

PETRONAS HYDRAULIC UF SERIES

High Performance Anti-wear Hydraulic Fluids

PETRONAS Hydraulic UF Series are high performance anti-wear hydraulic fluids specially developed for a wide range of mobile and industrial hydraulic equipment operating under normal to heavy duty conditions.

Formulated with high quality selected base oils enhanced with advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Hydraulic fluids provide high anti-wear protection, smooth operation of the hydraulic system and up to 3x longer lasting performance*.

PETRONAS Hydraulic UF Series meet or exceed key industrial specifications and OEM requirements.

*vs. minimum requirements of ISO 11158 HM for anti-wear hydraulic fluids based on TOST (ASTM D943)

Applications

PETRONAS Hydraulic UF Series are recommended for use in:

- various mobile hydraulic and industrial hydraulic systems operating under normal to heavy duty conditions
- hydraulic systems demanding high quality anti-wear fluids

Conditionally they may also be used in circulation, splash, bath and ring oiling systems feeding lubricant to gears and bearings. However please consult our local Technical Service Team and/or OEM manual before application.

For applications where premium performance anti-wear hydraulic fluids are required, PETRONAS Hydraulic PLUS Series is recommended.

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Features and Benefits

| Features | Benefits |
|--|--|
| Low temperature protection | Ensures proper protection of equipment components during cold starts |
| High anti-wear protection | Protects equipment components from excessive wear and provides long equipment life |
| High wet and dry filterability | Maintains high filter efficiency without giving rise to undue pressure drop, thus increasing filter lifetime |
| High thermal and oxidation stability | Maintains performance levels under high temperatures and pressure, enabling long oil drain intervals |
| High rust & corrosion protection | Inhibits the corrosion process that occurs in presence of water, improving equipment life |
| High water separability | Due to high water separability the system is protected from water degenerative effects, maintaining hydraulic system efficiency at required level and reducing maintenance costs |
| High air release and foam stability | Maintains high efficiency in hydraulic systems, ensures smooth operation due to fast air release. Protects the system from air degenerative effects reducing maintenance costs |
| High multi metal compatibility | Compatible with most metal alloys ensuring trouble free performance of the system |
| High compatibility with most seal and elastomers | Compatible with most seals and elastomers, which prevents oil leaks and contamination due to seal erosion |

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Typical Properties

| Characteristic | Method | Specification | 10 | 15 | 22 | 32 |
|------------------------------------|-------------|---------------|----------|----------|----------|----------|
| Specific Gravity @15°C | ASTM D 4052 | (1) | 0,856 | 0,860 | 0,868 | 0,871 |
| Kinematic Viscosity at 40°C, cSt | ASTM D 445 | ±10% | 10 | 15 | 22 | 32 |
| Kinematic Viscosity at 100°C, cSt | ASTM D 445 | ** | 2,7 | 3,4 | 4,3 | 5,4 |
| Viscosity Index | ASTM D 2270 | (1) | 108 | 98 | 101 | 102 |
| Flash Point, °C | ASTM D 92 | Report | 150 | 150 | 170 | 220 |
| Pour Point, °C | ASTM D 97 | ** | -39 | -39 | -36 | -33 |
| Cleanliness class | ISO 4406 | (a) | 16/14/11 | 16/14/11 | 16/14/11 | 16/14/11 |
| | NAS 1638 | | 5 | 5 | 5 | 5 |
| FZG, Stages Passed | ISO 14635-1 | Min. 10 | 12 | 12 | 12 | 12 |
| Water Separability, 40/37/3 - mins | ASTM D 1401 | ** | 10 | 10 | 10 | 15 |
| Copper Strip Corrosion | ASTM D 130 | Max. 2 | 1b | 1b | 1b | 1b |
| TOST life, hours | ASTM D 943 | Min. 1000 | 3900 | 3900 | 3900 | 3900 |
| Foam Sequence I, mL | ASTM D 892 | Max. 150/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Foam Sequence II, mL | | Max. 75/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Foam Sequence III, mL | | Max. 150/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Characteristic | Method | Specification | 46 | 68 | 100 | 150 |
| Specific Gravity @15°C | ASTM D 4052 | (1) | 0,877 | 0,883 | 0,886 | 0,890 |
| Kinematic Viscosity at 40°C, cSt | ASTM D 445 | ±10% | 46 | 68 | 100 | 150 |
| Kinematic Viscosity at 100°C, cSt | ASTM D 445 | ** | 6,8 | 8,7 | 11,2 | 14,7 |
| Viscosity Index | ASTM D 2270 | (1) | 102 | 99 | 97 | 97 |
| Flash Point, °C | ASTM D 92 | Report | 220 | 230 | 240 | 240 |
| Pour Point, °C | ASTM D 97 | ** | -33 | -30 | -27 | -27 |
| Cleanliness class | ISO 4406 | (a) | 16/14/11 | 16/14/11 | 16/14/11 | 16/14/11 |
| | NAS 1638 | | 5 | 5 | 5 | 5 |
| FZG, Stages Passed | ISO 14635-1 | Min. 10 | 12 | 12 | 12 | 12 |
| Water Separability, 40/37/3 - mins | ASTM D 1401 | ** | 15 | 15 | 30 | 30 |
| Copper Strip Corrosion | ASTM D 130 | Max. 2 | 1b | 1b | 1b | 1b |
| TOST life, hours | ASTM D 943 | Min. 1000 | 3900 | 3900 | 3900 | 3900 |
| Foam Sequence I, mL | ASTM D 892 | Max. 150/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Foam Sequence II, mL | | Max. 75/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Foam Sequence III, mL | | Max. 150/0 | 0/0 | 0/0 | 0/0 | 0/0 |

All technical data is provided for reference only and all specification based on DIN 51524-2 (2006) and ISO 11158 HM (FDIS 2008)

**Individual limits accordingly with each viscosity grade / (1): not required in specification / SS is available upon request including quality control limits/ (a) The requirements regarding cleanliness will vary from system to system. The delivered values must be agreed. The fact that oil is influenced by numerous factors during transport and storage is to be taken in consideration.

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Performance Levels

- ASTM D 6158 HM (2005)
- Bosch Rexroth RD90220
- DIN 51524 Part II HLP (2006)
- Eaton 03-401-2010
- Fives Cincinnati P-68/P-69/P-70
- GM LS-2 (2004)
- ISO 11158 HM (FDIS 2008)
- JCMAS HK P041 (2004)
- Parker Denison HF-0, HF-1, HF-2
- SAE MS1004
- SEB 181 222 (2007)
- US Steel 126, 127 and 136

Health, Safety and Environment

This product is unlikely to present any significant health and safety hazards when used in the recommended application. Avoid contact with skin. Wash immediately with soap and water after skin contact. Do not discharge into drains, soil or water.

For further detail regarding storage, safe handling, and disposal of product, please refer to product SDS or contact us at: www.pli-petronas.com

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