



## **INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS**

**ANNEX FOR CE ATEX REGISTERED EQUIPMENT UNDER DIRECTIVE  
2014/34/UE:**

### **HLR Ex Lobe Rotor Pump**

The contents of this Annex complement the information included in the instruction manual. The instructions in this Annex must be observed whenever equipment registered under Directive 2014/34/EU is used.

This annex is to be added to the manuals of the ATEX-certified components that form part of the assembly (e.g. motors, etc).



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# EU Declaration of Conformity

We,

**INOXPA, S.A.U.**

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17820 – Banyoles (Girona)

Hereby declare under our sole responsibility that the machine

## LOBE PUMP

Designation

**HLR**

From serial number **IXXXXXXXXXX** to **IXXXXXXXXXX** <sup>(1)</sup>

Is in compliance with applicable provisions of the following directive:

### Directive ATEX 2014/34/EU

Applicable harmonized standards:

**EN ISO 80079-36:2016**

**EN ISO 80079-37:2016**


**EN 1127-1:2019**


**EN 13237:2012**


**EN15198:2007**

**EN IEC 60079-0:2018**

This Declaration of Conformity covers equipment with the following ATEX marking:

 II 2G Ex h IIB T4...T3 Gb

 II 2D Ex h IIIB T125 °C...T200 °C Db

 II 2G Ex h IIB T4...T3 Gb  
II 2D Ex h IIIB T125 °C...T200 °C Db

The technical documentation referenced 021395/18 is on file with the notified body INERIS, Parc Technologique Alata BP 2 F-60550, Verneuil-en-Halatte, France. Reference num. 0080.

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

Banyoles, 2022



David Reyero Brunet  
Technical Office Manager

<sup>(1)</sup> Where X is a numeric character

# 1. Safety

## 1.1. INSTRUCTIONS FOR STARTING UP

This Annex to the instruction manual, together with the manual, contains the basic indications to be fulfilled during installation, operation, and maintenance. Consequently, it is essential that before installation, the installer and technical personnel responsible for the plant read this Annex to the instruction manual and it must remain permanently available in the proximity of the corresponding pump or installation.

Not only should the safety instructions indicated in this chapter be observed and fulfilled, but also the special measures and recommendations included in the other chapters of this manual.

## 1.2. SAFETY

### 1.2.1. WARNING SYMBOLS

The safety instructions in this Annex are expressed using the symbols indicated below. Non-fulfilment of these instructions could endanger the staff, the machine, and the operation of the machine:



**This sign will identify all the safety instructions given in this Annex that relate to the danger of forming an explosive atmosphere and creating sources of combustion in potentially explosive atmospheres, whereby failure to comply with those instructions may threaten your safety**

## 1.3. GENERAL SAFETY INSTRUCTIONS

### 1.3.1. DURING INSTALLATION



**In order to reduce the risk of static electricity, the equipment must be earthed to ensure electrical continuity between the pipes and the pump.**

### 1.3.2. During operation



**The limits of the operating conditions in explosive atmospheres must not be exceeded.**



**This pump was selected according to the operating conditions specified by the user. Therefore, INOXPA disclaims liability for any damage caused by use of the pump in conditions other than those stated in the order.**

### 1.3.3. During maintenance



**Danger! Important indications regarding protection from explosions**



**An explosive atmosphere may be created during disassembly of the pump. Therefore, permits to work must be issued and these jobs must only be done by qualified or trained personnel.**

#### **1.3.4. Compliance with the instructions**

Any non-fulfilment of the instructions may result in a risk for the operators, the environment and the machine, and may result in the loss of your right to claim damages.

Non-fulfilment may cause the following risks (in addition to those indicated in the manual):

- Creation of explosive atmospheres and risk of explosion.

#### **1.3.5. Guarantee**

Any guarantee will be lawfully cancelled immediately; in addition, we will be compensated for any claims of civil liability presented by third parties, in the case that (further to the conditions already indicated in the manual):

- The equipment has been used improperly or has not been used in accordance with the working conditions in the classified area, work has been carried out in a different classified area, or different conditions of temperature or pressure and/or different substances have been used.

