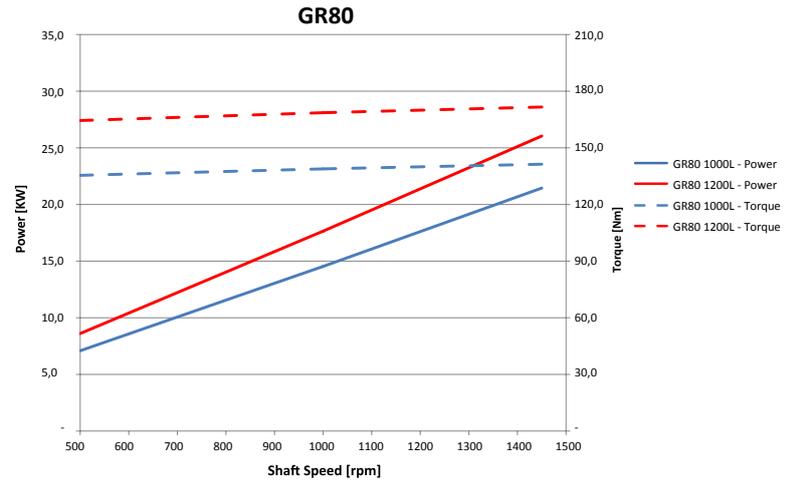
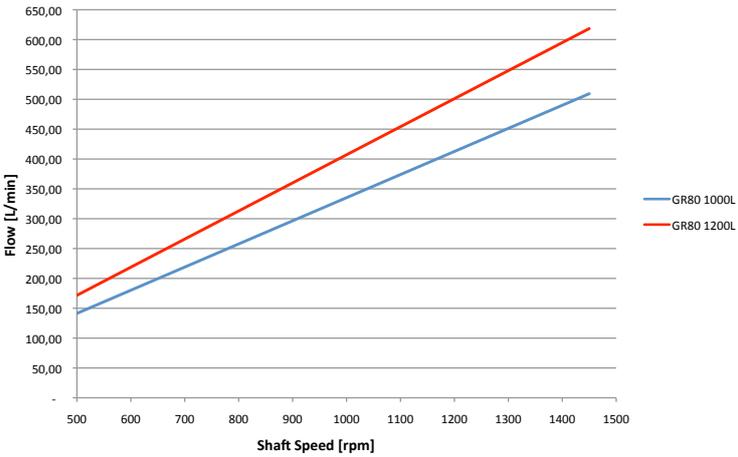
GR70



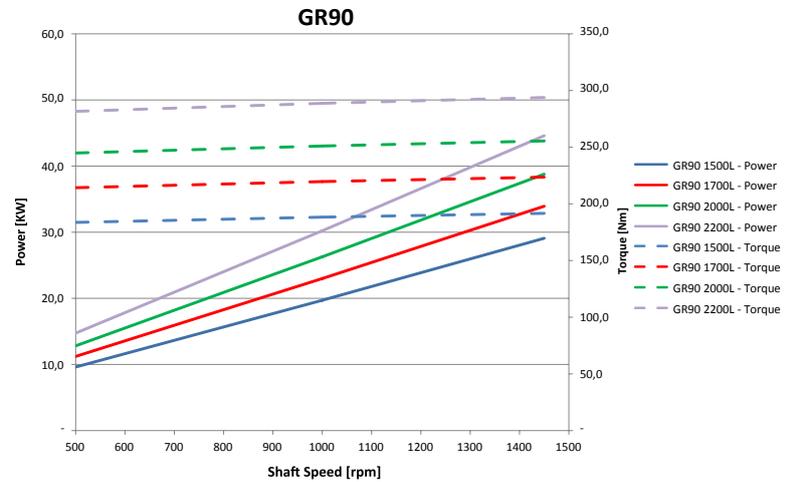
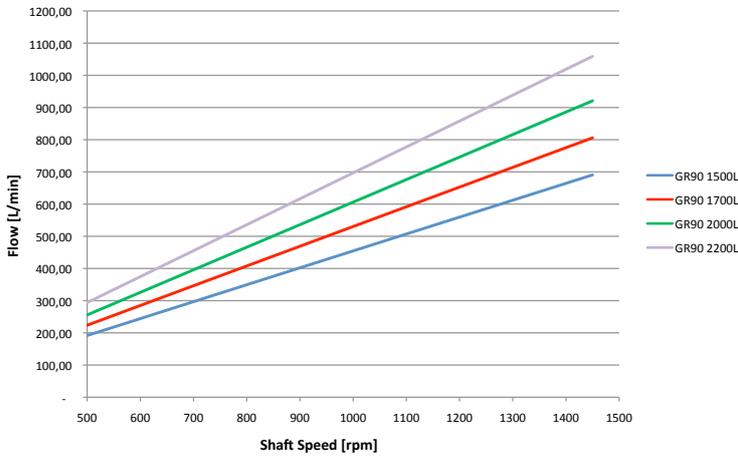
GR70



