

Liquid ring vacuum pumps with magnetic coupling



LEH 350, LEH 450

Pressure range: 33 to 1013 mbar
Suction volume flow: 100 to 400 m³/h

CONSTRUCTION TYPE

SIHI liquid ring vacuum pumps with magnetic coupling are displacement pumps of simple and robust design meeting high demands on tightness. Two liquid surrounded sleeve bearings of tungsten and silicon carbide bear the shaft axially and radial. The application of high-grade magnetic materials with high density of energy guarantees the transmission of the nominal torque and safety during the start-up phase and in case of overload.

The modular magnetic system makes possible the optimal adaptation to different operating conditions. The main components of the pumps mostly are equal to those of the standard pumps, the connecting dimensions are identical.

The material design can be adapted to the operating conditions.

APPLICATION

The vacuum pumps with magnetic coupling are suitable for handling and exhausting of nearly all dry and humid gases.

They are applied wherever extremely high demands on tightness exist which cannot be met by pumps with shaft seals.



NOTE

The main fields of application are in the chemical and pharmaceutical industry where polluting, unhealthy or dangerous media are to be handled. Many different process vapours can be exhausted and the generated condensate possibly can be used as service liquid for the pump.

For that purpose the service liquid, separated from the gas in a liquid separator, is run in a circuit. For the cooling of the system a heat exchanger is arranged in the circulating liquid line.

GENERAL TECHNICAL DATA

Pump type	unit	LEH 350	LEH 450
Nominal speed	rpm	1450	
Power of the electric motor	IP 55 ¹⁾	11	15
	EEx e II T3 ¹⁾	10	13,5
Max. compression over pressure	bar	0,6	
Max. admissible pressure difference	bar	1,5	
Hydraulic test (over pressure)	bar	3	
Moment of the inertial of the rotating pump parts and of the water filling (without outer magnet)	kg · m ²	1,17	1,23
Sound pressure level at a suction pressure of 80 mbar	dB (A)	66	67
Max. gas temperature	dry	100	
	saturated	50	
Service liquid	max. admissible temperature	50	
	max. viscosity	90	
	max. density	1200	
	volume up to shaft level	8	11
Max. flow resistance of the heat exchanger	bar	0,2	
Leakage	$\frac{\text{mbar} \cdot \text{l}}{\text{s}}$	$< 1 \cdot 10^{-3}$	

The combination of several limiting values is not admissible.

