

Oceanic HW540 E

Environmental Water based Subsea Production Control Fluid

General Description

Oceanic HW fluids are water based hydraulic media specifically formulated for use in modern subsea production control systems. Their low viscosity promotes optimum system response, while a sophisticated additive package provides a high degree of protection against wear, corrosion and microbiological degradation. The Oceanic HW fluids have been developed in close consultation with component manufacturers and are now in worldwide use, helping to achieve maximum production keeping system safety and reliability in mind. Oceanic HW540 has been the market leader for over 20 years, Oceanic HW540E is based on similar technology and properties as standard HW540 but has an improved environmental profile in addition to increased compatibility and reliability profiles.

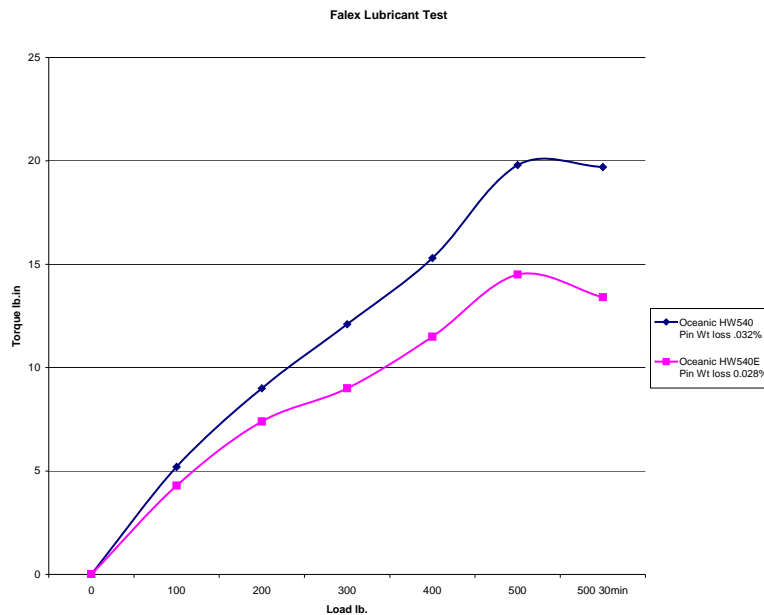
Oceanic HW540E can be used in new systems but, more importantly, can be used to 'top up' systems already using the standard fluid with minimal or no risk.

Low Viscosity Oceanic HW fluids, being water based, offer extremely low viscosity when compared with mineral oil or synthetic hydrocarbon types. This allows systems to be designed with optimum response, particularly where control is required over long distances, and through small-bore control lines.



High Lubrication Ability Particular care has been taken to maintain the excellent lubrication and anti-wear provided by the standard Oceanic HW540, especially in the case of metal-to-metal sliding contact situations such as are encountered in modern shear seal type control valves. The Oceanic HW540E also provides low coefficients of friction between elastomeric seals and packaging and metal surfaces. The following graph compares the lubrication and wear figures for Oceanic HW540 and the new Oceanic HW540E. Although the environmental profile has been improved, the friction has been reduced. The Falex lubricant test is the industry standard for lubrication acceptance of subsea fluids.





Corrosion Protection Oceanic HW fluids offer liquid corrosion protection of the metals commonly used in offshore hydraulic systems. Oceanic HW540E has proven corrosion protection for all ferrous metals and their alloys. It also offers some protection to yellow metals. However, aluminium and cast aluminium components should be avoided.

Zinc and Cadmium plating may be slightly affected, and should be avoided. (Passivated cadmium plating is acceptable chemically, but porosity may permit moisture absorption and "lifting" of the plate).

Elastomers and Plastics Common O - ring materials such as Nitrile, common Fluoroelastomers, Buna N, Buna A, Silicone and Neoprene are all acceptable.

Seal materials such as Teflon (P.T.F.E.) are also acceptable but composites such as common Fluoroelastomers impregnated cotton should be avoided as they may absorb moisture and swell over extended periods. Polyurethane and Porous gasket materials should be avoided. Thermoplastics such as those used for linings in umbilical hose bundles are generally acceptable. A full liner testing program is ongoing but no problems are anticipated.

Compatibility of Control Fluids All Oceanic HW fluids are compatible with one another and Oceanic HW540E is no different. Oceanic HW540E can be used in hydraulic systems, which have run on any of the other HW fluids without the need for expensive flushing. However, care must be taken regarding the thermal limit required by down-hole equipment.

Filter Elements Some impregnated paper types lose structural strength in contact with aqueous fluids. Recommended filter media are woven polypropylene or glass fibre.

MacDermid has long term experience with Pall Ultipor Filter Medium, and recommend its use in conjunction with Oceanic HW subsea production control fluids.



Paints Most paints used in the offshore industry are compatible with Oceanic HW fluids. The most satisfactory results may be obtained with Nylon, Phenolic or Epoxy based coatings.

Stability Oceanic HW fluids are extremely resistant to the effects of contamination by seawater and / or micro-organisms such as bacteria and fungi, although every effort should be made to avoid these conditions from occurring. The high stability of the additive pack reduces the possibility of flocculation and precipitation taking place, and if a monitoring program is operated, advanced warning of impending problems will allow corrective action to be taken well before the system safety reliability can be seriously impaired. The progress made in the development of HW 540E has increased the sensitivity in particular to seawater, therefore, making the product more stable in extreme conditions.

	Oceanic HW540E
Appearance	Clear pink fluid
Viscosity (cS) @ -20 °C = -4°F 0 °C = 32°F 20 °C = 68°F 40 °C = 104°F	20 6.8 3 1.7
Pour Point (°C) (°F)	-25 (13)
Specific Gravity (20°C) (68F)	1.055
pH Value	9.3
Cleanliness Level	NAS (AS) 4 or better
Thermal Conductivity $W.m^{-1}.K^{-1}$	0.470
Coefficient of Thermal Expansion (volumetric) per °C	0.00047
Specific Heat Capacity $J.kg^{-1}.K^{-1}$	3445
Bulk Modulus ($Nm^{-2} \times 10^9$)	2.3



Discharge Into Marine Environments

Discharge in U.K. Sector of North Sea The Oceanic HW range of subsea production control fluids is included in the U.K. Notification Scheme for the Selection of Chemicals for Use Offshore. Under this scheme, the U.K. Department of Energy has studied the chemical composition and toxicological effects on marine organisms of the Oceanic HW fluids. The full HOCNF has been forwarded to CEFAS; MacDermid knows that there will be no substitution warning relating to this fluid and expect to get a class E when the CEFAS template is returned.

Discharge in Other Waters Following the environmental testing of this product, MacDermid can predict the material will be yellow for use in Norwegian waters and will be acceptable for most other parts of the world.

Information given in this publication is based upon technical data gained in our own and other Laboratories and is believed to be true. However the material is used in conditions beyond our control thus we can assume no liability for results obtained or damages incurred through the application of the data presented herein.



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