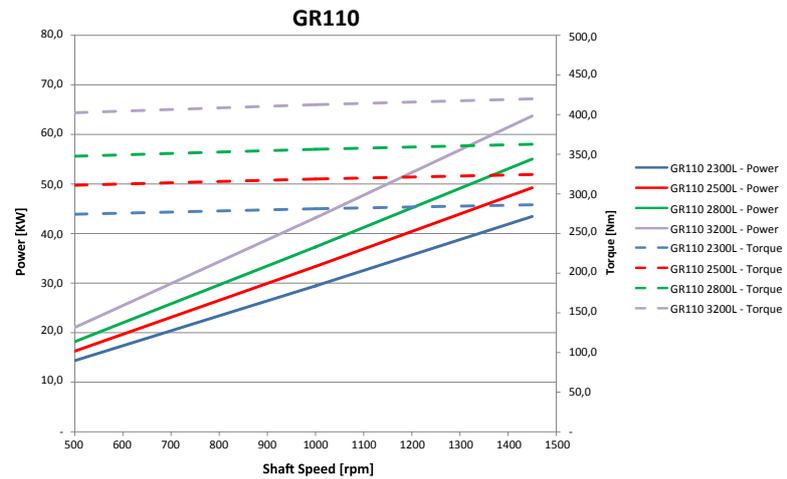
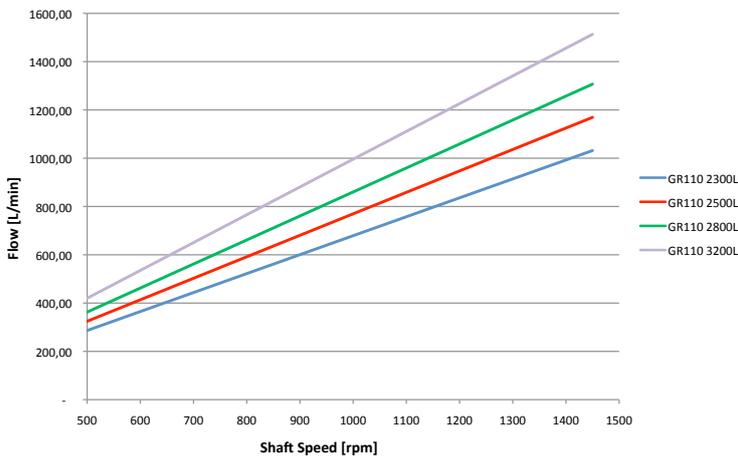
GR80