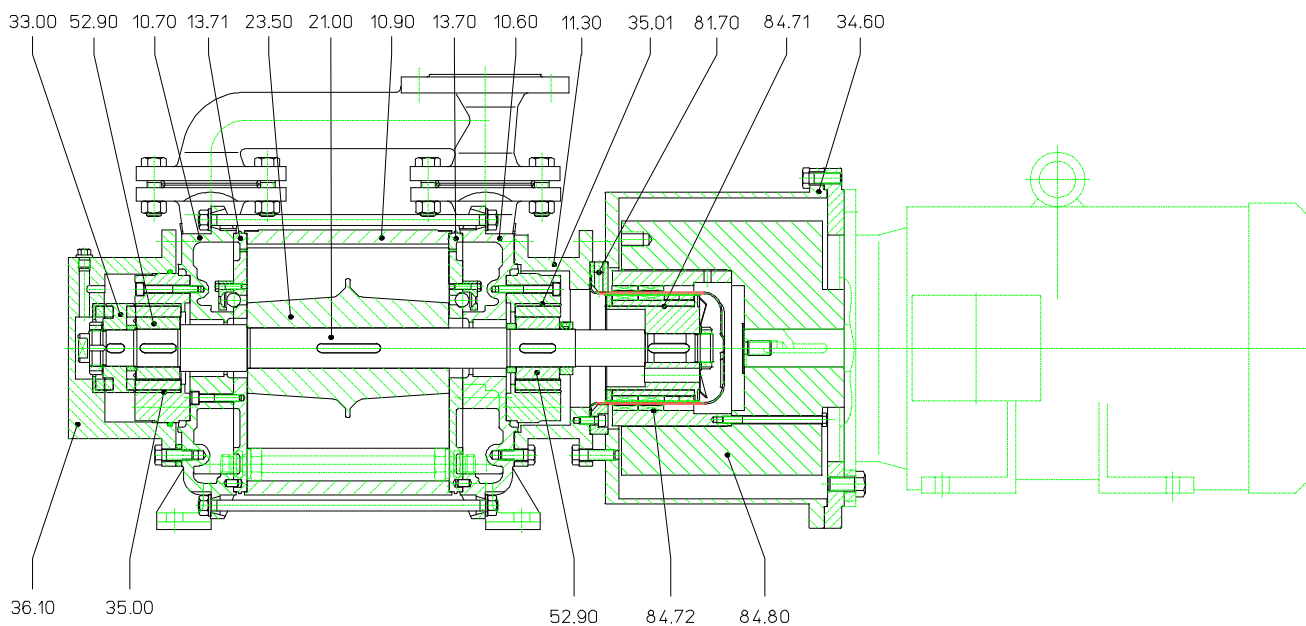
¹⁾ normally

The dimensioning of the magnetic coupling and of the electric motor depends on the physical data of the service liquid and of the