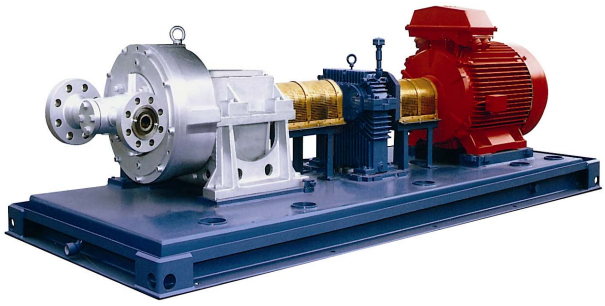
Pitot Tube Pumps

SIHI*Combitube*

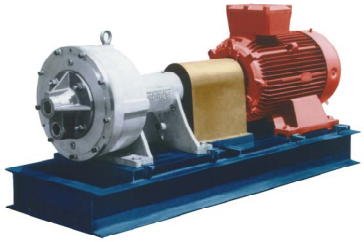
CWHC 400060 - 400152

TECHNICAL DATA

	Grease lubricated version	Oil lubricated version
Flow:	max. 80 m³/h	max. 90 m³/h
Head:	max. 780 m	max. 1900 m
Speedl:	max. 4300 rpm	max. 6800 rpm
Temperature:	max. 100 °C	max. 200 °C
Casing pressure:	max. 85 bar	max. 160 bar
Shaft sealing:	Mechanical seal	
Direction of rotation:	Counter clockwise when viewed from motor end of pump	



Oil lubricated version



Grease lubricated version

APPLICATIONS

SIHI*Combitube* has been developed for low flow, high head applications. The pitot tube design produces a stable, pulsation free flow. The ability of the pump to operate with minimum flow makes the pump suitable for a wide range of applications within its performance envelope.

SIHI*Combitube* is used in a wide range of industries including:

- Chemical and petro-chemical
- Plastic and rubber processing
- Paper mills
- Steel mills
- Sugar refining
- Cereal and food processing
- Automotive.

Within these, SIHI*Combitube* is used for cleaning, descaling, reactor feed, boiler feed, transport and process duties, system pressurisation and spray systems.

DESIGN

SIHI*Combitube* is a single stage, pitot tube pump. The liquid enters the pump via the suction line, passes the mechanical seal (the mechanical seal is under suction pressure only) and enters the rotor where it is accelerated up to the rotor speed. Owing to the rotational speed of the liquid, it has kinetic energy.

A stationary wing shaped pitot tube is placed inside the rotor and has a circular opening near the inside wall of the rotor.The liquid enters the pitot tube at high velocity due to the centrifugal force created by the rotor casing and the kinetic energy of the liquid is converted into pressure as the liquid passes along the diffuser section of the pitot tube. This results in a continuous, high pressure flow of liquid from the pump discharge.

CONSTRUCTION

Casing Pressure:

Grease lubricated version: max 85 bar
Oil lubricated version: max. 160 bar

Please note:
Casing pressure = zero head + suction pressure
The maximum test pressure is 110 bar (for the grease lubricated version) and 225 bar (for the oil lubricated version).

Position of Inlet/Discharge:

2" x 2" NPT Screwed connection: Discharge is axial on the centreline of the pump and the suction branch is below the discharge.
3" x 2" NPT Screwed connection: Suction side horizontal on the right with discharge branch axial to the centreline of the pump.
DN80 x DN50 (3" x 2") Flanged manifold: Branches are in line, horizontally opposed on each side of the pump centreline.

Flanges:

DIN-Flanges: DIN 2636 / PN 64,
DIN 2637 /PN 100 or
DIN 2638 / PN160
ANSI-Flanges: ANSI B16.5, WN 600 or WN 900 RF

Bearings:

The shaft is well supported by a large diameter ball bearing at the rotor end and by two ball bearings or one ball and one roller bearing (for V-belt drive) at the drive end.

Shaft Sealing:

Single or double mechanical seals from leading European and American suppliers are used.

Weight (Pump only):

Grease lubricated version: ca. 395 kg
Oil lubricated version: ca. 605 kg

MATERIAL DETAILS (Position numbers refers to the cut-away drawings on page 3)

Pos.	Descriptioin	Material		
		BG	ES	FA
103 162	Rotor Rotor cover	Spheroidal Cast Iron GGG-50 (0.7050)	Stainless A351-CF8M G-X6CrNiMo18 10 (1.4408)	Duplex steel CD4MCuN GX2CrNiMoCuN25-6-3-3 (1.4517)
710	Pitot tube	Duplex steel 17-4 PH 17Cr4Ni (1.4549)		
720	2" x 2" NPT Manifold	Spheroidal Cast Iron GGG-50 (0.7050	Stainless A351- CF8M G-X6CrNiMo 18 10 (1.4408)	Duplex steel CD4MCuN GX2CrNiMoCuN25-6-3-3 (1.4517)
	3" x 2" NPT and Flanged Manifold	Cast steel A216 GS-C25 (1.0619)		
528 471	Seal hub Seal cover	Stainless A182 X6CrNiMoTi17-12-2 (1.4571) (does not apply for screwed manifold 2" X 2")		Duplex steel A182 F51 X2CrNiMoN22-5-3 (1.4462)
151 350	Rotor casing Baseplate	Spheroidal Cast Iron GGG-50 (0.7050)		
161	Outer casing cover	Steel A-105 St 37-2 (1.0036)		
210	Shaft	High strength, low alloy carbon steel A576- 4140 HT 42 CrMo4V (1.7225)		
	O-Rings	Viton		

SEALING OF CASING :

An O-Ring made from Viton is used.
The execution using Viton has the classification : V

OILBATHCOOLING:

For pumped media with a temperature above 130°C and/or extreme operating conditions, oil bath cooling will be necessary. In such cases the oil bath of the pump is equipped with a cooling coil.

PUMPING OF PARTICLES:

Depending upon the size of the particles, their density and hardness, liquids with a particle concentration up to 100 ppm can be pumped. In these circumstances it is recommended that a filter (or similar filter arrangement) is installed in the suction line with a mesh size 100 (150 µm).

DRIVE:

Drive is through a normal AC motor type IM B3. For asynchronous motor/pump speeds, V-belts, gearbox and/or frequency converter or switched reluctance motors can be used.

ARRANGEMENT:

SIHI*Combitube* is normally operated in the horizontal plane.

ATEX:

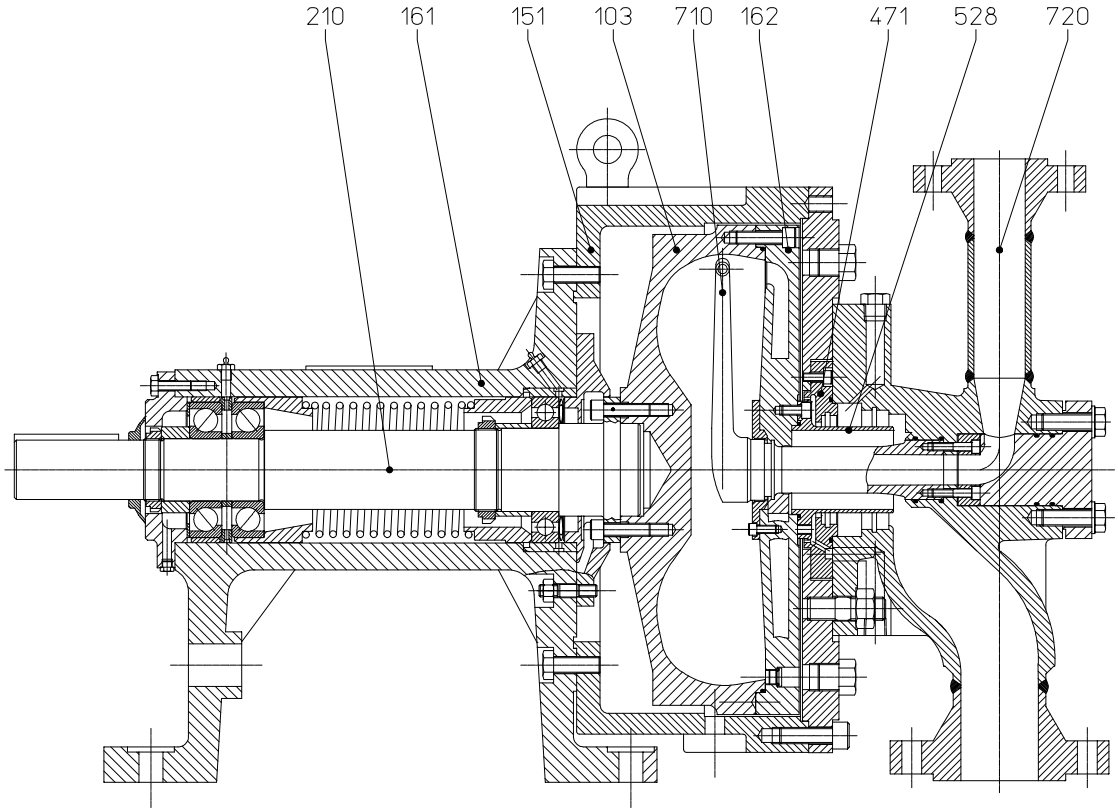
SIHI*Combitube* pumps and pump sets comply with the requirements of EU Directive 94/9 (ATEX 100a) with reference to Machine Class 11, Category 2. These pumps are therefore permitted to operate in areas in which explosive atmospheres caused through gas, vapour, mist or dust/air mixtures can occasionally occur .