### **LIABILITY FOR ATEX CERTIFICATION**

If INOXPA, S.A.U. supplies a bare shaft pump, the marking of the certification for protection against explosions shall only relate to the pump. All mounted devices must carry separate certification, supplied by the manufacturer of the device and having at least the same or a greater level of protection than the pump. The entire assembly must be certified separately by the manufacturer of the device and it must carry a name plate different to that of the pump.

If INOXPA, S.A.U. supplies the entire assembly, the certification against explosions and the mark on the name plate, affixed to the pump itself, shall relate to this specific assembly.



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## 3. General information

### 3.1. DESCRIPTION

For HLR Ex series lobe rotor pumps, the drives, used by the person in charge of the assembly, must be suitable for working in explosive atmospheres.

### 3.2. APPLICATION



**This pump was selected for a given set of pumping conditions and operating conditions in explosive atmospheres when the order was placed. will not be responsible for any damage caused if the information provided by the buyer is incomplete or incorrect (type of liquid, viscosity, RPM, classification of the potentially explosive zone, gas generated by the potentially explosive atmosphere, etc.)**



**The drives to be used by the person in charge of assembly must be EC marked, in accordance with ATEX directive 2014/34/EU, the instructions of the manufacturer of said drives, and local and national regulations.**



**This equipment must comply with the regulations in force and, in particular, with local regulations, decrees, legal provisions, laws, directives, circulars in application, standards, working rules, and any other document relating to their site of installation.**

## 4. Installation

### 4.1. RECEIVING THE PUMP



The received pump must be checked to ensure that it is adapted to the working conditions of the classified area and the conditions of the order.

#### 4.1.1. Pump identification

The shipment should be checked in accordance with the instructions included in the manual. Also, the CE ATEX mark inscribed on the manufacturer's plate should be checked in order to verify that it matches the requirements of the order.



II 2G Ex h IIB T4...T3 Gb  
II 2D Ex h IIB T125 °C...T200 °C Db



II 2G Ex h IIB T4...T3 Gb



II 2D Ex h IIB T125 °C...T200 °C Db

CE ATEX mark inscribed on the manufacturer's plate.

### 4.2. TRANSPORT AND STORAGE

If the pump is not for immediate use, then it must be moved twice a week in order to prevent the impeller, mechanical seal, and bearings from seizing up.

### 4.3. LOCATION

Place the pump near a drain on the floor. Note that the handling of inflammable fluids can create an area classified as Zone 0 in the drain area and therefore all the appropriate safety indications must be observed.

The motors used must be EC marked in accordance with Directive ATEX 2014/34/EU and with the instructions of the manufacturer and the applicable national and local regulations.



**When pumping inflammable or explosive liquids, a proper connection must be used. Connect the parts of the assembly with the earth connections in order to reduce the risk of static electricity.**

Depending on the fluid to be pumped, high temperatures may be reached inside and around the pump:



**Note that the surface temperature of the pump in normal operating conditions is determined by the fluid it pumps. Therefore the range of temperatures in section 4.1.1 must be taken into account.**



**Air must be properly recirculated in order to cool the pump motor. Make sure there is no other equipment or surfaces near the motor that may radiate additional heat or affect the cooling of the motor. See the motor instructions manual.**

#### 4.4. COUPLING

If the pump is installed with the corresponding mount, connector plate, and drive, electrical continuity must be ensured between the different components a proper earth connection.

#### 4.5. PIPES



**Before starting up the pump, make sure that the suction and discharge valves of the pump are open.**



**Before closing the suction and discharge valves, make sure that the pump is switched-off and has stopped.**

When hot fluids are being pumped, pay attention to thermal dilation. In this case, use expansion washers and pay special attention to avoid leaving the equipment electrically insulated (electrical equipotentiality) from the rest of the assembly.



**If a filter is installed in the suction inlet, this must be in conformity with Atex regulation 2014/34/EU. A periodic inspection must be performed to ensure that it is not obstructed and is not causing the pump to run dry.**

##### 4.5.1. Shut-off valves



**Use valves that are EC marked in accordance with the Directive ATEX 2014/34/EU and in accordance with the manufacturer's instructions and the applicable national and local regulations.**

##### 4.5.2. Pressure tank



**For a double mechanical seal pressure tank, it is advisable to ensure that the tank is always pressurised between 1,5 and 2 bar over the operating pressure of the pump while it is in operation, including when it is turned on and shut off. Always follow the manufacturer's instructions for the Atex mechanical seal.**

#### 4.6. SAFETY VALVE



**If the client wishes to provide the pumps with an external safety valve or bypass, this valve must be in compliance with Atex regulation 2014/34/EU, and the bypass must be provided with electrical continuity with the rest of the equipment.**

##### 4.6.1. For pumps with integrated by-pass

As the pressure relief valve is integrated into the pump housing, the fluid is recirculated directly from the discharge outlet to the suction inlet. The short length of the recirculation circuit means that, when the pump is operating with the discharge outlet obstructed, the bypass (and therefore the pump housing) can very quickly reach very high temperatures according to the operating conditions of the pump.

