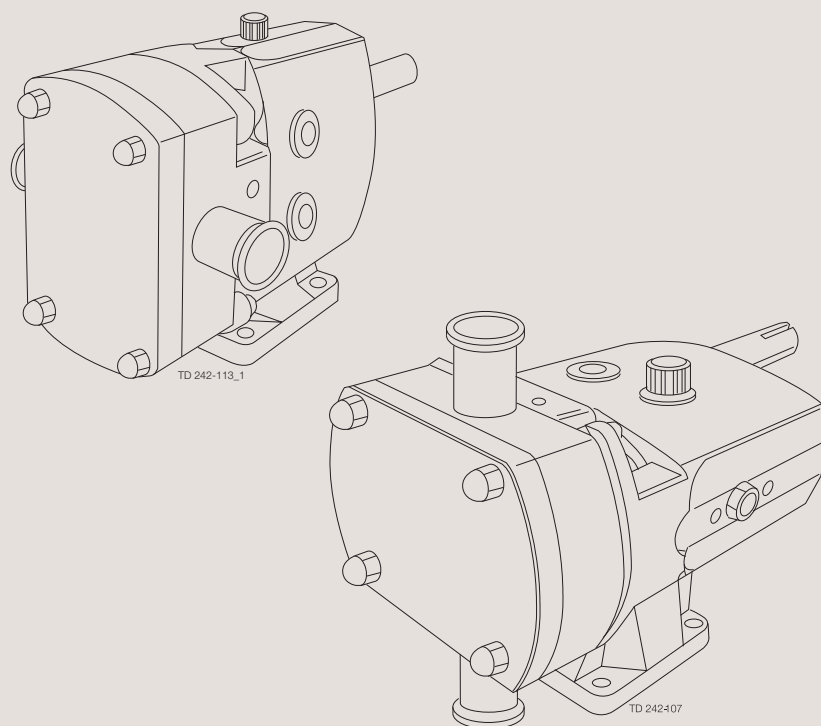




## Instruction Manual

### ATEX Addendum to SX Instruction Manual - Rotary Lobe Pumps - SX Range



**IMPORTANT!**

When ordering spare parts please quote Pump Serial No.

Read all of this pump manual and any instructions supplied for ancillary equipment before the unit is installed, operated or maintained.

ESE02203-EN4

2019-01

Original manual



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*The information herein is correct at the time of issue but may be subject to change without prior notice*

<b>1. EC Declaration of Conformity</b> .....	<b>4</b>
1.1. ATEX Directive 2014/34/EU .....	5
1.2. ATEX marking .....	5
<b>2. Safety</b> .....	<b>6</b>
2.1. Special conditions for safe use .....	6
2.2. General information .....	6
<b>3. Installation</b> .....	<b>7</b>
3.1. Installation .....	7
<b>4. Operation</b> .....	<b>8</b>
4.1. Operation .....	8
4.2. Important checks to maintain Safe Operation .....	8
<b>5. Maintenance</b> .....	<b>10</b>
5.1. Maintenance .....	10
5.2. Ordering Spare Parts .....	10
<b>6. Technical information</b> .....	<b>11</b>
6.1. Technical data .....	11
6.2. Seal Operation Data Sheet .....	13

# 1 EC Declaration of Conformity

This declaration of conformity is issued under sole responsibility of the manufacturer:

Alfa Laval Eastbourne, Alfa Laval Ltd

Company Name

Brich Road, Eastbourne, East Sussex, BN23 6PQ United Kingdom

Address

+44 (0) 1323 412555

Phone No.

