

# Liquid ring vacuum pumps with magnetic coupling



## LEH 1200, LEH 1500, LEH 1800

**Pressure range:** 33 to 1013 mbar  
**Suction volume flow :** 400 to 1560 m<sup>3</sup>/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 1200 | LEH 1500            | LEH 1800 |
|---|---|----------|---------------------|----------|
| Nominal speed   | rpm   |          | 975                 |          |
| Power of the electric motor   | IP 55 <sup>1)</sup>                           | 37       | 45                  | 55       |
|   | EEx e II T3 <sup>1)</sup>                     | 40       | 46                  | 64       |
| Max. compression over pressure  | bar   |          | 0,6                 |          |
| Max. admissible pressure difference   | bar   |          | 1,2                 |          |
| 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 <sup>2</sup>                           | 3,92     | 4,38                | 4,84     |
| Sound pressure level at a suction pressure of 80 mbar   | dB (A)  |          | 75                  |          |
| Max. gas temperature  | dry   |          | 100                 |          |
|   | saturated                                     |          | 50                  |          |
| Service liquid  | max. admissible temperature                   |          | 50                  |          |
|   | max. viscosity                                |          | 90                  |          |
|   | max. density                                  |          | 1200                |          |
|   | volume up to shaft level                      | liter    | 33                  | 38       |
| 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.