suction and discharge pressure of the pump.

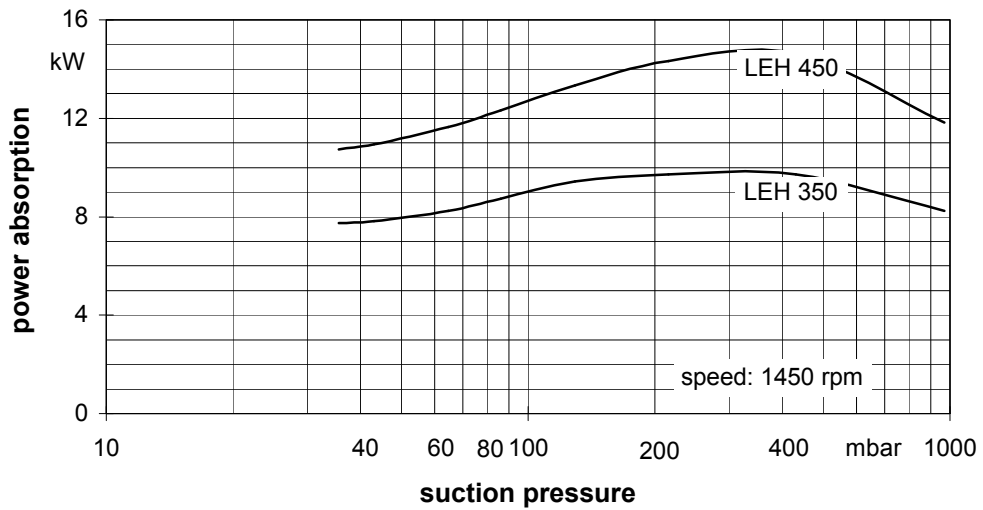
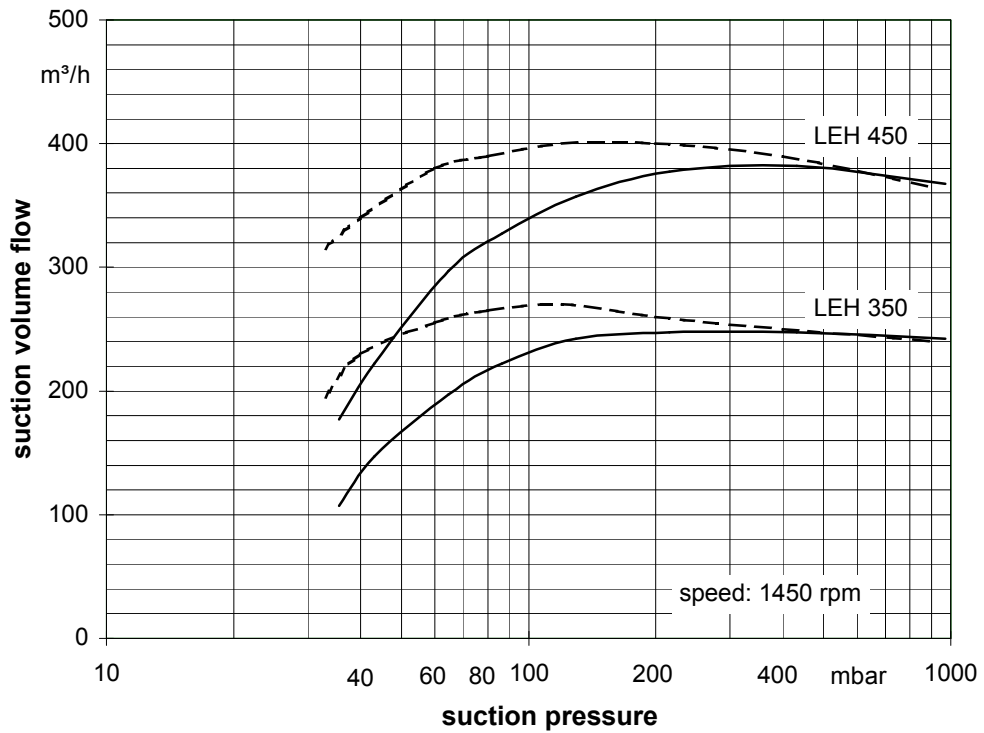
Material designs LEH 350, LEH 450 with magnetic coupling