Equipment covered by this declaration of conformity:

Pump

Designation

SX1, SX2, SX3, SX4, SX5, SX6, SX7

Type

From serial number 137.832 to 500.000

Is in conformity with the requirements of the following directives:

2006/42/EC Machinery Directive

2014/34/EU Equipment Explosive Atmospheres (ATEX)

This declaration of conformity covers pumps with the following ATEX markings:



II 2G c,b,k IIB T4 .. T2



II 3G c,b,k IIB T4 .. T2



II 2G c,b,k IIC T4 .. T2



II 3G c,b,k IIC T4 .. T2

For ATEX directive 2014/34/EU the following harmonized standards for non-electrical equipment have been applied:  
EN13463-1:2009, EN13463-5:2011, EN13463-6:2005, EN13463-8:2003

ATEX directive 2014/34/EU conformity for the motor and coupling is covered by the relevant EU Type examination certificates and declarations supplied by the manufacturers.

The Pump Technical file no. 9612-9602 is stored with SGS Baseefa Ltd., Rockhead Business Park, Staden Lane, Buxton, Derbyshire SK17 9RZ, United Kingdom - Certification body ref. no. 5102

The person authorized to compile the technical file is the signer of this document

Global Product Quality Manager

Pumps, Valves, Fittings and Tank Equipment

Title

Alfa Laval Kolding, Albuen 31, DK 6000 Kolding

Place

Lars Kruse Andersen

Name

2018-06-01

Date

Signature

(This Declaration of Conformity replaces Declaration of Conformity dated 2013-12-03)



## 1.1 ATEX Directive 2014/34/EU

### ATEX Directive 2014/34/EU

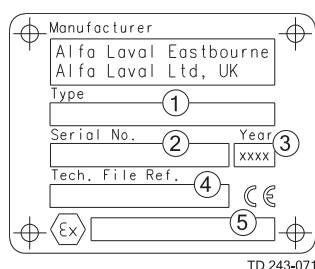
The ATEX Directive 2014/34/EU covers equipment and protective systems that will be used in areas endangered by potentially explosive atmospheres created by the presence of flammable gases, vapors and dusts.

Rotary Lobe Pumps supplied with an ATEX symbol are classified for use in potentially explosive atmospheres under ATEX Directive 2014/34/EU Group II, Categories 2 and/or 3.

Type of Equipment:	Rotary Lobe Positive Displacement Pumps
Equipment Group:	Group II category 2 G (zone 1)
	and/or Group II category 3 G (zone 2)
	Temperature class T4, T3 and T2
Ignition Protection used:	EN13463-1, EN13463-5 (c), EN13463-6 (b), EN13463-8 (k)

## 1.2 ATEX marking

### ATEX marking



### Typical nameplate

1. Pump type
2. Serial no.
3. Production year:
4. Reference of technical file at notified body: 9612-9602
5. ATEX marking

Unsafe practices and other important information are emphasized in this manual.

Warnings are emphasized by means of special signs, see description in Standard Instruction Manual section 2.1 & 2.2.

## 2 Safety

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### 2.1 Special conditions for safe use

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- **Never** operate pump outside max duty conditions specified in “Seal Operation Data” section 6.2. If the duty conditions change please refer to pump manufacturer.
- **Ensure** checks and running conditions for pump or pump unit during operation to be according to “Operation” section 4 .

### 2.2 General information

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- **Always** make sure that the Serial Number Stamped on the pump nameplate matches the number shown on the Declaration and on the Seal Operating Data in Section 6.2 .
- **Always** check that the components and equipment supplied is suitable for the area intended and corresponds with the order acknowledgement.
- **Always** read this ATEX addendum thoroughly before using the pump and read the safety instructions in the Standard Instruction Manual prior to handling, installing, operating or maintaining the pump.
- **Always** order genuine spare parts using the serial number of the pump, stated on the pump nameplate, for identification.
- **Always** ensure that intentionally or potentially mixing of fluids do not create hazardous reactions/situations (eg. process media and flush media)

#### Education:

Operators must have necessary knowledge about the pump supplied including the mechanical seals before doing any installation or maintenance work relating to the pump or pump unit. Necessary knowledge includes the understanding of the:

- function of the pump/pump unit including the mechanical seal.
- maintenance/service procedures of the pump/pump unit including the mechanical seals.
- safety instructions.
- operational limits for the pump/pump unit including the mechanical seals

#### Installation

- Always read section 3 “Installation”

