

Dolphin LM/LT

Liquid Ring Vacuum Pumps

Reliable Vacuum for a Variety of Industrial Processes



Liquid Ring Vacuum Technology
by Busch





Reliable Vacuum for a Variety of Industrial Processes – Robust and Proven

› Robust:

proven technology, high vapour and particle tolerance

› Compact:

direct flange-mounted motor, no base frame required, integrated flow channel

› Flexible:

application-oriented, operating fluids other than water are possible, ATEX certified version available (Cat. 1 (i) IIB, T4), corrosion-free stainless steel impeller, choice of cast iron (EN-GJL-200) or 316 grade stainless steel material housings

The Dolphin LM/LT series is the new generation of liquid ring vacuum pumps from Busch, with all the advantages of proven technology plus additional refinements.

Dolphin LMs are single-stage vacuum pumps for rough vacuum applications from atmospheric pressure to 130 hPa (mbar) ultimate pressure. Dolphin LTs are two-stage vacuum pumps and operate from atmospheric pressure to 33 hPa (mbar). The Dolphin LM/LT series is available in a total of 13 sizes, allowing an exact match to every process.

The operating fluid is usually water, but other liquids may be used if required by process conditions. Dolphin LM/LT liquid ring vacuum pumps may be operated as a simple continuous flow system, or as a partial or total recirculation system.

The precisely dimensioned range of sizes, extensive range of accessories and choice of construction materials allow these vacuum pumps to be perfectly adapted to many different industrial processes.

Dolphin LM/LT technology uses the proven liquid ring principle, with contact-free internal components and virtually isothermal compression. The LM/LT series has been developed for continuous operation to support a wide range of processes in many industrial sectors, including the chemical and pharmaceutical industries.



Technical specifications

Dolphin LM/LTs are single- or two-stage liquid ring vacuum pumps. An eccentrically mounted impeller rotates in a housing partially filled with operating fluid. The impeller blades dip into the fluid, and the centrifugal force exerted by their rotation forms a so-called liquid ring within the housing. The pumped medium is transported in the spaces between the blades and the liquid ring. The eccentric rotation of the impeller alters the volume of these spaces, causing gas to be drawn in, compressed and expelled. In the single-stage version (LM), compression is carried out once. In the two-stage version (LT), the pumped medium is compressed again to allow higher vacuum levels to be achieved. Operation as a compressor is possible up to 2.0 bar(g).

Product Overview

Dolphin LM/LT Series Type



> Dolphin LM 0100/0180/0270 A

50 Hz Ultimate pressure: 130 hPa (mbar)
Nominal pumping speed: 82–220 m³/h

60 Hz Ultimate pressure: 130 hPa (mbar)
Nominal pumping speed: 98–267 m³/h



> Dolphin LM 0530/0800 A

50 Hz Ultimate pressure: 130 hPa (mbar)
Nominal pumping speed: 440/722 m³/h

60 Hz Ultimate pressure: 130 hPa (mbar)
Nominal pumping speed: 556/867 m³/h



> Dolphin LM 0100/0180/0270 A

50 Hz Ultimate pressure: 33 hPa (mbar)
Nominal pumping speed: 105–203 m³/h

60 Hz Ultimate pressure: 33 hPa (mbar)
Nominal pumping speed: 128–232 m³/h



> Dolphin LT 0320/0430/0510 A

50 Hz Ultimate pressure: 33 hPa (mbar)
Nominal pumping speed: 265–430 m³/h

60 Hz Ultimate pressure: 33 hPa (mbar)
Nominal pumping speed: 320–510 m³/h



> Dolphin LT 0630/0750 A

50 Hz Ultimate pressure: 33 hPa (mbar)
Nominal pumping speed: 500/617 m³/h

60 Hz Ultimate pressure: 33 hPa (mbar)
Nominal pumping speed: 578/710 m³/h

> Dolphin LM/LT –
robust principle,
modern design.