Item	COMPONENTS	MATERIAL DESIGN	
		0B	4B
10.60, 10.70	Casing	0.6025	1.4408
13.70, 13.71	Guide disk		1.4581
10.90	Central body		
11.30	Intermediate casing	1.0553	1.4571
21.00	Shaft	1.4021	
23.50	Vane wheel impeller	1.4027.05	1.4517
34.60	Stool	1.0038	1.0038 stove enamelling
33.00	Thrust bearing	1.4462 / silicon carbide	
36.10	Bearing cover	1.0553 / 1.4462 / silicon carbide	1.4571 / 1.4462 / silicon carbide
35.00, 35.01	Bush	1.0553 / 1.4571 / silicon carbide	1.4571 / silicon carbide
52.90	Bushing	tungsten carbide	
81.70	Isolation shroud	1.4571 / 2.4610	
84.71	Inner magnet	1.4571 / magnet	
84.72	Outer magnet	1.0553 / magnet	
84.80	Magnetic bell	1.0553	

Sectional drawing LEH 350, LEH 450 with magnetic coupling



Suction volume flow and power absorption LEH 350, LEH 450 with magnetic coupling

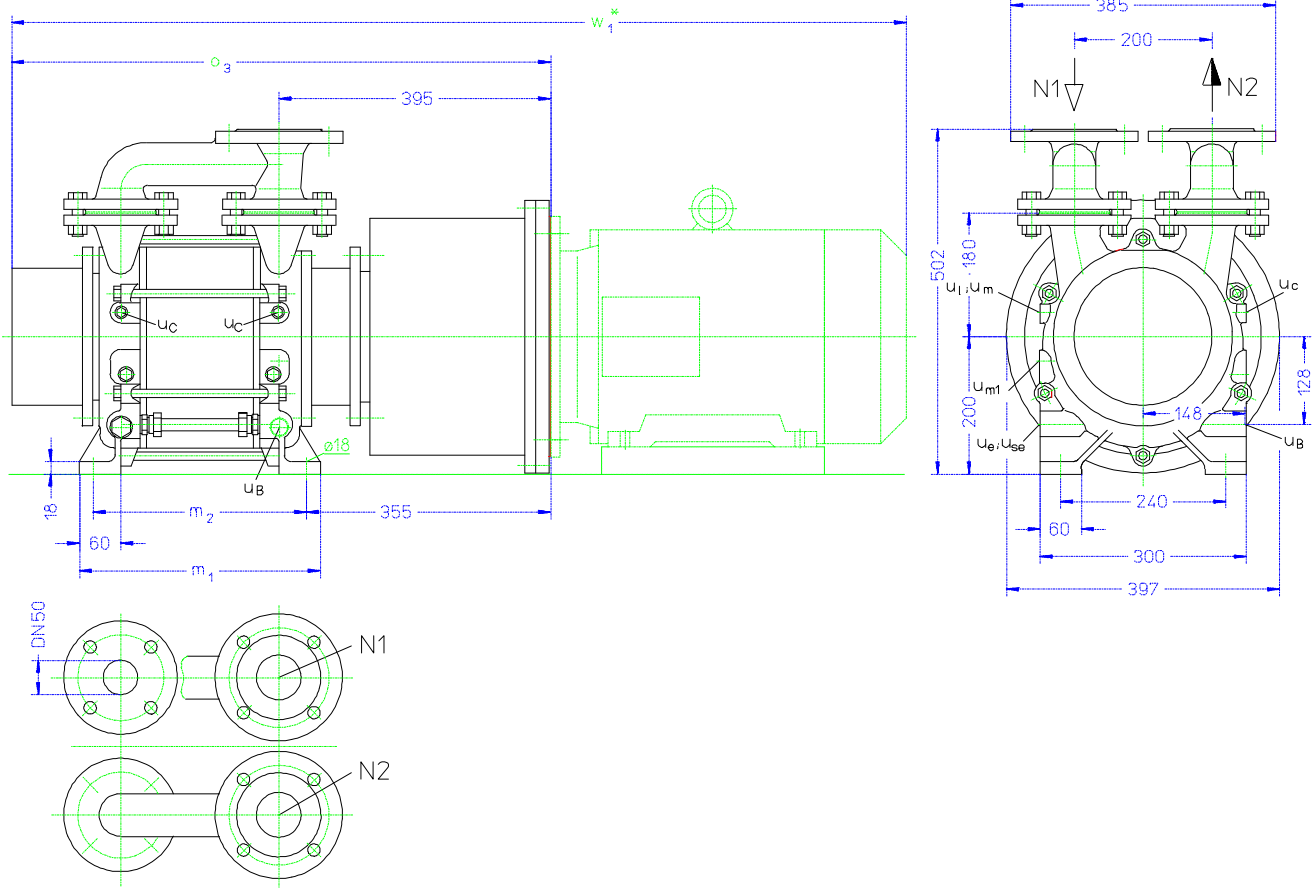


The operating data are applicable under the following conditions:

- pumping medium:
 - dry air: 20°C _____
 - water vapour saturated air : 20°C - - - - -
- service liquid:
 - water: 15°C _____

Compression pressure 1013 mbar (atmospheric pressure)
 The suction volume flow is applied to the suction pressure
 Tolerance of the operating data 10%
 Max. fresh water need with lowest suction pressure

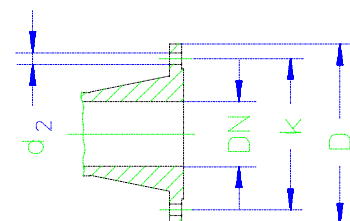
Dimension table LEH 350, LEH 450 with magnetic coupling



- N 1 = gas inlet DN 65
- N 2 = gas outlet DN 65
- u_B = connection for service liquid G ¾
- u_c = connection for protection against cavitation G ¼
- u_e = drain connection G ½
- u_l = connection for vent cock G ½
- u_m = connection for pressure gauge G ½
- u_{m1} = connection for drain valve G ½
- u_{se} = connection for dirt drain G ½

