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Storage and Operation of Pacoma Hydraulic Cylinders PA30

The following information sets out the storage times and conditions as well as the maintenance of Pacoma products to ensure proper functioning of the hydraulic cylinders.

1. Safety Precautions

When operated under load, a hydraulic cylinder is subjected to extreme pressure. Therefore, the following points must be adhered to:

- Installation and maintenance may only be performed by qualified personnel.
- The entire system must be depressurized prior to opening (e.g., replacing / disassembling individual components).
- The pressure in the hydraulic cylinder must not exceed the maximal operating pressure specified in the drawing, and must furthermore be restricted via a relief valve.
- Adhering to the safety regulations as defined in the Standard EN982 governing hydraulics and pneumatics.
- Immediately replace damaged or defective lubricated parts and components.
- Prevent hydraulic oil from escaping under pressure, as this can result in severe injuries.
- When dealing with hydraulic oil, all legal and official directives must be adhered to. This is also valid for rules and regulations governing waste disposal and leakage.

2. Storage

Hydraulic cylinders must be stored under dry conditions and at a constant temperature. Ensure that they are not impacted by aggressive agents such as corrosives or steam. When stored, cylinder oil ports must be sealed with suitable metal or plastic plugs. Under these conditions, cylinders can be stored up to 12 months provided that they have not yet been extended and retracted.

After 12 months, cylinders must be inspected and commercially available preservative agents reapplied.

Hydraulic Technology

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3. Conservation measures

3.1. Conservation measures when shipping a complete hydraulic cylinder

Pacoma hydraulic cylinders are internally lubricated, externally paint-treated (in accordance with customer specifications; base coat and/or lacquered) and the paint-free surfaces preserved, including bore holes and glands.

Preservative Agents:

Piston rod	Divinol Fett G 460 from Zeller+Gmelin GmbH, or comparable
Rod and head eye	Divinol Fett Central from Zeller+Gmelin GmbH, or comparable

Prior to commissioning the hydraulic cylinder, the following instructions and customized instructions must be observed for the respective cylinder.

3.2. Conservation measures for ocean freight

When shipped by boat, the chrome-plated piston rod protruding from the cylinder must be protected against potential corrosive damage through salt-water impact. Treat the entire surface with a preservative agent such as is recommended under Pt. 3.1. Alternatively, a commercially available grease may be used. It is very important to repeat conservation measures each time the piston is moved. Applying grease-saturated wipers foam or felt ring temporarily can also help.

3.3. Conservation measures during shutdown times

Should the entire machine be stored or shut down for more than one month, the chromeplated piston rod protruding from the cylinder must be protected as outlined in Pt. 3.2. This measure is to protect against potentially corrosive environmental conditions.

3.4. Conservation measures for parts

3.4.1. Conservation measures for an entire hydraulic cylinder, as described under Pt. 3.1

3.4.2. Pacoma delivers parts already treated with preservative agents, with the exception of sealing elements.

Upon request, parts can also be individually wrapped in VCI paper (anti-rust paper). The maximum guaranteed storage time is 17 months. Should the parts be stored for a longer period, their condition must then be visually checked and treated with a commercially available preservative agent (Pt. 3.1)

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3.4.3. Storing sealing elements, glands and wipers (Elastormere)

Storage regulations and times for sealing elements must comply with **DIN 7716** and **DIN 9088**.

4. Inserting the cylinders into the machine

When operated under load, a hydraulic cylinder is subjected to extreme pressure. Therefore, the following points must be adhered to:

- When inserting the cylinder, detrimental preload must be avoided. In particular, transverse forces or loads generated by installing the cylinder can cause damage (e.g., damaged joint bearings, bent or broken rods, piston jamming).
- The installed position may be arbitrary when buckling safety has been taken into consideration.
- All screws and fastening elements needed to install the cylinder must comply with DIN EN ISO 898-1 and a strength class of at least 8.8 (10.9, or even better).
- Ensure that the cylinder is installed in clean environmental conditions. Screws, fittings, pipes and reservoirs must be free of dirt, shavings and cinders. Clean surfaces using a lint-free cloth or special paper.
- Prior to filling the cylinder, ensure that the selected operating fluid is compatible with the sealing material(s). The fluid must be approved for operating the given cylinder. It must meet the purity level 19/17/14 in accordance with ISO 4406:1999-12. If necessary, filter the fluid when filling the hydraulic system. It is not permitted to seal using hemp, putty and sealing band.
- When using a plug-and-socket connection, use only clamps recommended by the manufacturer.

The cylinder may only be used for the intended purpose. Using it in a manner contrary to its specified purpose will result in the forfeiture of all liability claims under the manufacturer’s warranty.

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5. Setting-up Operation

Adhere to the following steps when installing the hydraulic cylinder:

1. Prior to connecting the cylinder and drive unit, hydraulic unit and feed lines have to be thoroughly flushed:

Step a. Connect oil connectors

Step b. Depending on the system's size, flush for 15 to 45 minutes

Step c. After flushing, clean the return filter in the hydraulic unit, or if necessary, replace it

2. Connect the hydraulic cylinder to the hydraulic circuit

3. To avoid the Diesel effect (self-ignition of compressed air/oil mixture), the system must be vented before being run under pressure:

Step a. Connect the oil port of the cylinder head side.

Step b. On the rod side, attach the oil connectors and/or air-bleeder plugs at the topmost position.

Step c. Fill hydraulic fluid into the cylinder's piston side and move it to the foremost front position. A brief, pressurized dwell time in the foremost front position will accelerate air bleeding the hydraulic system.

Step d. Connect the cylinder on the rod side.

Step e. Fill hydraulic fluid into the cylinder's rod side and move it to foremost end position. A brief, pressurized dwell time in the foremost end position will accelerate air bleeding the hydraulic system.

Step f. The first 3 double-stroke cylinder cycles must be run up to the internal stops.

Step g. Set the pressure relief valve of the machine. The cylinder is now ready for use.

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6. Servicing

To ensure the longest possible service life in hydraulic cylinders, please adhere to the following service instructions:

- Ensure that the bearing surfaces are meticulously lubricated (e.g. joint bearing, swivel bearing) when operated
- Check leak-tightness and functional safety at frequent intervals.
- Should internal or external leakage exceed permissible rates, the seals and glands must be replaced. We recommend having this carried out at our plant to enable inspection of the entire cylinder.
- Adhere to the service intervals as stipulated in the manufacturer's specifications, in particular, the intervals for oil and filter change.
- Maximum permissible level of contamination by particles in accordance with ISO 4406:1999-12 purity class 19/17/14. Depending on the system precision (e.g., with servo valves), higher purity classes must be adhered to.
- Additional filtering will increase the hydraulic cylinder's service life.
- It is recommended to use hydraulic filters equipped with an electronic clogging indicator.
- Adhere to the maximum temperatures recommended by the manufacturers of hydraulic fluids.
- To ensure consistent system response, it is recommended to maintain the hydraulic fluid at a constant temperature, tolerances of ± 5°C.
- We recommend that single-acting cylinders be protected against corrosion by directly connecting the unpressurized chamber to the system's reservoir. This enables the in take and exhaust of hydraulic fluid, and thus ensures consistent protection against corrosion. Should this be technically impossible, add anti-corrosive oil to the unpressurized chamber.
- When using a hydraulic-powered tool (jackhammer), ensure that none of the hydraulic cylinders in the system are resting on their internal stops.