Technical Features Dolphin LM/LT

1 Compact

Integrated flow channel and modular construction

- Optimized gas flow
- No base frame required
- Motor connected directly by flange
- Small number of components
- Ideal for use in vacuum systems

2 Corrosion protected

Stainless steel impeller

- Resistant to many different pumped media
- Stainless steel housing (option)

3 Efficient

IE3 standard motor

- Low costs per m³/h
- No electronic components
- No special motors required
- Easy replacement

4 Absolutely leak-tight

New sealing concept

- Optimized mechanical Viton or FFKM shaft seals
- Long service lifetime

5 Easy servicing

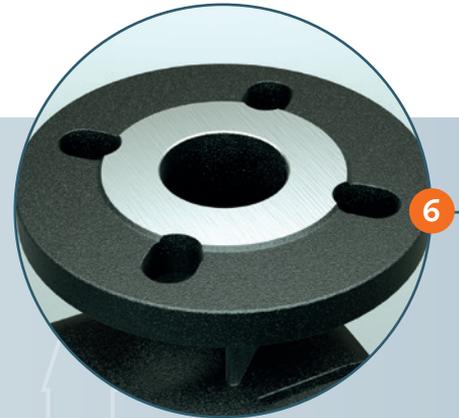
O-ring seals

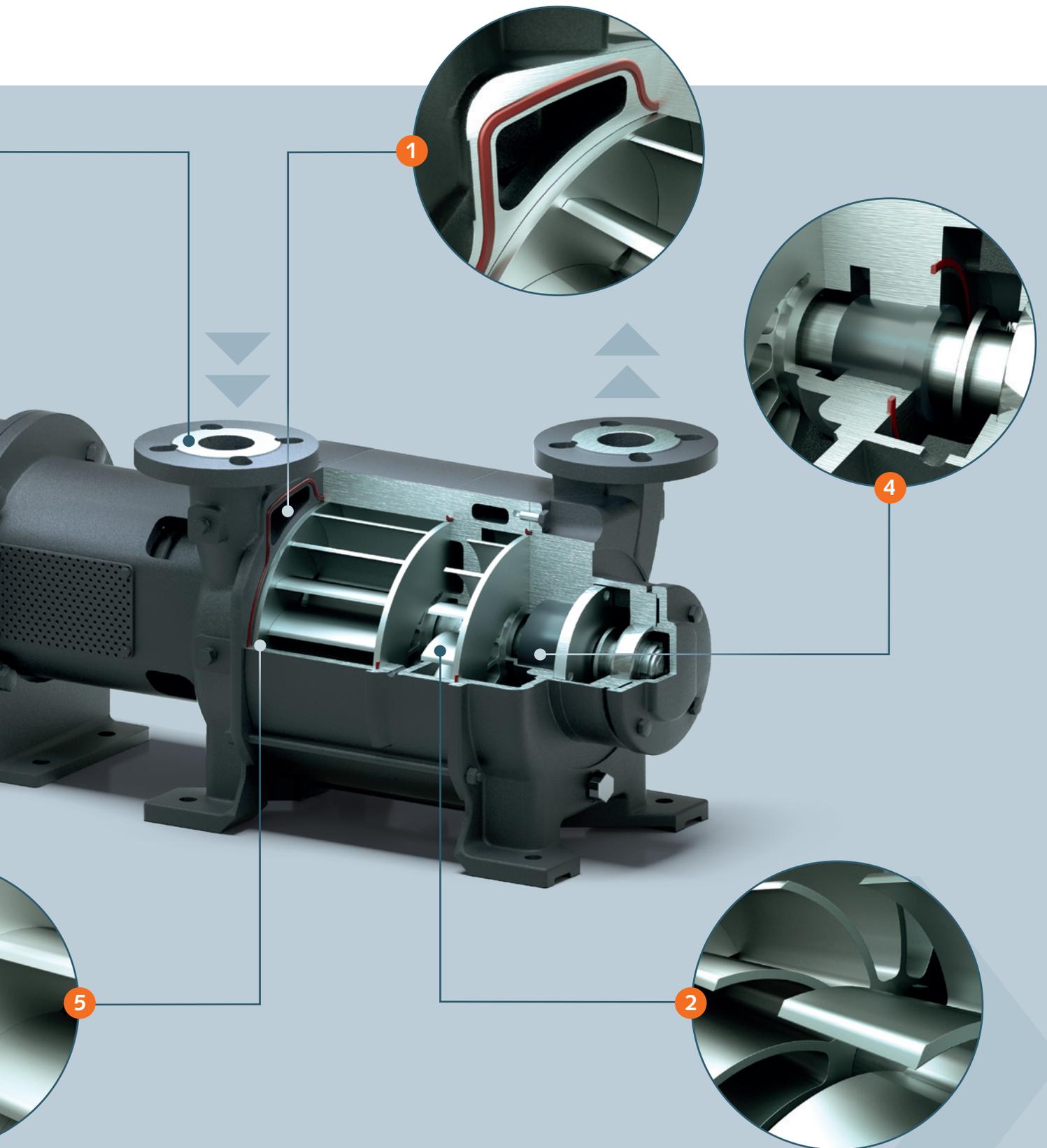
- Made of Viton or PTFE according to pumped medium
- Rapid and easy replacement

