TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0549-T

## OPET FUCHS MADENİ YAĞ SANAYİ VE TİCARET ANONİM ŞİRKETİ

**Accreditation Nr: AB-0549-T**
**Revision Nr: 11 Date: 14.06.2024**

**Testing Laboratory**

**Address :**
ATATÜRK MAH. İNÖNÜ BLV. NO:52 /19 ALİAĞA İzmir / Türkiye

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### Chemicals and Chemical Products

| Tested Materials / Products | Name of Test | Testing Method (National, International Standards, In-house Methods) |
|---|---|---|
| Antifreeze | Determination of Boiling point | ASTM D1120 |
| Antifreeze | Determination of Reserve Alkalinity | ASTM D1121 |
| Antifreeze | Determination of pH | ASTM D1287<br>TS 4614 |
| Antifreeze | Determination of Density and Relative Density<br>Oscillating U-Tube Method | ASTM D5931 |
| AUS 32 | Determination of Density and Relative Density<br>Oscillating U-Tube Method | ASTM D4052<br>ISO 12185<br>TS EN ISO 12185 |
| AUS 32 | Determination of Urea Content by<br>Refractive Index Method | ISO 22241-2,Annex C<br>TS ISO 22241-2, Annex C |
| AUS 32 | Determination of Refractive index | ISO 22241-2, Annex C<br>TS ISO 22241-2 Annex C |
| AUS 32 | Determination of Alkalinity<br>Titration Method | ISO 22241-2, Annex D<br>TS ISO 22241-2, Annex D |
| AUS 32 | Determination of Biuret Content<br>Spectrometry Method | ISO 22241-2, Annex E<br>TS ISO 22241-2, Annex E |
| AUS 32 | Determination of Aldehyde Content<br>Spectrometry Method | ISO 22241-2, Annex F<br>TS ISO 22241-2, Annex F |
| AUS 32 | Determination of Insoluble Matter Content<br>Gravimetric Method | ISO 22241-2, Annex G<br>TS ISO 22241-2, Annex G |
| AUS 32 | Determination of Phosphate (PO4) Content<br>Spectrometry Method | ISO 22241-2, Annex H<br>TS ISO 22241-2, Annex H |
| AUS 32 | Determination of Trace Element Content Calcium (Ca), Iron (Fe), Copper (Cu), Zinc (Zn), Chrome (Cr), Nickel (Ni), Aluminum (Al), Magnesium (Mg), Sodium (Na) and Potassium (K)<br>ICP Emission Spectrometry Method | ISO 22241-2, Annex I<br>TS ISO 22241-2, Annex I |

Accreditation Scope

| | |
|---|---|
| TÜRKAK<br>Test<br>TS EN ISO/IEC 17025<br>AB-0549-T | **OPET FUCHS MADENİ YAĞ SANAYİ VE TİCARET ANONİM ŞİRKETİ**<br>**Accreditation Nr: AB-0549-T**<br>**Revision Nr: 11 Date: 14.06.2024** |
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|---|---|---|
| AUS 32 | Determination of Identity<br>FTIR Spectrometry Method | ISO 22241-2, Annex J<br>TS ISO 22241-2, Annex J |
| Antifreeze | Determination of freezing point | ASTM D1177 |

This document has been signed by Gülden Banu Müderrisoğlu with a secure electronic signature in accordance with the electronic signature law numbered 5070. Use the QR code to verify the e-signed document.

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### Lubricants

| Tested Materials / Products | Name of Test | Testing Method (National, International Standards, In-house Methods) |
|---|---|---|
| Lubricating Oil | Flash-point determination<br>Cleveland Open Cup Method | ASTM D92<br>TS EN ISO 2592 |
| Lubricating Oil | Determination of Flash-point<br>Pensky-Martens Closed Cup Method | ASTM D93<br>TS EN ISO 2719 |
| Lubricating oil<br>Greases | Determination of water<br>Distillation Method | ASTM D95<br>TS ISO 3733 |
| Lubricating Oil | Determination of copper strip corrosion | ASTM D130<br>TS 2741 EN ISO 2160 |
| Lubricating Oil | Determination of Saybolt Color<br>Saybolt Chromometer Method | ASTM D6045 |
| Lubricating Oil | Determination of Kinematic Viscosity and Calculation of Dynamic Viscosity | ASTM D445<br>TS EN ISO 3104 |
| Lubricating Oil | Total Acid Number (TAN) Determination<br>Potensiometric titration Method | ASTM D664 |
| Lubricating Oil | Total Acid Number (TAN) Determination<br>Potensiometric titration Method in non-aqueous media | TS 2432 EN 12634 |
| Lubricating Oil | Rust Preventing Characteristics in the Presence of Water | ASTM D665<br>TS 6830 ISO 7120 |
| Lubricating Oil | Determination of foaming characteristic | ASTM D892<br>TS 1834 ISO 6247 |
| Lubricating Oil | Total Acid Number (TAN) Determination<br>Indicator Method | ASTM D974<br>TS 9178 ISO 6618 |
| Lubricating Oil | Determination of refractive index | ASTM D1218<br>TS 4368 ISO 5661 |
| Lubricating Oil | ASTM color determination | ASTM D1500<br>ASTM D6045<br>TS 1713 ISO 2049 |
| Lubricating Oil | Determination of water separability of oils | ASTM D1401<br>TS 6122 ISO 6614 |
| Lubricating Oil | Calculation of viscosity index | ASTM D2270<br>TS ISO 2909 |
| Lubricating Oil | Clouding point determination | ASTM D2500<br>TS 2834 EN 23015 |
| Lubricating Oil | Pour point detection | ASTM D97<br>TS EN ISO 3016 |

