



Shell Irus DR 46

HFD-R type fire-resistant hydraulic fluid

Shell Irus Fluid DR is a tri-aryl phosphate ester fire-resistant hydraulic fluid and contains carefully selected additives to give superior oxidation and hydrolytic stability characteristics.

DESIGNED TO MEET CHALLENGES

Performance, Features & Benefits

Fire resistance

Irus DR has excellent fire resistance. This is demonstrated in numerous standard tests designed to simulate its performance in the three most common fire risk scenarios:

- Ignitability of a spray or jet of fluid
- Spillage on to a hot surface or molten metal
- Ignitability of the fluid when soaked into an adsorbent material
- The fire resistance is inherent in Irus DR. It is not achieved by the use of additives and therefore will not change with time. Protection is available throughout all parts of the system and the whole time the fluid is in the system.
- Non-toxic under EEC Regulations
- Extended fluid change intervals
- Pump life similar to life with mineral hydraulic oils
- Fire resistance maintained during the life of the fluid
- Compatible with most seal materials

Lubrication

The lubricating properties of Irus DR compare favourably with those of an equivalent mineral oil of the same viscosity. This is not surprising in view of the wide use of phosphate esters as anti-wear additives in oil.

As a result, in many pumps, they show similar performance (bearing life and wear properties) to mineral oil, although some slight de-rating may be necessary at very high loads. Contact with the pump manufacturer is advisable before use.

Stability

Phosphate esters have a natural resistance to oxidation. The stability of Irus DR is further enhanced by the inclusion of an anti-oxidant in its formulation to give long life at normal bulk fluid temperatures of between 60°C and 80°C, and transient temperatures up to 150°C. This means that Irus DR has an extremely wide range of operating temperatures.

A property of phosphate ester fluids is that, when contaminated with water, hydrolysis of the phosphate ester can occur leading to the formation of strong inorganic acids. These acids can chemically attack metallic components.

Normal, good housekeeping is required to minimise water contamination. However, to provide still further protection Irus DR is formulated with a hydrolysis stabilizer which is a particular feature associated with this product.

Fluid Life

In some applications it is common practice to pass the fluid through an adsorbent solid which removes the acid as it is formed. In this way the life of Irus Fluid DR (and system components) can be greatly extended.

Rusting Resistance

The presence of water in the fluid has already been noted as potential concern with regard to hydrolysis. It can also cause rusting and galvanic attack on metals. Fortunately this does not occur in the liquid phase unless free water is present and as a result of the much higher solubility of water in phosphate esters than in mineral oils, this is rarely a problem. Rusting has occasionally been found above the liquid level in mild steel tanks due to condensation. This can easily be overcome by ensuring adequate ventilation.

Viscosity / temperature properties and shear-stability

Irus DR has a more marked change of viscosity with temperature than conventional mineral hydraulic oils. At low temperatures, therefore, it may be necessary to warm the fluid slightly prior to switching on the main pumps. A viscosity of 850 cSt is generally regarded as the reasonable maximum at which a hydraulic pump may be started.

The viscosity at which Irus Fluid DR reaches this value is approximately 6°C. As Irus Fluid DR contains no thickeners or viscosity index improvers, the product is shear-stable and the pump selection can be made on the basis of the listed viscosity data.

Main Applications

- Hydraulic and power transmission systems used in the steel and mining industries and other applications which call for a fire resistant hydraulic fluid
- Die-casting machines
- Billet loaders
- Electric arc furnaces
- Forging presses
- Welding robots
- Continuous casting machines
- Hydraulic presses
- Extrusion presses

Specifications, Approvals & Recommendations

For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk, or the OEM Approvals website.

Compatibility & Miscibility

Seals

Butyl, Viton, *Ethylene/Propylene

* Contact seal suppliers for their advice

Paints

Epoxy resin paints are compatible

Metals

Satisfactory with common constructional metals. Aluminium and its alloys should be hard anodized and not used as bearing surfaces.

Contamination with mineral oils

The presence of up to 0.5% of mineral oil will not affect the properties of Irus Fluid DR but a greater degree of contamination will affect its fire-resistant properties, above 5% of mineral oil will seriously detriment the fire-resistant properties of Irus Fluid DR and therefore this level of contamination or above must result in the fluid being replaced. Phosphate Ester and contamination with mineral oils should therefore be avoided.

Typical Physical Characteristics

Properties			Method	Shell Irus DR 46
ISO Viscosity Grade			ISO 3448	46
			ISO 6743/4	HFD-R
Appearance			Visual	Clear Pale Yellow Fluid*
Kinematic Viscosity	@0°C	mm ² /s	ASTM D445	1600
Kinematic Viscosity	@40°C	mm ² /s	ASTM D445	43
Kinematic Viscosity	@50°C	mm ² /s	ASTM D445	26
Kinematic Viscosity	@100°C	mm ² /s	ASTM D445	5.3
Viscosity Index			ISO 2909	15
Density	@15°C	kg/m ³	ISO 12185	1125
Pour Point		°C	ISO 3016	-18

These characteristics are typical of current production. Whilst future production will conform to Shell's specification, variations in these characteristics may occur.

*Clear pale yellow fluid from October 2010 production.

Health, Safety & Environment

- Guidance on Health and Safety is available on the appropriate Material Safety Data Sheet, which can be obtained from <http://www.epc.shell.com/>
- **Protect the Environment**
Take used oil to an authorised collection point. Do not discharge into drains, soil or water.

Additional Information

Advice

Advice on applications not covered here may be obtained from your Shell representative.