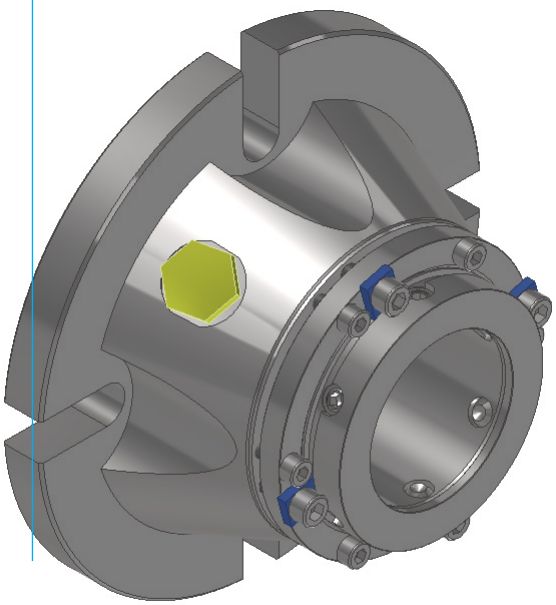
SEALTEK

INSTALLATION INSTRUCTIONS

STYLE 907 HYBRID SEAL



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INSTALLATION INSTRUCTIONS FOR STYLE 907 HYBRID SEAL

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1. DRAWING, ABOUT, EXPLOSION PROTECTION, FUNCTIONAL REQUIREMENTS

1.1 DRAWING

In the shipping box an assembly drawing will be included.
This product brochure refers to a mechanical seal designed by Sealtek® in order to provide reliable performance under a wide range of operating conditions.
Sealtek® provides general application guidelines, and the information presented are believed to be accurate; nonetheless are supplied for informational purposes only and should not be taken as warranty or guarantee.
The ultimate responsibility is to be assumed by the purchaser/ user, regarding proper selection, installation, operation and maintenance of the product.
Sealtek® reserves the right to change, without notice, the published information, illustrations, details, specifications, and dimensions, where necessary to improve product performance.

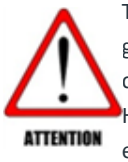
1.2 ABOUT

Style 907 is a cartridge seal based on the Sealtek Zero Leakage System injectable compound. While its installation is very similar to a standard cartridge-mounted mechanical seal, its operating procedures are different.
Under optimal working conditions, Style 907 can provide a failure-free operation for several years without requiring any refurbishment and with only occasional refills of Zero Leakage Compound, to be made specifically with original Sealtek injector guns.

Style 907 comes in different variants: for the purpose of this manual, the only distinction to be made is between Style 907TD (Total Dry) and all the other variants. Style 907TD is equipped with a sealing device that will prevent any visible leakage: refilling the seal will be necessary when the spring-loaded gland follower will be in contact with the gland. For all the other variants, refilling will be necessary when the leakage rate will be considered unacceptable.

For the refill procedure, please refer to the specific instructions of the injection gun type that will be used, at the end of this manual.
Unlike mechanical seals, Style 907 is expected to never incur in sudden failures. Wear to close tolerance components as a result of shaft vibration, deflection or runout will not compromise the seal's integrity, but will rather reduce the refill intervals, resulting in a higher amount of compound being used. When such intervals are deemed too short or unsatisfactory, the seal can be refurbished with new wear parts.

1.3 EXPLOSION PROTECTION



The mechanical seal is as a machine element, and as such it does not need to comply with Directive 94/9/EC (ATEX 95 product guide) as these being regarded as an integral part of a larger piece of machinery (pump, agitator). The EC ATEX standing committee as well as the European Sealing Association (ESA) has confirmed this.
However, it is generally required today that mechanical seals installed in atex zone must have proper certification issued either by manufacturer (zone 2 - 3) or by specific authority (zone 0 – 1).

1.4 FUNCTIONAL REQUIREMENTS

A variety of conditions must be verified to assure the functioning of a mechanical seal:

1. The seal is used under the conditions for which it was selected.
2. The equipment in which the seal(s) is (are) installed is operated within normal parameters (no cavitation, excess vibration etc.)
4. The spring loaded components are free to move in axial direction.
5. Perpendicularity and concentricity between the shaft and the seal chamber face and bore respectively are assured.
6. No sedimentation on shaft or sleeve surfaces caused by for instance crystallisation or polymerization are present.
8. Axial and radial shaft movements are within OEM-specified tolerances.