GR90



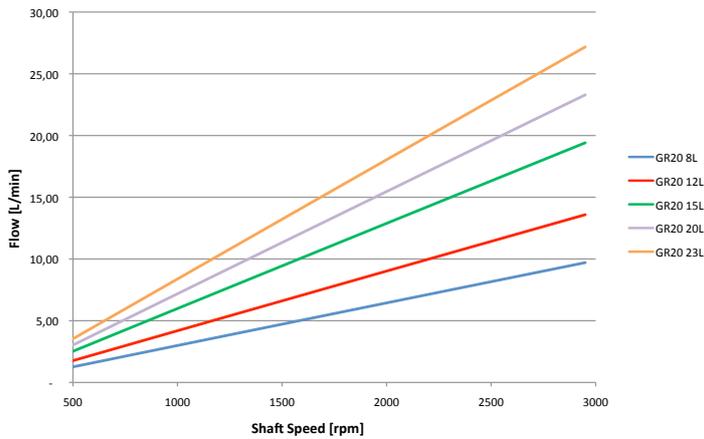
GR110



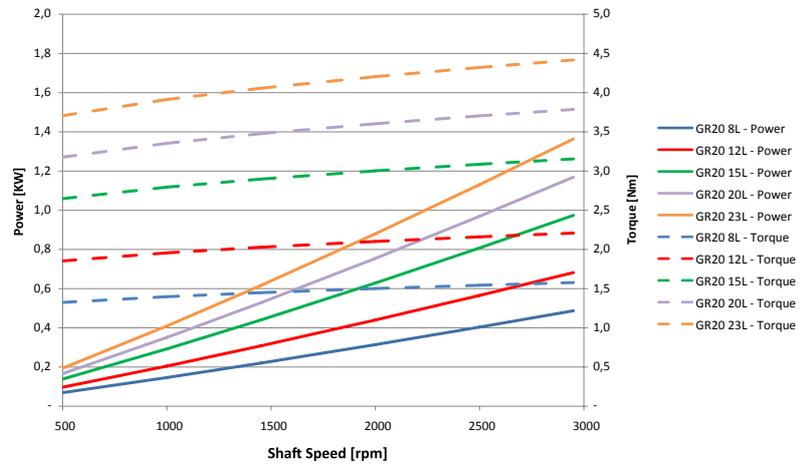
Flow & power performances 2 poles motor – 50 HZ