#### Operation

- Always read section 4 “Operation”

#### Maintenance

- Always read section 5 “Maintenance”
-

### 3.1 Installation

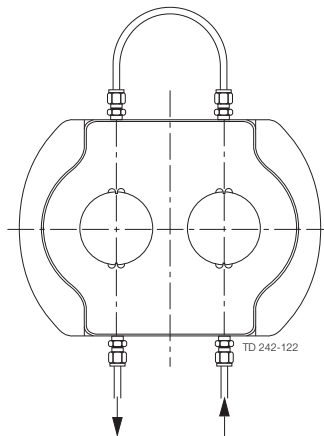


#### Pumps and motorized pump units

- **Always** follow the Installation instructions in the Standard Instruction Manual in conjunction with this addendum.
- **Always** ensure that instructions for all ATEX compliant equipment and components are followed (motors, couplings, reduction gears etc.)
- **Always** make sure that pump gearbox, base plate and motor are electrically earthed
- **Always** read section 4 "Operation" before pump start up.
- **Never** install the pump or pump unit at an angle of more than 5° from the horizontal plane
- **Never** cover up pump gearbox, motor or reduction gearbox in any way that will reduce the cooling effects intended
- **Ensure** correct alignment of pump and drive unit
- **Ensure** that all control and monitoring equipment complies with the requirements in appropriate ATEX standards e.g. EN 13463-6

#### Flush system

- **Always** measure flush media parameters at the flush outlet on the pump rotorcase eg. temperature, flow and/or pressure (see Technical data, section 6.1, for more information)



## 4 Operation

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### 4.1 Operation

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#### Pumps and pump units

- **Always** read the operations instructions in the Standard Instruction Manual
- **Always** read "Technical information" for shaft seals in section 6.1
- **Always** vent and purge the pump head and seal cavities of air/gas prior to start-up to avoid dry-run
- **Always** make a visual inspection of the pump unit at startup to ensure there are no malfunctions e.g. leaks, abnormal noises or vibrations etc.
- **Always** remove the rotorcase cover to drain the pump head. The rotor case is not self-draining.
- **Never** use the single seal options in applications where dry-running is predictable and/or where leakage from the shaft seal can cause a hazardous situation (double mechanical seal recommended).
- **Never** run pump with suction side and/or pressure side blocked. Process systems should be installed/controlled in a way so this cannot occur
- **Never** operate other equipment/components in pump unit outside limits specified in manufactures instructions manuals eg. motor, reduction gear, coupling etc.
- **Never** use a heating/cooling media in jackets, which can cause a hazardous situation in case of leakage
- **Ensure** that the temperature of the heating jacket, if fitted, does not exceed the Temperature Class rating (eg. T4 is 135°C).
- **Always** take care when choosing flush media such that a hazardous situation does not arise with seal leakage.

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### 4.2 Important checks to maintain Safe Operation

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In order to function correctly, mechanical seals are dependent upon lubrication and cooling of the sealing surfaces, using either pumped or barrier/buffer media. When either pumped or barrier/buffer media is not present, the seal will dry-run. Dry-running seal faces must be avoided at all times, as this will cause excessive and uncontrolled heat generation of the seal faces. This in turn could lead to exceeding the specified temperature class and thereby increasing ignition (explosion) risk. If dry-running cannot be avoided, then a flushed mechanical seal must be used. In order to ensure that the mechanical seal faces are lubricated and properly cooled, end users are required to monitor the pump/seal arrangement in such a way that this is achieved.

#### For pumps fitted with double mechanical seals (high pressure flush), the end user is required to ensure:

- Flush media is present
- Flush media is at a pressure 1.0 bar min. above the pump discharge pressure.
- Seal faces are receiving the required volume of flush media, to cool them and so dissipate any heat build up.

#### In practice this means the end user must monitor:

- Flush media pressure
- Flush media flow rate
- Temperature - either at outboard seal face or of flush media.

#### For pumps fitted with double mechanical seals (low pressure flush), the end user is required to ensure:

- Flush media is present
- Seal faces are receiving the required volume of flush media, to cool them and so dissipate any heat build up.