Only if the above conditions are strictly followed, can the proper functioning of a mechanical seal can be achieved, otherwise excessive leakage and / or shortened seal life can occur in high component and surface temperatures (See directive 94/9/EC, 1999/92/EC and EN 13463-5).

This instruction brochure is mainly intended for Maintenance, Operating and Supervisory personnel: the information and attached technical drawings and regulations are not to be used without authorization of Sealtek®.

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2. SAFETY

Read this information carefully to avoid personal injury or material damage.
Installation must be made in accordance with the provided instructions, to guarantee the best running of the mechanical seals. For related mechanical seal auxiliary equipment (vessels, coolers, etc.), separate instructions will be provided.

The personnel assigned to handle, install and run the mechanical seal and related equipment must have sufficient experience with the design and operating requirements of such equipment. It is duty of the end user to ensure it.

The user is responsible of wrong installation and use of the mechanical seal, which has been designed and produced to seal rotating equipment. Sealtek® will not accept responsibility for damages caused by inaccurate installation or installation not following the guidelines given in these instructions. Furthermore, Sealtek® will not accept any liability for instances or damages and malfunctioning caused by the misoperating itself.

Protective clothing for the personnel may be required.

Persons or environment shall not be exposed to dangerous situation from failure, recovery or fluctuation in power supply or supply system to the machine. Leakage in liquid or gas form can be caused by damage of any of the seal components; please note that particular attention must be paid to the faces. Depending on the sealed product, the leakage may have an effect on people or on the environment. It must be made sure that the leakage will not result in the formation of an explosive mixture. Plant regulation concerning work safety, accident prevention and pollution must be strictly adhered to.

3. TRANSPORT, STORAGE

The mechanical seal and related equipment must be transported carefully, and stored in the unopened, original shipping box. The seal(s) must be stored in a warehouse dry and free of dust. The seal must not be exposed to radiation and to temperature fluctuation. If a seal is stored for more than 2 years, then it must be totally inspected before use: it is necessary to ask for an inspection by a Sealtek® technician.

If there is a reason to believe that the seal MIGHT have been damaged during transport, such as being subjected to dropping or heavy impacts, it must not be installed. Sealtek® advises to ask for an inspection.
It is possible to transport the mechanical seal with suitable means like lifting accessories.
The mechanical seal can be preserved while installed, if the preserving medium does not impair the function of the seal itself.

4. EQUIPMENT CHECK

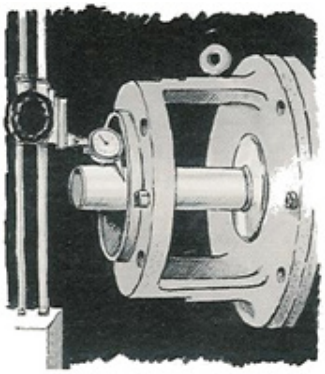
Follow plant safety regulations prior to machinery disassembly, such as: wear designated personal safety means, isolate equipment and relieve any pressure in the system, lock out equipment driver and valves.

In order to allow access to seal installation area, operate in accordance with the equipment manufacturer's instructions for disassembly. Remove existing sealing arrangement (mechanical seal or otherwise). Clean seal chamber and shaft thoroughly.

Check the shaft dimensions as shown on the seal assembly drawing. Inspect surfaces in contact qith gaskets to ensure they are free from dirt or scratches. Bevel all sharp corners on shaft steps, threads, reliefs, shoulders, key ways, etc. which gasket(s) must pass through and/or seal.

Check the seal chamber bore or OD pilot fit as shown on the seal assembly drawing.
Check seal assembly drawings for any modifications to be made to the machinery for mechanical seal installation and act accordingly.

First please carefully check the conditions of the machinery where seal is to be installed. To prevent sparks due to static electricity discharge, the equipment must be earthed.



1. Make sure shaft runout does not exceed .001 inch out of 1 inch of shaft diameter (0,01 mm out of 10 mm) . If this is exceeded the bearings might suffer damage or the shaft could be bent and adjustments might become necessary. Shaft tolerance recommended is +0 – 0.001 (+0 – 2/100 mm).
2. A static O-ring must seal to the shaft on the shown location. Be sure the shaft is clean and free from scratches within the O-ring area
3. Check the axial movement tolerance of the shaft. It should not exceed .005 inch (0,13), otherwise the bearings must be changed
4. **The stuffing box face should be rectangular to the shaft. Misalignment between the stuffing box and shaft should not exceed more than .003 inch per 1 inch (0,03 mm per 10 mm) of shaft diameter**
5. The stuffing box bore diameter D2 should be at least .05 inch (1,3 mm) larger than the D1 diameter of the seal.

