Alfa Laval SB Static Mixer

Liquid mixers

Lit. Code 200013088-1-EN-GB

Instruction Manual

BRITISH ENGLISH

Published by
Alfa Laval Kolding A/S
Albuen 31
DK-6000 Kolding, Denmark
+45 79 32 22 00

The original instructions are in English

Contents

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1 Safety

Read this first

This Instruction Manual is designed for operators and service engineers working with the supplied Alfa Laval product.

Operators must read and understand the ***Safety, Installation and Operating*** instructions of the supplied Alfa Laval product before carrying out any work or before you put the supplied Alfa Laval product into service!

Not following the instructions can result in serious accidents.

This documentation describes the authorized way to use the supplied Alfa Laval product. Alfa Laval will take no responsibility for injury or damage if the equipment is used in any other way.

This Instruction Manual is designed to provide the user with the information to perform tasks safely for all phases in the lifetime of the supplied Alfa Laval product.

The operator shall always read the chapter ***Safety*** first. Hereafter the operator can skip to the relevant section for the task to be carried out or for the information needed.

Always read the chapter ***Technical Data*** thoroughly.

This is the complete Instruction Manual for the supplied Alfa Laval product.

NOTE

The illustrations and specifications in this Instruction Manual were effective at the date of printing. However, as continuous improvements are our policy, we reserve the right to alter or modify the Instruction Manual without prior notice or any obligation.

The English version of the Instruction Manual is the original manual. Alfa Laval cannot be held responsible for incorrect translations. In case of doubt, the English version applies.

1.1 Safety Signs

Mandatory Action Signs

	General mandatory action sign.
	Refer to instruction manual.
	Use protective hand wear - safety gloves.
	Use ear protection in noisy environments - noise protector.

Warning Signs

	General warning.
	Cutting danger.

1.2 Safety Precautions

All warnings in the manual are summarised on this page. Pay special attention to the instructions below so that severe personal injury and/or damage to the Supplied Alfa Laval Product is avoided.

Transportation and Handling

During transport and handling the mixer must be handled with great care in order to avoid any mechanical damage.

NOTE

The two end connections of the mixer are holding the mixer insert in correct position inside the outer shell. Great care should therefore be taken when opening either of the end connections since there is a risk that the insert may fall out.

WARNING

The sharp edges may cause a risk that person could get hurt or material could be damaged by the falling object.

Installation

The supplied Alfa Laval product must be installed and operated with respect to any local environment legislation. It is the responsibility of the owner/user to follow all legislation and regulation including all necessary approval from environmental authorities before taking the supplied Alfa Laval product into use.

Operation

The supplied Alfa Laval product must be installed and operated with respect to any local environment legislation. It is the responsibility of the owner/user to follow all legislation and regulation including all necessary approval from environmental authorities before taking the supplied Alfa Laval product into use.

Maintenance

There is no strict requirement for inspection of the mixer. However, it is recommended that the mixer is dismantled once per year for visual inspection of the mixer insert in respect to corrosion and/or mechanical damage.

Storage

Alfa Laval recommend:

- Store the supplied Alfa Laval product as supplied in original packaging
- Port opening(s) should be protected against any ingress
- Bare steel (not stainless) should be lightly oiled/greased
- Store in a clean, dry place without direct sunlight or UV light
- Temperature range -5 °C to 40 °C (23 °F - 104 °F)
- Relative humidity less than 60%
- No exposure to corrosive substances (including contained air)

Noise

Noise emission of maximum 85 dB (A). Use ear protection when operating.

Hazards

Cut Hazard

- Sharp edges, especially on bowl discs and threads, can cause cuts. Wear protective gloves
- Avoid placing hands into valve orifice pinch points

Safety check

A visual inspection of any protective device (shield, guard, cover or other) on the supplied Alfa Laval product shall be carried out at least every 12 months. If the protective device is lost or damaged, especially when this leads to deterioration of safety performance, it shall be replaced. The fixing of the protective device should only be replaced with fixings of the same or an equivalent type.

Inspection acceptance criteria:

- It should not be possible to reach moving parts originally protected by a protective device
- The protective device must be securely mounted
- Ensure that screws for the protective device are securely tightened

Procedure in case of non-acceptance:

- Fix and/or replace the protective device

1.3 Warning Signs in Text

Pay attention to the safety instructions in this Instruction Manual.