20 bar, 46 cSt

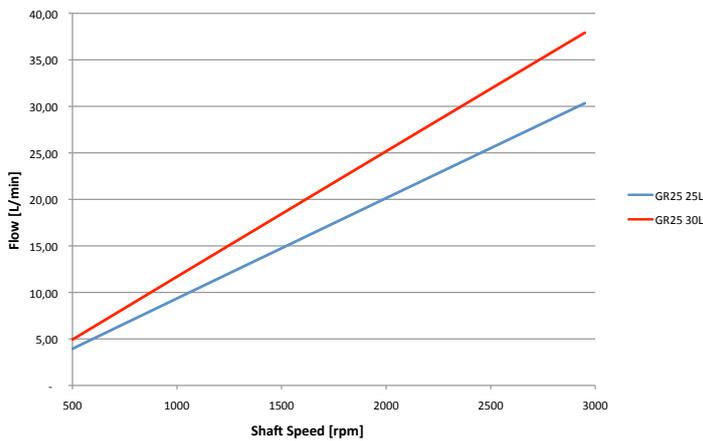
GR20



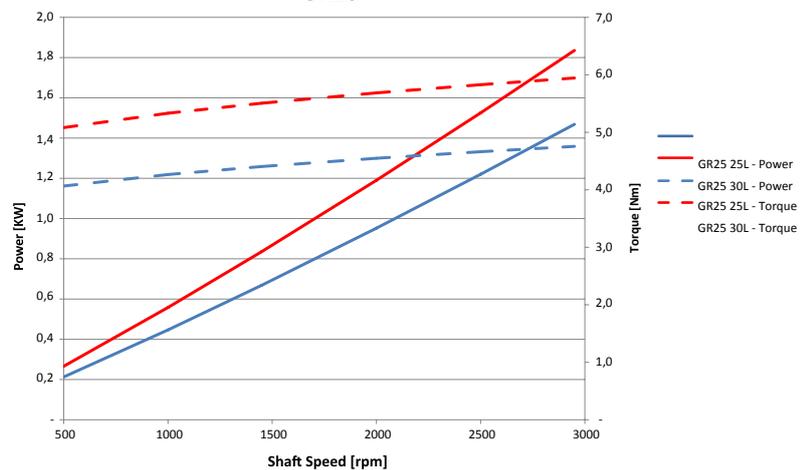
GR20



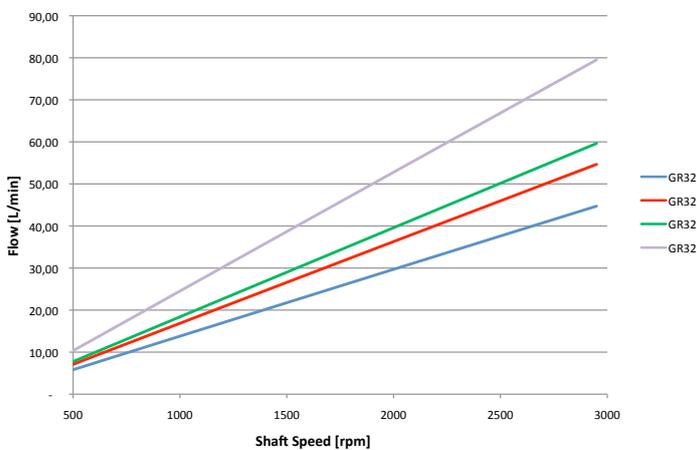
GR25



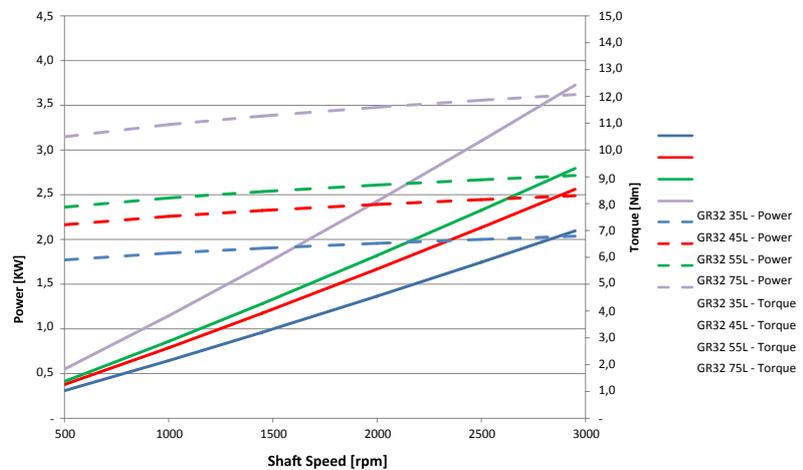
GR25



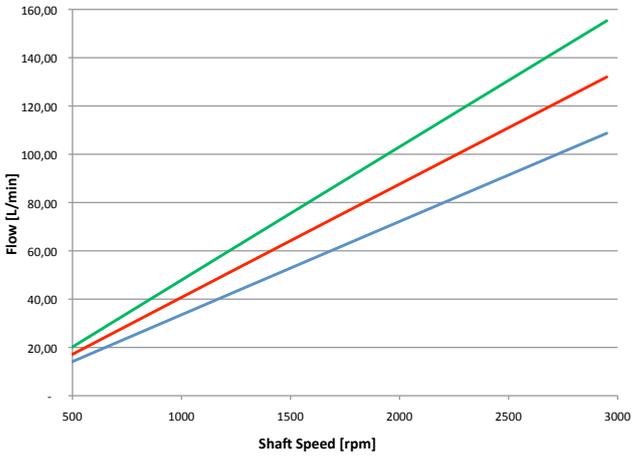
GR32



GR32

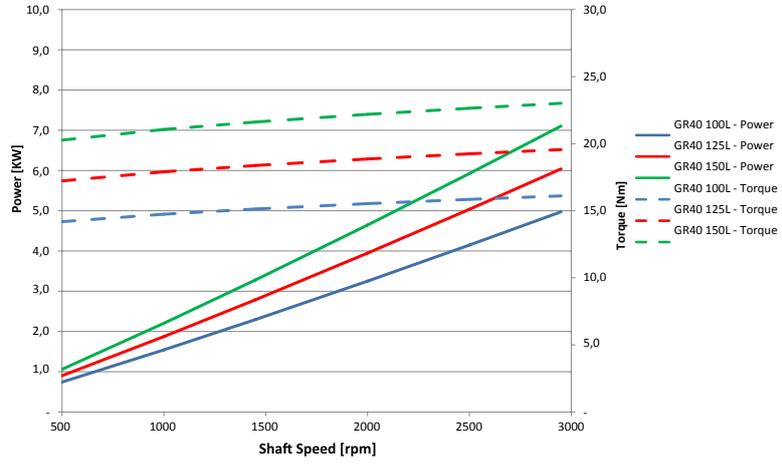


GR40



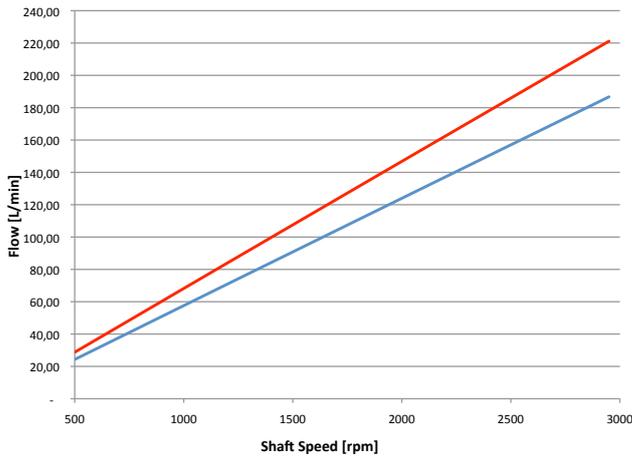
GR40 100L