The presence of a shut-off device triggered by high temperature in the location established for this purpose, is essential for complying with the temperature classification. As the disconnection threshold is determined by temperature classification (see following table), the shut-off device cuts supply from the pump and controls any safety measures necessary in the installation if it exceeds the threshold of the maximum surface temperature corresponding to temperature classification T (the wiring enabling the device to manage the system shut-off must be implemented according to the relevant rules).



This equipment must comply with the standards in force and, in particular, the standards for electrical materials in explosive atmospheres and/or standard EN ISO 80079-37:2016 relating to protection of non-electrical equipment in explosive atmospheres through the control of ignition sources.

#### 4.6.2. For pumps without integrated bypass

The pump must be protected from over-pressures. It is particularly recommended to install a pressure switch to cut the supply of the pump in the event of overpressure. For safety reasons, the cut-off pressure must be less than the maximum delivery pressure of the pump and less than the lowest pressure permitted by the circuit components.

This equipment must comply with the standards in force and, in particular, the standards for electrical materials in explosive atmospheres and/or standard EN ISO 80079-37:2016 relating to protection of non-electrical equipment in explosive atmospheres through the control of ignition sources.

It is also possible to mount an external b-pass to the pump, with return to the tank. As with the integrated bypasses of INOXPA pumps, it is essential to have a shut-off device triggered by high temperature at the location of the bypass valve to control any heating caused by fluid recirculation. This shut-off device cuts supply from the pump and controls any safety measures necessary in the installation if it exceeds the threshold of the maximum surface temperature corresponding to temperature classification T (the wiring enabling the device to manage the system shut-off must be implemented according to the relevant rules). This equipment must comply with the standards in force and, in particular, the standards for electrical materials in explosive atmospheres and/or standard EN ISO 80079-37:2016 relating to protection of non-electrical equipment in explosive atmospheres through the control of ignition sources.

Temperature classification	Detection threshold of the shut-off device
T4 - T3	110°C ± 5°C - 140°C ± 5°C

**Caution:** The shut-off device does not protect the pump during operation beyond its limits, but disconnects itself when a malfunction could lead to the temperatures higher than what is permitted by the Atex area. The settings for the shut-off device disconnection threshold are the end-user's responsibility. These must be set according to the material temperature class. In the specific case in which the temperature of the pumped-liquid flash point is less than the limit imposed by temperature classification of its material, the shut-off device disconnection threshold must be adapted to ensure that the installation is protected.

#### 4.7. ELECTRICAL INSTALLATION

Before connecting and electric motor to the system, check local regulations regarding electric safety and standards EN 60204-1 and EN 60079-14. Also the motor manual. This motor should be Atex with adequate protection for the working environment in which it must run.



**Follow the motor manufacturer's indications at all times.**



**The converter or gear motor must comply with the specifications given in Atex regulation 2014/34/EU.**



**Consult at all times the converter or gear motor manual for correct assembling.**

##### 4.7.1. Automatic circuit-breaker

It must be remember that these automatic circuit-breakers have to work in a potentially explosive atmosphere. Therefore, the circuit-breakers selected must bear the CE ATEX mark in accordance with Directive 2014/34/EU



**The operating equipment must comply with the applicable electrical safety regulations and the instructions of the ATEX motor manufacturer.**

#### 4.7.2. Connection

Before connecting the motor to the mains, read the manufacturer's instructions manual. This motor must be an ATEX motor with a protection level corresponding to the working environment where it will operate.



