Product Data

Brayco Micronic LV/4

Synthetic subsea production control fluid

Description

Castrol Brayco Micronic™ LV/4 is a low viscosity synthetic hydrocarbon control fluid specifically formulated for use in subsea and downhole systems where response times are important. These include long offset closed loop subsea systems, surface well control, intelligent well completion, and low temperature applications such as carbon capture and storage. The fluid incorporates all the features required for operation throughout a control system, and has a wide operating temperature range, suitable for use from -50ºC (-58ºF) to 200ºC (392ºF).
Castrol Brayco Micronic™ products are developed and qualified using rigorous industry and equipment manufacturers quality standards.

Application

- Designed for use in all conventional and high pressure, high temperature applications and very long offsets.
- Can operate over a temperature range of -50ºC (-58ºF) to 200ºC (392ºF).
- Suitable for use within Electro-Hydraulic Multiplex (EH-Mux) or direct hydraulic control systems.
- Designed for use throughout the entire production and workover control systems, covering topsides, subsea applications and downhole, including intelligent well completions.
- Low viscosity and pour point make this product suitable for Carbon Capture and Storage applications, where ultra-low transient temperature conditions can be expected.

Advantages

- Environmental testing for OSPAR registration has been completed.
- Thermally stable and enhanced viscosity profile over full operating range of temperature.
- Low viscosity to reduce pressure drops in long lines and maintain good system response.
- Maintains corrosion prevention with seawater contamination.
- Compatible with CO2, both gas and dense phase.
- Fully compatible and miscible in all proportions with other products in the Castrol Brayco Micronic range.
- Compatible with a wide range of system materials commonly used in subsea control systems. More detailed compatibility information is available on request.

Typical Physical Characteristics

Castrol Brayco Micronic™ LV/4 Rheology at Ambient Pressure								
Property	**@ units**	**-50ºC(1)**	**-25°C**	**0°C**	**20°C**	**40°C**	**100°C**	**175°C(1)**
Density	g/ml	0.8556	0.8318	0.8153	0.8019	0.7886	0.7486	0.6999
	lb/ft^3	53.41	51.93	50.90	50.06	49,23	46.73	43.69
Kinematic Viscosity	mm²/s	1128.37	89.28	21.52	9.85	5.48	1.81	0.89
Bulk Modulus	N/m² (x 10^9)	1.91	1.65	1.43	1.26	1.12	0.67	0.48
	psi (x 10^5)	2.77	2.40	2.07	1.83	1.62	1.11	0.69

Castrol Brayco Micronic™ LV/4 General Properties			
Property	**Method**	**Units**	**Typical Value**
Appearance	-	-	Clear mobile liquid
Colour	-	-	Amber
Pour Point	ISO 3016 ASTM D97	°C (F)	-69 (-92.2)
Flash Point – closed cup method	ISO 2719 ASTM D93	°C (F)	159 (318)
Water Content - Karl Fischer test (coulometric test)	ISO 6296 ASTM D1744	ppm	< 300 ppm
Acid Number	ISO 6619 ASTM D664	mg KOH/g	0.2
Base Number	ISO 3771 ASTM D2896	mg KOH/g	1,1
Coefficient of Thermal Expansion	ASTM D1903	ºC^{-1}	0.0008
Thermal Conductivity		W/m°C	0,14
Specific Heat	ASTM D2766	kJ/Kg°C	2,119
Foam Test Sequence 1 –tendency/stability	ISO 6247 ASTM D892	ml / ml	50 / 0
Particulate Cleanliness (at point of fill into packs)	SAE AS4059F	-	max. Class 6 B-F

(1) Extrapolated data from PVT calculator

The above figures are typical of those obtained with normal production tolerance and do not constitute a specification. Detailed Pressure/Viscosity/Temperature (PVT) data is available on request.

Castrol Brayco Micronic™ LV/4 Typical Performance Characteristics			
Property		**Method**	**Performance**
Sea Water Stability			Provides anti corrosion performance on carbon steel with up to 10% seawater.
Lubrication Shell 4 Ball - Mean Wear Scar Diameter (1hr, 30 kg, 1460 rpm)		IP239	0.51 mm
Environmental Performance		OSPAR Requirements	Tested and registered for OSPAR - all components tested for toxicity, biodegradation and bioaccumulation.
Compatibility	Metals	API 17F Annex C (Rev4)*	Compatible with a wide range of metals. For a core set of commonly used metals see Table 3.
	Elastomers / Plastic	API 17F Annex C (Rev4)*	Compatible with a wide range of elastomers/plastics. For a core set of commonly used compounds see Table 4.
	Umbilical Testing	API 17E	Please contact Castrol for more information.
Valve Testing	DCV	OEM specific	Please contact Castrol for more information.
	SSSV	OEM specific	Please contact Castrol for more information.