GR40 125L
GR40 150L

GR40



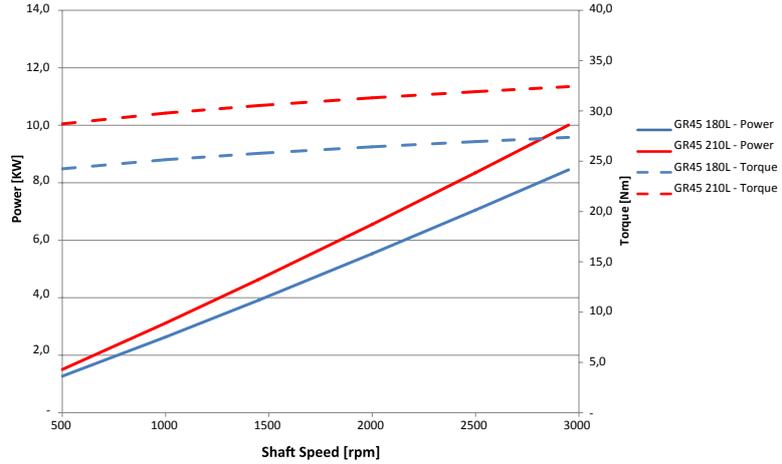
GR40 100L - Power
GR40 125L - Power
GR40 150L - Power
GR40 100L - Torque
GR40 125L - Torque
GR40 150L - Torque

GR45



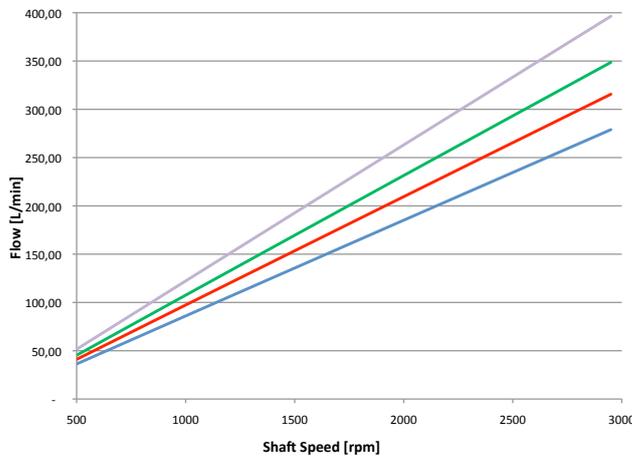
GR45 180L
GR45 210L

GR45



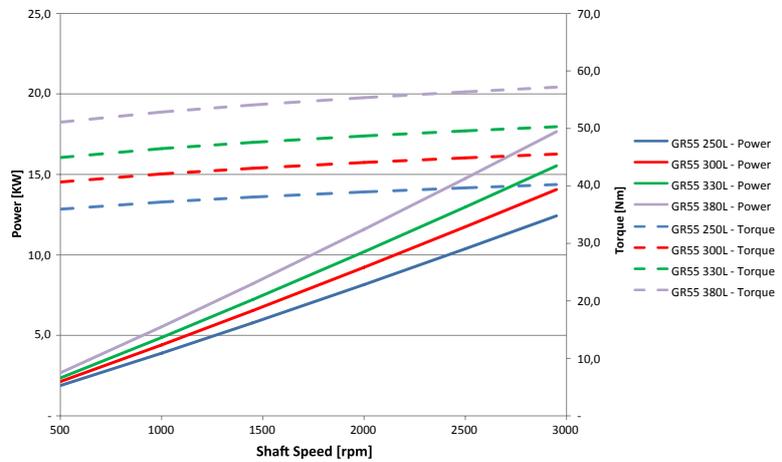
GR45 180L - Power
GR45 210L - Power
GR45 180L - Torque
GR45 210L - Torque

