



LUBRICANTS

## Ecoterra® Hydraulic Oil

Phillips 66® Ecoterra Hydraulic Oil is a high-quality, zinc-free antiwear hydraulic oil specifically developed for use in industrial and mobile equipment operating in environmentally sensitive areas. It is specially formulated for reduced environmental impact in case of leaks or spills. It is non-toxic to fish and aquatic species as determined by OECD Test Method 203 1-12, and is classified as inherently biodegradable by the OECD Test Method 301B. It passes the visual “no sheen” requirements of the U.S. EPA Static Sheen Test.

Ecoterra 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 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 Hydraulic Oil is recommended for use in place of conventional zinc-containing hydraulic oils in applications where there is the possibility of soil or water contamination. It also may be used as a lower-cost alternative to synthetic, readily biodegradable hydraulic fluids. It 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.

### Applications

- Hydraulic equipment used in environmentally sensitive areas, such as national parks, wildlife refuges, ski resorts and other recreational areas
- Hydraulic equipment in amusement parks and zoos
- Hydraulic jacks and other equipment in machine shops
- Oil drilling rigs and offshore platforms
- Chain drives
- Electric motor bearings
- Service station lifts
- Hydraulic systems where the equipment manufacturer specifies an ashless, zinc-free antiwear hydraulic oil

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

- Bosch Rexroth RE 90220, Type HLP
- DIN 51524 Part 2, Antiwear Hydraulic Oils, Type HLP
- Eaton-Vickers I-286-S, M-2950-S
- German Steel Industry SEB 181222
- ISO 11158:1997, Family H (Hydraulic Systems), Type HM
- 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

**Non-toxic, Zinc-Free Antiwear Hydraulic Oil; Inherently Biodegradable**

KEEPING THE  
WORLD  
RUNNING  
SMOOTHLY. 



## Features/Benefits

- Non-toxic to aquatic organisms
- Inherently biodegradable
- Does not contain zinc or other heavy metals
- Excellent oxidation resistance and thermal stability
- Protects against rust and corrosion
- Excellent water-separating properties
- Good foam resistance
- Lower-cost alternative to synthetic biodegradable hydraulic fluids

**Note:** Ecoterra® Hydraulic Oil is **not** compatible with zinc-containing hydraulic oils, and may cause residue, gelling, or filter plugging if mixed with such fluids. Mixing the two products will lessen the environmental benefits normally gained by using Ecoterra® Hydraulic Oil.

## Ecoterra® Hydraulic Oil

Typical Properties			
ISO Grade	32	46	68
Specific Gravity @ 60°F	0.862	0.869	0.873
Density, lbs/gal @ 60°F	7.18	7.23	7.27
Color, ASTM D1500	0.5	1.0	1.0
Flash Point (COC), °C (°F)	227 (440)	232 (450)	241 (465)
Pour Point, °C (°F)	-34 (-29)	-33 (-27)	-30 (-22)
Viscosity			
cSt @ 40 °C	32.0	46.0	68.0
cSt @ 100 °C	5.4	6.8	8.8
SUS @ 100 °F	165	237	352
SUS @ 210 °F	44.4	49.0	55.9
Viscosity Index	102	102	102
Acid Number, ASTM D974, mg KOH/g	0.22	0.22	0.22
Copper Corrosion, ASTM D130	1a	1a	1a
Demulsibility, ASTM D1404, minutes to pass	10	15	15
Dielectric Strength, ASTM D877, kV <sup>(1)</sup>	35	35	35
Foam Test, ASTM D892, Seq. I, mL	0/0	0/0	0/0
Four-Ball Wear, ASTM D4172, Scar Diameter, mm	0.62	0.54	0.44
FZG Scuffing Test, ASTM D5182, Failure Load Stage	>12	>12	>12
Oxidation Stability			
TOST, ASTM D943-04a, hours	8,000	8,000	8,000
RPVOT, ASTM D2272, minutes	>500	>500	>500
Rust Test, ASTM D665 A&B	Pass	Pass	Pass
Aquatic Toxicity, Rainbow Trout, OECD 203 1-12, 1000mg/L, 96 hours, LC50	Non-toxic	Non-toxic	Non-toxic
Biodegradability in 28 days, OECD 301B, %	22	22	22

<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>.