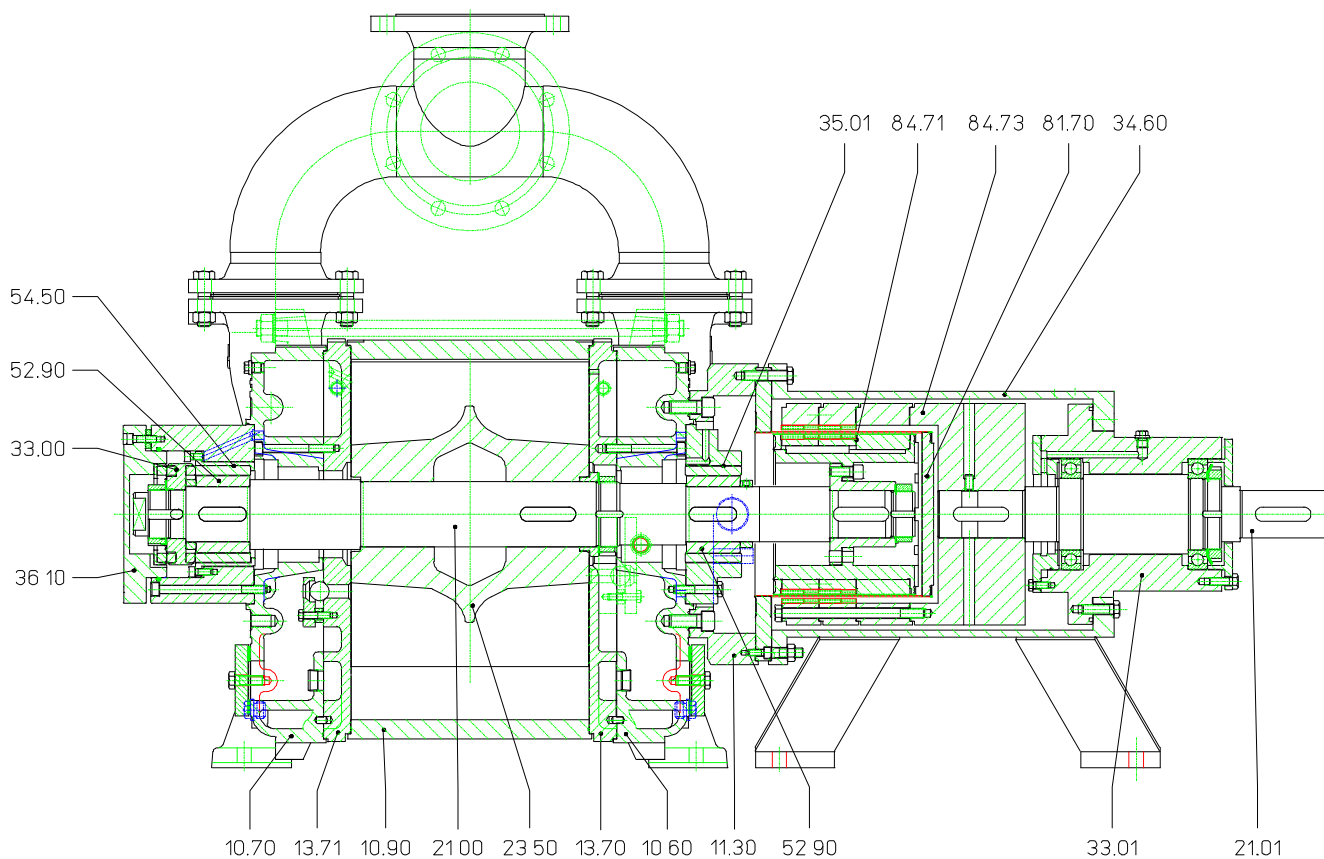
<sup>1)</sup> normally

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.

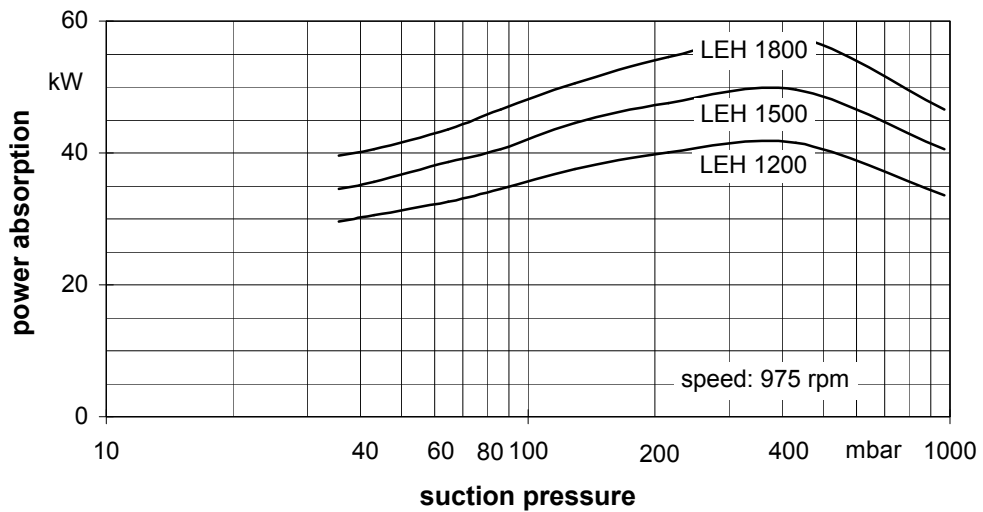
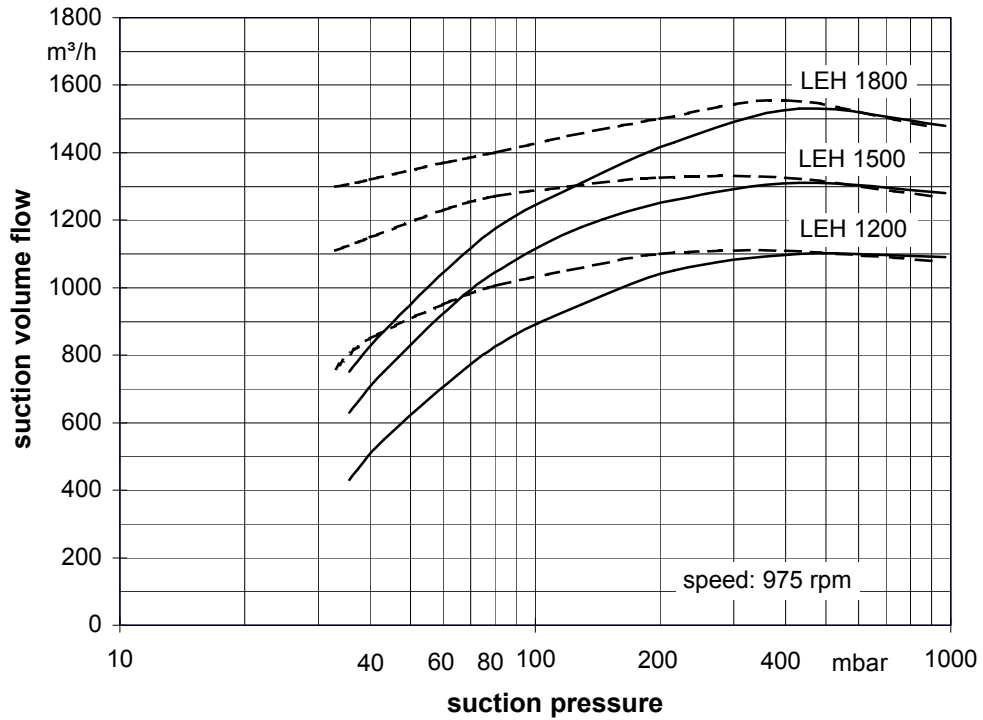
## Material designs LEH 1200, LEH 1500, LEH 1800 with magnetic coupling

