# PRODUCT INFORMATION

A PRODUCT OF AMERICAN CHEMICAL TECHNOLOGIES, INC.

# EcoSafe® EHC

**FIRE-RESISTANT & READILY BIODEGRADABLE HYDRAULIC FLUIDS**

**DESCRIPTION:**

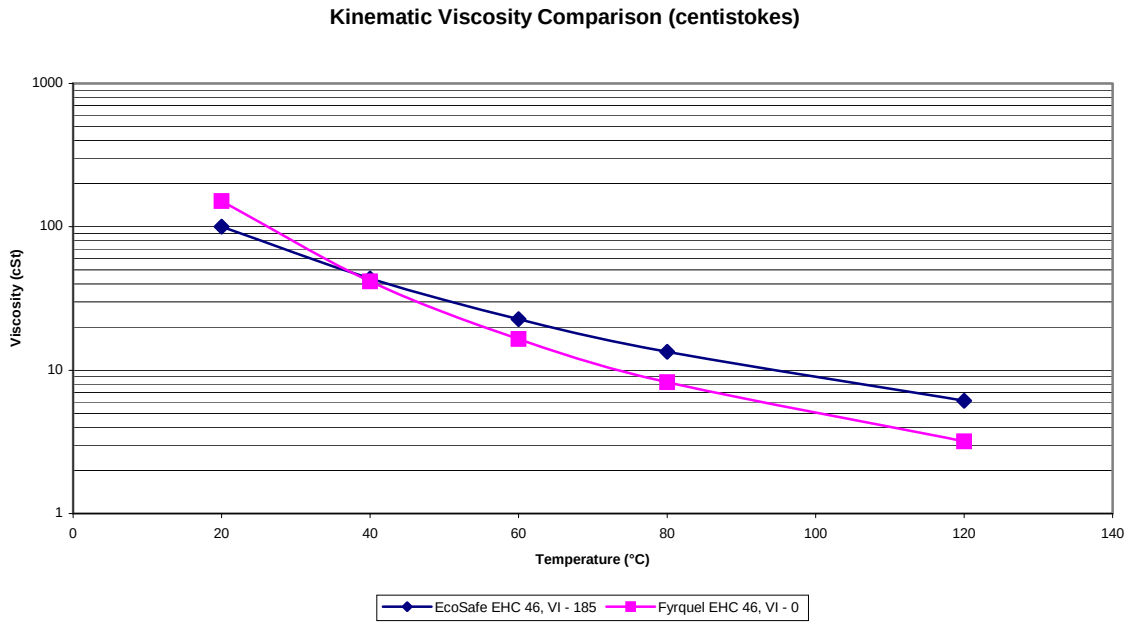
**EcoSafe® EHC** fluids are full-synthetic, non-aqueous hydraulic fluids that have passed Factory Mutual testing and are listed as Approved Industrial Fluids. These fluids can also be used in industrial, marine, and mobile equipment applications, including high-pressure systems, systems with servo valves, and all robotics. **EcoSafe® EHC** fluids are formulated from very high VI (>180), polyalkylene glycols (PAG), coupled with a non-metallic additive package which provide the properties demanded by today's high performance hydraulic systems, while at the same time, satisfying the stringent criteria for biodegradability and toxicity. Both viscosity grades achieved a 12-stage rating in the FZG Gear Test demonstrating a high level of protection against wear and scuffing. **EcoSafe® EHC** fluids also have excellent low temperature properties; good shear stability, and are resistant to oxidative and thermal degradation. **EcoSafe® EHC** fluids meet or surpass Bosch-Rexroth, Sauer-Danfoss, Denison, Parker and Eaton (formerly Vickers) specifications. Our superior chemistry and product design also offers the following benefits:

- Superior hydrolytic stability
- Superior oxidative and thermal stability
- Fully compatible and miscible with phosphate ester
- Excellent lubrication properties (outperforms anti-wear mineral oils, even at 5,000 psi / 380 bar)
- Good fire-resistance
- Longest fluid life due to stable chemistry (NO acid removal/ion exchange filters are required.)
- Excellent compatibility with commonly used seals, hoses and metals
- Superior, long-term fluid cleanliness (chemistry does not support formation of sludge or gels)
- High dielectric properties to eliminate electro-chemical erosion of EHC servo-valves

**TYPICAL PHYSICAL PROPERTIES**

| | EHC-46 | EHC-68 |
|---|---|---|
| Viscosity @ 100 °F, SUS | 220 | 310 |
| @ 210 °F, SUS | 53.3 | 65.3 |
| Viscosity Index | 185 | 189 |
| Pour Point, °F | - 55 | - 50 |
| Density (lbs./gal) @ 60 °C | 8.2 | 8.23 |
| Flash Point, °F, COC | 525 | 585 |

## VISCOSITY COMPARISON




## TYPICAL PERFORMANCE PROPERTIES

| | |
|---|---|
| Vickers 104C Vane Pump (ASTM D-2882)<br>(2,000 psi, 100 hours, 150 °F, 7.5 gpm, 1,200 rpm, 3.5 gal. Sample) | < 10 mg Total Wear * |
| Four Ball Wear (ASTM D-2266)<br>(1,800 rpm, 1 hour, 167 °F, 40 kg load) | 0.35 mm |
| Four Square Gear Test (FZG)<br>(194 °F, 1,760 rpm, 1,600 ml sample, 12 stages | Pass, all 12 stages |
| Turbine Oil Stability Test (ASTM D 943)<br>(95 °C, iron and copper catalysts, 60 mls water)<br>Time to 2.0 Acid Number increase | >2,000 hours |

* Results of 1.2 and 1.7 mg's Total Wear were obtained by UEC (USX Engineers & Consultants, Inc.)