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|---|---|---|
| Lubricating Oil | Calculation of Viscosity Gravity Constant | ASTM D2501<br>TS 7113 |
| Lubricating Oil | Estimation of Mean Relative Molecular Mass<br>Viscosity Measurements Method | ASTM D2502<br>TS 5215 |
| Lubricating Oil | Determination of Extreme Pressure Properties of Lubricating Fluids<br>Four Ball Method | ASTM D2783 |
| Lubricating Oil | Determination of Total Base Number (TBN)<br>Potenciometric perchloric acid titration Method | ASTM D2896<br>TS ISO 3771 |
| Lubricating Oil | Determination of viscosity at low temperatures<br>Rotational viscometer (brookefield) Method | ASTM D2983<br>TS 13488 |
| Lubricating Oil | Calculation of carbon distribution and structural group distribution<br>n-d-M Method | ASTM D3238<br>TS 6519 |
| Lubricating Oil | Determination of density and relative density<br>Oscillating U-Tube Method | ASTM D4052<br>TS EN ISO 12185<br>ISO 12185 |
| Lubricating Oil | Determination of insoluble matters in Pentane<br>Membrane filtering Method | ASTM D4055<br>TS 7713 |
| Lubricating Oil | Determination of Wear Preventive Characteristics<br>Four-Ball Method | ASTM D4172<br>TS 5715 |
| Lubricating Oil | Determination of Additive Elements<br>(Calcium (Ca), Copper (Cu), Zinc (Zn),<br>Magnesium (Mg), Boron (B), Molybdenum (Mo),<br>Sodium (Na) Phosphorus (P), Sulfur (S)<br>ICP Emission Spectrometry Method | ASTM D4951 |
| Lubricating oil | etermination of Additive Ellements, Wear Metals and Amount of Contaminants (Aluminum (Al), Boron (B), Calcium (Ca), Copper (Cu), Iron (Fe), Magnesium (Mg), Molybdenum (Mo), Sodium (Na), Nickel (Ni), Lead (Pb) Phosphorus (P), Silicon (Si) Tin (Sn) and Zinc (Zn)<br>ICP Emission Spectrometry Method | ASTM D5185<br>TS 13351 |
| Lubricating Oil | Determination of apparent Viscosity<br>Cold Crank Stimulator Method | ASTM D5293<br>TS 1896 |
| Lubricating Oil | Determination of pour point<br>Automatic Tilt Method | ASTM D5950 |
| Lubricating Oil | Determination of water amount<br>Culometrical Karl Fischer titration Method | ASTM D6304<br>TS 6147 EN ISO 12937 |
| Lubricating Oil | Determination of dynamic viscosity and density calculation of kinematic viscosity<br>Stabinger Method | ASTM D7042 |
| Lubricating Oil | Evaluation of used oils<br>FTIR Method | ASTM E2412 |
| Greases | Determination of penetration | ASTM D217<br>TS ISO 2137 |

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|---|---|---|
| Greases | Determination of Dropping Point | ASTM D566<br>TS 1267 ISO 2176 |
| Greases | Determination of Oil Separation During Storage | ASTM D1742<br>TS 2263 |
| Greases | Determination of Dropping Point Over<br>Wide Temperature Range | ASTM D2265<br>TS 5937 ISO 6299 |
| Greases | Determination of Wear Preventive Characteristics<br>With four ball test device | ASTM D2266<br>TS EN ISO 20623 |
| Greases | Determination of Extreme Pressure Properties<br>Four-Ball Method | ASTM D2596<br>TS EN ISO 20623 |
| Greases | Determination of copper strip corrosion | ASTM D4048 |
| Lubricating Oil | Determination of saponification number<br>Titrimetric method | ASTM D 94<br>TS 4730 ISO 6293-1<br>TS ISO 6293-2 |
| Lubricating Oil | Determination of elements content of additives, wear and other contaminations -<br>Barium (Ba), Copper (Cu), Calcium (Ca), Magnesium (Mg), Molybdenum (Mo), Sodium (Na), Phosphorus (P), Zinc (Zn), Chlorine (Cl), Sulfur (S)<br>Wavelength dispersive X-ray fluorescence spectrometry (WDXRF) Method | ASTM D6443<br>DIN 51399-2<br>ASTM D 6443<br>DIN 51399-2 |
| Lubricants (Cutting Oils) | Determination of Corrosion Preventing Characteristics<br>Chip / filter paper Method | TS 5208<br>DIN 51360/2 |
| Lubricating Oil | Determination of No Flow Point and Pour Point | ASTM D7346 |
| Base oils, Mineral oils | Determination of evaporation loss<br>Noack Method | ASTM D5800<br>TS 13489 |
| Mineral oils | Determination of Kinematic Viscosity<br>Houillon Method & NBSP; | ASTM D7279 |
| Mineral oils | Determination of Emulsion Stability | TS 5353 |

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### Environmental Tests

| Tested Materials / Products | Name of Test | Testing Method (National, International Standards, In-house Methods) |
|---|---|---|
| Water | Determination of Conductivity | ASTM D1125 |