API 610:

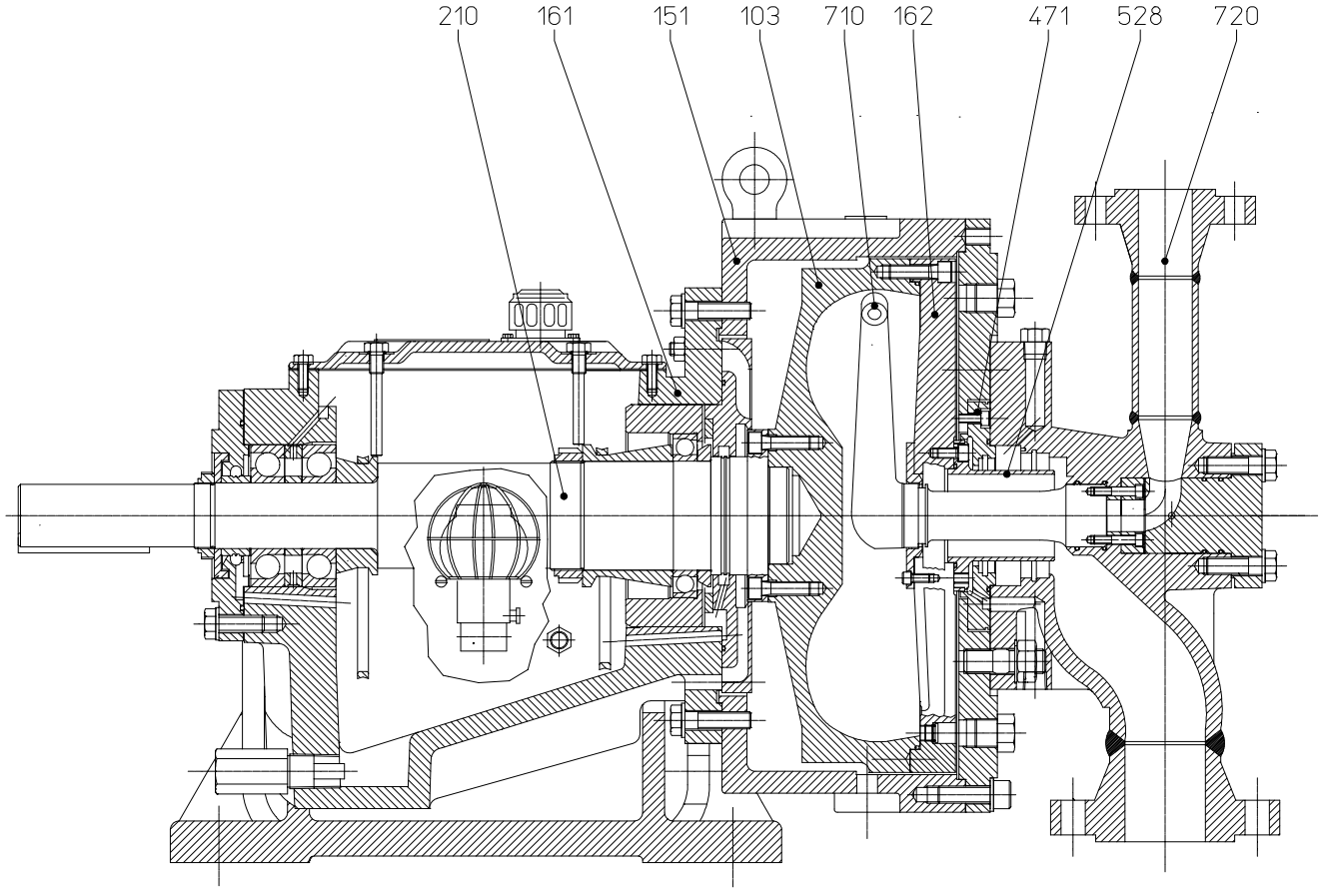
The oil lubricated version of SIHI*Combitube* complies with the requirements of API 610, 8. Edition (with exceptions). Please contact your local pump sales offices of Sterling Fluid Systems who can direct requests for further informaton to relevant SIHI*Combitube* specialists .

CUT AWAY DRAWING

Grease lubricated Version



Oil lubricated Version

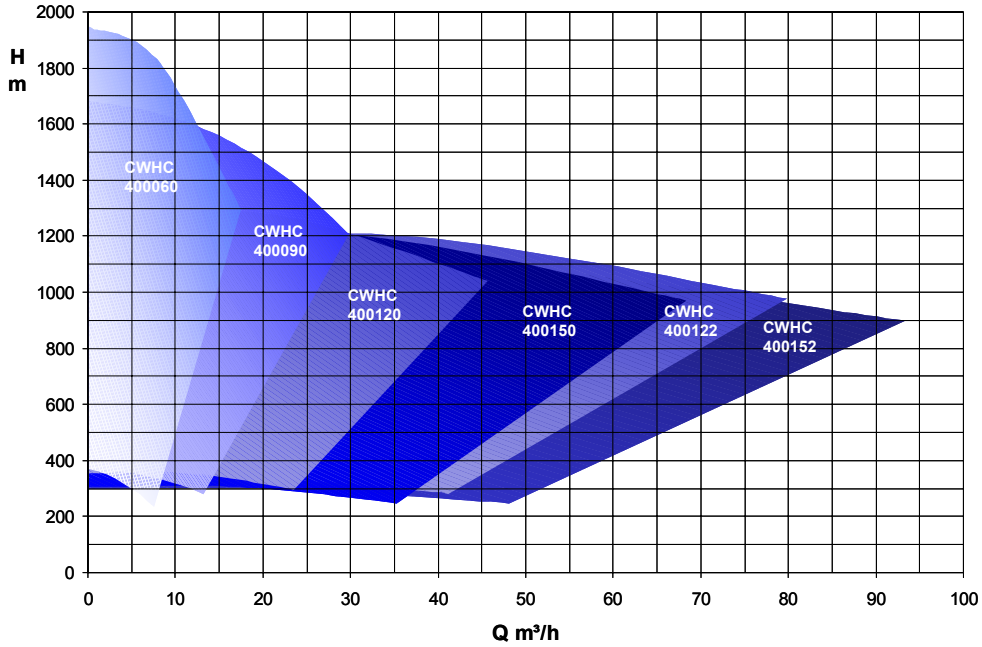


PUMP NOMENCLATURE – EXAMPLE

CWH	C	400	06	0	A	2	XXF	BG	V	06
Combitube										
	Construction									
		Diameter of Rotor Cover								
			Size of Pitot Tube							
				Type of Pitot Tube						
					Hydraulics					
						Bearing/Lubrication				
							Shaft Sealing			
								Materials		
									O-Rings	
										Flanges

PERFORMANCE RANGE

Note: Valid for oil lubricated version. The grease lubricated version has a more limited range



OPERATING LIMITS

Maximum permitted speeds

Material	Grease lubrication	Oil lubrication
BG	4400 rpm	4400 rpm
ES	4400 rpm	4400 rpm
FA	4500 rpm	6800 rpm

Maximum permitted temperatures

Grease lubricated version: 100 °C
Oil lubricated version: 200 °C (above 130 °C oil bath cooling is necessary)

Temperature classes

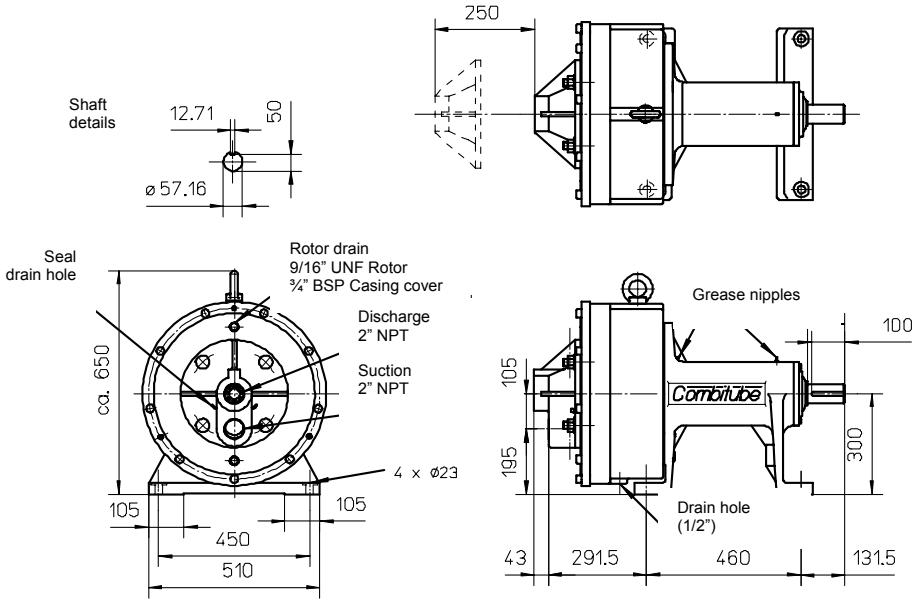
Temperature class acc. To EN 13463-1	Max. permitted surface temperature	Max. temperature of pumped liquid	Comments
T4	135 °C	100 °C 60 °C	Oil lubricated[1)] Grease lubricated
T3	200 °C	165 °C 100 °C	Oil lubricated[1)] Grease lubricated
T2	300 °C	200 °C 100 °C	Oil lubricated[1)] Grease lubricated
T1	450 °C	200 °C 100 °C	Oil lubricated[1)] Grease lubricated

1) These values are valid to a maximum speed of 5700 rpm. For higher speeds please contact your local Sterling Fluid Systems sales office.