## ENVIRONMENTAL DATA

| | |
|---|---|
| OECD Ready Biodegradability<br>Test Method 301B, 28 days | 70.9 |
| OECD Ready Biodegradability<br>Test Method 301F, 28 days | 88.0 |
| OECD Method 203, Fish Acute Toxicity Test<br>96 hour LC50 for rainbow trout, Oncorhynchus mykiss | "practically non-toxic" |

**Note: 60% biodegradation within 28 days is required to be classified as a "readily biodegradable" hydraulic fluid.**

## SEAL COMPATIBILITY WITH EcoSafe® EHC Fluids

| | V747-75 2-214 | L1120-70 2-214 | V1006-75 2-214 | N674-70 2-214 | C873-70 2-214 | E540-80 2-214 | S604-70 2-214 |
|---|---|---|---|---|---|---|---|
| ***Original Physical Properties*** | | | | | | | |
| Hardness, Shore A., pts. | 78 | 68 | 79 | 71 | 73 | 80 | 70 |
| Tensile Strength, psi | 1,733 | 908 | 1,716 | 2,459 | 1,914 | 1,584 | 825 |
| Elongation, % | 195 | 211 | 228 | 399 | 244 | 205 | 185 |
| ***158 Hrs. @ 158 °F*** | | | | | | | |
| Hardness Change, pts. | - 2 | + 2 | + 1 | - 2 | - 5 | 0 | - 2 |
| Tensile Change, % | - 2.9 | - 23.7 | + 1.0 | + 4.7 | + 6.9 | 0 | - 45.9 |
| Elongation Change, % | - 1.5 | - 29.3 | 0 | - 4.8 | + 14.3 | - 6.3 | - 38.4 |
| Volume Change, % | - 0.1 | + 0.3 | - 0.01 | + 1.7 | + 7.2 | - 1.4 | - 1.0 |

KEY: V747 Fluorocarbon (Viton) V1006 Fluoroelastomer C873 Neoprene
L1120 Fluorosilicone N674 Nitrile (Buna N) E540 Ethylene-Propylene
S604 Silicone

*(Data furnished courtesy of Parker Seals)*

**Test Method - DIN 53 521**

| Material | **NBR-1 (Buna-n)** | **FKM-2 (Viton)** | **Polyurethane P 5000** |
|---|---|---|---|
| Temperature, °C | 100 | 100 | 60 |
| Time, hours | 1,000 | 1,000 | 1,000 |
| Hardness Change, Pts. | -5 | -3 | -2 |
| Modulus Change, % | +29.5 | +4.7 | -8.6 |
| Tensile Change, % | -11.9 | -5.8 | +13.2 |
| Elongation Change, % | -31.5 | +6.8 | +15.7 |
| Weight Change, % | +9.0 | +0.7 | +3.9 |
| Volume Change, % | +10.8 | +1.5 | +4.7 |

Performed by: Parker Hanniffin GmbH
Prädifa – Packing Division

**STORAGE AND HANDLING:**

If you want to add **EcoSafe® EHC** fluid to a hydraulic system, call us and we will advise you regarding compatibility/solubility. Most "oil soluble" additives are not soluble in **EcoSafe® EHC** requiring a thorough and detailed plan prior to conversion. A separate information sheet *'Converting Hydraulic Systems to EcoSafe® EHC Fluids'* is available upon request. Your ACT representative is also trained and experienced in all aspects of conversion assistance.

We believe **EcoSafe® EHC** fluids have a low degree of hazard when used as intended. They are stable, non-corrosive; high flash point materials that are compatible with nearly all commonly used materials in standard hydraulic systems. As with all products of this type, we recommend that good hygiene practices be observed, including: (1) avoid prolonged skin contact, (2) provide adequate ventilation, (3) do not ingest; and that all OSHA Standards pertaining to products of this type be observed. Refer to American Chemical Technologies' Material Safety Data Sheet for personnel protection, spill and leak procedures, handling and first aid information.

***The information contained herein is correct to the best of our knowledge. The recommendations or suggestions contained in this bulletin are made without guarantee or representation as to results. We suggest that you evaluate these recommendations and suggestions in your own laboratory prior to use. Our responsibility for claims arising from breach of warranty, negligence, or otherwise is limited to the purchase price of the material. Freedom to use any patent owned by American Chemical Technologies' or others is not to be inferred from any statement contained herein.***