

# Alfa Laval LKHex Prime UltraPure

## Centrifugal pumps

### Introduction

The Alfa Laval LKHex Prime UltraPure Centrifugal Pump is a self-priming pump designed for use in high-purity applications which meets the requirements of the ATEX directive 2014/34/EU group II, category 2G, temperature class T3 and T4.

Precision-engineered, the LKHex Prime UltraPure delivers greater energy efficiency than similar pumps. Its optimized design, premium motor, tight tolerances and advanced impeller and airscrew design minimize recirculation and reduce energy consumption.

### Applications

The Alfa Laval LKHex Prime UltraPure is designed to meet the stringent demands and regulations of high-purity applications across the biotechnology and pharmaceutical industries and is engineered for use in potentially explosive environments and conforms to the provisions of the ATEX directive 2014/34/EU group II, category 2G, temperature class T3 and T4. It is ideal for tank emptying and CIP return applications; However, LKHex Prime UltraPure cannot be used for pumping flammable media.

All pumps are delivered with a complete Alfa Laval Q-doc package. Q-doc provides easier validation, proof of origin and compliance for inspection purposes according to Good Manufacturing Practice (GMP) and ASME BPE requirements.

The LKHex Prime UltraPure pump is available in two sizes to handle capacities up to 70 m<sup>3</sup>/h and differential pressures up to 4 bar at 50 Hz.

### Benefits

- Energy efficient: superior efficiency resulting in reduced energy consumption and CO<sub>2</sub> footprint.
- Conforms to the provisions of ATEX directive: can be used in potentially explosive environments.
- Low contamination risk: comes with full material traceability and USP Class VI elastomers to reduce risk of process contamination from extractables.
- Smooth qualification, validation and process control: material traceability, and pump supplied with the Alfa Laval Q-doc package in line with Good Documentation Practices (GDP).



### Standard design

All media contacting steel components like pump casing, impeller, airscrew, front cover, recirculation pipe and backplate are in W. 1.4404 (AISI 316L) with material traceability 3.1 according to EN 10204. Product wetted elastomers are specified to USP Class VI, 121°C, Chapter 88 and Chapter 87. A stainless steel shroud protects the motor and four adjustable stainless steel legs support the complete unit.

A compression coupling securely attaches the stub shaft to the motor shaft with precision alignment, and the semi-open impeller with a special vane design ensures efficient handling of the product as it moves through the pump.

As standard, the LKHex prime pump is equipped with a single mechanical shaft seal but is also available with a double mechanical shaft seal. The front-loading shaft seal, with the spring and washers mounted on the atmospheric side, makes maintenance fast, easy and inexpensive. It takes just a few minutes to replace the shaft seal. In addition, the balanced design minimizes the risk of seal opening during unforeseen pressure shock.

## Working principle

On applications where the pumped media contains a mixture of air and liquid in the suction line, airscrew rotation causes the formation of a continuous liquid ring within the canister. Due to the eccentric position of the canister relative to the airscrew, an air chamber forms between the liquid ring and the airscrew, which separates into air pockets between the air-screw vanes.

The continuous rotation of the airscrew forces air pockets through the canister into the suction stage of the impeller which are then pumped out via the discharge.

Liquid is returned from the discharge via the recirculation pipe into the canister to ensure the liquid ring is maintained at all times. When there is no air present, the canister and recirculation loop have no function and are fully filled with liquid. The liquid passes through the canister into the suction stage of the impeller, allowing the pump to act as a traditional centrifugal pump.

## TECHNICAL DATA

### Materials

Product wetted steel parts:	W. 1.4404 (316L) with material traceability 3.1 according to EN 10204
Other steel parts:	Stainless steel
Inside surface finish:	Mech Ra ≤ 0.5
Product wetted elastomers:	EPDM - USP Class VI, 121°C. Chapter 88, and Chapter 87
Rotary seal face:	Silicon Carbide
Stationary seal face:	Silicon Carbide

### Motor

Foot-flanged ATEX approved motor according to the IEC metric standard, 2 poles = 3000/3600 rpm. at 50/60 Hz.

### Motor sizes

50Hz:	1.5 - 18.5kW
60Hz:	2.5 - 21 kW

### Min/max motor speed

Air evacuation:	2800 - 3600 rpm.
Pumping product (no air):	900 - 3600 rpm.

### Warranty

Extended 3-years warranty on LKHex Prime UltraPure pumps. The warranty covers all non wear parts on the condition that genuine Alfa Laval Spare Parts are used.

## OPERATING DATA

### Max inlet pressure

LKHex Prime UltraPure 10 - 20:	500kPa (5 bar)
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### Air release time

LKHex Prime UltraPure 10 - 20:	Max. 15 min
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### Temperature, Class T4

Product temperature, EPDM, FPM, FEP:	-10 °C to +100 °C
Ambient temperature, without shroud:	-20 °C to +40 °C
Ambient temperature, with shroud (<18.5kW):	-20 °C to +35 °C

### Temperature, Class T3

Product temperature, EPDM:	-10 °C to +130 °C
Product temperature, FPM, FEP:	-10 °C to +140 °C
Ambient temperature:	-20 °C to +40 °C

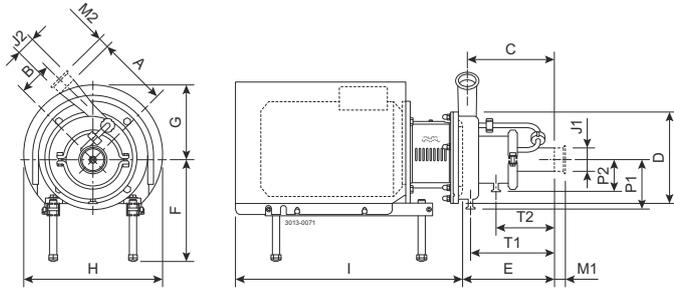
### Double mechanical shaft seal

Water pressure inlet, LKH Prime UltraPure 10 - 20:	Max. 500 kPa (5 bar)
Water consumption:	Min. 0.5 l/min

