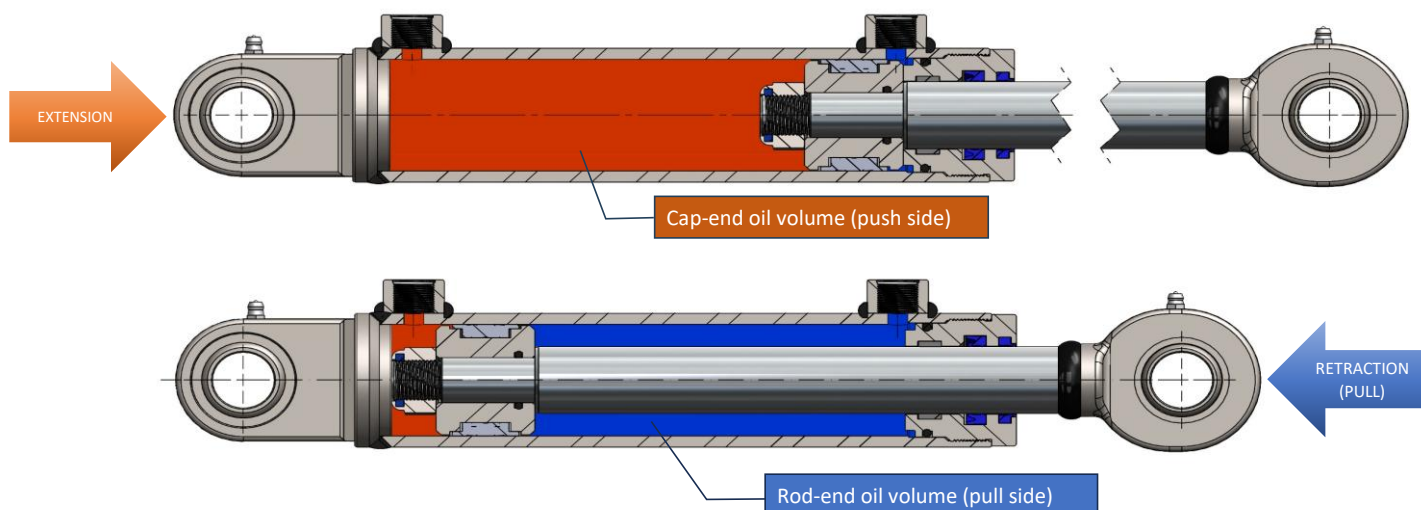


## Technical Specifications

### Hydraulic Cylinder Double Acting

### Point 60/40-Stroke



- Standard working pressure: 180 bar
- Test pressure: 1.5 × working pressure
- Standard flow for speed data: 5 L/min
- Maximum radial load: 10% of the axial force
- Maximum operating pressure depends on the buckling load
- Safety factor against buckling: 3:1

- All data refer to mineral oil at 40°C – viscosity 46 cSt
- Oil type: Mineral oil-based hydraulic oil (HL/HLP, DIN 51524)
- Filtration requirement: ISO 4406 ≤ 20/18/15
- Permissible ambient temperature: -40°C to +50°C
- Permissible oil temperature: -15°C to +80°C

(Force vs Pressure)

Theoretical forces at different working pressures

| Pressure [bar] | Push Force [kgf] | Pull Force [kgf] |
|----------------|------------------|------------------|
| 50             | 1414             | 785              |
| 100            | 2827             | 1571             |
| 150            | 4241             | 2356             |
| 180            | 5089             | 2827             |
| 200            | 5655             | 3142             |
| 250            | 7069             | 3927             |

1 ton ≈ 1000 kg  
 1 kN ≈ 102 kg  
 1 daN ≈ 1.02 kg

Values are theoretical and do not include friction losses or efficiency factors.