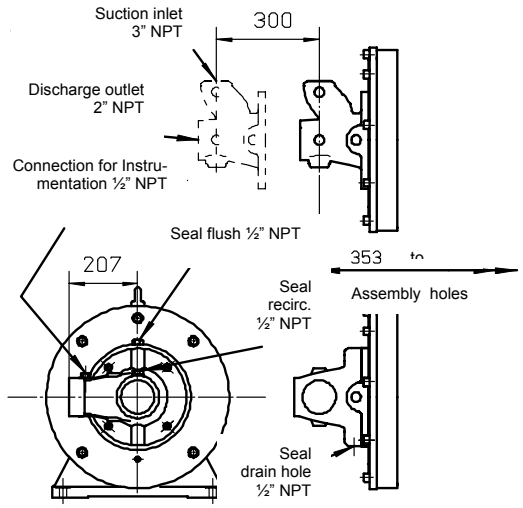
The maximum permitted temperatures quoted for the pumped liquid are valid for normal operating conditions and aqueous type liquids.

DIMENSIONS : Grease Lubricated Version

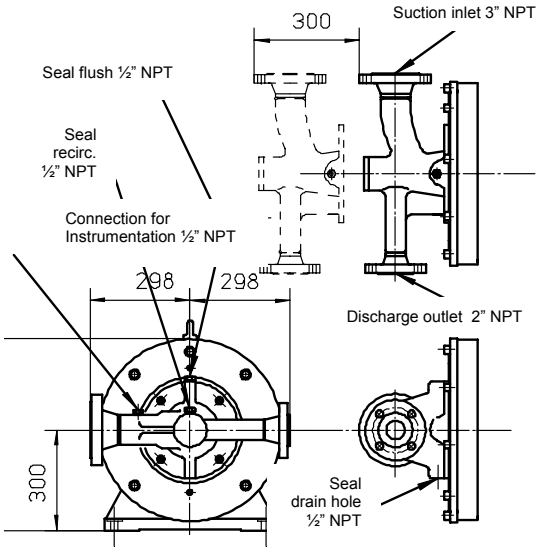
Version with Screwed Connections 2“ x 2“



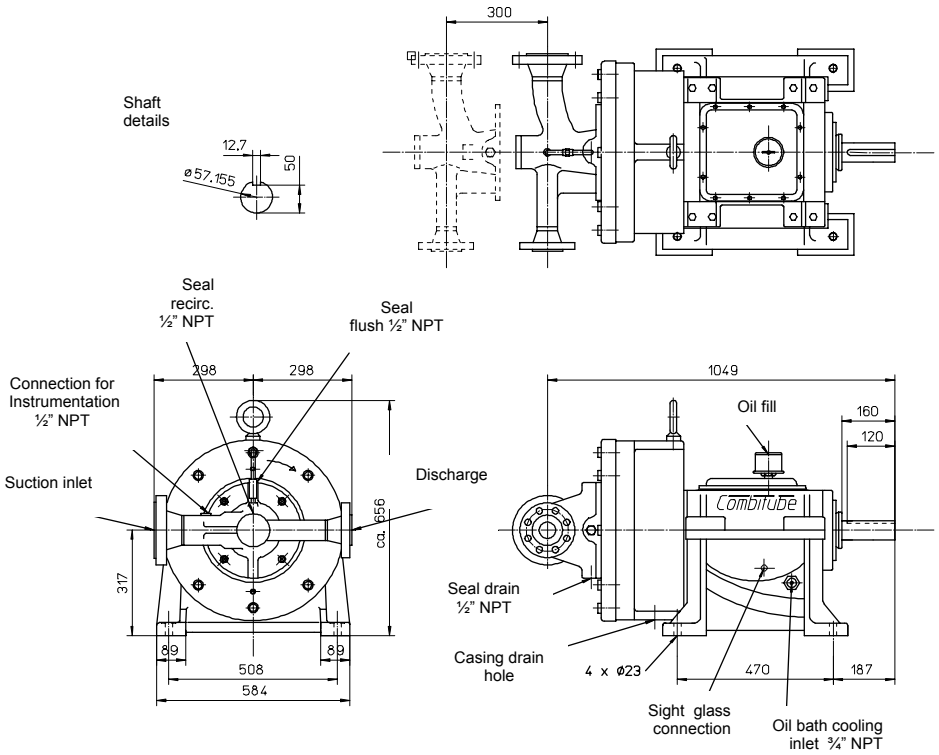
Version with Screwed Manifold Connection 3“ x 2“



Version with Flanged Manifold Connection 3“ x 2“



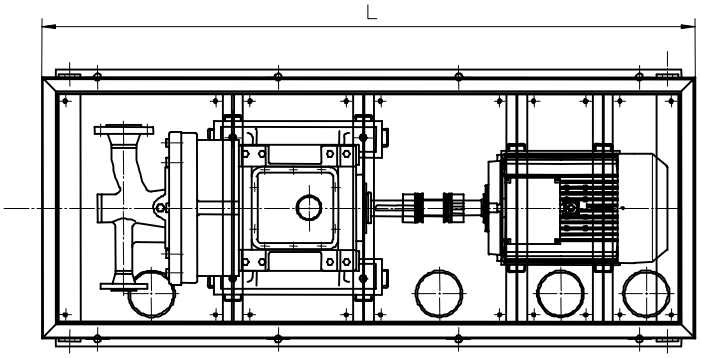
DIMENSIONS: Oil Lubricated Version

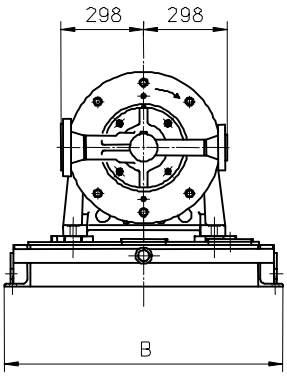


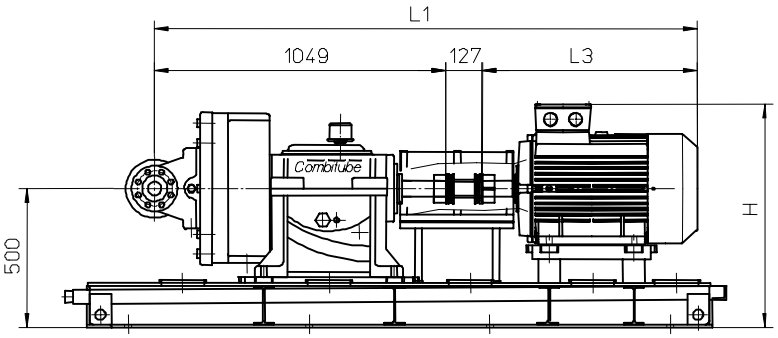
DIMENSIONS DIRECT DRIVE PUMPSET (Note: dimensions are approximate)

Oil lubricated version (All dimensions in mm)

Motor Size	L	L1	L3	B	H	Weight kg
160L	2000	1760	590	750	700	1005
180M	2000	1890	710	750	770	1065
200L	2000	1950	770	750	800	1140
225M	2000	1950	780	750	840	1230
250M	2000	2100	930	750	930	1315
280S	2300	2180	1000	900	960	1520
280M	2300	2180	1000	900	960	1560
315S	2300	2290	1100	900	1010	1740
315M	2300	2290	1100	900	1010	1800
315L	2300	2420	1250	900	1010	1940

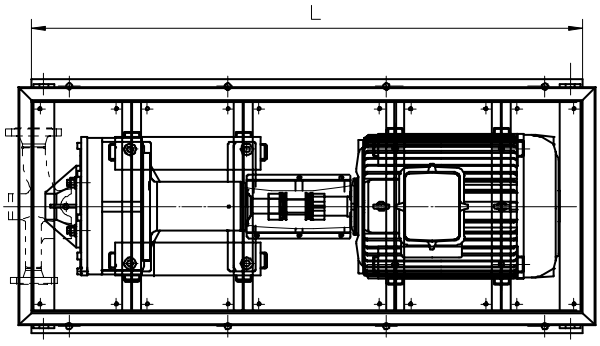


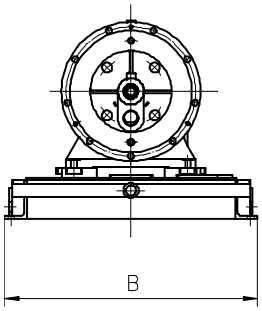


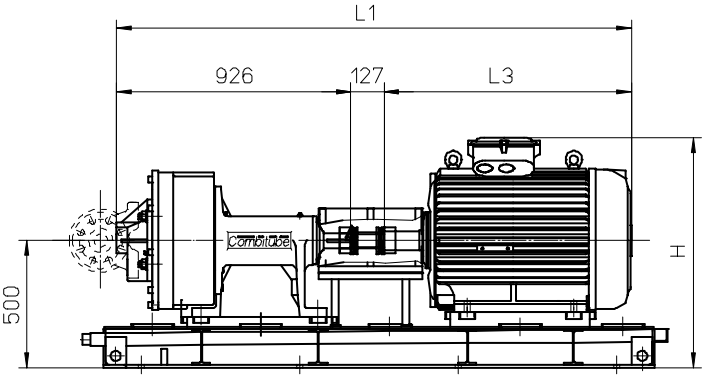


Grease lubricated version (All dimensions in mm)

