

# Instructions for Installation, Commissioning, and Safety of Hydraulic Cylinders

## 1. Preparatory Steps

### 1. Initial Inspection:

- Check that the cylinder has no visible damage.
- Ensure that all required parts are present, including seals, bolts, and connectors.

### 2. Required Tools:

- Prepare specific tools such as adjustable wrenches, torque wrenches, pressure gauges, filters, and personal protective equipment (PPE), including gloves, safety glasses, a helmet, and steel-toe boots.
- Ensure that all tools are in good condition to prevent accidents.

### 3. Work Area Cleaning:

- The work area must be free of dirt, dust, spills, and objects that might interfere with the process.
- Establish an organized, designated, and safe work zone to avoid distractions or accidents.

## 2. Transportation and Positioning

- Use appropriate tools such as cranes, trolleys, hoists, or forklifts to move the cylinder. Ensure that slings or chains are correctly positioned at points designed for lifting the load.
- Never transport the cylinder by holding it by the hydraulic connections, as this could damage them.
- Position the cylinder in its final location, ensuring it is fully aligned with the anchor points or the system where it will be installed.

## 3. Cylinder Installation

### 1. Structural Mounting:

- Before securing the cylinder, ensure that the supports or anchoring points are suitable for bearing the maximum expected load.
- Install bolts and fasteners according to the manufacturer's recommendations, ensuring that there are no inclinations or misalignments that could generate lateral stresses.

### 2. Connecting Hydraulic Lines:

- Thoroughly clean the connections and hoses before installing them to prevent particles from entering the hydraulic system.
- Connect the hydraulic lines to the corresponding ports, paying special attention to the flow direction.
- Use a torque wrench to tighten the hydraulic connections to the recommended torque. Check for leaks after finishing.

### 3. Connecting Sensors or Electrical Components (if applicable):

- Review the technical manual to identify the required type of electrical connection.
- Perform electrical connections in a dry environment, using sealed connectors and ensuring the cables are protected from mechanical and environmental damage.

## 4. Commissioning

### 1. System Bleeding:

- Fill the system with the manufacturer-recommended hydraulic fluid. Ensure the oil is clean and free of contaminants.
- Slowly move the cylinder in both directions several times to expel any air bubbles trapped in the system.
- Monitor the oil levels in the reservoir during this process and top up if necessary.

### 2. Initial Adjustments:

- Gradually increase the hydraulic pressure, observing the cylinder's behavior.
- Verify the cylinder's stability during movements, ensuring there are no oscillations, abnormal noises, or vibrations.

### 3. Functional Testing:

- Operate the cylinder under real load conditions, checking its functionality in all operating positions.
- Monitor the hydraulic system's temperature and connection points to ensure they are functioning correctly and without leaks.

## 5. Safety Measures

- Always use personal protective equipment, including oil-resistant gloves, safety glasses, a helmet, and steel-toe boots.
- Keep all personnel away from the cylinder during operation or testing.
- Do not position yourself under a moving cylinder or in areas where there is a risk of heavy objects falling.
- Disconnect system pressure before making adjustments or performing maintenance.

## 6. Preventive Maintenance

- Regularly inspect hydraulic lines, seals, and connections for leaks or wear.
- Replace the hydraulic fluid according to the manufacturer's schedule, using only recommended and filtered oils.
- Check anchoring points and tighten any bolts or connections that may have loosened over time.
- Keep a detailed record of all inspections, maintenance, and repairs performed to ensure traceability and improve future planning.