**The electrical equipment, terminals and components of the control systems may still contain electric current when switched off. Contact may place the operator or installation in danger or cause irreparable damage to the equipment. The supplier's instructions for the safe opening of the motor should be followed at all times.**



**Permits to work will be required to handle the equipment in potentially explosive atmospheres. It is strongly recommended that this type of work be carried out in non-classified atmospheres (i.e. there must not be an explosive atmosphere in the location of the pump when it is being handled).**



**The turning direction must be set when the motor is disconnected from the pump.**

#### 4.7.3. Bedplate

The bedplate must always have a cam for connecting it to earth. Ensure that the earth connection is correctly fitted to the bedplate.

#### 4.8. COOLED MECHANICAL SEAL

- Check the level of supply reserve.
- Check the temperature of the washing liquid.
- Check the condition of the washing liquid by inspecting it: in the sealing system that must be repaired.

Frequent contamination is indicative of an unacceptable leak in the sealing system that must be repaired.

##### 4.8.1. Single mechanical seal option

If the single mechanical seal is working in dry conditions, its maximum operating temperature may be exceeded. This is why a simple mechanical seal must not operate under any circumstances in dry conditions.

- Regularly check that the single mechanical seal is functioning correctly.
- Check that the hydraulic part of the pump is always free of liquid during operation.
- Avoid pumping fluids that contain large amounts of gas

The end user must ensure that there is a constant flow to the pump by using a flow detector, flowmeter, or any other device in the pump intake, in order to prevent any increase in the surface temperature. Another option is to fit a temperature probe in the mechanical seal.

##### 4.8.2. Double mechanical seal option

- Check the level of supply.
- Check the temperature of the washing liquid.
- Check the pressure.



**Caution: the washing liquid must always be under pressure when the pump is operating.**



- Check the condition of the washing liquid: Change the washing liquid if it has been contaminated by another liquid.

Contamination of the liquid means that the pump is not functioning properly and it must be inspected. For example, the sealing system may have leaks in the middle or be open due to insufficient backpressure of the washing liquid.

## 5. Starting up



**Before starting up, those responsible must be duly informed about the pump and the safety instructions. This Annex, along with the instructions manual, will be available to staff at all times.**



**In order to carry out any type of work in potentially explosive atmospheres, it is necessary to adopt special safety measures such as permits to work.**

### 5.1. STARTING UP



**An explosive atmosphere may be formed during the start-up of the pump. Therefore, permits to work will be required and these tasks must only be carried out by qualified or trained personnel.**

#### 5.1.1. Checks before starting up the pump



**Before starting up the pump, make sure that the suction and discharge valves of the pump are open.**

If there is a risk of operation in dry conditions, it is recommended that a flow-detection probe be installed in the pump intake, or any other device preventing the pump from operating in dry conditions.

In the case of the (non-cooled) single seal option, the pump and the area around the seal must be covered by the pump fluid before start up.



**If the fluids that have to be drained are inflammable, the possible formation of potentially explosive atmospheres must be considered; permits to work should therefore be issued.**

### 5.2. BYPASS

In case the customer mounts an external bypass to the pump, the pressure relief valve shall also be Atex Certified. If the pump is provided with an external bypass, follow the instructions specified in chapter 4.6 SAFETY VALVE

# 6. Maintenance

## 6.1. GENERAL INFORMATION



The maintenance work of any equipment intended for use in potentially explosive atmospheres can only be carried out with the appropriate permit to work, as specified by ATEX 2014/34/UE.



Maintenance jobs can only be done by qualified personnel. Use the proper clothing. Ensure that staff read the entire instructions manual and this Annex and, in particular, indicate those chapters that refer to the job to be done.

### 6.1.1. Check mechanical seals

Check areas 1 and 21 daily. Check areas 2 and 22 weekly.

For a double mechanical seal:

- A control of temperature, level and barrier liquid pressure are essential and it is advisable to install an automatic device that stops the pump when the temperature of the liquid exceeds the temperature class in the classified area or when the liquid level is not what it should be.



The instructions of the mechanical seal manufacturer, and in particular those concerning the temperature probe, must be followed at all times.

### 6.1.2. Environment

Try to ensure that the working environment is clean, for some parts are very fragile and others have a low tolerance level.



The possibility of the presence of an explosive atmosphere must also be considered. Therefore, these jobs can only be carried out after the appropriate work permit has been issued

### 6.1.3. Tools

Use tools that are technically suitable for maintenance and repair jobs. If the area is not unclassified, all the tools must be flameproof and safe-work permits must be issued the job is started.