Motor Size	L	L1	L3	B	H	Weight kg
160L	1900	1640	590	750	700	805
180M	1900	1760	710	750	770	865
200L	2000	1820	770	750	800	940
225M	2000	1830	780	750	840	1030
250M	2000	1980	930	750	930	1115
280S	2300	2060	1000	800	960	1320
280M	2300	2060	1000	800	960	1360
315S	2400	2160	1100	900	1010	1540
315M	2400	2160	1100	900	1010	1600
315L	2400	2300	1250	900	1010	1740



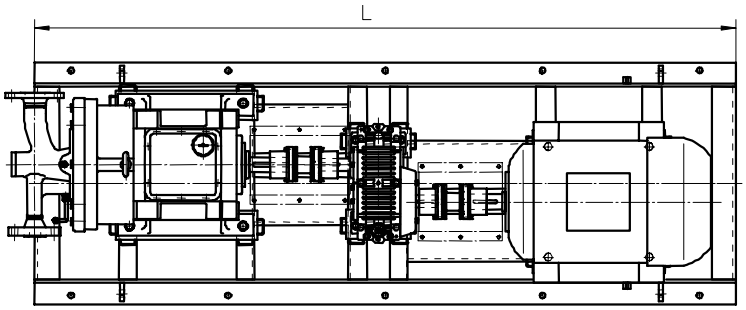


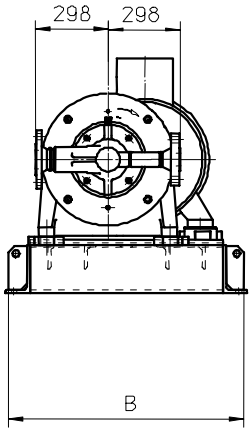


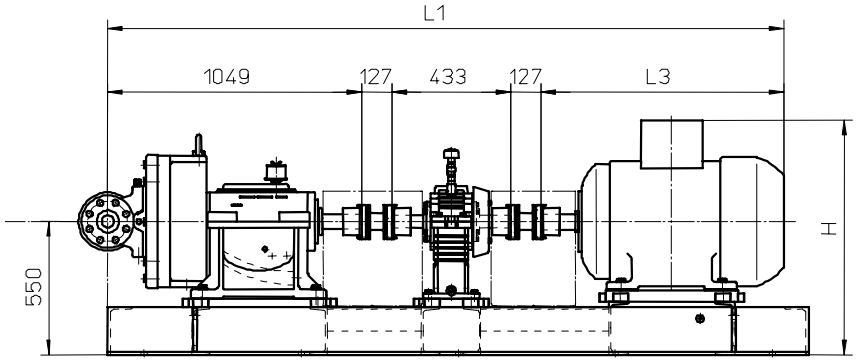
DIMENSIONS PUMPSET WITH GEARBOX (Note: dimensions are approximate)

Oil lubricated version (All dimensions in mm)

Motor Size	L	L1	L3	B	H	Weight kg
160L	2600	2380	590	900	750	1255
180M	2600	2500	710	900	820	1315
200L	2600	2560	770	900	950	1390
225M	2600	2270	780	900	890	1480
250M	2600	2720	930	900	980	1565
280S	2900	2800	1000	1000	1005	1820
280M	2900	2800	1000	1000	1005	1860
315S	2900	2900	1100	1000	1110	2040
315M	2900	2900	1100	1000	1110	2100
315L	2900	3040	1250	1000	1250	2240

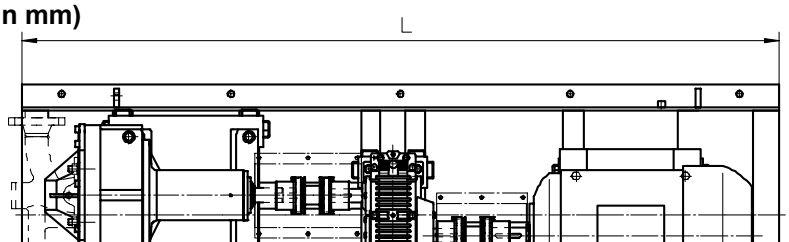


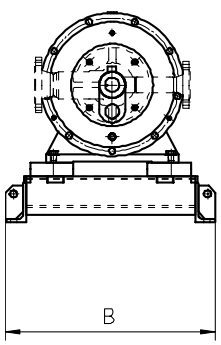


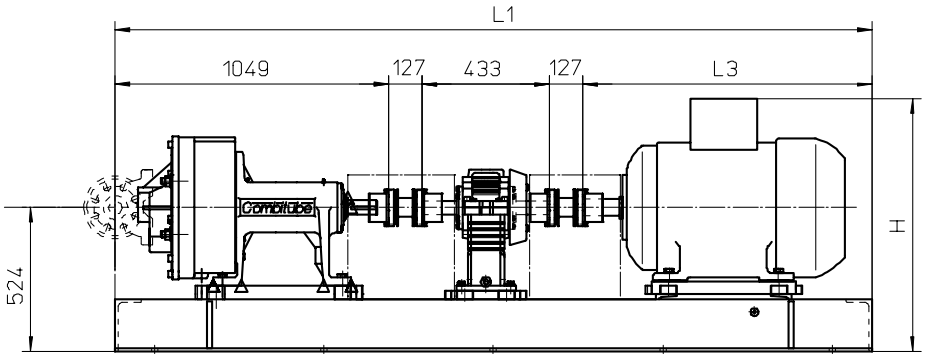


Grease lubricated version (All dimensions in mm)

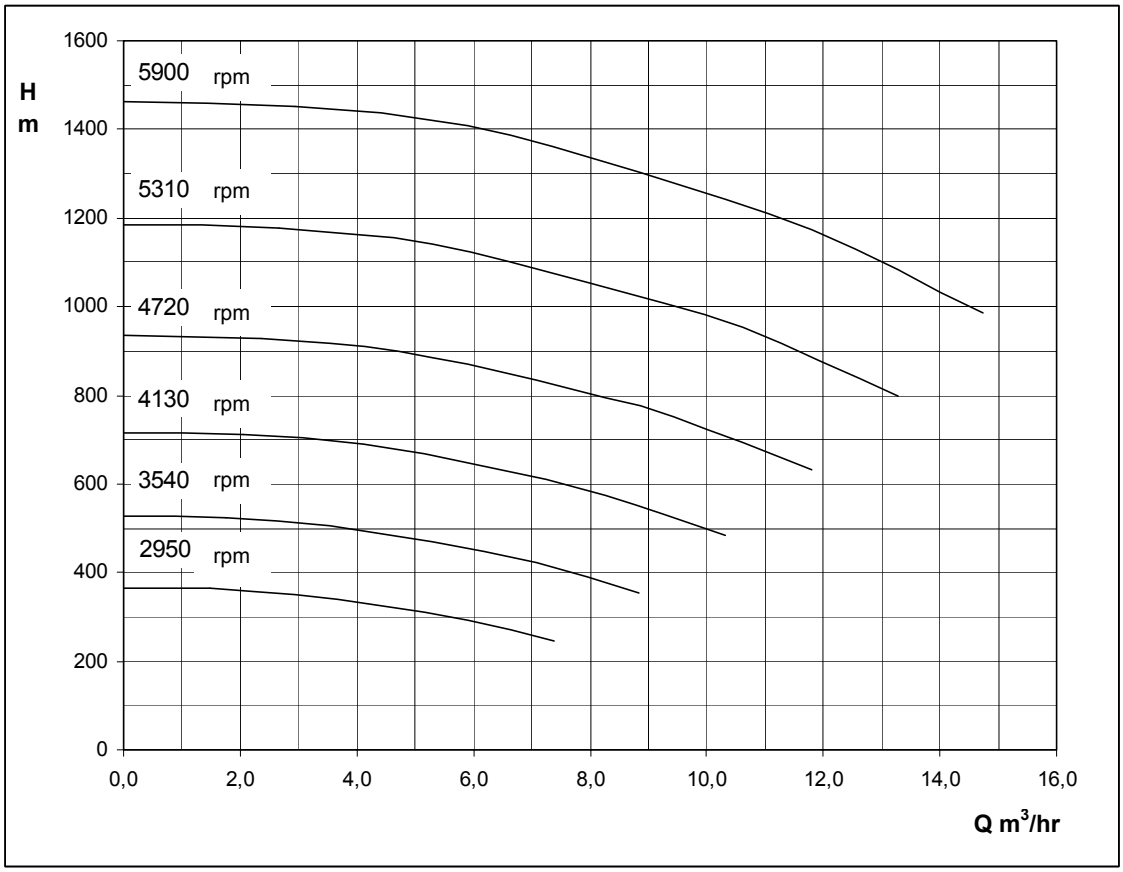
Motor Size	L	L1	L3	B	H	Weight kg
160L	2600	2380	590	900	750	1055
180M	2600	2500	710	900	820	1115
200L	2600	2560	770	900	950	1190
225M	2600	2270	780	900	890	1280
250M	2600	2720	930	900	980	1365
280S	2900	2800	1000	1000	1005	1620
280M	2900	2800	1000	1000	1005	1660
315S	2900	2900	1100	1000	1110	1840
315M	2900	2900	1100	1000	1110	1900
315L	2900	3040	1250	1000	1250	2040