#### In practice this means the end user must monitor:

- Flush media pressure or flow rate
- Temperature - either at outboard seal face or of flush media.

#### For pumps fitted with single mechanical seals, the end user is required to ensure:

- Seal face temperature does not exceed temperature class limit.

#### In practice this means the end user must either monitor:

- Presence of pumped media either by flow rate or pressure indicator.
- Temperature - either pumped media or seal face.



### Daily checks (category 2 only)

#### Shaft seal, all types

- Ensure there is no unacceptable leakage

#### Pump Gearbox

- Ensure, via sight glass, oil level to be correct and that there are no signs of oil contamination.
- Ensure there are no signs of overheating
- Ensure there are no abnormal running conditions such as loose components, abnormal noise, vibration or oil leakage

#### Pump units

- Ensure there are no signs of overheating, abnormal running conditions such as loose components, leaks, abnormal noise or vibration.

#### Control/monitoring equipment

- Ensure, at least daily, correct function of control and monitoring equipment so as to ensure surface temperatures to stay within the specified temperature class (eg. process media temperature/pressure sensors)
- Ensure, at least daily, correct function of signals and alarms so as to ensure surface temperatures stay within the specified temperature class

### Weekly checks (Category 3 only)

The above checkpoints listed under “daily checks..” should be carried out on a weekly basis

#### Other checks

Pumps and pump units, category 2 and 3

- Ensure that Pump duty conditions never exceed limits specified in “Seal Operation Data” section 6.2.

#### Pump units, category 2 and 3

- Ensure surface temperatures on motor and reduction gearbox stay within the limits of the appropriate temperature Class e.g. T4. See manufacturers instructions.
-

## 5 Maintenance

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### 5.1 Maintenance

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#### Maintenance

- **Always** follow the Maintenance instructions in the Standard Instruction Manual
- **Always** read "Technical information" section 6.1 and the "Seal Operation Data" section 6.2
- **Always** ensure that instructions of all ATEX compliant equipment and components are followed (motors, couplings, reduction gears etc.)
- **Always** read section 4 "Operation" before starting up the pump unit after maintenance
- **Always** replace pump gearbox lip seals if they are disturbed i.e. cover removed.

#### Pump Gearbox

The oil in the gearbox acts as a coolant/lubricant for the bearings, lip seals and timing gears. Also the oil acts as ignition prevention and thus it is essential to ensure the oil level to be correct as specified in the standard instruction manual. Recommended oil as follows:

BP Enersyn SG 150  
Castrol Alphasyn PG 150  
Mobil Glygoyle 30  
Shell Tivela S 150  
Texaco Synlybe CLP 220  
Mobil Glygoyle 22

#### Pump Gearbox bearings changing intervals

If the bearings are worn excessively it can cause increased friction and thus increased surface temperature on the gearbox. Gearbox bearings should be renewed before the running hours stated in the table below have been exceeded. Alternatively it should be ensured by other means that the bearings are working satisfactorily eg. bearing frequency analysis. The bearings should be checked/monitored continuously or at least every 1000 running hours when the running hours in the table below are exceeded.

Pump Model	Bearing changing intervals (pump running hours x 1000)		
	Process media differential pressure		
	0 to 7 bar	7 to 10 bar	10 to 15 bar
SX1/005	30	23	13*
SX1/007	19	-	-
SX2/013	30	30	15
SX2/018	30	-	-
SX3/027	30	30	18
SX3/035	30	-	-
SX4/046	30	30	30
SX4/063	30	30	-
SX5/082	30	30	22
SX5/115	30	30	-
SX6/140	30	30	17
SX6/190	30	28	-
SX7/250	30	30	9
SX7/380	30	10	-

\* SX1/005 only goes from 0 to 12 bar

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### 5.2 Ordering Spare Parts

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When ordering spare parts please quote Pump Serial No.

