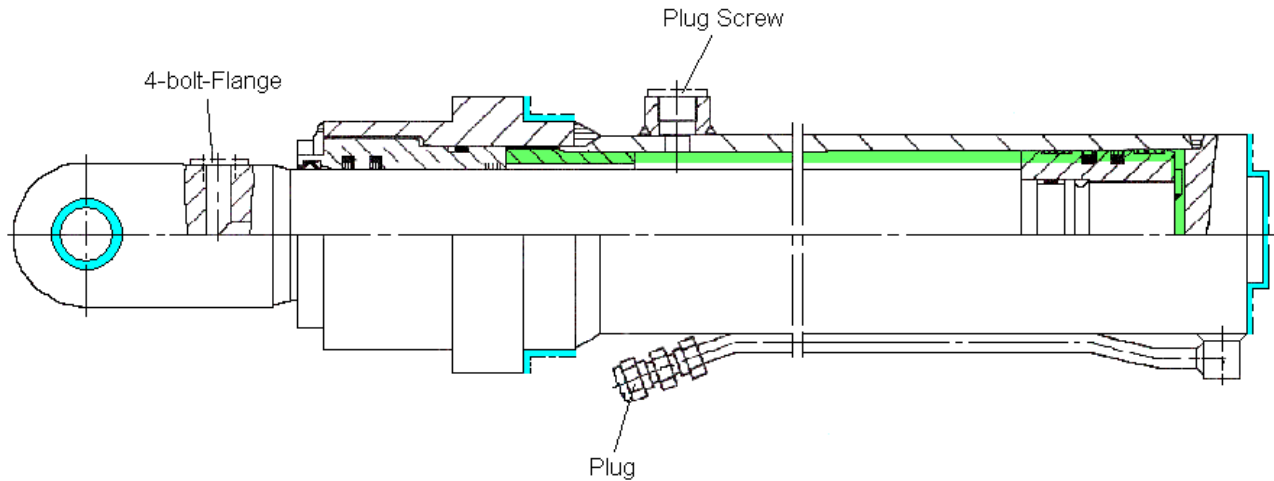


**General Cylinders****1. Anti-corrosion protection****1.1 Shop conservation**

Hydraulic cylinders made by the MH group are internally preserved for up to half a year by the testing fluid used. Longer storage periods are to be stated on the order form.

For a one-year-storage, cylinders will be tested with an **anti-corrosion-protective oil; either ARAL Konit W10 (alternatively Resilan M 46) or ESSO Rustban 335**, and finally emptied again.

When a storing period longer than one year is requested, cylinders will be delivered with an oil filling of above mentioned quality.

However, the storing instructions as under paragraph 3 are prerequisites for any period.

In case the cylinders are meant to be stored for more than 2 years it is highly recommended to consult the manufacturer.

For hydraulic cylinders with unplated piston rods, always contact the manufacturer for conservation.

**1.2 Sealing**

The anti-corrosion-protection is only effective when all ports have been closed-off ensuring airtightness: Four-bolt flanges are sealed with a synthetic plug retained by a metal plate; pipe- and thread connections are plugged with synthetic couplings or plug caps.

Cylinders which cannot be emptied completely (e. g. cylinders with hollow rods) and oil-filled cylinders (such as tele rams) will be plugged-off oiltight using plug screws with integrated seal rings for female threads and plug caps with spigot nuts for threaded pipe ends.

**1.3 Surface protection**

External surfaces such as flange surfaces, bearings, untreated cylinder barrels and also the exposed rod end section, in case the rod has no other corrosion protection, are all treated with **ARAL Resilan WA or ESSO Rustban 397**.

In addition, whenever plunger cylinders are concerned, the plunger rod, its guiding parts and cylinder bore interior surface are treated with an anti-corrosion-protective. All hydraulic cylinders will be dispatched coated with a proven versatile primer, if not otherwise specified by the client.

**2. Transportation**

**2.1** In preparation for transportation the hydraulic cylinders must be handled and packaged carefully. Any kind of impact, including bumping against each other must be avoided by using adequate handling auxiliaries and methods and also suitable packaging materials.

**2.2** Rods are to be secured adequately against self-extending.

**2.3** All ports are to be plugged (acc. to 1.2).

**2.4** Whenever rods project out of the cylinder like on twin-rod-cylinders, the projecting rod end must be protected against any possible damage by using appropriate packaging materials. Any contact with acids which may harm the chromium plating must be strictly avoided.



### **3. Storage**

- 3.1** Upon delivery the customer should check for any damage resulting from transportation. Damaged plugs are to be renewed and damaged coating is to be touched-up, immediately.
- 3.2** Hydraulic cylinders should only be stored in a dry, dust- and steam-free room at a constant temperature ranging between 10°C and 20°C.
- 3.3** After the first year of storage the cylinders should be rotated (about 90°) in order to shift possible air bubbles and simultaneously re-oil these dried zones.

### **4. Installation**

- 4.1** In case hydraulic cylinders have been stored for longer than 2 years, the manufacturer should be contacted, because for some types it may be necessary to replace the seal kit prior to installation.
- 4.2** In general, hydraulic cylinders may be installed in any desired position.
- 4.3** In order to prevent premature wear or operational disturbances the hydraulic cylinders are to be installed tension-free and without any lateral forces acting.
- 4.4** Before connecting the hydraulic cylinders to the system all lines should be thoroughly flushed using suitable cleansing agents in order to remove any possible deposits.
- 4.5** External preservatives are to be removed using benzine or petroleum ether.

### **5. Start up**

- 5.1** Regarding the little remaining anti-corrosion protective adhering to the cylinder's internal surfaces, cleansing is not necessary, because it is compatible with most used mineral-oil-based pressure fluids. Cylinders filled with protective oil are to be emptied and re-filled with the operating fluid, before taken into operation. In order to achieve maximum endurance and operating reliability the operating fluid should be filtered (filtering grade nominal 10 µm).
- 5.2** Only proven trade mark brands of mineral-based-oils acc. to DIN 51524 and DIN 51525 should be used. Whenever other hydraulic fluids are meant to be used, the manufacturer should be consulted first.
- 5.3** The rod should be free of any kind of deposits e. g. paint rests, dirt etc. resulting from installation. Otherwise cleaning is necessary.
- 5.4** Some cylinder types require locking the rod eye on-site.
- 5.5** Before taken into operation the cylinder is to be vented at both ends repeatedly until the operating fluid excludes free of air bubbles.
- 5.6** The hydraulic cylinders are suitable for an operating temperature range of von -20°C to +80°C unless specified otherwise. In case the temperature exceeds this range please contact the manufacturer.

### **6. Maintenance**

- 6.1** The rod's normal chromium layer does not provide an everlasting corrosion protection against aggressive environmental influences, so therefore maintenance is important, especially when the rod remains in extended position.
- 6.2** It is recommended to check the oil filter repeatedly during the start-up period.
- 6.3** In general, following above mentioned instructions as a prerequisite, MH hydraulic cylinders are designed to be maintenance-free during operation.