GR55



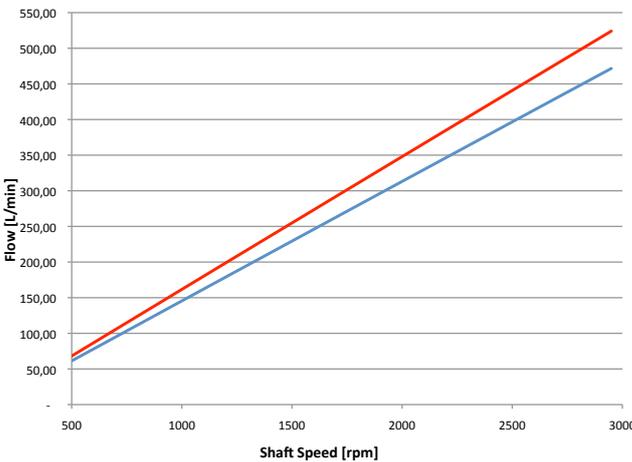
GR55 250L
GR55 300L
GR55 380L

GR55



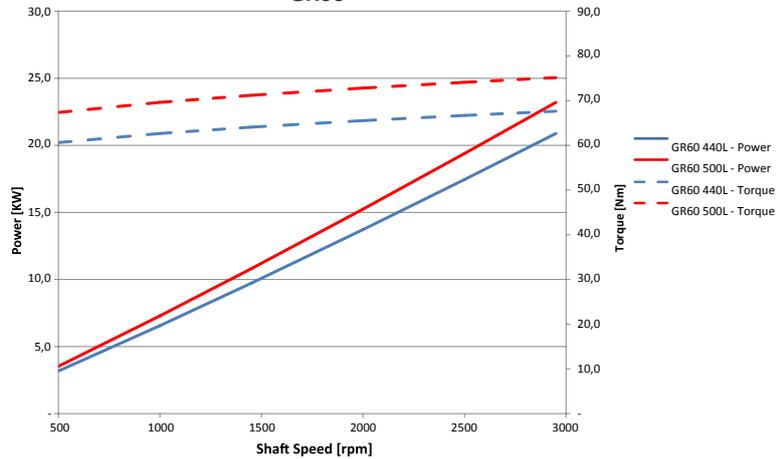
GR55 250L - Power
GR55 300L - Power
GR55 380L - Power
GR55 250L - Torque
GR55 300L - Torque
GR55 380L - Torque