### 6.1.4. Safety

Apart from the safety measures indicated in the manual given by the motor manufacturer for safely opening it must also be followed.

### 6.1.5. Lubrication

The gears and bearings are lubricated by means of an oil bath.



Check that the oil level is correct every week for zones 2 and 22, and every day for zones 1 and 21. If not, add oil up to the required level. The first oil change must be carried out after 150 hours of service. Following this, the oil must be changed after every 2.500 hours of service or at least once a year under normal operating conditions.



The oil box should be filled up to the level in the centre of the sight-glass. **NO MORE AND NO LESS**, as both an excess and a lack of oil can cause problems of temperature increase. The following table shows the oil amounts to put into each box.

TYPES	Oil amount in box (l)
HLR 0	0.3
HLR 1	0.5
HLR 2	0.75
HLR 3	1.75
HLR 4	4.5

## 6.2. CLEANING

The user is responsible for establishing a cleaning or disinfection plan that suits their needs. This plan should take into account all applicable laws, regulations and standards related to protection of public health and safety in the use and disposal of chemical products.



**The possible presence or formation of explosive atmospheres must be taken into account when emptying the pump; safe-work permits must therefore be issued and all possible sources of ignition around the equipment or workplace must be eliminated.**



**Start-up may create a potentially explosive atmosphere; you must therefore obtain safe-work permits and only qualified and properly trained staff may intervene.**

### 6.2.1. Outside cleaning



**Do not spray the hot parts of the pump with water, since some parts might crack and pump fluid could spill into the environment, thereby generating a potentially explosive atmosphere.**



**The outside of the equipment must be cleaned in order to avoid the excessive build-up of combustible or explosive dust on the outer Surface of the equipment. The accumulated dust must never exceed 2 mm**

## 6.3. SPARE PARTS

When ordering spare parts for a pump operating within a classified area, it must be expressly stated that the pump is an ATEX pump and quote the manufacture number.

Otherwise, Inoxpa cannot ensure that the pump operates with parts that are suitable for the classified.

## 6.4. PAINTWORK

If rust appears on the painted surface of the lantern, the affected area must be repainted in order to avoid the risk of any abnormalities. The material the lantern is made of is an alloy with less than 7,5% of light materials.

Under no circumstances should a painted surface of a thickness in excess of 2 mm be allowed.

## 6.5. DISASSEMBLY / ASSEMBLY OF THE PUMP



**Improper assembly or disassembly of the equipment can impair operation of the pump, cause high repair costs, long downtime and even render the protective system of the equipment ineffectual.**

INOXPA disclaims any liability for accidents or damage caused by failure to observe the instructions of the manual and of this Annex.

### 6.5.1. Preparations

As well as the instructions given in the manual, the possibility of the presence of an explosive atmosphere must also be considered. Therefore, these Jobs can only be carried out after the safe work permits have been issued.

### 6.5.2. Tools

Use tools that are technically suitable for maintenance and repair jobs. If the area is not unclassified, all the tools must be flameproof and safe-work permits must be issued.

### 6.5.3. Cleaning

Before proceeding to dismantle the pump, both the outside and the inside of the pump must be cleaned. The possibility of the presence or development of an explosive atmosphere must also be considered. Therefore, these jobs can only be carried out after the appropriate work permits have been issued.

### 6.5.4. Electrical safety

In addition to the safety instructions given in the manual, the indications given by the motor manufacturer must be followed at all times in order to open the motor safely or lock it in.

In addition to the instructions included in the manual, you must:



**Always observe the indications of the manufacturer of the motor and the mechanical seal if this has a temperature probe.**

## 6.6. ASSEMBLY / DISASSEMBLY PUMP CASING



**CAUTION! Fluid might spill out when the pump casing is removed and a potentially explosive atmosphere might develop.**

# 7. Technical Specifications

Temperature range. See section 4.1.1.

Therefore, the following limit values must be taken into account for the HLR Ex pump range:

	Short rotor	Long rotor
Maximum flow rate .....	52.13 m <sup>3</sup> /h	77.2 m <sup>3</sup> /h
Maximum speed .....	750 rpm	750 rpm

The technical data to be taken into account for HLR Atex pumps are set out in the following table. All other data can be found in the pump instructions manual.

