

# Oil compatibility



# 1. GENERAL :

The main function of hydraulic fluids is to transmit energy in the form of pressure. For the proper functioning of a system, hydraulic fluids must protect the circuit organs against corrosion, provide lubrication to prevent seizure, while being the least polluted. The fluids used in hydraulic applications fall into three main families:

## **Mineral oils ISO / AFNOR classification:**

The basic classes HH, HL, HM, HV, HG each having several possible grades identified by a number from 15 to 220. This number corresponds to the average kinematic viscosity at 40 ° C in centistokes ( $\text{mm}^2\cdot\text{s}^{-1}$ ). HM and HV oils are the most used.

## **Hardly flammable oils:**

These so-called "high security" oils are used when there is a risk of fire. They have a special classification. They require certain precautions for use because of their possible action on seals, paints and their miscibility with other oils, etc. Applications: presses, special machines, rolling mills, drills, excavators, concrete pumps...

## **Biodegradable oils:**

These oils are mainly based on saturated synthetic esters from natural resources and special additives. Bio lubricants are to be preferred in all applications that may pose a risk to the environment. Their purchase cost is higher. Finally, they tend to replace mineral hydraulic oils due to increasingly restrictive environmental regulations.

## 2. Notes on the use of hydraulic oils:

The compatibility of the hydraulic oil used with the elastomers in a hydraulic assembly is fundamental for the functioning of the mechanism (cylinder seals, pump or fittings).

### Cleanliness of hydraulic oils:

It is an essential element for the proper functioning of the devices. Pollution (solid particles, water, and gas) is the main cause of deterioration of a hydraulic circuit. The ISO 4406 standard makes it possible to assess the pollution of oil by rating from 0 to 30 the number of pollutants greater than 5  $\mu\text{m}$  and those greater than 15  $\mu\text{m}$ . (99% of pollutants have a size between 2 and 25  $\mu\text{m}$ ). For the servo valves the effects of pollutants start from 2  $\mu\text{m}$ .

### Filtration:

It controls the entry of pollutants to minimize them and also eliminates dangerous pollutants. Good filtration depends on the size and position of the filter in the circuit, but also on its regular renewal. In addition, not all hydraulic fluids have the same filterability characteristics.

### Main points to watch:

- ❖ Compatibility between oils seals and filter medium
- ❖ Viscosity of the fluid
- ❖ Compatibility with other lubricants
- ❖ Oil filterability in the presence of water
- ❖ Cleanliness of new oil
- ❖ Fluid temperature
- ❖ Bleeding of the area in the circuit
- ❖ Rolling and shearing which causes aging of the fluid

### Corrosion inhibitor:

This additive helps prevent the appearance of corrosion that results from the condensation of water vapor. When this product is added to the oil of hydraulic systems (e.g. hydraulic cylinder), it provides effective protection of internal organs during transport, storage and operation.