

## BioBar Range

Environmentally responsible hydraulic oil

### Description

Castrol BioBar 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 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 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 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 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.

### Advantages

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

High levels of protection given to pump and motor components, which can contribute to a high level of 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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(\*) Using OSPAR criteria for assessing bioaccumulation potential.

## Typical Characteristics

Name	Method	Units	BioBar 22	BioBar 32	BioBar 46	BioBar 68	BioBar 100
Kinematic Viscosity @ 40°C	ASTM D445 / ISO 3104	mm <sup>2</sup> / s	22	32	46	68	100
Kinematic Viscosity @ 100°C	ASTM D445 / ISO 3104	mm <sup>2</sup> / s	4.9	6.4	8.2	11.0	15.6
Viscosity Index	ASTM D2270 / ISO 2909	None	139	145	147	150	150
Density @ 15°C	ASTM D4052 / ISO 12185	kg/m <sup>3</sup>	0.90	0.90	0.92	0.95	0.95
Pour Point	ASTM D97 / ISO 3016	°C	-42	-42	-36	-36	-36
Flash Point, open cup method	ASTM D92 / ISO 2592	°C	226	232	218	230	230
Rust test - synthetic sea water (24 hrs)Water	ASTM D665B / ISO 7120	Rating	No Rust	No Rust	No Rust	No Rust	No Rust
Copper corrosion (3 hrs @ 100°C)	ASTM D130 / ISO 2160	Rating	1A	1A	1A	1A	1A
Foam Sequence I, tendency / stability	ASTM D892 / ISO 6247	ml / ml	20	20	20	50	50
Oxidation Stability - Rotating Pressure Vessel test	ASTM D2272 IP 229	min	300	300	320	315	315

The above figures are typical of those obtained with normal production tolerances and do not constitute a specification.

## Additional Information

Castrol BioBar 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 usually be achieved without flushing being required. 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 does not require any additional maintenance in service over and above that which is considered good practice for hydraulic fluids in general service. 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.

## Storage

All packages should be stored under cover. Where outside storage is unavoidable drums should be laid horizontally to avoid the possible ingress of water and the obliteration of drum markings. Products should not be stored above 60°C, exposed to hot sun or freezing conditions.

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