GR60



GR60 440L
GR60 500L

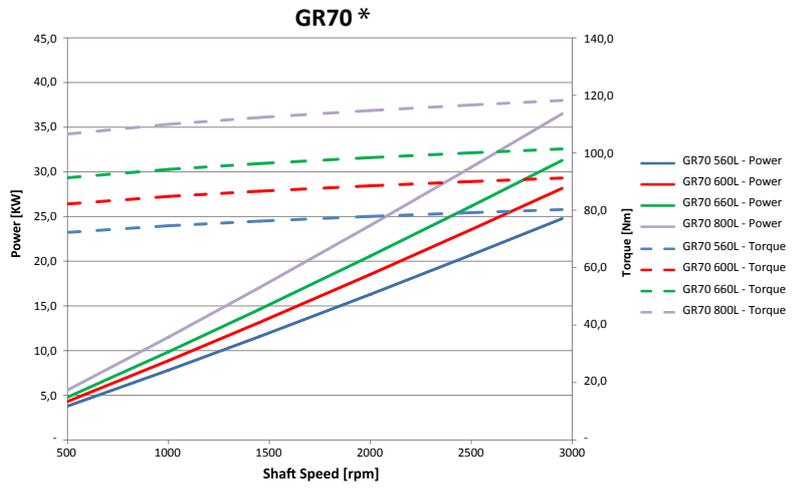
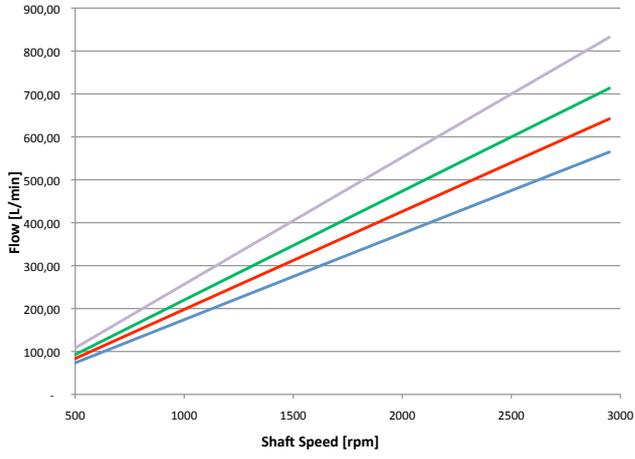
GR60



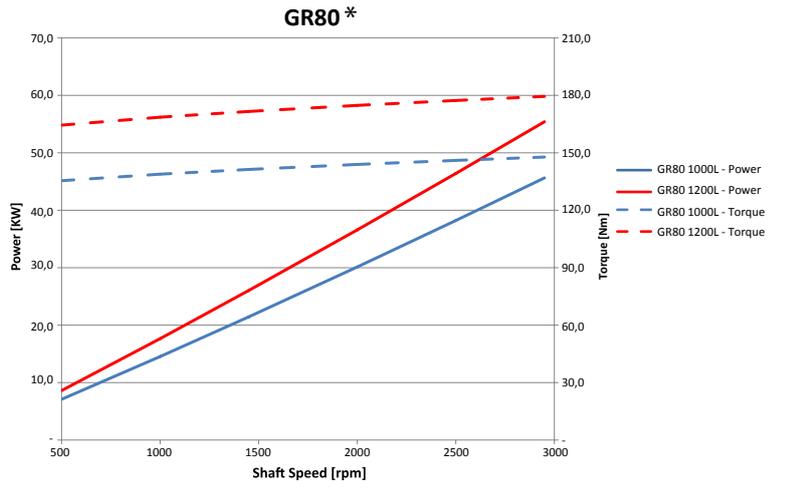
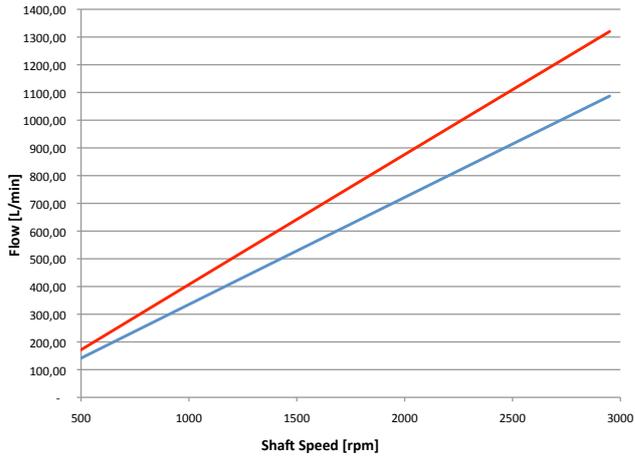
GR60 440L - Power
GR60 500L - Power
GR60 440L - Torque
GR60 500L - Torque

*For model GR70 600L and 800L, GR80, GR90, GR110 pump must be over-busted, please contact Settima.