5. MECHANICAL SEAL INSTALLATION - PRELIMINARY CHECK

Before you start the installation process, verify that the purchased seal corresponds to the order and that the item is the right one.

During installation, please pay attention and handle all the components with care. Personal injuries are to be avoided by wearing the protective clothing, by plant's safety regulations, and by following the ergonomic principles.

The successful functioning of the mechanical seal depends on its correct setting: incorrect setting may lead to damage, malfunction, and/or leakage in the environment. Installation can be eased by lubricating the gaskets, provided the lubricant is compatible with both handled product and gasket material.

Please, handle the parts of the mechanical seal that will be used as support to step on during assembly operations with care: protect these parts against slipping, stumbling or falling.

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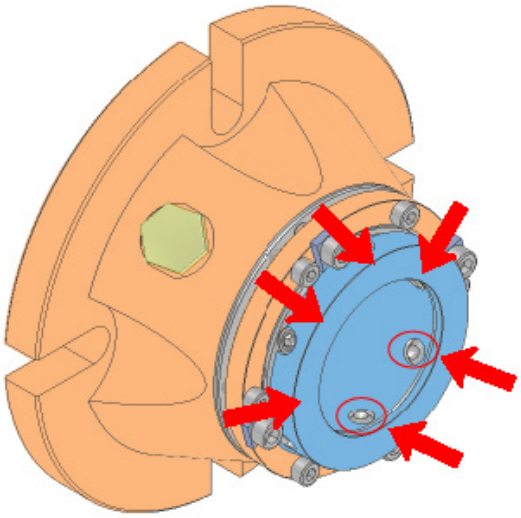
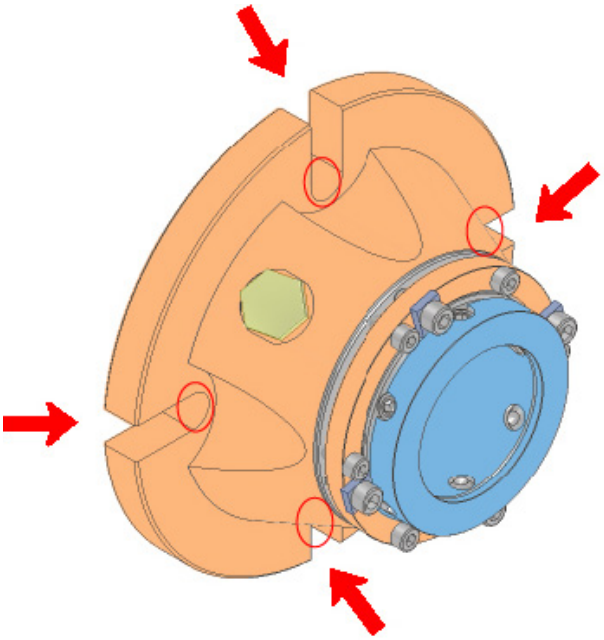
5.1 INSTALLATION OF THE SEAL

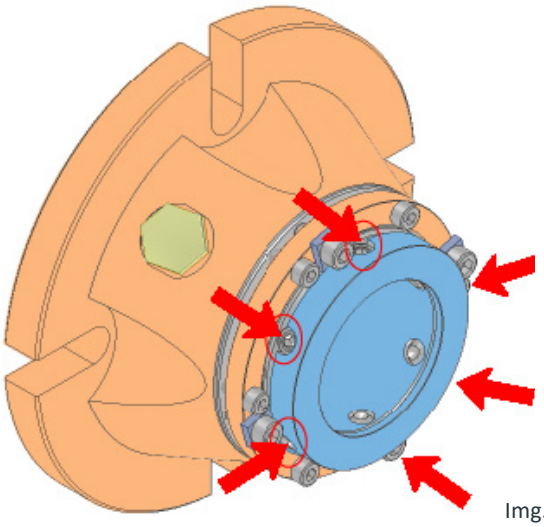
1. Check the chemical compatibility of the O-Rings and the metal parts. The standard O-rings are either Viton 747 – 75 or equivalent. The metal parts are 316 SS or equivalent.
2. Lubricate the O-ring in the sleeve with silicon grease or another compatible lubricant.
3. Slide the completely assembled seal onto the shaft making sure that none of the set screws are touching the shaft (Img. 1), which could result in scoring of the shaft
4. Reassemble the pump and – if required – make all the necessary impeller adjustments. Tighten the gland nuts around the stuffing box studs (Img. 2).
5. Carefully check that the centering clips are perfectly in contact with the outside seal gland.
6. Change screw position in case of left rotation.
7. Tighten the set screws (Img. 3) to the shaft. Install all set screws with Loctite 241 or equivalent to avoid loosening during operation. Connect the ZLS refill valve or hose to a refill port. IMPORTANT: In case the refill ports are not being used, ensure that metal plugs are screwed into the flush port connections.
8. Remove the centering clips (Img. 4).
9. Turn the shaft by hand to make sure the seal turns freely.
10. You can start your pump now. In case of leakage, proceed to refill the seal with ZLS compound until leakage disappears. Note: smoke could initially be seen rising from the seal. This is a normal behavior of the ZLS compound and should cease in few minutes.