6 Compatible

Universal flanges

- Inlet and outlet flange connections according to ISO, ANSI and JIS
- Simple fitting or replacement of vacuum pumps
- May be installed worldwide







Reliable Vacuum for a Variety of Applications

Vacuum drying

Vacuum drying is employed when delicate materials need to be dried rapidly and without damage. It is used in food processing to avoid loss of quality or taste. It is also highly suitable for materials with large surface areas, such as the removal of water from plastic granules or drying complex machine parts after cleaning. The high tolerance of Dolphin LM/LT vacuum pumps to water and moisture make them the ideal choice for drying processes. Examples of drying processes:

- Freeze drying
- Cleaning / Drying of industrial components
- Drying of plastic granules
- Drying of ceramic materials
- Drying of building materials
- Slurry drying in waste water treatment plants
- Wood drying and impregnation

Vacuum distillation

Vacuum distillation is a distillation process carried out under reduced pressure. The lower pressure reduces the boiling point of the mixture allowing sufficiently volatile components to be extracted. As a rule, an extremely robust vacuum pump with a

high tolerance to vapour is necessary to remove vapours and gases. Dolphin LM/LT vacuum pumps are ideally suited to vacuum distillation. Examples of distillation processes may be found in:

- Chemical and pharmaceutical process technology
- Laboratory technology
- Food processing technology

Vacuum evaporation

Vacuum evaporation is a similar process to vacuum distillation: Liquid is boiled by reducing its pressure, and the resulting vapour is extracted. This process allows the manufacture of both liquid and solid concentrates. The vacuum pumps used must have a high tolerance to vapour. The main applications of vacuum evaporation are found in food processing technology, in the chemical industry and in industrial waste water treatment systems:

- Concentration of liquids such as emulsion, acids and electrolytes
- Treatment of wash water

Sterilization

In sterilization, vapour is injected into a sterilization chamber, then extracted by a

vacuum pump. This procedure may be repeated several times, and several different vapours may be used. Vacuum has the task of extracting the vapour completely, helping the vapour introduced in the next cycle to fill the sterilization chamber. After the sterilization process, vacuum is also used to dry the sterilized items. Sterilization processes are mainly carried out in:

- Foodstuff manufacturing
- Food packaging manufacturing
- Food packaging operations
- Preparation of surgical instruments

Degassing

Degassing of melts, for example the extrusion of plastics or pasta dough, produces gases and vapours that have a highly detrimental effect on the quality of the product. Degassing of the molten mass in the screw zone of the extruder is therefore necessary. Dolphin LM/LT liquid ring vacuum pumps are ideal for this purpose, as their robust operating principle allows the complete extraction of air, water vapour and other gas mixtures emitted by the process.

... and many more!



Design Options Dolphin LM/LT

Housing materials

- Cast iron, EN-GJL-200 (standard)
- Stainless steel, 316 grade (option)

Impeller and shaft materials

- Stainless steel, 316 grade (standard)

O-Ring materials

- Viton (standard)
- PTFE (option)

Shaft seal elastomer materials

- Viton (standard)
- FFKM (option)

Operating liquid system

- Continuous flow system
- Partial recirculation system (open circuit)
- Total recirculation system (closed circuit)

ATEX certification

Dolphin LM/LT liquid ring vacuum pumps are available in a version conforming to EU guidelines 2014/34/EU (ATEX) Cat. 1 (i) IIB, T4. Dolphin LM/LT models are available in different ATEX versions and temperature classes.