| Item         | COMPONENTS          | MATERIAL DESIGN                   |                                   |
|--------------|---------------------|-----------------------------------|-----------------------------------|
|              |                     | 0B                                | 4B                                |
| 10.60, 10.70 | Casing              | 0 6025                            | 1 4408                            |
| 13.70, 13.71 | Guide disk          |                                   |                                   |
| 10.90        | Central body        | 1.0038                            | 1.4571                            |
| 11.30        | Intermediate casing | 1.0553                            | 1.4571                            |
| 21.00, 21.01 | Shaft               | 1.4021                            | 1.4571 / 1.4021                   |
| 23.50        | Vane wheel impeller | 0.7043                            | 1.4517                            |
| 34.60        | Stool               | 1.0038                            | 1.0553 stove enamelling           |
| 33.01        | Bearing bracket     | 1.0553                            |                                   |
| 33.00        | Thrust bearing      | 1.4462 / silicon carbide          |                                   |
| 35.01, 54.50 | Bush                | 1.0553 / 1.4571 / silicon carbide | 1.4571 / silicon carbide          |
| 36.10        | Bearing cover       | 1.0553 / 1.4462 / silicon carbide | 1.4571 / 1.4462 / silicon carbide |
| 52.90        | Bushing             | tungsten carbide                  |                                   |
| 81.70        | Isolation shroud    | 1.4571 / 2.4610                   |                                   |
| 84.71        | Inner magnet        | 1.4571 / magnet                   |                                   |
| 84.73        | Magnetic bell       | 1.0553                            |                                   |