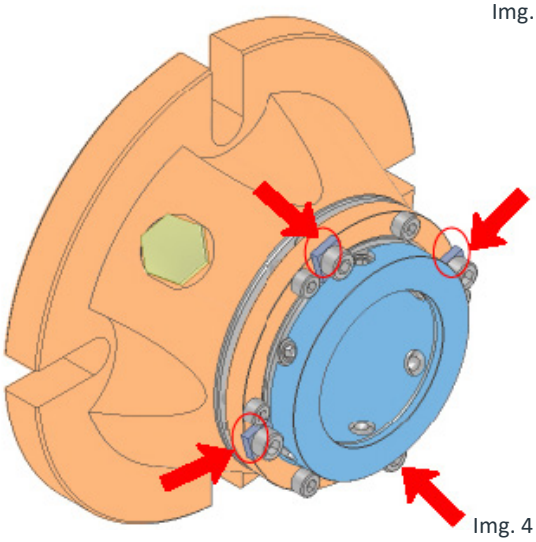
Img. 1



Img. 2



Img. 3



Img. 4

6. FUNCTIONAL RECOMMENDATIONS

All that follows must be considered both during the first startup and during every restart after machine has been stopped.

Please note that proper precautions need to be taken to prevent contact with hot parts: external temperature of the mechanical seal depends on the operating temperature of the product and on the barrier fluid.

Make sure that pressure and temperature in the seal chamber or of the barrier fluid, and shaft speed, do not exceed the recommended limits.

Do not expose the seal materials to products other than those shown on the assembly drawing; this will make the seal resist corrosion by the product(s) listed on the assembly drawing. The seal assembly drawing lists the materials of construction.

Start up equipment according to normal maintenance procedures unless specifically requested otherwise by Sealtek®. If the machine is not operating properly (e.g. seals and / or bearings running hot, cavitation, heavy vibration, etc.), shut down the equipment, investigate and remove the cause, or contact your nearest Sealtek® representative.

7. SHUT DOWN, DISASSEMBLY

Before disassembling the mechanical seal, the machine must first be stopped, and the external of the equipment must be cool enough to be handled without risk. It is duty of the operator to check that the temperature is convenient. The operator should act carefully anyway.

The equipment can be shut down at any time. Before the mechanical seal can be removed, the equipment must be de-pressurized and drained. After the equipment has been de-pressurized, barrier pressure (if applicable) must be relieved.
It is possible that during removal of the mechanical seal, product may be released. Plant's safety regulations must be checked in order to provide the operator with protective clothing, if required. Safety measures must be followed.

8. SYSTEM CHECK

The necessary area for the maintenance to the mechanical seal must be easy accessible. The machine must be stopped before maintenance to the mechanical seal is allowed.

Pressure, temperature, leakage and consumption of ZLS compound fluid must be monitored, when possible.

9. SPARE PARTS, REPAIRS

If the seal is used outside of its design capabilities, or when the seal simply reaches the end of its normal life expectancy, it will be necessary to operate a replacement or a repair.

Please note that Sealtek® will not answer for damages incurred through the use of non – original spare parts. Therefore, be sure to look for original Sealtek® spare parts only; those can be provided from Sealtek® worldwide distributors.
The seal in need of repair should be carefully removed from the equipment.

Replacement parts are always offered according to our best available technology and the most recent regulations and laws.
We suggest our customers to keep a spare seal on stock, in order to reduce equipment downtime. Refer to the seal code, order number or serial number on the seal itself to order replacement parts.
Seals can also normally be reconditioned: they must be carefully removed from the equipment, and then decontaminated before being returned to Sealtek® or a Sealtek® authorized repair facility. Please be sure to mark the order as " Repair or Replace", and to attach a signed certificate of decontamination, for safety purposes.

