

## Castrol BioBar HE Range

Environmentally responsible hydraulic oil

### Description

Castrol BioBar HE is a range of environmentally acceptable hydraulic fluids which can replace conventional mineral oils in hydraulic equipment where leakage or spillage may result in escape into the marine environment.

Castrol BioBar HE hydraulic fluids are formulated from synthetic ester base oils which are selected to give a wide operating temperature range and long service life.

Extensive testing of Castrol BioBar HE and hydraulic system components (in particular, elastomer seals) has confirmed good compatibility with standard components, which can allow conversion of existing equipment without the need for major changes.

Castrol BioBar HE hydraulic fluids have been tested and registered according to OSPAR (Oslo and Paris Convention for the Protection of the Marine Environment of the North-East Atlantic) requirements and therefore meet the definition of an Environmentally Acceptable Lubricant (EAL) under the US Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels (VGP) 2013.

### Application

Hydraulic systems are extensively used for power transmission on board ship. Cranes, winches, windlasses and life boat davits are often located where leakage or spillage can escape into the marine environment. The extensive use of flexible hoses, which are susceptible to mechanical damage through abrasion or fatigue, can increase the risk of leakage which can lead to a rapid loss of fluid if there are high operating pressures and high flow rates.

Castrol BioBar HE is recommended for hydraulic systems and hydrostatic transmissions which incorporate gear pumps, vane pumps, radial piston or axial piston pumps and motors and where there is a perceived risk of egress into the environment in the event of spillage or leakage.

### Features / Benefits

Reduced environmental impact when compared to conventional lubricants – demonstrable benefits in the following key environmental performance criteria:

- Superior biodegradation
  - Significantly reduced bioaccumulation\* and toxicity
  - Enhanced renewability

\*Using OSPAR criteria for assessing bioaccumulation potential.

High levels of protection given to pump and motor components, which can contribute to extended component life and increased reliability:

- Minimal wear of ring and vane in Vickers PM 104C pump test.
  - Minimal wear of ring and vane in Eaton-Vickers 35VQ25 pump test.

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### Additional Information

Castrol BioBar HE hydraulic fluids are fully miscible with conventional mineral oils and compatibility has been confirmed by testing with several standard grades. However, Castrol strongly recommends that the guidelines given for changeover in ISO 15380: 2002 Annexe 1 are followed closely and that the residual mineral oil in the system is reduced to 2%. This is to ensure that the intended environmental performance is achieved, as well as to ensure reliable operation. This figure can be achieved without flushing being required, if reasonable care is taken and the steps detailed in the section above are followed. A significant proportion of the fluid volume in a hydraulic system is contained in pipework, actuators and accumulators and this needs to be expelled back to the reservoir and removed during changeover. There are many different types of hydraulic fluids which are marketed as biodegradable or environmentally friendly, which are based upon a variety of different base oil types. As a general rule Castrol does not recommend mixing different types of hydraulic fluids due to the number of different base oils and additive system combinations which are possible. There are exceptions but compatibility testing is required before confirmation can be given.

Castrol BioBar HE does not require any additional maintenance in service over and above that which is considered good practice for hydraulic fluids in general service. The hydraulic fluid – whatever type is in use – is a key component without which the system will not operate, but it is frequently ignored or abused which can have long term effects upon the reliability of the system. Water removal equipment and additional filtration will prolong the life of system components and of the lubricant, and is recommended. Some Class Societies may insist on the installation of water removal equipment whenever EALs are used.

## Technical Data

Name	Method	Units	BioBar HE 22	BioBar HE 32	BioBar HE 46	BioBar HE 68	BioBar HE 100
Density @ 15°C / 59°F	ISO 12185 / ASTM D4052	kg/m <sup>3</sup>	916	927	936	946	979
Kinematic Viscosity @ 40°C / 104°F	ISO 3104 / ASTM D445	mm <sup>2</sup> /s	22.5	32.3	47.2	69.1	102
Kinematic Viscosity @ 100°C / 212°F	ISO 3104 / ASTM D445	mm <sup>2</sup> /s	4.9	6.3	8.3	10.9	14.7
Viscosity Index	ISO 2909 / ASTM D2270	-	145	151	153	148	149
Pour Point	ISO 3016 / ASTM D97	°C/°F	-54/-65	-54/-65	-51/-60	-48/-54	-51/-60
Flash Point - open cup method	ISO 2592 / ASTM D92	°C/°F	252/486	260/500	256/493	256/493	276/529
Rust test - synthetic seawater (24 hrs)	ISO 7120 / ASTM 665B	-	No rust	No rust	No rust	No rust	No rust
Copper corrosion (3hrs @ 100°C / 212°F)	ISO 2160 / ASTM D130	-	1b	1b	1b	1b	1b
Air release @ 50°C / 122°F	ISO 9120 / ASTM D3427	mins	1	5	8	8	-
Air release @ 75°C / 167°F	ISO 9120 / ASTM D3427	mins	-	-	-	-	7
Foam sequence I - tendency / stability	ISO 6247 / ASTM D892	ml/ml	0/0	0/0	0/0	0/0	0/0
Oxidation Stability - TOST	ISO 4263-3	hrs	2621	2741	2883	3387	3387
FZG Gear Scuffing test - A/8.3/90	ISO 14635-1	Failure Load Stage	-	10	10	11	11
Vane Pump test - ring/vane	ISO 20763	mg/mg	-	20/2	-	7/1	-

Subject to usual manufacturing tolerances.

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