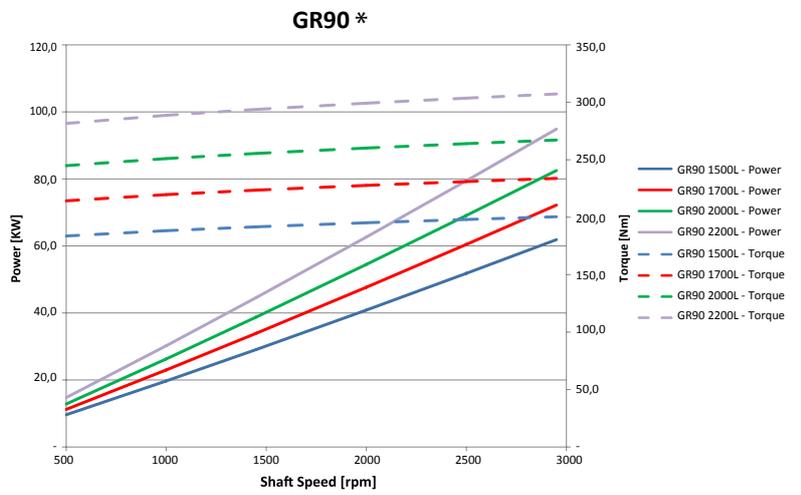
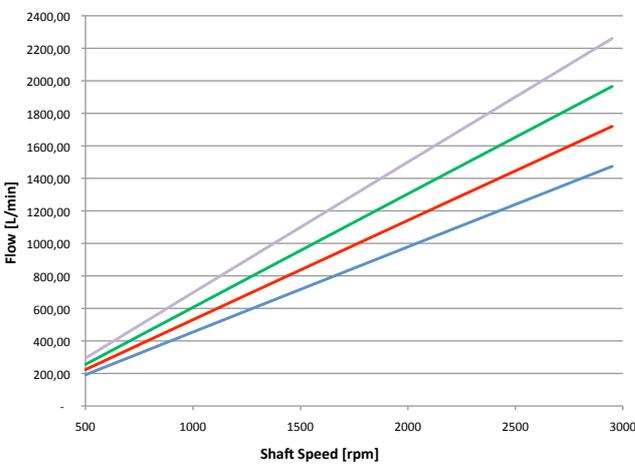
GR70 *



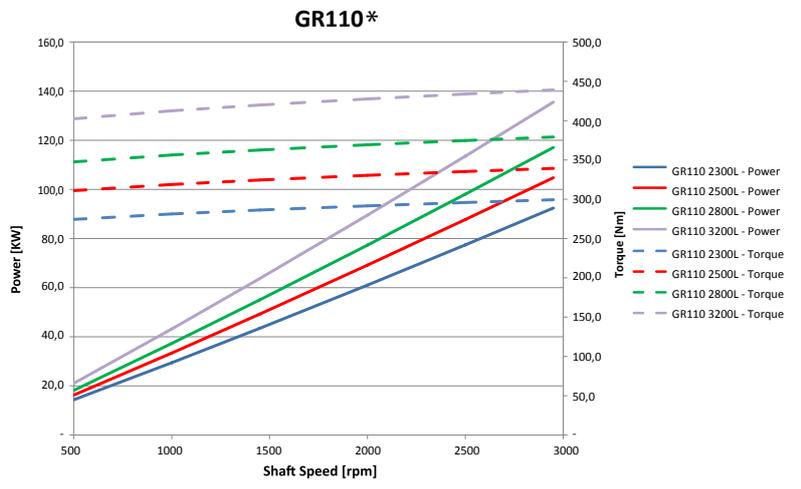
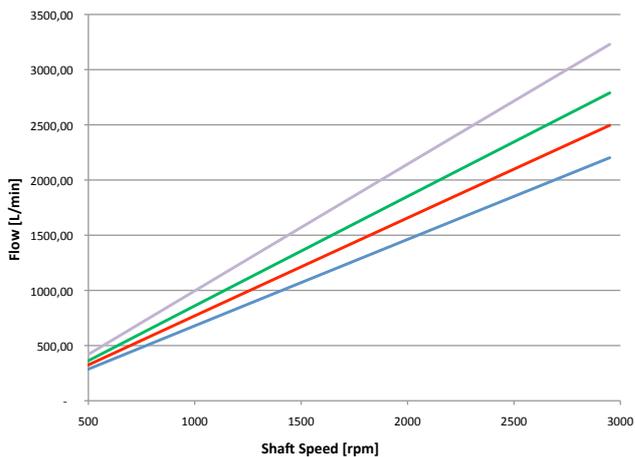
GR80 *



GR90 *



GR110 *



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