



TECHNICAL BULLETIN

Hydraulic Fluids

Issue: December 2017

Mineral Based Hydraulic Oils

Hydraulic Oils are generally mineral oil-based, with suitable additives. The requirements for hydraulic oil are set out in ISO 6743-4 with the designations **HL**, **HM**, **HV**. Germany designations - **HL**, **HLP**, **HVLP** are standard, in accordance with DIN 51524.

H & HH:	Mineral oil with no active ingredients – (Obsolete)
HL:	Contains active ingredients to increase the corrosion protection and resistance to aging.
HM:	Contains active ingredients to increase the corrosion protection and resistance to aging and to reduce wear due to scoring in the mixed friction area.
HLP:	Further active ingredients in addition to HL oil to reduce wear and increase resistance in the mixed friction area – widest application in practice.
HV & HVLP:	Similar to HLP with increased resistance to aging, with improved high temperature-viscosity.
HLPD:	Like HLP, but with additives to improve particle transport (detergent effect) and dispersion capacity (water carrying capacity) and active ingredients to increase the corrosion protection (German designation, not standardised)

Flame resistant fluids

HFAE: Oil in water emulsions

- Water content is above 80% and is mixed with a mineral oil or soluble polyglycol-based concentrate
- With a mineral-oil based concentrate, there is the risk of separation and microbe growth
- Flame resistant, can be used at temperatures between +5°C and +55°C

HFAS: Synthetic concentrates dissolved in water

- No risk of separation, since this is a true solution, which means the hydraulic components are considerably more susceptible to corrosion

HFB: Water in oil emulsions

- The water content is above 40% and is mixed with a mineral oil. This emulsion is rarely used.
- Flame resistant, can be used at temperatures between +5°C and +60°C.
- In Germany, HFB fluids are not permitted due to the lack of fire protection properties

HFC: Water glycols

- the water content is more than 35% in a polymer solution,
- flame resistant, can be used at temperatures between -20°C and +60°C.
- Can be used at pressures of 250 bar.

HFD: Synthetic liquids

- **HFD-R:** phosphoric esters
- **HFD-S:** anhydrous chlorinated hydrocarbons
- **HFD-T:** mixture of HFD-R and HFD-S
- **HFD-U:** anhydrous other composition (consisting of fatty acid esters)
- Synthetic liquids have a higher density than mineral oil or water (not HFD-U), they can cause problems with the suction performance of pumps and affect a lot of gasket materials.
- Flame resistant, can be used at temperatures between -20°C and +150°C.



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Biodegradable

Biodegradable hydraulic liquids are manufactured using plant oils (e.g. rapeseed oil) and used in biologically critical environments (construction machinery in water protection areas, food industry, snow moving equipment in mountains, etc.). The fluids are class 1 harmful substances.

Labelling : HE = Hydraulic Environmental

Classification:

- **HETG** (triglyceride base = plant oils),
- **HEES** (synthetic ester base),
- **HEPG** (polyglycol base)
- **HEPR** (other base liquids, primarily Poly-alpha-olefins).

Water

Water can be used as hydraulic liquid but offers no resistance to corrosion. It is **not** normally used in powered hydraulics but is mixed with oil to form an emulsion, where it can separate from the oil. The first technical use of hydraulics employed water as the fluid. Water has a practically constant low viscosity.

Classification:

- **Tap water** (filtered)
- **Technical water** (water-oil emulsion)
- **Sea and salt water** (filtered, not suitably due to aggressiveness)

Penrite have Hydraulic oils available in –

HM & HLP Types

Indus Pro Hydraulic 10
Indus Pro Hydraulic 22
Indus Pro Hydraulic 32
Indus Pro Hydraulic 46
Indus Pro Hydraulic 68
Indus MR 68
Hydraulic Jack Oil

HV & HVLP

Indus HV 15
Indus HV 32
Indus HV 46
Indus HV 68
Indus HV 100

Penrite recommend using the “**Right Product for the Right Application**” Please visit our website for further product information or our on line product guide. [Click Here](#) to visit the Penrite Recommendation Guide, which will ensure you receive the correct oil for your application.



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