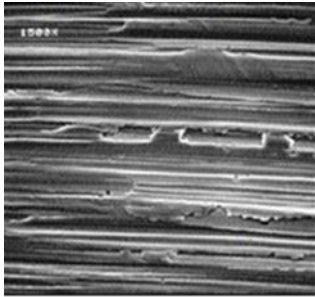


HD MOTOR OIL

HIGH PERFORMANCE MOTOR OIL

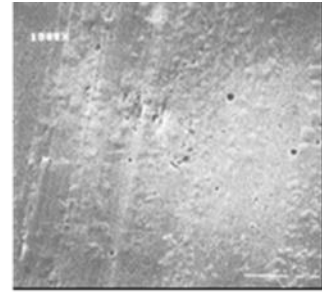
Royal Purple[®] HD Motor Oil is specifically formulated to maximize performance and meet the demands of heavy-duty engines. Many older heavy-duty engines, and some newer commercial and stationary engines recommend the use of heavy-duty engine oil with a high level of anti-wear additive (ZDDP), and heavier viscosity grades. HD Motor Oil is fortified with a high level of zinc/phosphorus anti-wear additive and a generous dose Synerlec[®]. Synerlec[®] is Royal Purple's proprietary additive chemistry that greatly increases the protective film strength of the oil, reducing metal to metal contact, friction and wear. Synerlec[®] also increases the oil's resistance to thermal degradation, reducing deposit formation and lengthening the oil's useful life.



New Bearing*



After Leading Synthetic*



After Royal Purple
w/ Synerlec*

HD Motor Oil reduces parasitic loss compared to other straight grade HD engine oils, saving fuel, and its synthetic solvency keeps internal engine parts cleaner than detergents alone. Superior oxidation resistance also minimizes oil degradation and greatly extends engine oil drain intervals, reducing maintenance costs. HD motor oil is recommended for use in gasoline and diesel applications including automotive, commercial fleet and stationary industrial engines that need a high anti-wear additive, Heavy Duty engine oil. Royal Purple HD Motor Oils may also be used in transmissions and gear boxes that specify the use of SAE 30, SAE 40, SAE 50 or SAE 15W-40 engine oil.

PERFORMANCE ADVANTAGES

- UNSURPASSED WEAR PROTECTION – Elevated anti-wear additive and Synerlec[®] additive technology prevents wear of piston rings, valve train, and other components beyond licensed HD diesel engine oils
- OUTSTANDING OXIDATION RESISTANCE – Less thermal breakdown allows longer oil drain intervals
- INCREASED EFFICIENCY – Synthetic base oils and Synerlec[®] additive technology reduce parasitic loss, increasing fuel economy
- OUTSTANDING DEPOSIT CONTROL – Keeps engines cleaner, ensuring maximum performance
- SUPERIOR CORROSION PROTECTION - No rust observed in standard industry testing



TECHNICAL DATA SHEET

OEM SPECIFICATIONS

SAE 30: Meets API Service SJ
 SAE 40: Meets API Service SJ
 SAE 50: Meets API Service SJ

SAE 10W-30 & SAE 15W-40:

10W-30HD and 15W-40HD engine oils meet/exceed performance requirements of API Service CK-4, CJ-4, CI-4+ for HD diesel engine oils.

Recommended for:

- ACEA E7-16 & E9-16
- CAT ECF-1, ECF-2 & ECF-3
- Cummins CES 20076, 20077, 20078, 20081 & 20086
- Daimler MB 228.3 & 228.31
- Detroit Diesel DFS 93K214 & 93K222
- Ford WSS-M2C171-F1
- Mack EO-N Premium Plus & EO-S 4.5
- MTU 2 & 2.1
- Renault RLD, RLD-2 & RLD-4
- Volvo VDS-3 & VDS 4.5

Typical Physical Properties

| Property | Test Method | 30 | 40 | 50 | 10W-30 | 15W-40 |
|--------------------------|-------------|-----------|-----------|-----------|--------------|--------------|
| API Service | | SJ | SJ | SJ | CK-4* | CK-4* |
| Viscosity @ 40°C, cSt | ASTM D445 | 75.3 | 124 | 185 | 71.63 | 101.13 |
| Viscosity @ 100°C, cSt | ASTM D445 | 10.1 | 13.8 | 18.6 | 11.21 | 14.7 |
| Viscosity Index | ASTM D2270 | 116 | 109 | 112 | 149 | 151 |
| Flash Point, °C (°F) | ASTM D92 | 226 (440) | 232 (450) | 234 (454) | 216 (420) | 232 (450) |
| Pour Point, °C (°F) | ASTM D97 | -42 (-45) | -36 (-33) | -36 (-33) | -48 (-54) | -45 (-49) |
| Cold Crank Simulator, cP | ASTM D5293 | -- | -- | -- | 4,726 @-25°C | 3,672 @-20°C |
| TBN, mg KOH | ASTM D2896 | 9.5 | 9.8 | 9.4 | 9.5 | 9.6 |
| Sulfated Ash, wt% | ASTM D874 | 1.05 | 1.03 | 1.03 | 1.04 | 1.04 |
| HTHS, @150°C, cP | ASTM D5481 | 3.1 | 4.2 | 5 | 3.3 | 4.1 |

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