



LUBRICANTS

## Ecoterra® HVI Hydraulic Oil

Phillips 66® Ecoterra HVI Hydraulic Oil is a high-quality, high viscosity index, zinc-free antiwear hydraulic oil developed for use in mobile equipment operating over a wide temperature range. It is particularly recommended for use in off-road equipment manufactured by Hitachi, John Deere and others. It passes the visual “no sheen” requirements of the U.S. EPA Static Sheen Test, and is classified as inherently biodegradable by the OECD Test Method 301B.

Ecoterra HVI Hydraulic Oil is formulated with an ashless (zinc-free) antiwear additive package to provide excellent wear protection for hydraulic pumps and motors, and to protect hydraulic system components against rust and corrosion. It has excellent oxidation resistance and thermal stability at high temperatures to minimize deposit formation and provide long service life. It also has excellent low-temperature properties for cold start-ups. This fluid has excellent water-separating properties to minimize the formation of emulsions, and is resistant to excessive foam buildup that can cause poor or sluggish hydraulic system response.

Ecoterra HVI Hydraulic Oil has a high viscosity index and low pour point for use over a wider temperature range than conventional antiwear hydraulic oils. Its high viscosity index helps maintain oil viscosity at operating temperatures and reduce energy (power) loss caused by internal oil leakage in the hydraulic system, resulting in up to 6% higher system efficiency compared to conventional single-grade hydraulic oils.

Ecoterra HVI Hydraulic Oil meets the performance requirements of all major hydraulic pump manufacturers, and is recommended for use in all types of high-pressure, high-speed hydraulic pumps. It also meets the performance requirements of Hitachi Advanced Hydraulic Oil, and is fully compatible with the Hitachi fluid and with Hitachi seals and hoses.

### Applications

- Hitachi excavators with 5,000-hour service intervals
- Off-road mobile construction and forestry equipment, such as backhoes, bulldozers, crawlers, excavators, skid-steer loaders and motor graders, where the manufacturer recommends an ashless, zinc-free hydraulic oil

Ecoterra HVI Hydraulic Oil meets the requirements of the following industry and OEM specifications:

- Bosch Rexroth RE 90220, Type HVLP
- DIN 51524 Part 3, Antiwear Hydraulic Oils, Type HVLP
- Eaton-Vickers M-2950-S, I-286-S
- German Steel Industry SEB 181222
- Hitachi Advanced Hydraulic Oil (for use in dry systems only) (ISO VG 46)
- ISO 11158:1997, Family H (Hydraulic Systems), Type HV
- Parker Hannifin (Denison) HF-0, HF-1, HF-2
- U.S. EPA/U.S. Coast Guard Static Sheen Test, Federal Register Vol. 58, No. 41
- U.S. Steel 127

**High-Efficiency,  
High VI, Zinc-  
Free Antiwear  
Hydraulic Oil  
for Off-Road  
Equipment;  
Separates  
from Water;  
Inherently  
Biodegradable**

KEEPING THE  
WORLD  
RUNNING  
SMOOTHLY. 



## Features/Benefits

- Zinc-free formulation
- Inherently biodegradable
- High VI to reduce internal oil leakage and increase hydraulic system efficiency by up to 6% compared to conventional single-grade hydraulic oils
- Excellent wear protection for hydraulic pumps and motors
- Excellent oxidation resistance and thermal stability
- High shear stability
- Protects against rust and corrosion
- Excellent water-separating properties
- Good filterability
- Good foam resistance
- Suitable for year-round use

## Ecoterra® HVI Hydraulic Oil

Typical Properties		
ISO Grade	32	46
Specific Gravity @ 60°F	0.860	0.868
Density, lbs/gal @ 60°F	7.16	7.23
Color, ASTM D1500	0.5	0.5
Flash Point (COC), °C (°F)	208 (406)	231 (448)
Pour Point, °C (°F)	-51 (-60)	-45 (-49)
Viscosity		
cSt @ 40 °C	32.0	46.0
cSt @ 100 °C	6.5	8.5
SUS @ 100 °F	163	234
SUS @ 210 °F	47.9	54.7
Viscosity Index	162	164
Acid Number, ASTM D974, mg KOH/g	0.30	0.16
Copper Corrosion, ASTM D130	1a	1a
Demulsibility, ASTM D1404, minutes to pass	15	15
Dielectric Strength, ASTM D877, kV <sup>(1)</sup>	35	35
Foam Test, ASTM D892, Seq. I, mL	0/0	0/0
FZG Scuffing Test, ASTM D5182, Failure Load Stage	12	12
Oxidation Stability, RPVOT, ASTM D2272, minutes	>600	>600
Rust Test, ASTM D665 A&B	Pass	Pass

<sup>(1)</sup>Note: At the point of manufacture

## Health & Safety Information

For recommendations on safe handling and use of this product, please refer to the Safety Data Sheet via <http://www.phillips66.com/EN/products/Pages/MSDS.aspx>.