TYPE	n <sub>max.</sub> [rpm]	Q <sub>th</sub> [m <sup>3</sup> /h]	V <sub>u</sub> [m/s]	V <sub>i</sub> [m/s]
HLR 0-20	750	0,95	1,88	1,34
HLR 0-25	750	1,35	1,88	0,95
HLR 1-25	750	4,48	2,72	3,16
HLR 1-40	750	6,27	2,72	1,80
HLR 2-40	600	8,42	2,75	2,42
HLR 2-50	600	10,83	2,75	1,68
HLR 3-50	500	20,31	3,44	3,14
HLR 3-80	500	28,58	3,44	1,94
HLR 4-100	400	52,13	3,55	1,94
HLR 4-150	400	77,2	3,55	1,21

n<sub>max</sub> ≡ maximum working speed  
 Q<sub>th</sub> ≡ maximum flow rate at maximum speed  
 V<sub>u</sub> ≡ peripheral speed  
 V<sub>i</sub> ≡ maximum suction speed

## 7.1. SINGLE MECHANICAL SEAL

If the mechanical seal operates dry, the maximum temperature in the zone where it operates may be exceeded. Therefore, a single mechanical seal must not operate dry under any circumstances. For maintenance, see the supplier's instructions manual.



**The end user must ensure that there is a constant flow to the pump by using a flow detector, flow meter, or any other device in the pump suction, in order prevent an increase in temperature on the surface area.**

## 7.2. COOLED MECHANICAL SEAL

For maintenance, see the supplier's instructions manual.

Frequent contamination indicates an unacceptable leak in the sealing system which must be repaired.

## 7.3. DOUBLE MECHANICAL SEAL

For maintenance, see the supplier's instructions manual.





**Caution! The flushing liquid must always be under pressure when the pump is operating.**

Contamination of the liquid indicates incorrect operation which must be checked. For example, the sealing system may contain leaks in the side or be open due to insufficient back-pressure of the washing liquid.

#### **7.4. O-RING / PTFE LIP SEAL / DOUBLE LIP SEAL / PACKING GLAND**

It is FORBIDDEN to use these options for Atex pumps

#### **7.5. HEATING CHAMBERS**

Maximum temperature: see the maximum temperature value table

Maximum pressure: 4 bars (58 PSI)

#### **7.6. MATERIALS**

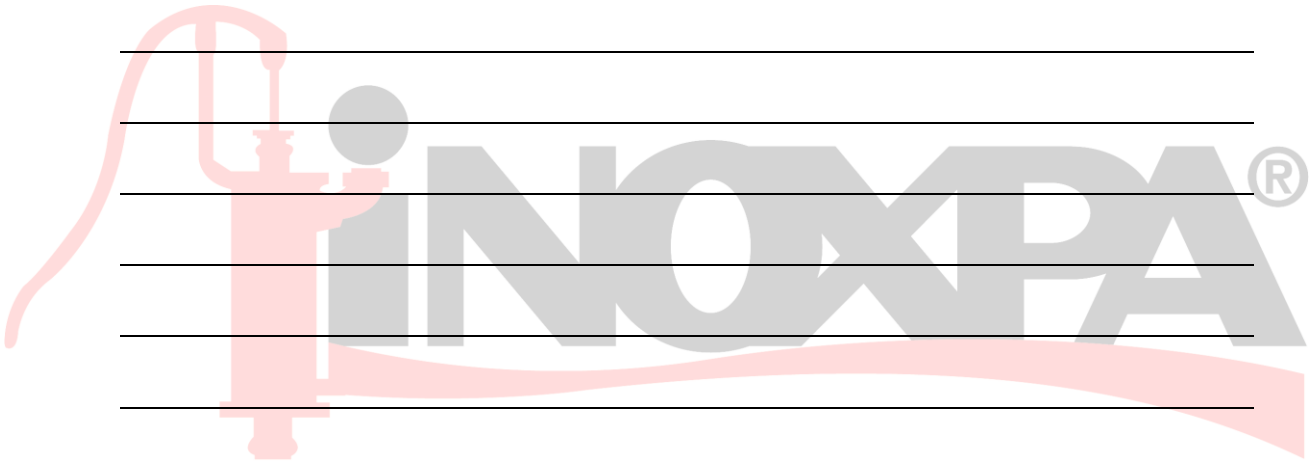
Maximum temperature for joints: see the maximum temperature value table