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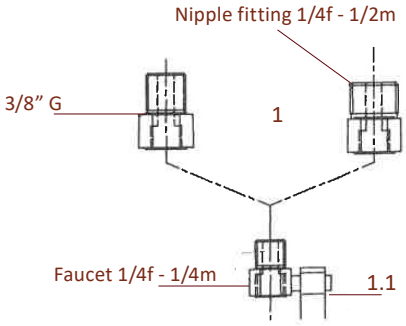
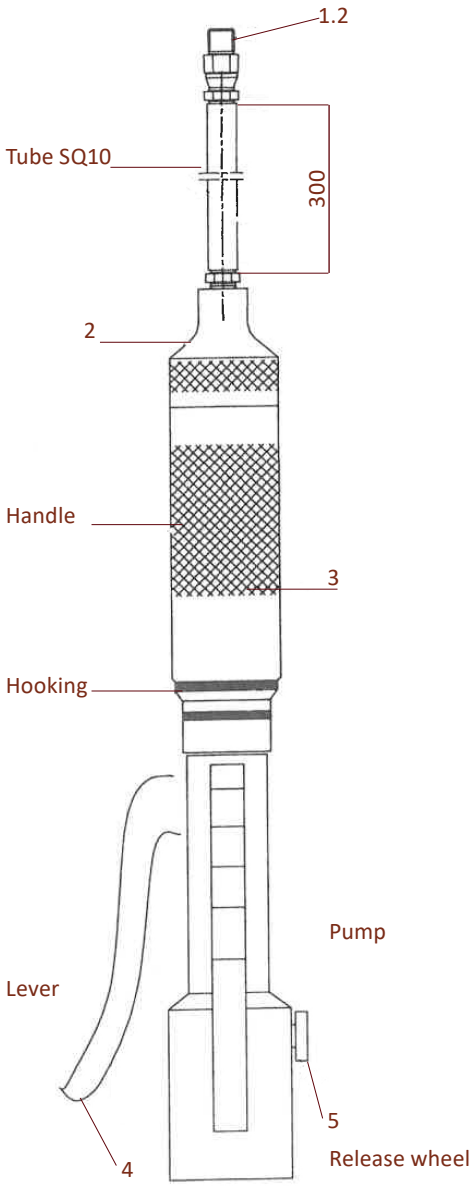
10. ZERO LEAKAGE SYSTEM MANUAL INJECTOR

Open the case and check that there are no missing components



PREPARATION AND USE

a) Screw the fitting (pos.1) suitable to the stuffing box.
b) Screw the tap (pos.1.1.) to the fitting (pos.1).
c) Screw the pipe with its fitting swivel (pos. 1.2) on the tap (pos. 1.1).
b) Prepare the compound.
c) Unscrew the tip (pos.2) and insert the compound inside the cylinder (pos.3).
d) Screw the tip onto the piston.
e) Open the tap on the flange.
f) Close the release wheel (pos.5).
g) Begin to inject the material inside the chamber by acting on the lever (pos. 4).
h) Once the compound has been injected, it is necessary to unscrew the tip (pos. 2), unlock the wheel (pos. 5) counterclockwise, push the piston to the maximum lower position with the handle of a hammer: it is recommended not to use metal parts in order not to damage the inside of the piston sliding area.
i) Repeat the operations from step b) to step g) until the ZLS material is under pressure.