ATEX-1/2

Certification acc. to regulation 2014/34/EU:
Ex II 1(i)/2(o) G IIB3(i)/IIB(o)



ATEX-2/2

Certification acc. to regulation 2014/34/EU:
Ex II 2(i)/2(o) G IIB(i)/IIB(o)
Ex II 2(i)/2(o) G IIC(i)/IIC(o)

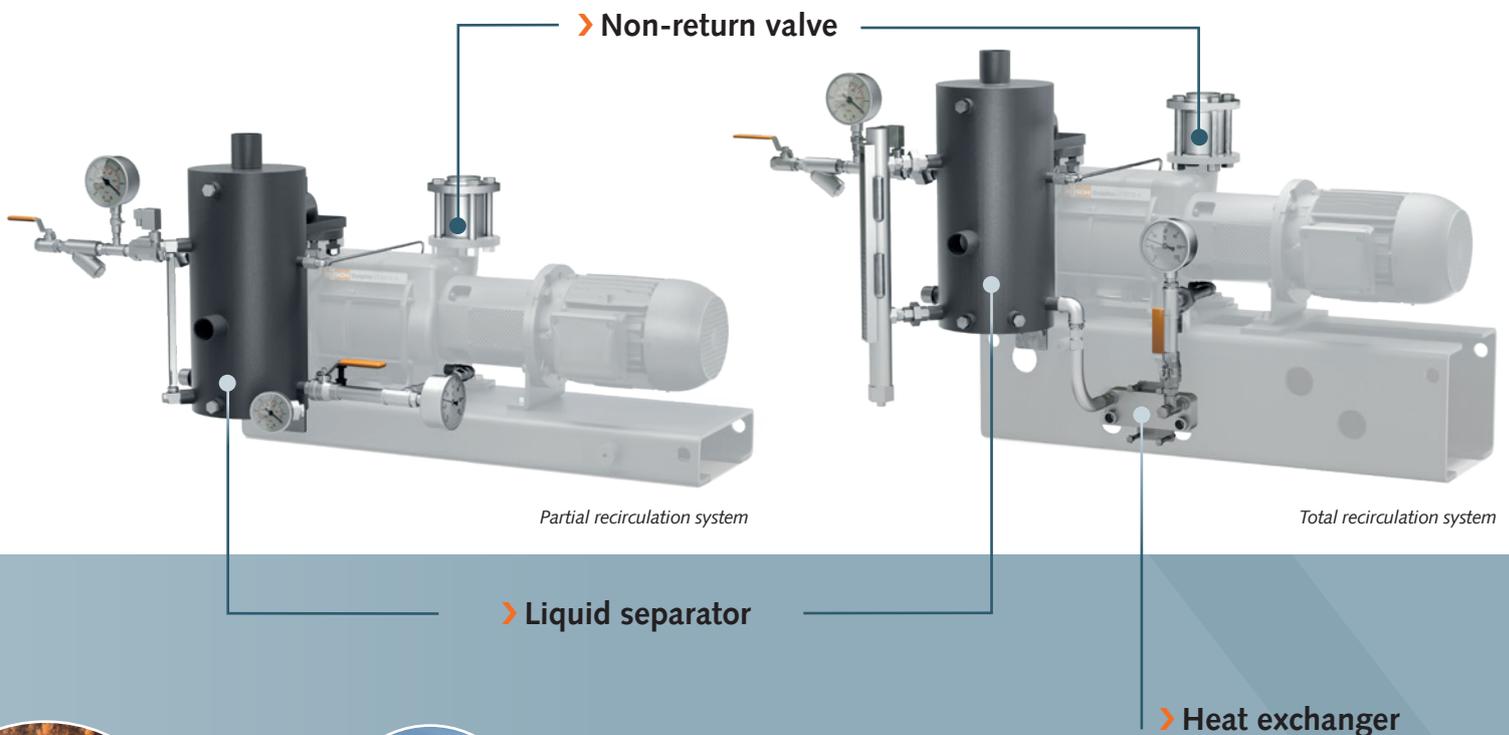


ATEX-3/3

Certification acc. to regulation 2014/34/EU:
Ex II 3(i)/3(o) G IIB(i)/IIB(o)

Accessories and Spare Parts

- › Standard motors meeting IEC and NEMA criteria, IE3
- › ATEX motors
- › Liquid separator
- › Cavitation protection
- › Heat exchanger
- › Gas ejector
- › Non-return valves
- › Drain valves
- › Vacuum relief valves
- › Base frame mounted pumpset



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Technical data is subject to change. Created in Germany. MG STB DOLPHINMLT Len 09/2018 8Aa