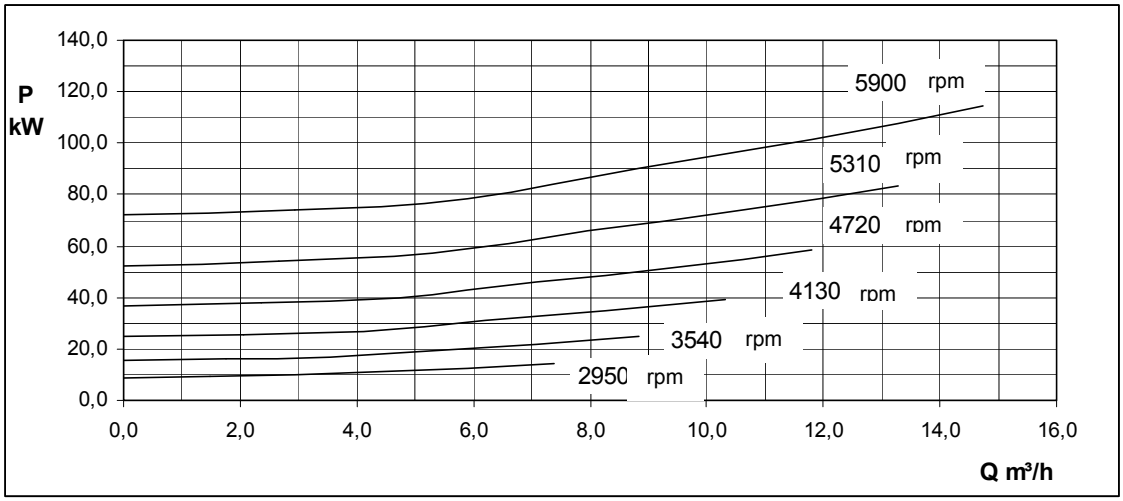


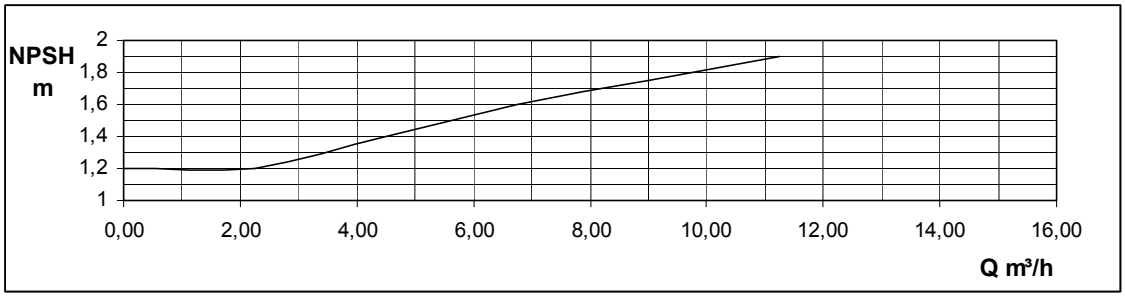




RANGE CURVES SIHI*Combitube* CWHC 400060







Performance valid for density = 1,0 kg/dm³
The speeds are based on standard transmission ratios. For higher speeds please consult your local Sterling Fluid Systems representative.
The performance curves are based on DIN ISO 9906 Class 2.
NPSH-Safety margin of 0.5m is necessary.

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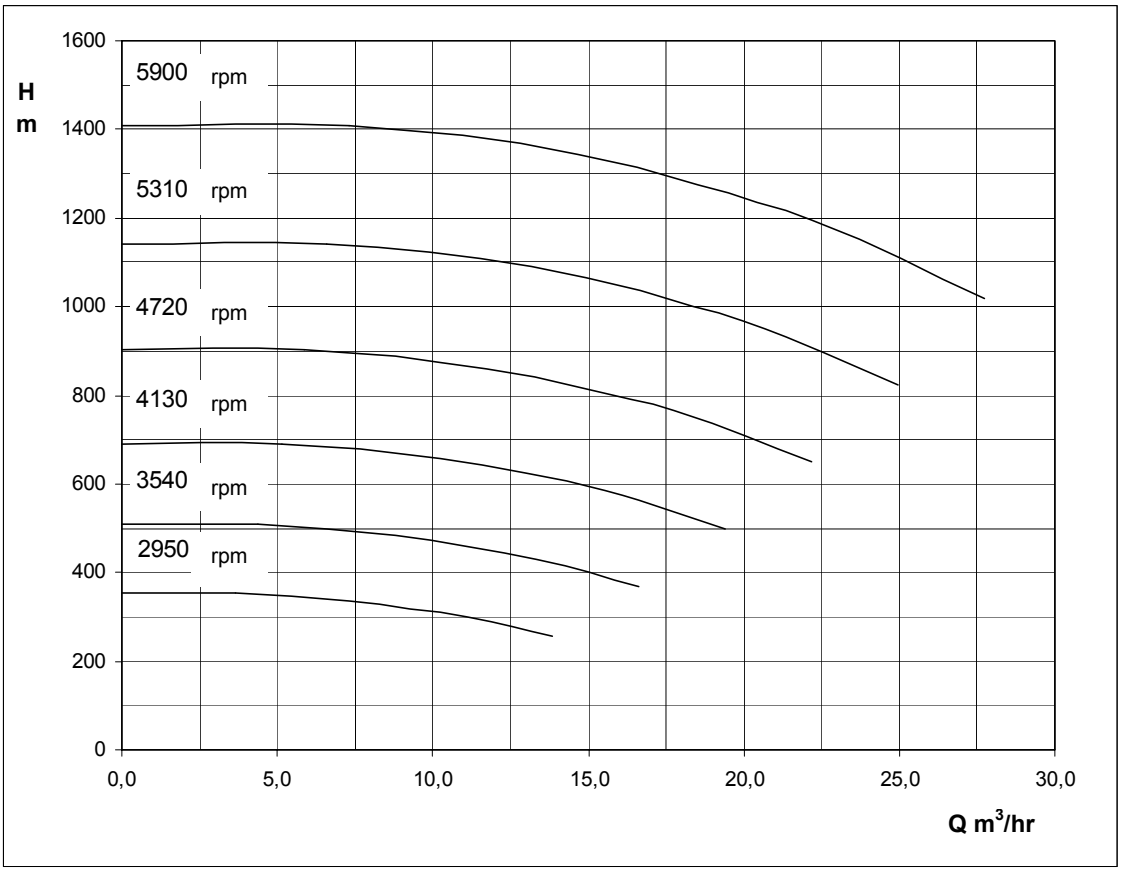
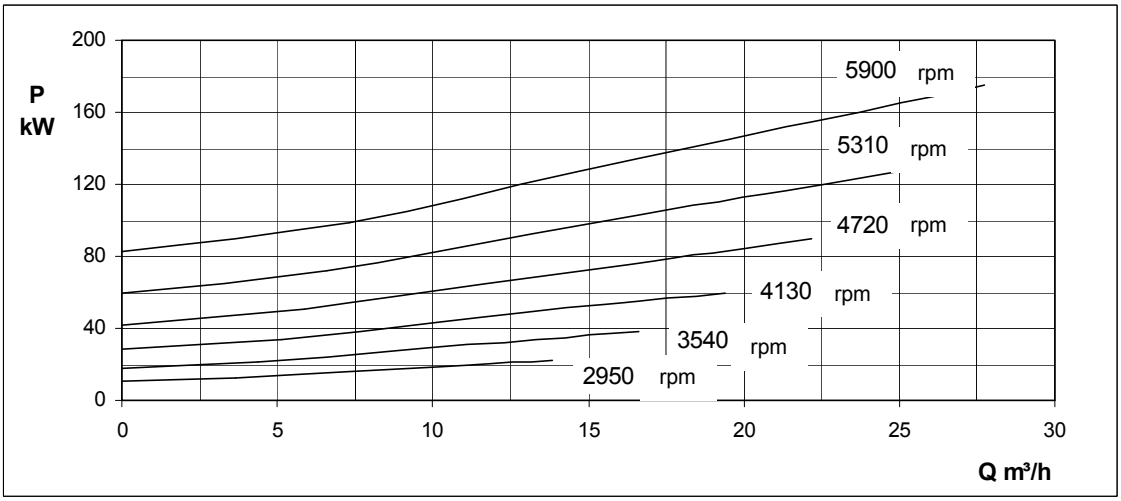
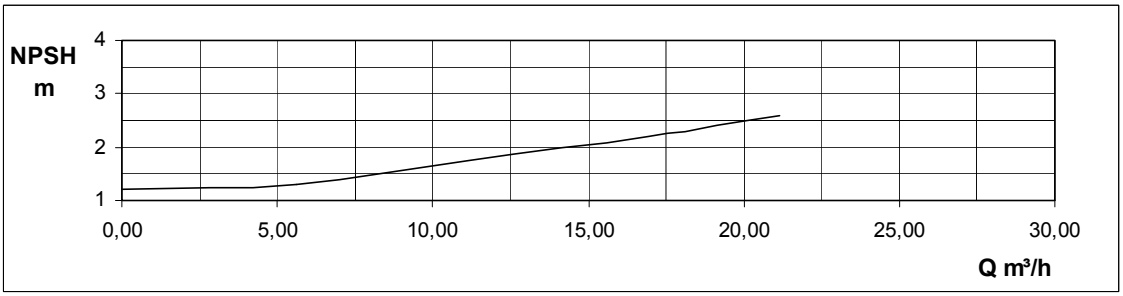
RANGE CURVES SIHI*Combitube* CWHC 400090