FINAL STAGE

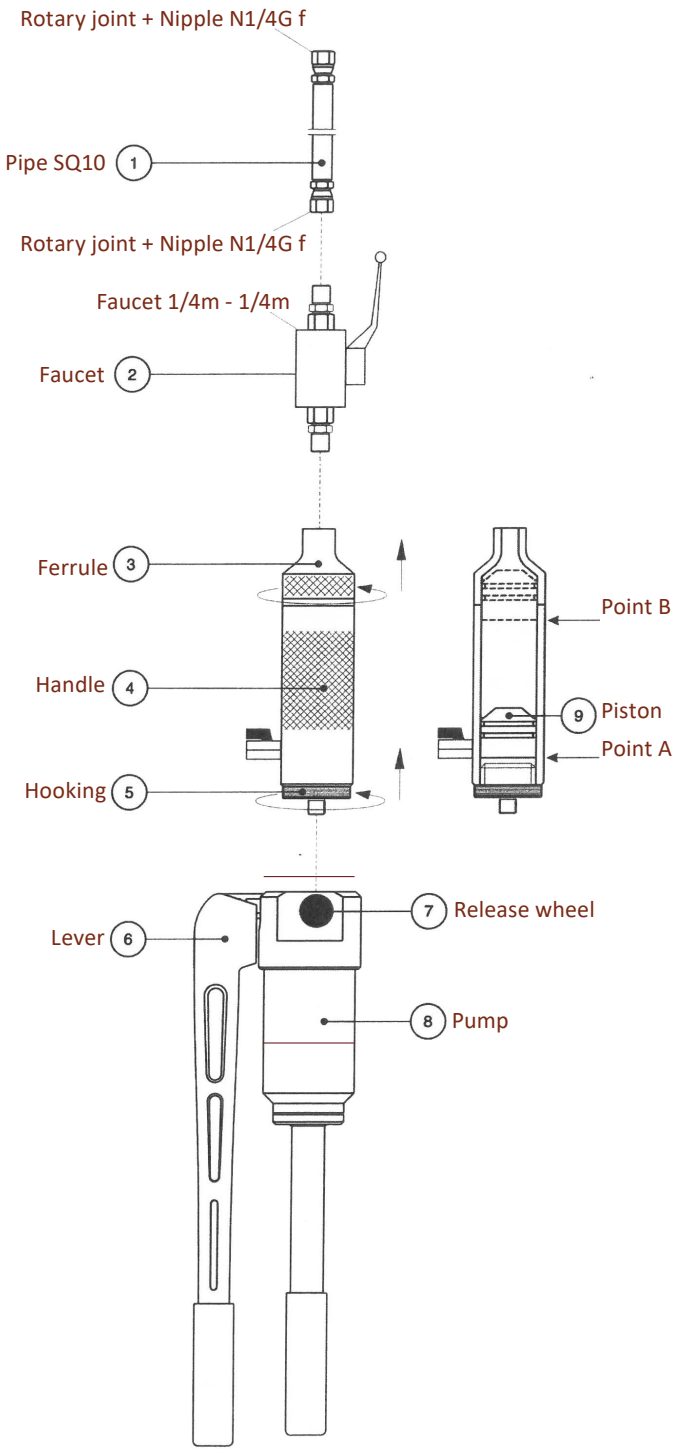
j) Unscrew the tip one last time, then pump the piston dry until you see the piston reach the top. At this point remove any waste with a cloth and be careful not to damage the piston itself.
k) Bring the piston to the starting position following the indications of point h).
l) Screw the tip back on and put it back in the toolbox after use.

11. ZERO LEAKAGE SYSTEM MANUAL HIGH PRESSURE INJECTOR

Open the case and check that there are no missing components

PREPARATION AND USE

a) Unscrew the hook (pos. 5) from the cylinder / handle (pos. 4).
b) Screw the coupling (pos.5) to the pump (pos.8).
c) Screw the cylinder / handle (pos. 4) to the coupling (pos. 5).
d) Prepare the mixture.
e) Unscrew the tip (pos. 3) and put the compound inside the cylinder / handle (pos. 4) first check that the piston (pos. 9) is at POINT A of the cylinder / handle (pos. 4).
f) Screw the tip (pos. 3) to the cylinder / handle (pos. 4).
g) Screw the tap (pos. 2) to the tip (pos. 3).
h) Screw the pipe (pos. 1) to the tap (pos. 2).
i) Connect the tube (pos. 1) to the chamber where ZLS is to be injected.
j) Open the tap (pos. 2).
k) Close the release wheel (pos. 7) on the pump (pos. 8), by turning it clockwise.
l) Begin to inject the material inside the chamber by acting on the lever (pos. 6).
m) Once the compound has been injected, close the tap (pos. 2) and unscrew the tip (pos. 3).
n) Open the release wheel (pos. 7) by turning it counter-clockwise.
o) Push the piston (pos. 9) into POINT A of the cylinder / handle (pos. 4) with the handle of a hammer (it is advisable not to use metal objects, in order to avoid damaging the inside of the piston sliding).
p) Repeat the operations until the ZLS material is under pressure.



FINAL STAGE

q) Bring the piston (pos. 9) to the starting position (POINT A) following the indications in point (m).
r) Screw the tip (pos. 3) back on and put it back in the toolbox after use.

SEALTEK® srl
Via Germania, 31
35010 VIGONZA (PD) Italy
Tel. +39 049 8930536-8932178
Fax +39 049 8931723
www.sealtek.com
info@sealtek.com