#### **7.7. TORQUE**

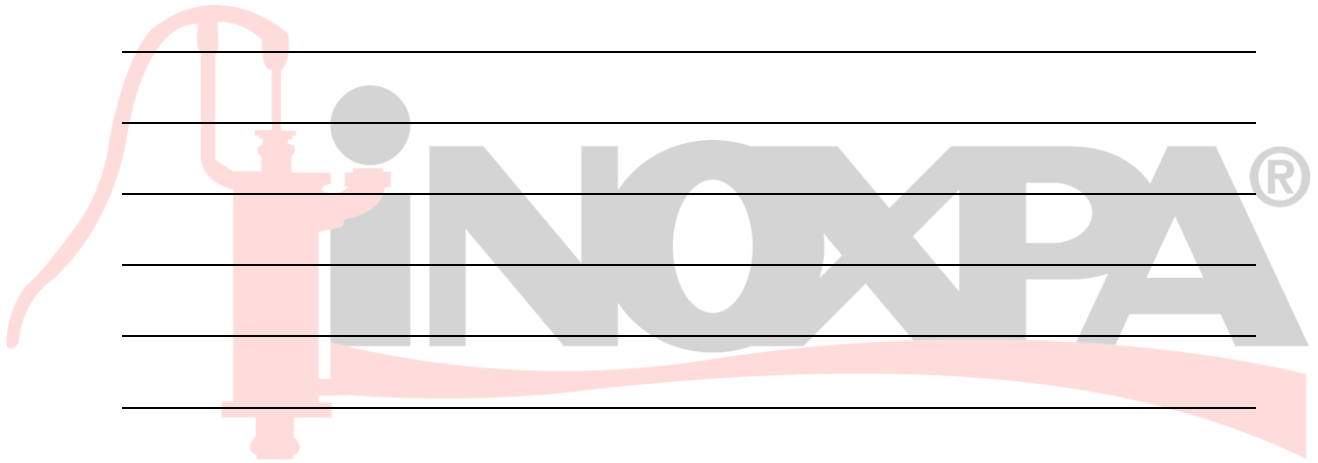
Maximum torque in the pump shaft

<b>Support</b>	<b>(N.m)</b>
HLR 0	17,5
HLR 1	26,5
HLR 2	54
HLR 3	200
HLR 4	600

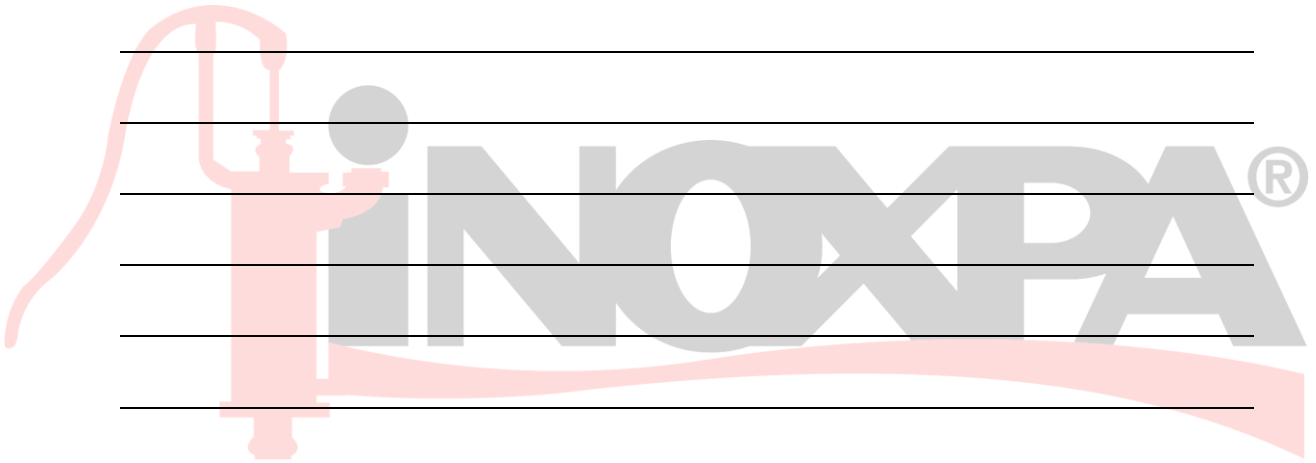
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