Below are definitions of the four grades of warning signs used in the text where there is a risk for injury to personnel or damage to the supplied Alfa Laval product.

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate damage to the supplied Alfa Laval product.

NOTE

Indicates important information to simplify or clarify procedures.

1.4 Recycling Information

Unpacking

Packing material may consist of wood, plastics, cardboard boxes and in some cases metal straps.

	• Wood and cardboard boxes can be reused, recycled or used for energy recovery • Plastics should be recycled or burnt at a licensed waste incineration plant • Metal straps should be sent for material recycling

Maintenance

During maintenance, oil (if used) and wear parts in the supplied Alfa Laval product should be replaced.

- Oil and all non-metal wear parts must be disposed of in accordance with local regulations
- Rubber and plastics should be burnt at a licensed waste incineration plant. If not available they should be disposed of in accordance with local regulations
- Bearings and other metal parts should be sent to a licensed handler for material recycling
- Seal rings and friction linings should be disposed of to a licensed land fill site. Check your local regulations
- All metal parts should be sent for material recycling
- Worn out or defected electronic parts should be sent to a licensed handler for material recycling

Scrapping

At end of use, the equipment must be recycled in accordance with the relevant local regulations. Besides the equipment itself, any hazardous residues from the process liquid must be considered and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact your local Alfa Laval sales company.

How to contact Alfa Laval

Contact details for all countries are continually updated on our website.

Please visit *www.alfalaval.com* to access the information directly.

2 Introduction

The Alfa Laval SB Static Mixer is a static mixer mainly intended for dissolving gasses into liquids. In this case the mixer is equipped with a gas inlet connection.

It can also be used for mixing of different liquids in case the mixing requires high mixing force. The mixer Type L is in this case delivered without any gas inlet.

The Alfa Laval SB Static Mixer is intended for mixing of liquids demanding low or medium mixing force.

Since the mixer can be used at high pressure and that a certain product treatment takes place inside, it has been concluded that the mixer is to be considered as pressure vessel - and thereby subject to approval according to relevant PED regulations.

The design is made according to EN 13445 (unfired pressure vessels), inspection and testing according to rules for conformity assessment in this directive

2.1 Intended Use

The mixer is designed to function with the following limitations:

- Maximum operation pressure: diameter <= 101,6 1500 kPa > 101,6 1000 kPa
- Maximum operation temperature: 90 °C
- Minimum operation temperature: 0 °C

DANGER

If these limitations are not respected, there is a risk that the mixer might leak and in the worst case burst. This causes a risk of injuring operators and staff.

2.2 Working Principle

The HP Mixer is a specially developed high performance static mixer for brewery or other beverage applications. The product components are mixed by a combination of pressure and turbulence.

The mixer consists of an outer shell and an insert which is positioned at the centre. The insert is equipped with propeller shaped wings that puts the incoming liquid(s) into rotation. When this has been obtained, another pair of wings changes the rotation direction and the turbulence created gives an extremely effective mixing.

The mixer type L with gas connection is designed so that the gas inlet is located at a position where the turbulence is at a maximum. This means that the injected gas will be dispersed in very small bubbles that are easily dissolved into the liquid phase.

3 Installation

3.1 Installation Recommendations

The mixer can be installed in horizontal or vertical position. In cases of low flow rates, the mixing action is improved if the mixer is installed vertically.

3.2 Mounting and Accessibility

The mixer is to be mounted by welding into the surrounding pipe system. Normally no pipe holder should be fixed to the mixer in order to allow for easy dismantling.

When performing welding work – make sure to avoid that gaskets in end connections are subjected to high temperatures.

The mixers can be installed in horizontal or vertical position.

In case of mixer with gas connection - the mixer shall be mounted with the gas inlet closest to the upstream end (= liquid inlet end) of the mixer. When introducing the mixer insert, make sure this is turned in the right direction.

In case of low liquid flow rates - the mixing action / gas dissolving efficiency is improved if the mixer is installed vertically with liquid inlet from above.

DANGER

The two end connections of the mixer are holding the mixer insert in correct position inside the outer shell. Great care should therefore be taken when opening either of the end connections since there is a risk that the insert may fall out. The sharp edges may cause a risk that person could get hurt or material could be damaged by the falling object.