## Sectional drawing LEH 1200, LEH 1500, LEH 1800 with magnetic coupling



**Suction volume flow and power absorption LEH 1200, LEH 1500, LEH 1800 with magnetic coupling**

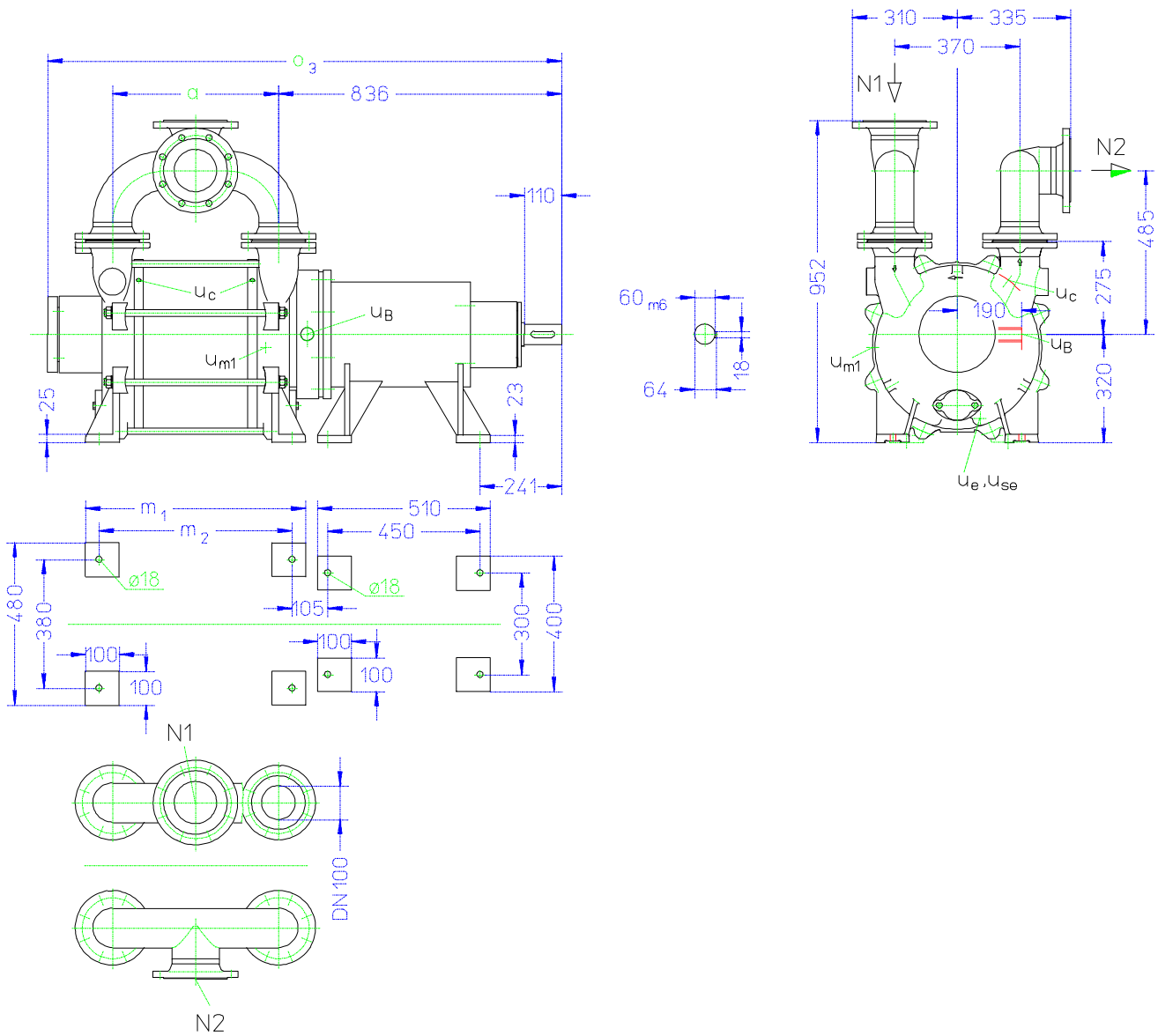


The operating data are applicable under the following conditions:

- 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

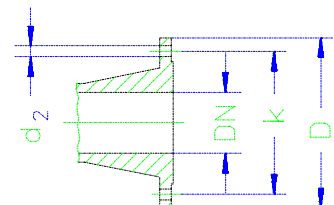
**Dimension table LEH 1200, LEH 1500, LEH 1800 with magnetic coupling**