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### 6.1 Technical data

#### Shaft seals

Mechanical seals are dependant upon lubrication and cooling of the sealing surfaces. Therefore dry-running of the seal faces must be avoided since this can cause excessive generation of heat and thus possibility of exceeding the specified temperature class.

During normal operation a mechanical seal will generate a small but controlled leakage. This leakage will increase upon failure.

Due to the working principles of mechanical seals a flush system must be monitored if dry-running of the process media cannot be avoided or if leakage of the product media can cause a hazardous situation (eg. flammable products).

All control and monitoring equipment used to ensure that the seal operating conditions stay within specified limits should comply with appropriate ATEX standards e.g. EN 13463-6.

There are two standard mechanical seal options conforming with ATEX

#### 1. ATEX compliant double flush mechanical seal (Vertically ported pumps only)

These seals provide the user with the highest level of protection against the mechanical seal faces running hot.

Proper function of the flush system is essential. If the flush stops, the outboard seal will run dry and thus the seal face temperature will increase and possibly be a potential explosion risk.

Refer to standard Instruction Manual for seal removal and fitting.

There are two basic types of flush:

##### Double Flushed Mechanical Seal (high pressure flush)

On this seal arrangement the flush is used as a 'Barrier' fluid. The pressure of the barrier fluid should be 1.0 bar min. above the pump discharge pressure. The inboard seal interface film will therefore be flush media. The barrier fluid will act as a coolant and lubricant for both inboard and outboard seals. Leakage of pumped media into the barrier fluid will not occur.

##### Double Flushed Mechanical Seal (low pressure flush)

On this seal arrangement the flush is used as a 'Buffer' fluid. The pressure of the buffer fluid should be as low as possible, but below the pump discharge pressure. The inboard seal interface film will therefore be pumped media. The buffer fluid will act as a coolant for the inboard seal and carries any leakage of pumped media away to ensure good seal function. The buffer fluid also acts as a coolant and lubricant for the outboard seal.



#### Ensuring seal face temperature

It must be ensured that the temperature of the seal face does not exceed the temperature class limit. This can be achieved by:

a) ensuring that the temperature of the buffer/barrier fluid does not exceed the value listed on "Seal Operation Data" and that the total flow is at least 30 litres/hour. The temperature and flow must be measured after the flush outlet on the pump rotorcase.

If a recommended flow higher than 30 litres/hour is stated on the "Seal Operation Data" this should be followed.

b) ensuring that the temperature of the buffer/barrier fluid does not exceed the value listed on "Seal Operation Data" and that the total flow is high enough to ensure the flush media to reach the temperature sensor within 10 seconds after leaving the flush outlet on the pump rotorcase. The distance between the flush outlet on the pump rotorcase and the temperature sensor should not exceed 200mm. This applies when the flow of the flush media is lower than 30 litres/hour.

#### NOTE:

For good seal function and life a general minimum flow of 30 litres/hour is recommended.

However, the flow can be lower from an explosion risk aspect under the circumstances described in b). Preferably the temperature sensor should be mounted as close to the flush outlet on the pump rotorcase as possible. By lowering the flow below 30 litres/hour the seal life and function might be compromised in some applications.

Thermosyphon flush system is not recommended.

## 6 Technical information

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**2. ATEX compliant single mechanical seal.** There is NO monitoring device or protection built into this seal option. It relies on the process fluid to cool and lubricate the seal faces in order to stay within the stated temperature class. The process must be controlled/monitored in a way, which ensures the seal face not to exceed the temperature limit. This can be done by ensuring that there is a reasonable flow of the process fluid and that the process temperature does not exceed the values listed in "Seal Operation Data" section 6.2.

Single mechanical seals are not suitable for applications/duties where leakage of process fluid can cause a hazardous situation.

Single mechanical seals should not be allowed to run dry.

**Refer to standard Instruction Manual for removal and fitting.**

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### 6.2 Seal Operation Data Sheet

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6.2 Seal Operation Data Sheet attached here.

**How to contact Alfa Laval**

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

Please visit [www.alfalaval.com](http://www.alfalaval.com) to access the information directly.

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