3.3 Start-up and Commissioning

When the mixer has been properly mounted according to above, it is ready to be taken into use. Before any production is to take place, the total pipe system including mixer is to be properly cleaned from particles, remnants from welding etc.

DANGER

Cleaning of the pipe system will normally take place at elevated temperatures. Great care should therefore be taken in order to avoid injury to persons caused by contact with the hot mixer surface.

4 Operation

4.1 Permitted Fluids in Mixer

In order not to damage the mixer only the following fluids and gases are permitted/not permitted in the mixer:

- The mixer can be used for liquid beer products or other beverages
- The mixer can (when applicable) be used for dissolving of air, oxygen, nitrogen or carbon dioxide into the liquid phase
- The mixer may not be exposed to liquids, vapour or gases having a corroding effect on the material within the permitted operation conditions
- The mixer may not be exposed to liquid with chloride ion content exceeding 100 ppm at 20 °C or 10 ppm at 60 °C

4.2 Safety Equipment

During operation sufficient measures should be taken in order to secure that the mixer is not subjected to excessive pressures. This could be in the form of limitation of the equipment providing pressure. However, if there is a risk of exceeding the allowable operation condition for the mixer, the pipe system as such shall be equipped with safety valve, bursting disc or other arrangement in order to limit the pressure to allowable levels.

4.3 Normal Operation

When the mixer is in use, the system is to be operated by trained staff who knows the operation conditions and limitations of the system and the mixer so that the staff is aware of dangers such as bursting, burns and other damages caused by wrongful use.

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5 Maintenance

5.1 Inspection

There is no strict requirement for inspection of the mixer. However, it is recommended that the mixer is dismantled once per year for visual inspection of the mixer insert in respect to corrosion and/or mechanical damage.

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6 Technical Data

> **NOTE**
>
> Technical data must be observed during installation, operation and maintenance.
>
> All personnel should be informed about the technical data.

6.1 Technical Data

HP Mixer Type L	Approx. length (mm/ inch)	Kv/Cv (water)
HP - LF - 51	480/19	7.5/8.7
HP - L - 51	680/27	10/11.6
HP - L - 63	920/36	20/23
HP - L - 76	1060/42	25/28.9
HP - L - 101	1250/49	35/40.5
HP - L - 125	1550/61	65/75
HP - L - 150	1560/61	110/127

HP Mixer Type S	Approx. length (mm/ inch)	Kv/Cv (water)
HP - S - 51	420/17	15/17
HP - S - 63	540/21	25/28.9
HP - S - 76	630/24	35/40.5
HP - S - 101	750/30	55/63.6
HP - S - 125	900/35	65/75

Flow range in tables is indicative only - selection of most suitable mixer to be done based on the actual application.

Calculation of pressure drop for water according to the following formula:

$$\Delta P = \frac{Q^2}{Kv^2}$$

ΔP = Pressure drop in bar / PSI

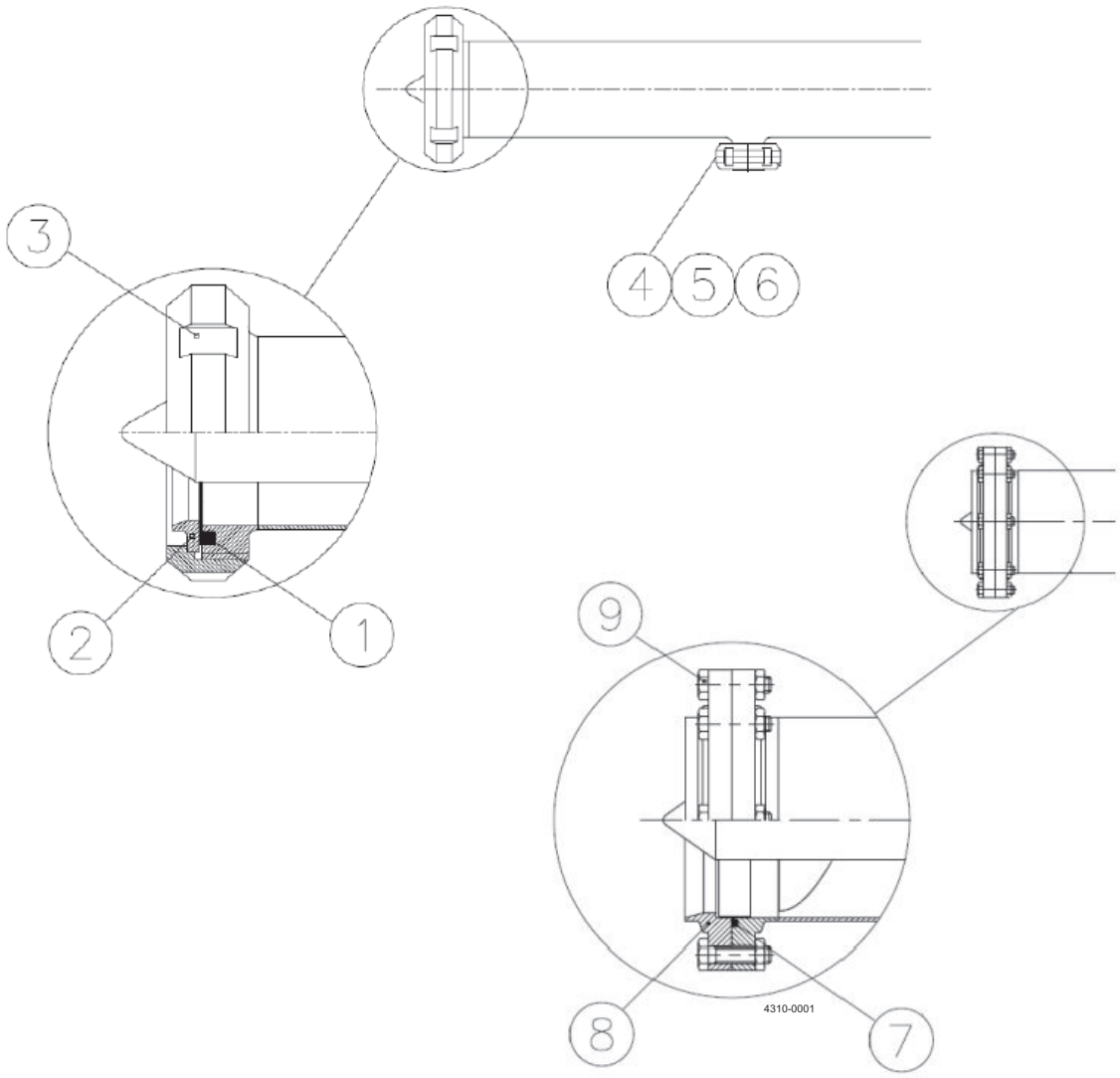
Q = Flow in m^3/h / Gallons

6.2 Physical Data

Material Specifications	
Product wetted steel surfaces	EN 1.4404 (AISI 316L)
Product wetted seals	EPDM

7 Parts List and Exploded View

7.1 SB Static Mixer



Denomination	Position	Mixer size					
		51	63	71	101	125	150
Gasket EPDM	1	3131703785	3131703793	3131703803	3131708862		
Liner for ISO 2037	2	9680150005	9680150006	9680150007	9680150008		
Liner for DIN 11850	2	9680148559	9680148560	9680148561	9680148562		
Nut	3	190616	190617	190618	3131708841		
Gasket EPDM for Gas inlet	4	3131703753	3131703753	3131703753	3131703753	3131703753	3131703753
Liner for ISO 2037 for gas inlet	5	9611309611	9611309611	9611309611	9611309611	9611309611	9611309611
Nut for gas inlet	6	190613	190613	190613	190613	190613	190613
Gasket EPDM	7					9612402608	9612402609
Flange for DIN 11850	8					9680148120	9680125768
Screws and Nut set	9					9612499303	9612499303

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8 Spare Parts

For every delivered Alfa Laval Product, a spare part list is available.

This spare part list contains a range of the most common wear parts for the machinery. If any component not mentioned is required, please contact your local Alfa Laval representative for availability.

You can find our spare part catalogue at *https://hygienicfluidhandling-catalogue.alfalaval.com*.

Always use Alfa Laval genuine spare parts. The warranty of Alfa Laval products is dependent on use of Alfa Laval genuine spare parts.

8.1 Ordering Spare Parts

When ordering spare parts, please always state:

1. Serial number (if available)
2. Item number/spare part number (if available)
3. Capacity or other relevant identification

8.2 Alfa Laval Service

Alfa Laval is represented in all larger countries of the world.

Do not hesitate to contact your local Alfa Laval representative, with any questions or requirement of spare parts for Alfa Laval equipment.