*based on compatibility performance of Brayco Micronic SV/4 (same chemistry platform). Testing carried out to API 17F protocol. For a more extensive list of tested materials and detailed information on testing contact Castrol.

Compatibility

Castrol Brayco Micronic™ LV/4 Metal Compatibility*		
Material	**Compatibility**	**Comments**
Carbon Steel S235	Compatible	Unprotected carbon steel above the fluid surface may be subject to corrosion from condensed moisture if fluid contains excessive water.
Low Alloy Steel 4130	Compatible	
Alloy Steel 51CrV4	Compatible	
Stainless Steel 410	Compatible	
Stainless Steel 430FR	Compatible	
Stainless Steel 316	Compatible	
Stainless Steel 17-4PH	Compatible	
Nitronic 60	Compatible	
Monel K500	Compatible	
Inconel 718	Compatible	
Super Duplex 2507	Compatible	
Aluminium Bronze UNS C63000	Compatible	
Beryllium Copper	Compatible	
Tungsten Carbide - 10% Nickel bonded	Compatible	
Electroless Nickel Plating	Compatible	
Zinc Plating	Compatible	

*Brayco Micronic LV/4 is the same chemistry platform as Brayco Micronic SV/4. Brayco Micronic LV/4 metals compatibility based on compatibility performance of Brayco Micronic SV/4 testing carried out to API 17F protocol.

As with the use of any fluid, a system materials review should always be carried out before using Brayco Micronic LV/4.

For coating compatibility data please contact Castrol.

Castrol Brayco Micronic™ LV/4 Elastomer and Plastic Compatibilty*		
Material	**Compatibilty**	**Comments**
Nitrile (NBR)	Compatible	Widely used as standard seal material, but care should be taken to select grades that provide the best performance. Higher acrylo nitrile contents generally give improved compatibility
Hydrogenated Nitrile (HNBR)	Compatible	
Low Permeability Nitrile	Compatible	
Fluorocarbon (FKM-Viton)	Compatible	Performance can vary according to grade. Superior to Nitrile if higher temperatures involved (90ºC or above).
PTFE	Compatible	Very inert, and suitable for high temperature and pressure applications.
PEEK	Compatible	Very inert, and suitable for high temperature and pressure applications.
Perfluoroelastomer (FFKM - Chemraz)	Compatible	Suitable for extreme temperature applications.
Polyurethane	Compatible	
Ethylene Propylene (EPDM)	Not Compatible	**Important** EPDM is not suitable for use with any hydrocarbon-based fluids or greases.
Nylon 11	Compatible	Tested to API 17 E
Silicone	Not Compatible	

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The data above refer to "standard" compounds recognised by industry. However, performance can vary depending on manufacturer, grade or operational conditions, e.g. manufacturing process, filler materials used in compounds, application, extreme temperatures, etc. We therefore recommend clarification or further testing is sought regarding project specific material compatibility, from either seal vendor or Castrol.

Seal Materials to be Avoided

Ethylene Propylene rubbers (EPR, EPDM) are not compatible with Castrol Brayco Micronic LV/4. These materials must be changed out from equipment to be used with Castrol Brayco Micronic LV/4.

Paint and other Surface Coatings

It is recommended that in accordance with good working practice the internal surface of the hydraulic system should not be coated. However, external surfaces may require coating and as with all control fluids conventional paint systems will tend to soften or strip. It is therefore recommended that these be replaced by cured epoxy, nylon or Phenolic types as commonly used subsea. Surface preparation prior to paint application is critical.

Where it is necessary to use internal surface coatings such as PTFE, these should be assessed for suitability of use. Manufacturers guidelines should be observed with regards cure times and temperatures and as with paints systems surface preparation specifications should be adhered to.

Care and Handling

This product has been manufactured to a tightly controlled cleanliness specification. Any container that has been opened for use must be re-sealed to avoid contamination ingress from the environment (e.g. particulates or water). Any contaminants entering the product can affect its performance. The integrity of the product once the container is opened is the responsibility of the end user. It is good practice to use tarpaulins or drum lids to cover all containers to prevent ingress of contamination.

Castrol Brayco Micronic LV/4 must never be mixed with control fluids of different base types such as water glycol (e.g. Castrol Transaqua SP). It can be used to replace mineral oils (such as the Castrol Hyspin range), but this requires clarification with Castrol. Contamination of Castrol Brayco Micronic LV/4 with other fluid types can seriously affect the product performance.

If you need advice on any of the above, please contact your local Castrol Technical Service Engineer for more specific details.

Storage

All containers should be stored under cover and protected from exposure to direct sunlight. Do not store containers in temperatures below minus 5ºC or above 45°C. 208L plastic drums can be stored a maximum of 2 high, providing a pallet is used to distribute the upper load evenly. In addition, the fill level of the upper drums should be less than or equal to the fill level of the lower drums. It is not recommended to store 208L plastic drums horizontally.

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