

## Performance™ Bio HE Range

Biodegradable hydraulic fluid

### Description

The Castrol Performance™ Bio HE range (previously named Carelube SES) are highly biodegradable hydraulic fluids, based on saturated synthetic esters.

The range contains selected additives ensuring good oxidation stability, good anti-corrosion and anti-wear properties, as well as compatibility with bearing alloys containing lead. The synthetic base oil ensures Performance Bio HE has a very high viscosity index and an extremely low pour point.

### Application

Performance Bio HE should be used in all hydraulic systems, where leakages may pollute natural water and drainage systems - for instance in earth-moving, agricultural and forestry machinery, refuse lorries, rail cars, presses and wrapping machines. The careful choice of the saturated synthetic ester enables the product to operate up to +120°C/ +248°F system temperature.

The high value of its viscosity index means that the product shows a relatively low dependence of the viscosity on the temperature.

Performance Bio HE is not soluble in water, but miscible with mineral oil and with rape seed oil based hydraulic fluids. When changing from mineral oil based products to Performance Bio HE, the system should be drained completely, as a mixture with mineral oil would have a reduced biodegradability and could cause foam problems in the system.

Castrol Performance Bio HE 46 is classified as biodegradable in OECD 301B testing (>60% after 28 days).

### Advantages

- High biodegradability
- Good oxidation- and hydrolytic stability
- Can tolerate low levels of mineral oil contamination and still maintain acceptable anti-foam performance
- High shear stability

## Typical Characteristics

| Name                                    | Method                 | Units                                   | Bio HE 22              | Bio HE 32              | Bio HE 46              | Bio HE 68              |
|-----------------------------------------|------------------------|-----------------------------------------|------------------------|------------------------|------------------------|------------------------|
| Appearance                              | Visual                 | -                                       | Clear, bright & yellow | Clear, bright & yellow | Clear, bright & yellow | Clear, bright & yellow |
| ISO Viscosity Grade                     | -                      | -                                       | 22                     | 32                     | 46                     | 68                     |
| Density @ 15°C / 59°F                   | ISO 12185 / ASTM D4052 | kg/m <sup>3</sup>                       |                        | 907                    | 920                    | 950                    |
| Kinematic Viscosity @ 40°C / 104°F      | ISO 3104 / ASTM D445   | mm <sup>2</sup> /s                      | 22.6                   | 32.4                   | 48.8                   | 68.8                   |
| Kinematic Viscosity @ 100°C / 212°F     | ISO 3104 / ASTM D445   | mm <sup>2</sup> /s                      | 4.9                    | 6.3                    | 8.4                    | 10.9                   |
| Viscosity Index                         | ISO 2909 / ASTM D2270  | -                                       | 143                    | 149                    | 149                    | 148                    |
| Pour Point                              | ISO 3016 / ASTM D97    | °C/°F                                   | -30/ -22               | <-30/-22               | <-30/-22               | <-30/-22               |
| Flash Point - open cup method           | ISO 2592 / ASTM D92    | °C/°F                                   | 226 / 439              | 240/464                | 242/468                | 242/468                |
| Acid Number                             | ISO 6619 / ASTM D664   | mgKOH/g                                 | 0.50                   | 0.36                   | 0.43                   | 0.61                   |
| FZG Gear Scuffing test - A/8.3/90       | ISO 14635-1            | Failure Load Stage                      | -                      | -                      | >12                    | >12                    |
| Vickers Pump Test (Ring / Vane Wear)    | ASTM D2882             | mg/mg                                   | -                      | <120 / <30             | <120 / <30             | <120 / <30             |
| Elastomer Compatibility - with SRE-NBR1 | ASTM D3604 / ISO 6071  | % volume change / shore hardness rating | +8 / -4                | +7 / -3                | +7 / -3                | +7 / -3                |
| Rust test - synthetic seawater (24 hrs) | ISO 7210 / ASTM D665B  | Rating                                  | Pass                   | Pass                   | Pass                   | Pass                   |

Subject to usual manufacturing tolerances.

**This product was previously named Carelube SES. The name was changed in 2015.**

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