Oil volume per stroke

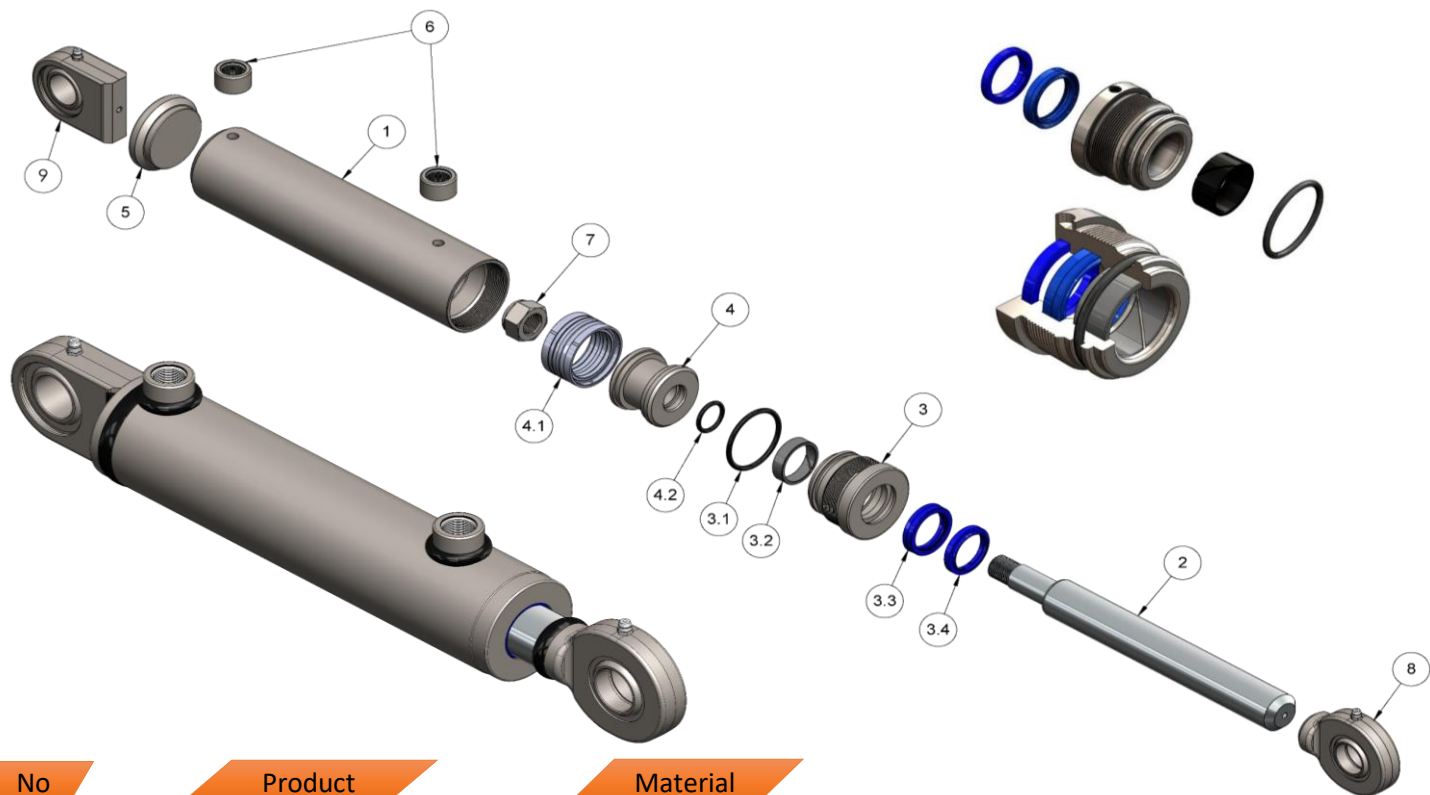
Cap-end and Rod-end chambers

| Stroke [mm] | Push volume (cap-end) [L] | Pull volume (rod-end) [L] |
|-------------|---------------------------|---------------------------|
| 50          | 0,14                      | 0,08                      |
| 100         | 0,28                      | 0,16                      |
| 150         | 0,42                      | 0,24                      |
| 200         | 0,57                      | 0,31                      |
| 250         | 0,71                      | 0,39                      |
| 300         | 0,85                      | 0,47                      |
| 350         | 0,99                      | 0,55                      |
| 400         | 1,13                      | 0,63                      |
| 450         | 1,27                      | 0,71                      |
| 500         | 1,41                      | 0,79                      |
| 550         | 1,56                      | 0,86                      |
| 600         | 1,70                      | 0,94                      |
| 700         | 1,98                      | 1,10                      |
| 800         | 2,26                      | 1,26                      |
| 900         | 2,54                      | 1,41                      |
| 1000        | 2,83                      | 1,57                      |