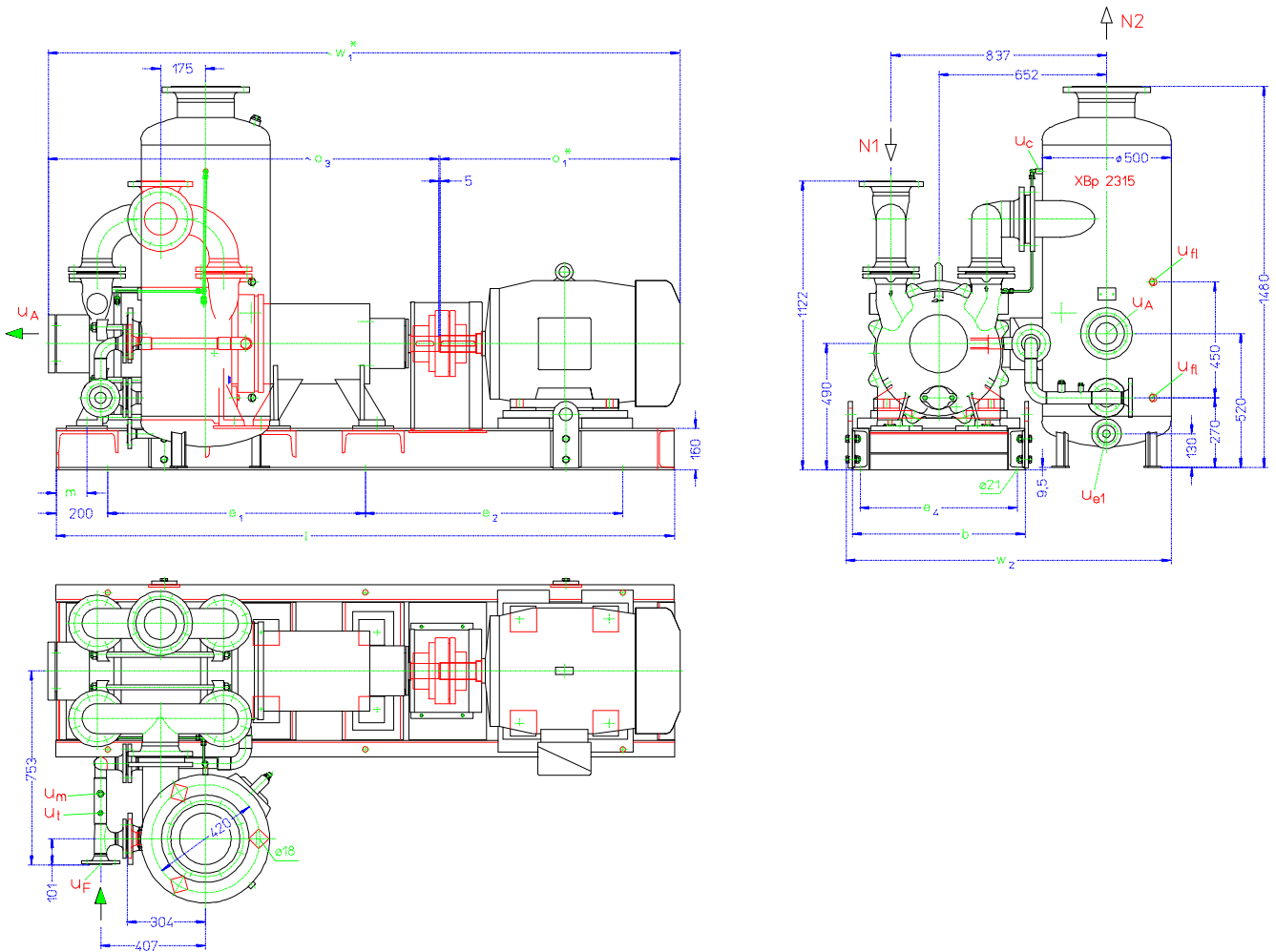
- N 1 = gas inlet DN 125
- N 2 = gas outlet DN 125
- u<sub>B</sub> = connection for service liquid G 1¼
- u<sub>c</sub> = connection for protection against cavitation G ¼
- u<sub>e</sub> = drain connection G ½
- u<sub>m1</sub> = connection for drain valve G ½
- u<sub>se</sub> = connection for dirt drain G ½

|          | a   | m <sub>1</sub> | m <sub>2</sub> | o <sub>3</sub> | weight app. kg |
|----------|-----|----------------|----------------|----------------|----------------|
| LEH 1200 | 490 | 651            | 571            | 1518           | 780            |
| LEH 1500 | 560 | 721            | 641            | 1588           | 820            |
| LEH 1800 | 615 | 776            | 696            | 1643           | 850            |

| flange connections to DIN 2501 PN 10 |        |        |
|--------------------------------------|--------|--------|
| DN                                   | 100    | 125    |
| k                                    | 180    | 210    |
| D                                    | 220    | 250    |
| number x d <sub>2</sub>              | 8 x 18 | 8 x 18 |



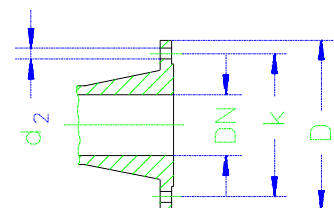
Arrangement drawing LEH 1200, LEH 1500, LEH 1800 with magnetic coupling



- N 1 = gas inlet DN 125
- N 2 = gas outlet DN 200
- U<sub>A</sub> = connection for liquid drain DN 80
- U<sub>F</sub> = connection for fresh liquid DN 40
- U<sub>C</sub> = connection for protection against cavitation G ¼
- U<sub>e</sub> = drain connection DN 25
- U<sub>fl</sub> = connection for liquid level indicator G ½
- U<sub>m</sub> = connection for pressure gauge G ½
- U<sub>t</sub> = connection for thermometer G ¼