### Flush connections for double mechanical shaft seal

LKH Prime UltraPure 10 - 20:	1/8" G
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## Dimensions



## Pump specific measures

Pump Model	LKHex Prime UltraPure 10	LKHex Prime UltraPure 20
A	182	194
B	85	92
C	222	248
D	247	253
E	245	280
P1	116	123
P2	82	83
T1	219	239
T2	161	170

## Motor specific measures Exeb

Motor IEC	IEC90	IEC100	IEC112	IEC132	IEC160
Motor kW	1.85kW	2.5kW	3.3kW	4.6-5.5kW	7.5-12.5kW
F(max) <sup>1</sup>	316	336	339	358	386
G	243	242	208	248	305
H	365	383	360	425	510
I	492	550	540	629	791

<sup>1</sup> Possible to reduce dimension F by min. 59 mm for all pump models. For smaller models it will be possible to reduce dimension F even further.

## Motor specific measures Exdbeb

Motor IEC	IEC90	IEC100	IEC112	IEC132	IEC160
Motor kW	1.5-2.2 kW	3kW	4kW	5.5-7.5kW	11kW
F(max) <sup>1</sup>	262	282	285	304	332
G	243	242	261	298	390
H	365	383	412	465	610
I	492	550	574	636	827

<sup>1</sup> Possible to reduce dimension F by min. 59 mm for all pump models. For smaller models it will be possible to reduce dimension F even further.

## Motor overview Exeb

Pump Model	LKHex Prime UltraPure-10	LKHex Prime UltraPure-20
Motor range (IEC)	IEC90-IEC112	IEC100-IEC160

Dimensional data are based on 2 pole,WEG motors.

## Motor overview Exdbeb

Pump Model	LKHex Prime UltraPure-10	LKHex Prime UltraPure-20
Motor range (IEC)	IEC90-IEC100	IEC100-IEC160

Dimensional data are based on 2 pole,WEG motors.

## Connections

Pump Model	LKHex Prime UltraPure 10		LKHex Prime UltraPure 20
Clamp ISO 1127	M1	36	36
	M2	36	36
Clamp ASME BPE	M1	29	29
	M2	29	29
Clamp ISO 2037	M1	21	21
	M2	21	21

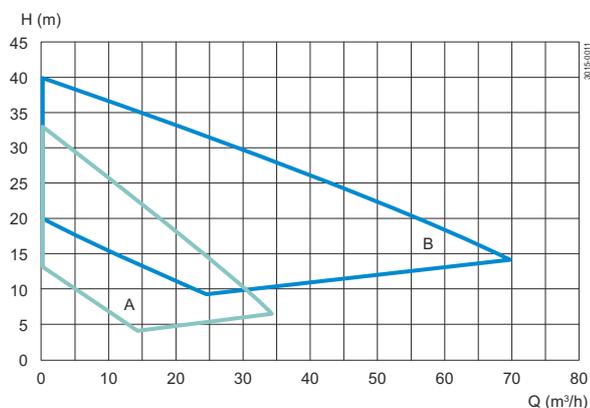
<sup>1</sup> Other dimensions available on request.

Pump Model	LKHex Prime UltraPure 10		LKHex Prime UltraPure 20
Clamp DIN 32676	M1	21	64
	M2	21	21
Flange Asept. A for DIN	M1	47	56
	M2	47	47
Flange Asept. A for ASME	M1	47	56
	M2	47	47
Union Asept. A for DIN	M1	48	100
	M2	48	48
Union Asept. A for ASME	M1	48	60
	M2	48	48
J1 <sup>1</sup>	51 / 2"		63,5 / 2,5"
J2 <sup>1</sup>	51 / 2"		51 / 2"

<sup>1</sup> Other dimensions available on request.

TC	
Clamp	
1/2"	12.7

### Flow chart



A = LKHex Prime UP 10  
B = LKHex Prime UP 20

Figure 1. Frequency: 50Hz - Speed (synchr): 3000 rpm

### Options

- Impeller with reduced diameter.
- Double mechanical shaft seal.
- Adjustable pads.
- No drain.
- Product wetted surface finish mechanically polished to  $Ra \leq 0.8 \mu\text{m}$ .
- Product wetted surface finish electropolished to  $Ra \leq 0.4 \mu\text{m}$ .
- Passivated surface.
- Product wetted elastomers FPM or FEP to USP Class VI, 121°C Chapter 88, and Chapter 87.
- Hydrostatic testing with certificate.
- Surface finish measurement with certificate.
- 0° outlet.

### Q-doc

#### Standard documentation package:

- Declaration of compliance with Regulation (EC) No.: 1935/2004.
- Declaration of compliance to EN 10204 type 3.1 (MTR).
- Declaration of compliance to the U.S. Food & Drug Administration CFR 21 (non-metallic parts).
- Declaration of compliance to the U.S. Pharmacopeia (Elastomers and polymers).
- TSE (Transmissible Spongiform Encephalopathy) / ADI (Animal Derivative Ingredient) declaration.
- Declaration of surface finish compliance.
- Declaration of passivation and electro polishing (if specified).
- 3.1 certification in accordance to EN10204.
- Pump performance test certificate.

**Optional documentation:**

- Hydrostatic test certificate.
- Surface measurement report.

**Ordering**

Please state the following when ordering:

- Pump size.
- Connections.
- Impeller diameter.
- Motor size.
- Voltage and frequency.
- Flow, pressure and temperature.
- Density and viscosity of the product.
- Options.

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