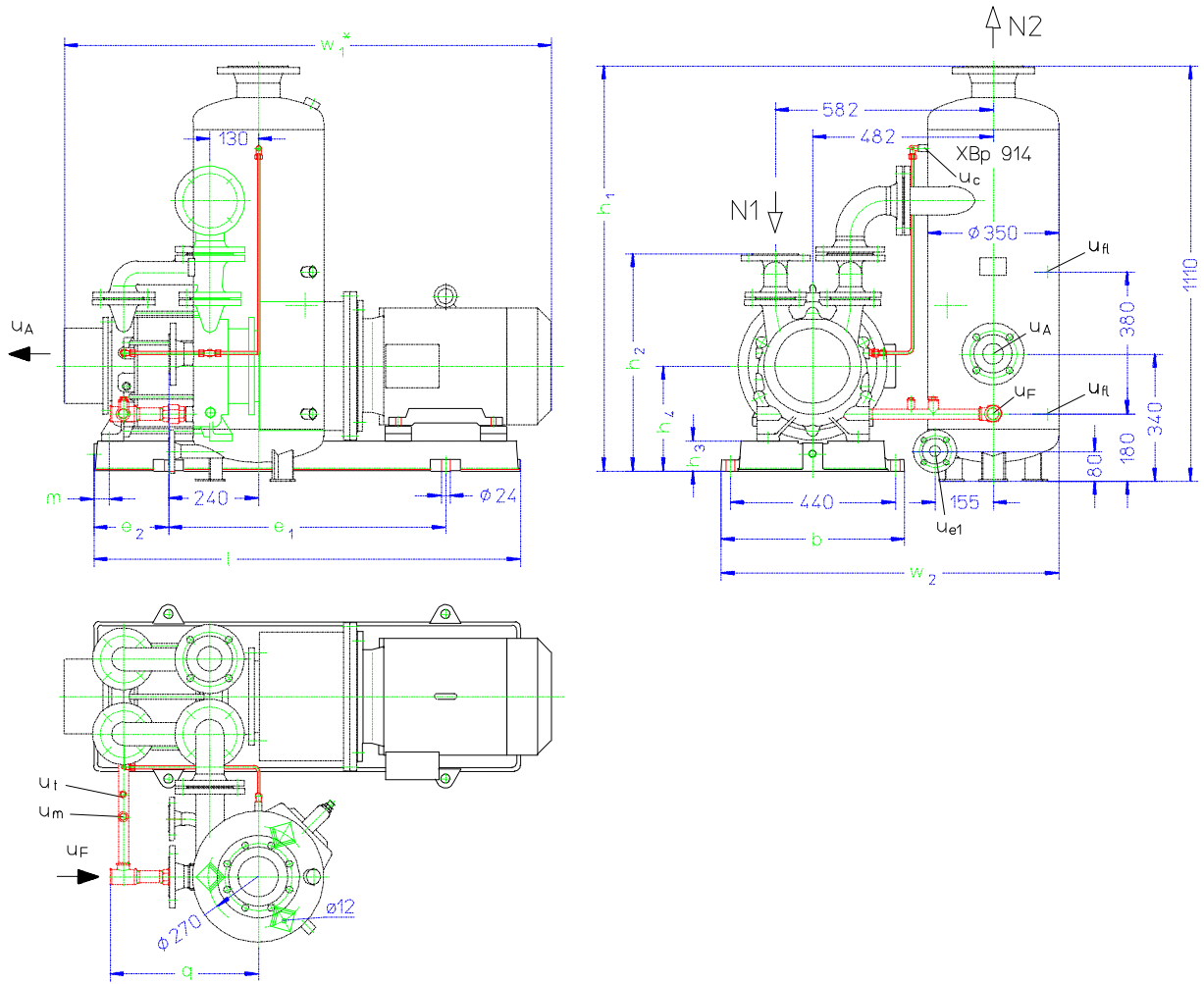
	m ₁	m ₂	o ₃	w ₁ *	weight without motor app. kg
LEH 350	350	310	784	1301	320
LEH 450	422	382	856	1373	340

flange connections to DIN 2501 PN 10		
DN	50	65
k	125	145
D	165	185
number x d ₂	4 x 18	4 x 18



* dimension dependent on the motor make

Arrangement drawing LEH 350, LEH 450 with magnetic coupling

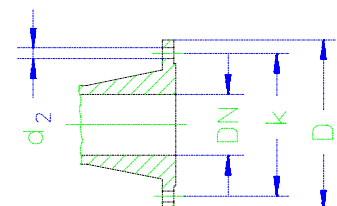


- N 1 = gas inlet DN 65
- N 2 = gas outlet DN 100
- UA = connection for liquid drain DN 50
- UF = connection for fresh liquid G 1
- UC = connection for protection against cavitation G ¼

- ue = drain connection DN 25
- ur = connection for liquid level indicator G ½
- um = connection for pressure gauge G ½
- ut = connection for thermometer G ¼

	electric motor 50 Hz			b	e ₁	e ₂	h ₁	h ₂	h ₃	h ₄	l	m	q	w ₁ *	w ₂	weight app. kg
	size	IP 55	kW EEx e II T3													
LEH 350	160 M	11	-	490	740	200	1082	580	80	280	1140	40	396	1301	902	538
	160 M	-	10											1257		581
LEH 450	160 L	15	-	488	840	205	1112	610	110	310	1250	50	465	1373	901	586
	160 L	-	13,5													637

flange connections to DIN 2501 PN 10				
DN	25	50	65	100
k	85	125	145	180
D	115	165	185	220
number x d ₂	4 x 14	4 x 18	4 x 18	8 x 18