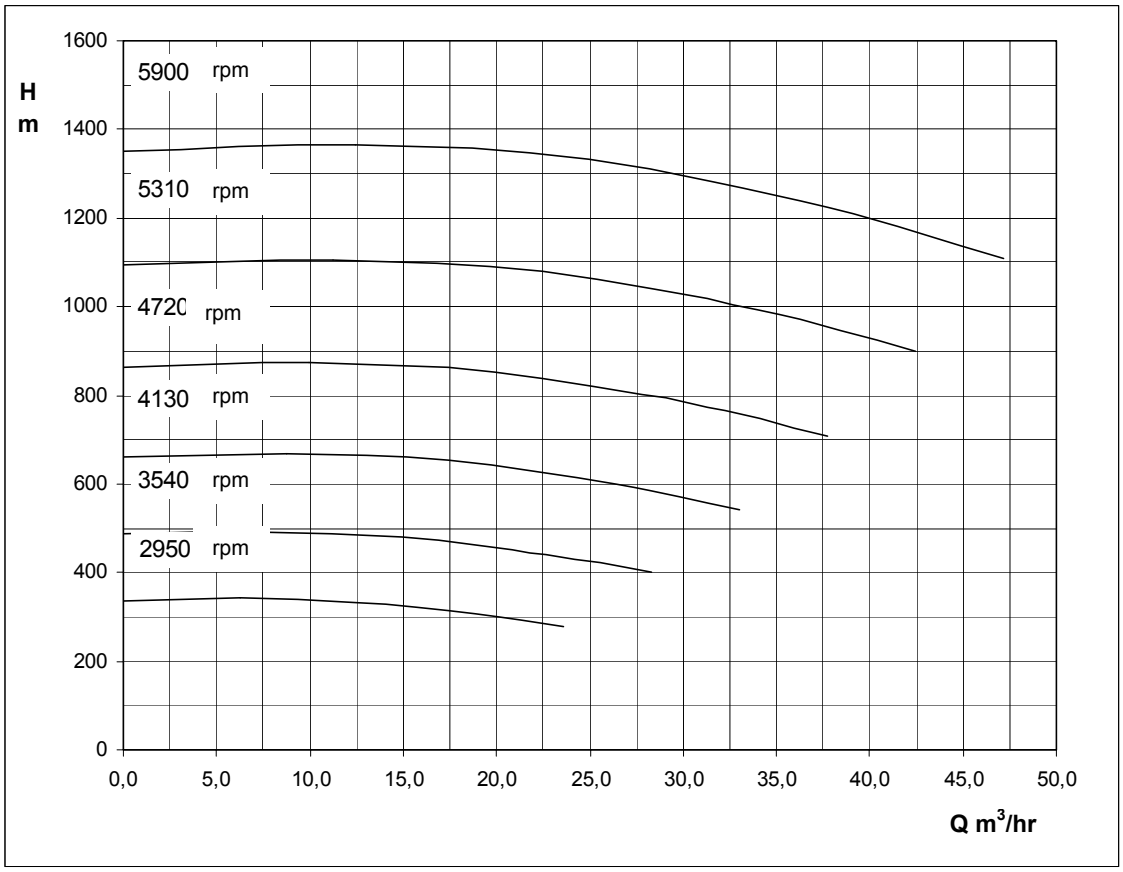


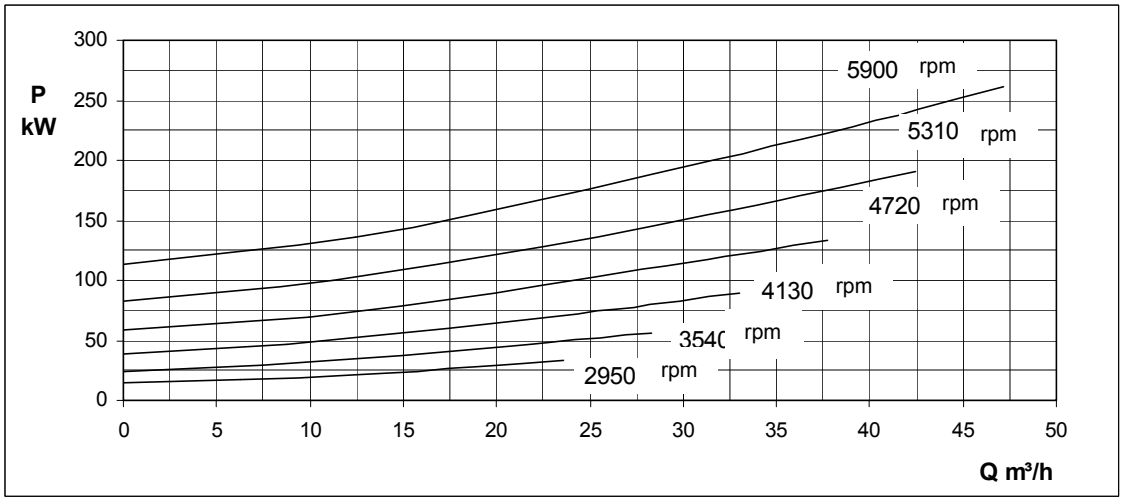


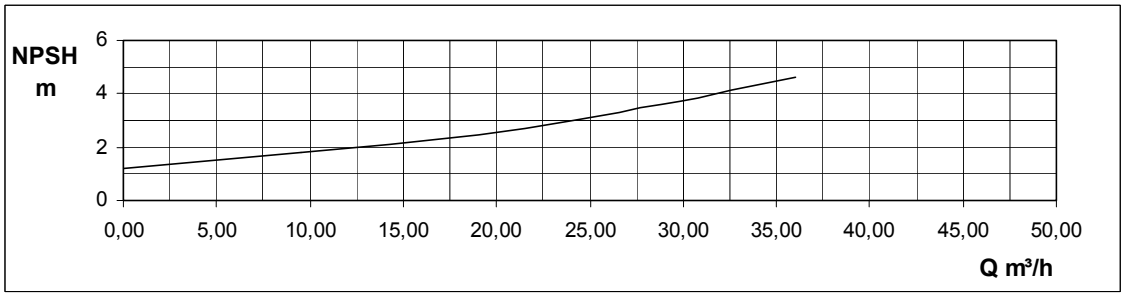


Performance valid for density = 1,0 kg/dm³
The speeds are based on standard transmission ratios. For higher speeds please consult your local Sterling Fluid Systems representative.
The performance curves are based on DIN ISO 9906 Class 2.
NPSH-Safety margin of 0.5m is necessary.

RANGE CURVES SIHI*Combitube* CWHC 400120







Performance valid for density = 1,0 kg/dm³
The speeds are based on standard transmission ratios. For higher speeds please consult your local Sterling Fluid Systems representative.
The performance curves are based on DIN ISO 9906 Class 2.
NPSH-Safety margin of 0.5m is necessary.