|          | electric motor 50 Hz |       |                 | b    | e <sub>1</sub> | e <sub>2</sub> | e <sub>4</sub> | l    | m    | o <sub>1</sub> * | o <sub>3</sub> | w <sub>1</sub> * | w <sub>2</sub> | weight app. kg |
|----------|----------------------|-------|-----------------|------|----------------|----------------|----------------|------|------|------------------|----------------|------------------|----------------|----------------|
|          | size                 | IP 55 | kW EEEx e II T3 |      |                |                |                |      |      |                  |                |                  |                |                |
| LEH 1200 | 250 M                | 37    | -               | 670  | 1000           | 1000           | 610            | 2400 | 120  | 930              | 1518           | 2453             | 1262           | 1720           |
|          | 280 S                | -     | 40              |      |                |                |                |      |      |                  |                |                  |                | 2527           |
| LEH 1500 | 280 S                | 45    | -               | 710  | 1035           | 650            | 2435           | 85   | 1055 | 1588             | 2597           | 2648             | 1282           | 1860           |
|          | 280 M                | -     | 46              |      |                |                |                |      |      |                  |                |                  |                | 2703           |
| LEH 1800 | 280 M                | 55    | -               | 1050 | 1050           | 2500           | 1200           | 1643 | 2848 | 2703             | 2848           | 2848             | 1282           | 1940           |
|          | 315 S                | -     | 64              |      |                |                |                |      |      |                  |                |                  |                | 2848           |

| flange connections to DIN 2501 PN 10 |        |        |        |        |        |
|--------------------------------------|--------|--------|--------|--------|--------|
| DN                                   | 25     | 40     | 80     | 125    | 200    |
| k                                    | 85     | 110    | 160    | 210    | 295    |
| D                                    | 115    | 150    | 200    | 250    | 340    |
| number x d <sub>2</sub>              | 4 x 14 | 4 x 18 | 8 x 18 | 8 x 18 | 8 x 22 |



\* dimensions 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  |      |      |      |   |
|                         |             | difference in temperature [°C] |      |      |     | difference in temperature [°C] |      |      |     | difference in temperature [°C] |      |      |     |      |      |      |   |
|                         |             | 10                             | 5    | 2    |     | 10                             | 5    | 2    |     | 10                             | 5    | 2    |     |      |      |      |   |
| LEH                     | 1200        | 1,65                           | 2,83 | 4,97 | 10  | 1,94                           | 3,06 | 4,67 | 7,2 | 1,99                           | 3,03 | 4,43 | 6,4 | 1,88 | 2,73 | 3,75 | 5 |
|                         | 1500        | 1,94                           | 3,25 | 5,46 |     | 2,25                           | 3,42 | 5,00 |     | 2,27                           | 3,35 | 4,69 |     | 2,12 | 2,98 | 3,93 |   |
|                         | 1800        | 2,21                           | 3,62 | 5,86 |     | 2,48                           | 3,69 | 5,21 |     | 2,51                           | 3,60 | 4,88 |     | 2,34 | 3,18 | 4,07 |   |

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   |
|-----------------------------|--|--|---|---|
|                             | <ul style="list-style-type: none"> <li>A • hydraulic A</li> <li>• F two grease lubricated antifriction bearings</li> </ul> | <ul style="list-style-type: none"> <li>5 •• 36-pole magnet</li> <li>• A • glandless with isolation shroud</li> <li>•• M torque of the magnetic coupling *</li> <li>•• N</li> <li>•• P</li> </ul> | <ul style="list-style-type: none"> <li>0B main parts of GG without non-ferrous metal</li> <li>4B main parts of Cr Ni Mo cast steel</li> </ul> | <ul style="list-style-type: none"> <li>4 soft Teflon</li> </ul> |
| LEH<br>1200<br>1500<br>1800 | AF   | <ul style="list-style-type: none"> <li>5AM</li> <li>5AN</li> <li>5AP</li> </ul>  | alternative 0B, 4B  | 4   |

\* 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.

### Design - Motor selection table

|   | designation | electric motor 50 Hz  |       |             |                             |       |             |
|---|-------------|-----------------------|-------|-------------|-----------------------------|-------|-------------|
|   |             | motor enclosure IP 55 |       |             | motor enclosure EEx e II T3 |       |             |
| pump with free shaft end                      | 01          | kW                    | size  | designation | kW                          | size  | designation |
| pump with coupling, pre-drilled at motor side | 04          |                       |       |             |                             |       |             |
| as above, but with motor, for example         |             | 37                    | 250 M | BC          | 40                          | 280 S | CL          |
| 45 kW three-phase motor                       | e.g. CC     | 45                    | 280 S | CC          | 46                          | 280 M | DL          |
| (50 Hz, 400 VΔ) at 975 rpm                    |             | 55                    | 280 M | DC          | 64                          | 315 S | EL          |

#### Example for ordering:

The construction size LEH 1500 AF 5AN 4B 4 with 45 kW three-phase ac motor (50 Hz, 400 VΔ) 975 rpm has the complete order number:

