



# Shell Irus DU 46

## *High performance less flammable hydraulic fluids*

Shell Irus Fluids DU are advanced, synthetic, anhydrous less flammable hydraulic fluids based on organic esters and proven additives. These ISO Class HFDU fluids are specially designed to provide good performance in conventional hydraulic systems and have better fire resistance than mineral oils. They are also biodegradable with a low ecotoxicity, and are particularly suited for use in environmentally sensitive areas.

### DESIGNED TO MEET CHALLENGES

#### Performance, Features & Benefits

- Lower flammability than mineral oils.
- Readily biodegradable - biodegraded by >60% after 28 days when tested in OECD 301 B (CO<sub>2</sub> evolution test).
- Low ecotoxicity - 'not harmful' to plants (algae), invertebrates (Daphnia sp.) and fish; EL50/LL50 >100 mg/l when tested as water-accommodated fractions in OECD 201, OECD 202 and OECD 203.
- Excellent viscosity/temperature characteristics - minimum change of viscosity with variation in operating temperature, giving true 'multigrade' characteristics.
- Pump anti-wear protection similar to mineral hydraulic oils.
- Low flammability maintained during the life of the fluid.
- Excellent corrosion protection.
- Compatible with most materials specified for use with mineral oils.

#### Main Applications

Typical applications for Irus DU are to be found in the tunnel boring, metal, mining and glass industries. Irus Fluids can replace mineral oils in hydraulic installations to provide good lubrication and a higher degree of fire resistance.

#### Specifications, Approvals & Recommendations

- Classification HFDU according to ISO 6743-4
- ISO 12922 Specifications for fire-resistant hydraulic fluids - category HFDU
- The European Communities Mines Safety Commission 7th Report - Requirements for less flammable fluids ('7th Luxembourg Report').
- Approved by Eaton for industrial and mobile hydraulic systems according to Brochure 694 requirements.

For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk.

#### Compatibility & Miscibility

- **Seal compatibility**  
Shell Irus DU are compatible with seal and paint materials normally specified for use with mineral oils, except those made from natural rubber. More details are given in the attached "Typical Physical Characteristics" table.
- **Change-over procedure**  
In order to achieve maximum benefits from the use of Shell Irus DU, it is necessary to completely drain all mineral oil from the hydraulic circuit prior to filling with fresh fluid. A detailed change-over procedure can be obtained from your Shell representative.

## Typical Physical Characteristics

Properties			Method	Shell Irus Fluid DU 46	
ISO Viscosity Grade			ISO 3448	46	
ISO Fluid Type			ISO 6743/4	HFDU	
Kinematic Viscosity	@-20°C	mm <sup>2</sup> /s	ISO 3104	1839	
Kinematic Viscosity	@40°C	mm <sup>2</sup> /s	ISO 3104	48.7	
Kinematic Viscosity	@100°C	mm <sup>2</sup> /s	ISO 3104	9.6	
Viscosity Index			ISO 2909	187	
Acid Number			mgKOH/g	ISO 6618	1.14
Density	@20°C	kg/m <sup>3</sup>	IP 365	923	
Pour Point			°C	ISO 3016	-36
Foaming Characteristics - Seq I Tendency Stability	@24°C			IP 146 / ASTM D892	0/0
Foaming Characteristics - Seq II Tendency Stability	@93.5°C			IP 146 / ASTM D892	0/0
Foaming Characteristics - Seq III Tendency/Stability after test at 93.5°C	@24°C	ml	IP 146 / ASTM D892		0/0
Air Release	@50°C			ISO 9120	4
Load Carrying Capacity, FZG Gear Machine - Pass Stage			ISO 14635-1	10	
Compatibility : with elastomers NBR 2, CR, FPM, AU and PTFE					Compatible
Compatibility : with NBR 1, EPDM and IR					Not compatible
Flash Point (COC)			°C	ISO 2592	320
Fire Point			°C	ISO 2592	348
Auto-ignition temperature			°C	ASTM E659	> 400

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

### 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.

- Storage

Drums must be kept sealed in weatherproof conditions, in order to prevent contamination by water or dust.