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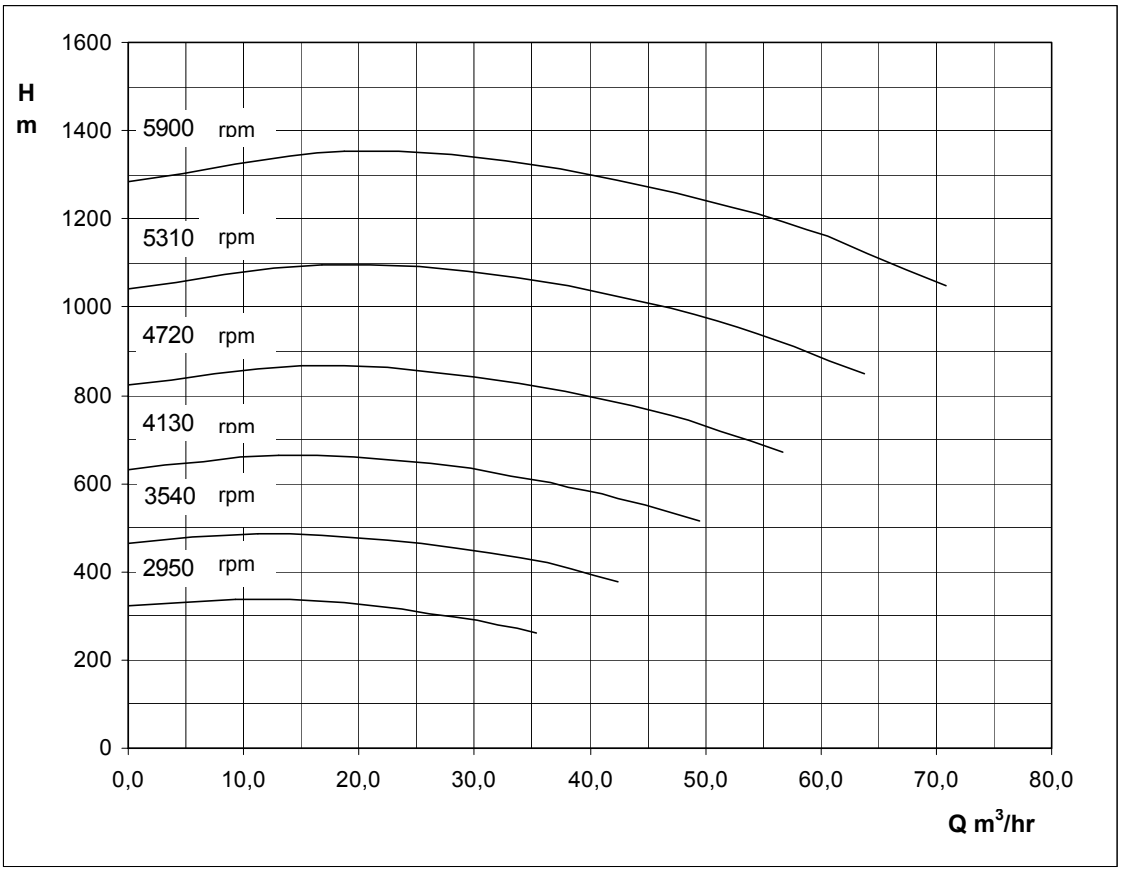
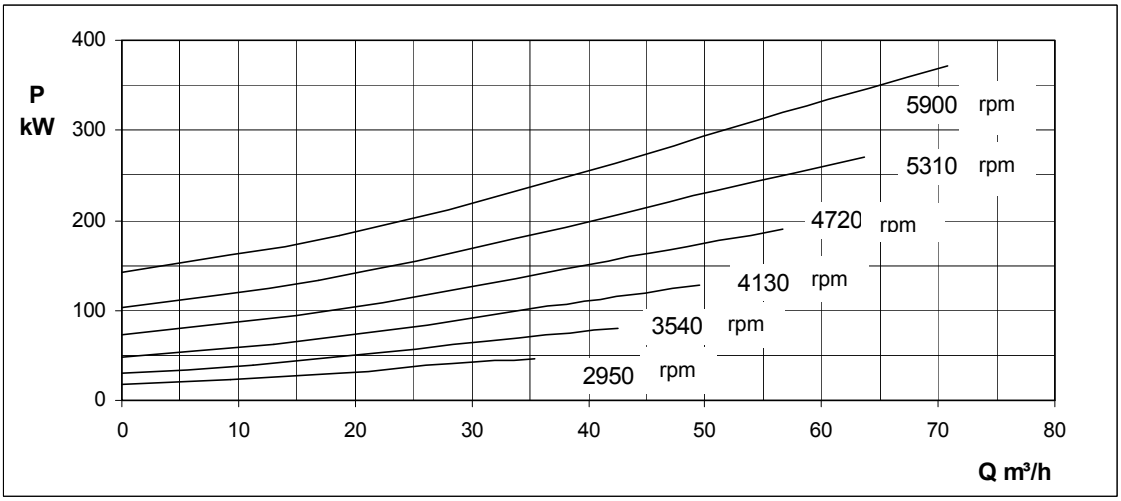
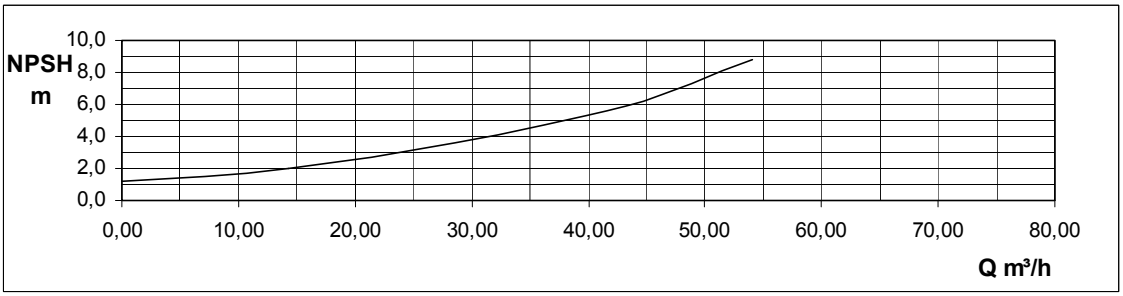
RANGE CURVES SIHI*Combitube* CWHC 400150