**LEH· 1500 AF 5AN 4B 4 CC**

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 1200, LEH 1500, LEH 1800 with magnetic coupling

| Recommended accessories                                       |  |                                | LEH 1200                   | LEH 1500        | LEH 1800    |             |
|---|--|--------------------------------|----------------------------|-----------------|-------------|-------------|
| <b>Upright liquid separator</b><br>material design            | 130 / galvanized                                 | type / weight<br>SIHI part No. | XBp 2315 / 98 kg           |                 |             |             |
|   | 172 / 1.4571                                     |                                | 35 005 449                 |                 |             |             |
|   |  |                                | 35 005 447                 |                 |             |             |
| service liquid line<br>material design                        | 072 / St 37-0                                    | SIHI part No.                  | 35 010 935                 | 35 010 961      | 35 010 962  |             |
|   | 172 / 1.4571                                     |                                | 35 013 577                 | 35 013 578      | 35 013 579  |             |
| cavitation protection line<br>material design                 | 072 / St 37-0                                    | SIHI part No.                  | 20 043 410                 | 20 043 412      | 20 043 414  |             |
|   | 172 / 1.4571                                     |                                | 20 043 411                 | 20 043 413      | 20 043 415  |             |
| <b>SIHI-gas ejector</b><br>at service liquid temperature      |  | 15 °C                          | GEVA 1200 A                | GEVA 1500 A     | GEVA 1800 A |             |
|   | at service liquid temperature                    |                                | 30 °C                      | GEVA 1200 B     | GEVA 1500 B | GEVA 1800 B |
| <b>SIHI-ball type non-return valve</b><br>material design     | 767 / GG-25                                      | type / weight<br>SIHI part No. | XCk 150 / 35,8 resp. 43 kg |                 |             |             |
|   | 784 / 1.4408                                     |                                | 43 016 900                 |                 |             |             |
|   |  |                                | 43 030 924                 |                 |             |             |
| <b>Reduction</b><br>material design                           | 072 / St 37-0                                    | weight<br>SIHI part No.        | 16,5 kg                    |                 |             |             |
|   | 172 / 1.4571                                     |                                | 35 002 762                 |                 |             |             |
|   |  |                                | 35 014 264                 |                 |             |             |
| <b>Motor</b><br>IP 55   |  | size<br>power<br>weight        | 250 M                      | 280 S           | 280 M       |             |
|   |  |                                | 37 kW                      | 45 kW           | 55 kW       |             |
|   |  |                                | 410 kg                     | 540 kg          | 580 kg      |             |
|   | EEx e II T3                                      |                                | size                       | 280 S           | 280 M       | 315 S       |
|   |  |                                | power                      | 40 kW           | 46 kW       | 64 kW       |
|   |  |                                | weight                     | 605 kg          | 670 kg      | 795 kg      |
| <b>Coupling</b><br>for motor IP 55<br>pump side<br>motor side |  | type / weight<br>SIHI part No. | A 180 / 14 kg              | A 180 / 14 kg   |             |             |
|   |  |                                | 43 035 527                 | 43 035 527      |             |             |
|   |  |                                | 43 034 392                 | 43 021 495      |             |             |
|   | for motor EEx e II T3<br>pump side<br>motor side |                                | ADS 194 / 17,5 kg          | ADS 218 / 24 kg |             |             |
|   |  |                                | 43 040 600                 | 43 040 602      |             |             |
|   |  |                                | 43 038 678                 | 43 040 603      |             |             |
| <b>Contact safety device</b><br>material design               | 076 / steel                                      | SIHI part No.                  | 35 004 816                 |                 | 35 004 800  |             |
|   | 345 / 2.0321                                     |                                | 35 004 817                 |                 | 35 004 801  |             |
|   |  |                                |                            |                 |             |             |
| <b>Base frame</b><br>for motor IP 55                          | 081 / USt 37-1                                   | SIHI part No.<br>weight        | 35 010 946                 | 35 010 959      | 35 010 960  |             |
|   |  |                                | 354 kg                     | 332 kg          | 340 kg      |             |
|   | for motor EEx e II T3                            | 081 / USt 37-1                 | SIHI part No.              | 35 010 959      |             |             |
|   |  |                                | weight                     | 332 kg          |             |             |
| <b>Smooth starter</b>   |  | type / weight                  | on request                 |                 |             |             |

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

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