* dimension dependent on the motor make

Fresh water requirements in [m³/h] dependent on suction pressure, speed, mode of operation and difference in temperature

suction pressure [mbar]		33					120					200					400				
pump	speed [rpm]	KB			FB	KB			FB	KB			FB	KB			FB				
		difference in temperature [°C]				difference in temperature [°C]				difference in temperature [°C]				difference in temperature [°C]							
		10	5	2		10	5	2		10	5	2		10	5	2		10	5	2	
LEH	350	1450	0,43	0,73	1,27	2,5	0,51	0,82	1,30	2,15	0,50	0,80	1,22	1,9	0,45	0,67	0,94	1,3			
LEH	450	1450	0,59	0,96	1,52		0,68	1,03	1,50		0,69	1,01	1,41		0,60	0,82	1,05				

FB = fresh liquid service

KB = combined liquid service with service water 10 °C, 5 °C, 2 °C warmer than the fresh water.

Data regarding the pump size - order notes

series + size	hydraulics + bearings	shaft sealing + magnetic coupling	material design	casing seal	code of motor connection**
	<ul style="list-style-type: none"> A • hydraulic A • F two grease lubricated antifriction bearings 	<ul style="list-style-type: none"> 2 •• 20-pole magnet • A • glandless with isolation shroud •• C torque of the •• D magnetic coupling * 	<ul style="list-style-type: none"> 0B main parts of GG without non-ferrous metal 4B main parts of Cr Ni Mo cast steel 	4 soft Teflon	NS for IMB35 motor 160M resp. 160L flange Ø 350 mm
LEH 350 450	AF	2AC 2AD	alternative 0B, 4B	4	NS

* The magnet size depends on the load range of the pump. In case of deviation from standard, please request further information and give details of your problems.

** Only applicable when ordering pumps without motor

Motor selection table

	motor enclosure IP 55 n = 1450 rpm			motor enclosure EEx e II T3 n = 1450 rpm		
	power kW	size	motor-designation	power kW	size	motor-designation
LEH 350	11,0	160 M	SB	10,0	160 M	SK
LEH 450	15,0	160 L	UB	13,5	160 L	UK

Example for ordering:

The construction size LEH 350 AF 2AC 4B 4 with 11 kW three-phase ac motor (50 Hz, 400 VΔ) 1450 rpm has the complete order number:

LEH. 350 AF 2AC 4B 4 SB

If motors with other voltage or frequency are required a special information should be given.

On delivery the point (•) in the fourth place of the type code is replaced by a letter in the factory.

Accessories LEH 350, LEH 450 with magnetic coupling

Recommended accessories			LEH 350	LEH 450
Upright liquid separator		type / weight	XBp 914 / 53 kg	
material design	130 / galvanized 172 / 1.4571	SIHI part No.	35 000 540 35 000 541	
service liquid line				
material design	072 / St 37-0 172 / 1.4571	SIHI part No.	35 008 807 35 008 808	35 003 147 35 005 772
cavitation protection line				
material design	072 / St 37-0 172 / 1.4571	SIHI part No.	20 043 955 20 043 957	20 043 952 20 043 953
discharge line				
material design	072 / St 37-0 172 / 1.4571	SIHI part No.	35 003 220 35 003 221	
SIHI-gas ejector				
at service liquid temperature		15 °C	GEVA 350 A	GEVA 450 A
at service liquid temperature		30 °C	GEVA 350 B	GEVA 450 B
SIHI-ball type non-return valve		type	XCk 65	
material design	767 / GG-25 784 / 1.4408	weight SIHI part No.	5,6 resp. 15,8 kg 43 016 894 20 029 500	
Motor				
IP 55		size power weight	160 M 11 kW 77 kg	160 L 15 kW 96 kg
EEx e II T3		size power weight	160 M 10 kW 120 kg	160 L 13,5 kW 147 kg
Base plate		type / weight	P 385 / 61 kg	S 386 / 90 kg
material design	003 / GG-25 081 / RSt 37-2	SIHI part No.	43 016 854 35 000 008	
Smooth starter		type / weight	on request	

Any changes in the interest of the technical development are reserved.

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