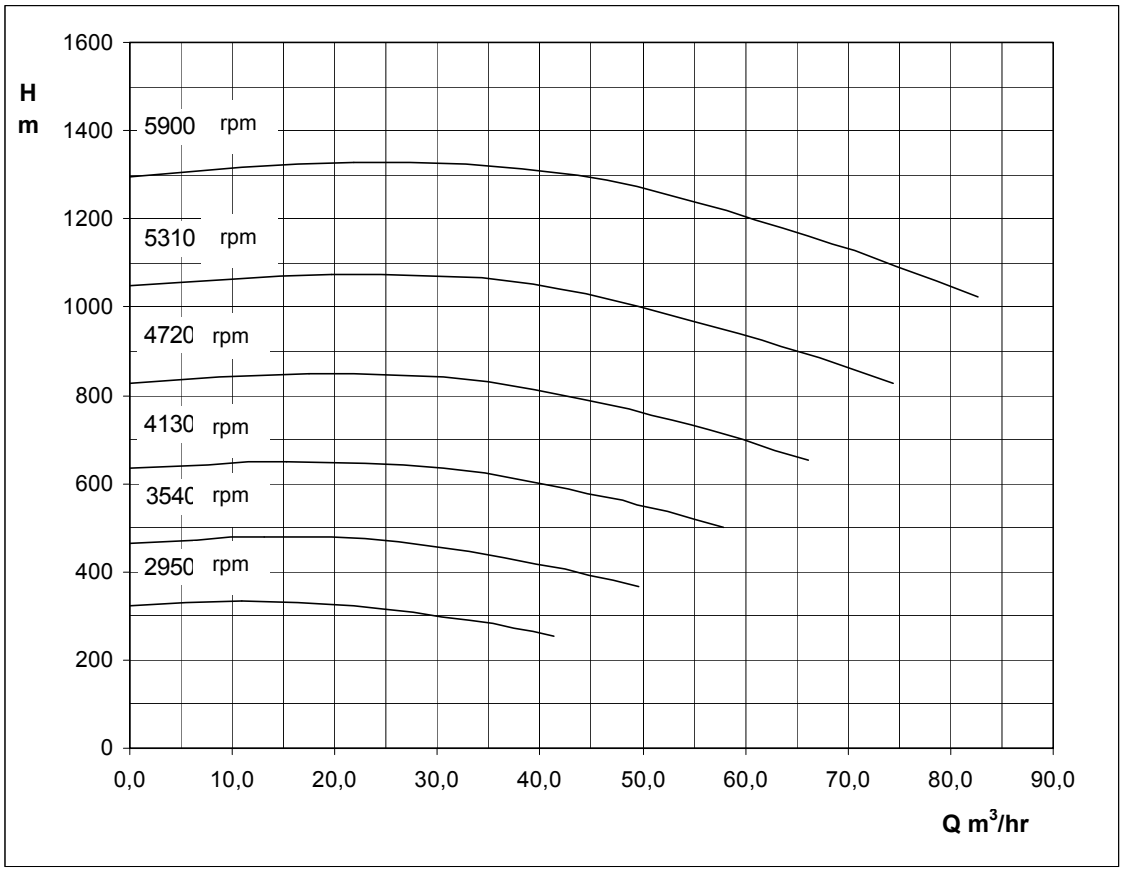


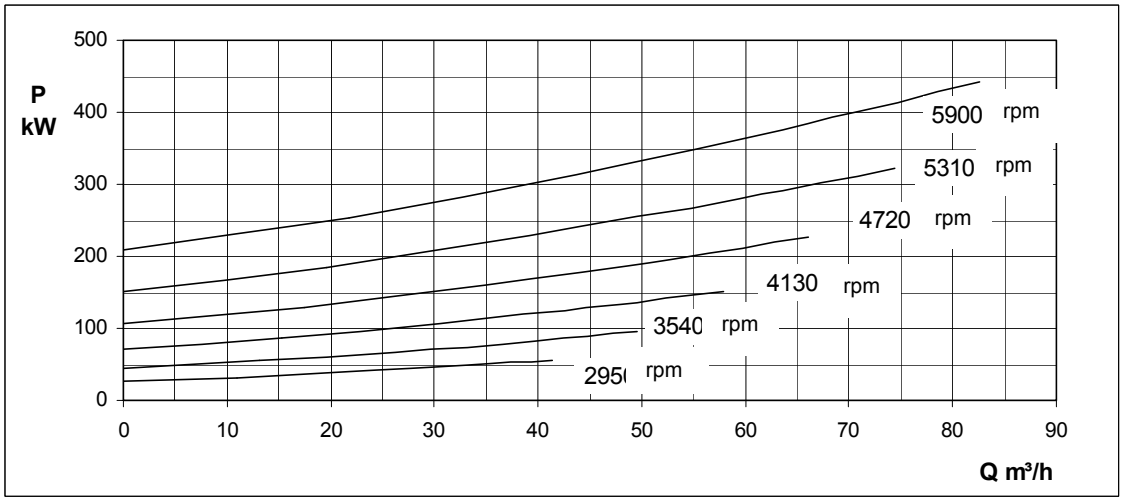


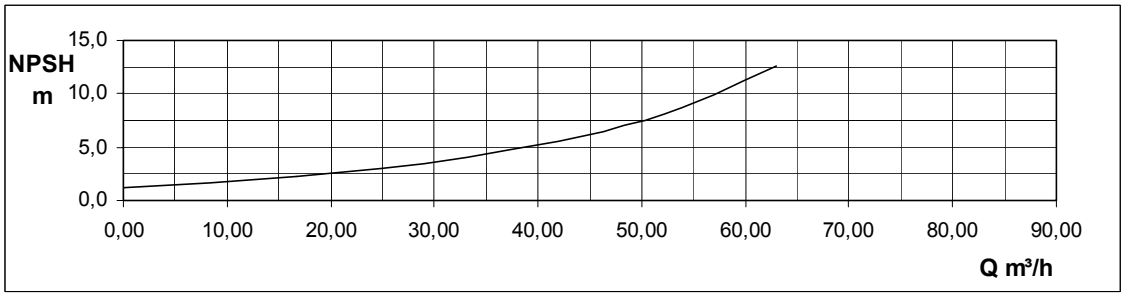


Performance valid for density = 1,0 kg/dm³
The speeds are based on standard transmission ratios. For higher speeds please consult your local Sterling Fluid Systems representative.
The performance curves are based on DIN ISO 9906 Class 2.
NPSH-Safety margin of 0.5m is necessary.

RANGE CURVES SIHI*Combitube* CWHC 400122







Performance valid for density = 1,0 kg/dm³
The speeds are based on standard transmission ratios. For higher speeds please consult your local Sterling Fluid Systems representative.
The performance curves are based on DIN ISO 9906 Class 2.
NPSH-Safety margin of 0.5m is necessary.

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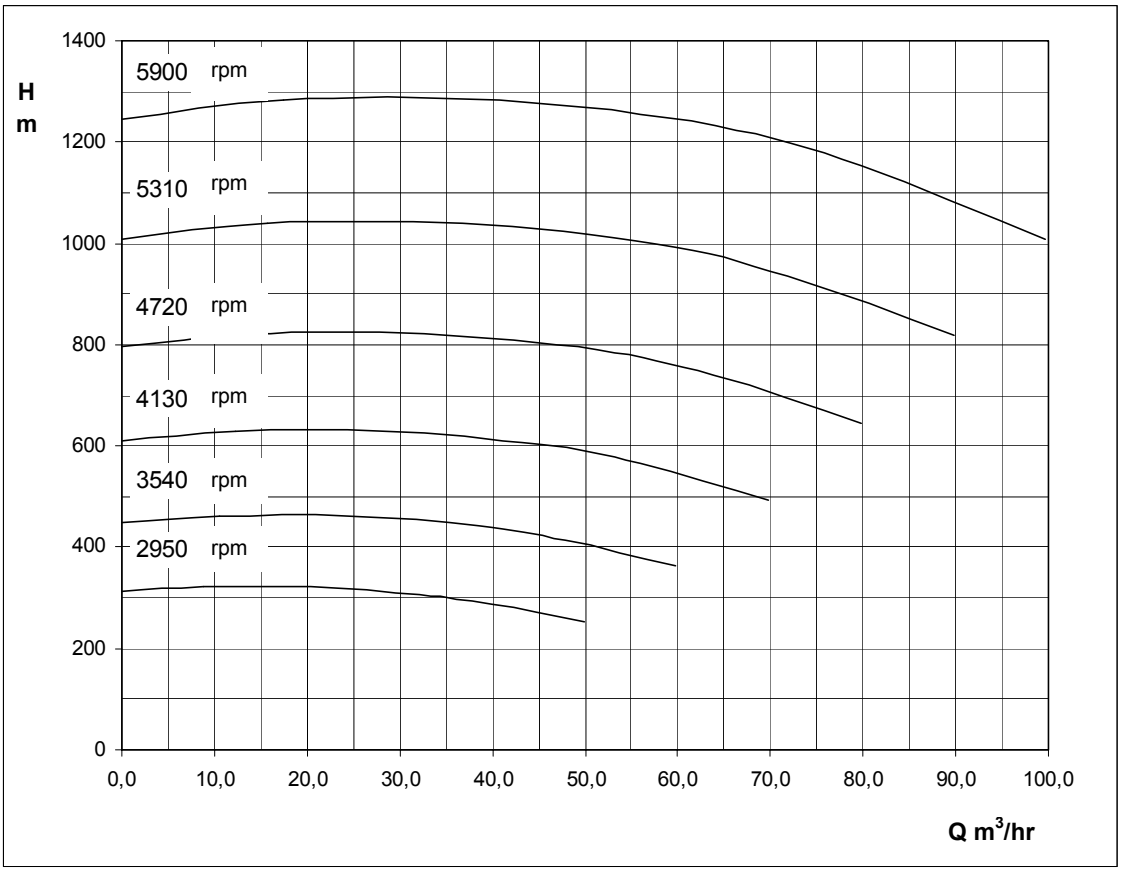

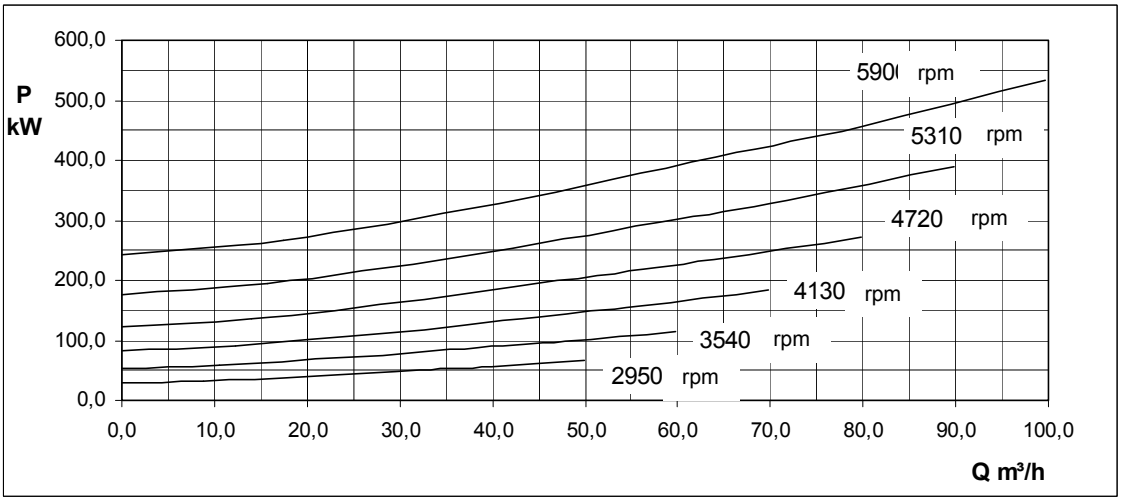

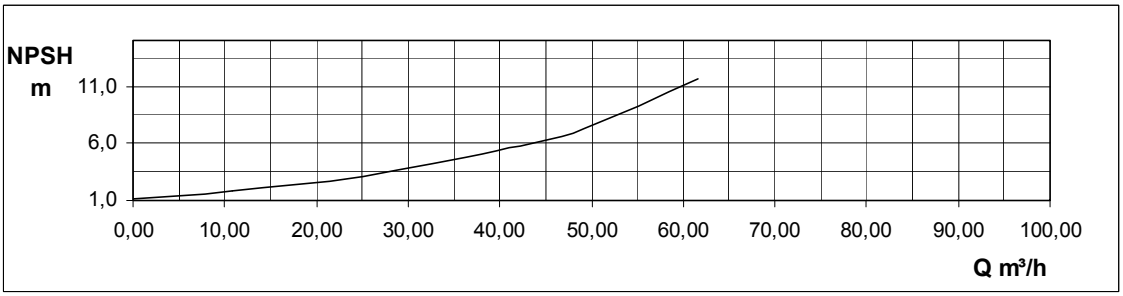

Performance valid for density = 1,0 kg/dm³
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The performance curves are based on DIN ISO 9906 Class 2.
NPSH-Safety margin of 0.5m is necessary.

Additional information on SIHI[Combitube] is available from the Sterling Fluid Systems operation nearest to you. Alternatively please visit our website www.sterlingfluidsystems.com. The SIHI[Combitube] Business Unit can be reached at:

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