Stroke times at 5 L/min

| Stroke [mm] | Extension time [s] | Retraction time [s] |
|-------------|--------------------|---------------------|
| 50          | 1,70               | 0,94                |
| 100         | 3,39               | 1,88                |
| 150         | 5,09               | 2,83                |
| 200         | 6,79               | 3,77                |
| 250         | 8,48               | 4,71                |
| 300         | 10,18              | 5,65                |
| 350         | 11,88              | 6,60                |
| 400         | 13,57              | 7,54                |
| 450         | 15,27              | 8,48                |
| 500         | 16,96              | 9,42                |
| 550         | 18,66              | 10,37               |
| 600         | 20,36              | 11,31               |
| 700         | 23,75              | 13,19               |
| 800         | 27,14              | 15,08               |
| 900         | 30,54              | 16,96               |
| 1000        | 33,93              | 18,85               |





| No  | Product                                  | Material                |
|-----|------------------------------------------|-------------------------|
| 1   | Polished tube                            | Steel St. 52.3 ISO H9   |
| 2   | Chromed rod                              | Steel UNI C45 25 Micron |
| 3   | Head bush                                | Steel C43               |
| 3.1 | O-Ring                                   | NBR 70 shore            |
| 3.2 | Guiding Element                          | POM                     |
| 3.3 | Rod Seal                                 | Polyurethane / PU       |
| 3.4 | Wiper                                    | Polyurethane / PU       |
| 4   | Piston                                   | Steel C43               |
| 4.1 | Compact Piston Seal                      | Nbr / Tpe / Pom         |
| 4.2 | Piston O-Ring                            | NBR 70 shore            |
| 5   | End Plug                                 | Steel St. 52.3          |
| 6   | Threaded Port                            | Steel C43               |
| 7   | Locknut                                  | UNI7473-DIN982          |
| 8   | Ball-Joint End With Grease Nipple Circle | ISO 12240-4 Series E    |
| 9   | Ball-Joint End With Grease Nipple Flat   | ISO 12240-1 Series E    |

## WARNINGS & SAFETY INFORMATION

- **Rated pressure:** Recommended working pressure is 180 bar; maximum allowable pressure is 250 bar.
- **Recommended lubricant:** Hydraulic mineral oil H-LP series (H-LP32, H-LP46, H-LP68).
- **Oil filtration:** Use efficient filtration with periodic replacement; required filtration level is 25 µm.
- **Oil temperature:** Keep oil temperature between 40–50°C during operation. Do not exceed 80°C. High temperatures reduce viscosity and lubrication quality, decreasing cylinder performance and service life.
- **Rod load:** Never apply radial loads to the rod during operation.
- **Welding:**
  - Remove the rod completely before welding accessories on the bottom or rod end.
  - Allow welded parts to cool before reassembly.
  - Protect the rod from welding sparks to avoid chrome damage.
  - Absolutely avoid welding on the external diameter of the cylinder tube.
- **Painting:**
  - When oven-drying, do not exceed 80°C.
  - When cold-painting a cylinder with rod installed, protect the rod to avoid contamination of the wiper/seal.
- **Safety:**
  - Materials are not dangerous, but installation may involve risks.
  - Install shut-off valves or additional safety devices according to machine regulations.
  - The manufacturer is not responsible for damages caused by non-compliance or improper use.
- **Maintenance:**
  - Replace worn seals when required.
  - Pay attention to oil cleanliness and prevent contamination.

