

# PRODUCT AND TECHNICAL DATA



## Castrol Brayco Micronic SV/200

Synthetic subsea production control fluid

### Description

Castrol Brayco Micronic SV/200 is a synthetic hydrocarbon control fluid specifically formulated for use as the control medium in closed loop surface and subsea production control systems. The fluid incorporates all the features required for operation in a wide range of equipment, and can therefore be used as the operating medium throughout the control system including subsurface safety valve and well control areas.

Castrol Brayco Micronic SV/200 has been developed and qualified under a Quality Management System with ISO 9001:2000 certification and an Environmental Management System with ISO14001:1996 certification for Research and Development.

Qualification testing was carried out in accordance with ISO13628-6 Annex C requirements.

### Application

- Castrol Brayco Micronic SV/200 is designed specifically for use in all conventional and high pressure, high temperature applications.
- Castrol Brayco Micronic SV/200 is rated for operation over a temperature range of -40°C (-40°F) to 200°C (392°F).
- The fluid incorporates all the features required for operation in a wide range of equipment and is stable for operation at the temperatures found in the well bore.
- The low pour point also allows use in areas where low ambient temperatures prevail.
- Designed for use within Electro-Hydraulic Multiplex (EH-Mux) or direct hydraulic control systems.
- Designed for reliable use throughout the entire production and workover control systems, covering Topsides and Subsea applications: both open water and well bore; and Downhole from control of a single SSSV through to complex intelligent well completions.





## Features

- Castrol Brayco Micronic SV/200 has undergone rigorous environmental testing that meets the requirements of OSPAR 2007 legislation.
- Castrol Brayco Micronic SV/200 has similar performance to Castrol Brayco Micronic 864, 864HT/200 and 865 grades with an operating capability up to 200°C (392°F). See Table 1 & Table 2 for detailed physical and performance characteristics.
- Physical and chemical testing has demonstrated Castrol Brayco Micronic SV/200 is fully compatible and miscible in all proportions with the Castrol Brayco Micronic 864, 864HT/200 and 865 grades as well as the low viscosity synthetic Castrol Brayco Micronic LV/200. It is also upwardly compatible with Castrol Brayco Micronic SV/3.
- As with all specialist Castrol Brayco Micronic subsea grades, Castrol Brayco Micronic SV/200 must never be mixed with water glycol based control fluids (e.g. Castrol Transaqua HT2). It can be used to replace mineral oils (such as the Castrol Hypsin range), but this requires clarification with Castrol Offshore. Contamination of Castrol Brayco Micronic SV/200 with other fluid types can seriously affect the product performance.
- Castrol Brayco Micronic SV/200 is resistant to bacterial and fungal growth.
- Castrol Brayco Micronic SV/200 provides corrosion protection with sea water contamination.
- Castrol Brayco Micronic SV/200 has excellent lubrication performance.
- Castrol Brayco Micronic SV/200 is compatible with a wide range of materials commonly used in subsea control systems, for basic lists see Table 3 & Table 4.

## Benefits

- Allows reliable operation of subsea equipment exposed to conventional or HP/HT conditions.
- Compatibility and miscibility properties of Castrol Brayco Micronic SV/200 with 864, 864HT/200, 865 and SV/3 allow for easily managed direct top up and upgrade option programmes. For further details contact Castrol Offshore.
- The low pour point of the fluid allows operation in low ambient temperature environments.
- Viscosity profile of fluid permits optimum hydraulic response through long control umbilicals.

Table 1

Fluid - Castrol Brayco Micronic SV/200 Rheology @ ambient pressure							
Property	Units @	-25°C (-13°F)	0°C (32°F)	20°C (68°F)	40°C (104°F)	100°C (212°F)	175°C (347°F)
Density	g/ml	0.8431	0.8267	0.8137	0.8006	0.7614	0.7123
	lb/ft <sup>3</sup>	52.63	51.61	50.80	49.98	47.53	44.47
Viscosity	cSt	144.6	42.5	22.7	12.7	3.8	1.7
Bulk Modulus	N/m <sup>2</sup> (x 10 <sup>9</sup> )	1.67	1.48	1.34	1.21	0.82	0.42
	Psi (x 10 <sup>5</sup> )	2.43	2.15	1.94	1.74	1.20	0.62

  

General Properties			
Property	Code	Units	Typical Value
Appearance	-	-	Clear mobile liquid
Colour	-	-	Pale straw
Pour Point	IP15 / ASTM D97	°C (°F)	< -50 (<-58)
Flash Point	ASTM D92	°C (°F)	150 (302)
pH @ 20°C (68°F)	-	-	N/A
TAN	IP177 / ASTM D664	mg KOH/g	1.2
TBN	IP276 / ASTM D2896	mg KOH/g	9.0l
Coefficient of Thermal Expansion	-	m <sup>3</sup> /m <sup>3</sup> °C	0.00109
Thermal Conductivity	ASTM D2717	W/m°C	-
Specific Heat	ASTM D2766	KJ/Kg/K	-
Foam Test Sequence 1 Tendency	IP146 / ASTM D892	ml	50
Foam Test Sequence 1 Stability	IP146 / ASTM D892	ml	0
Viscosity Index (VI)	ASTM D2270	-	270
Moisture Content Volumetric- Karl Fisher	IP386	p.p.m.	< 500
Relative Humidity	CWS01	%	< 20
Particulate Cleanliness	SAE AS4059E	-	Class 6 B to F or better
	ISO 4406	-	Code 14/11 or better

Castrol Offshore Ltd has comprehensive PVT data available, which covers a range of pressures and temperatures upon request.

Table 2

Fluid - Castrol Brayco Micronic SV/200 Typical Performance Characteristics		
Property	Code	Performance
Sea Water Stability	ISO 13628-6 Annex C (2006 E)	Provides anti corrosion performance on carbon steel with 10% sea water Pass (24, 48 hours)
Microbiological Growth – 28 Day Challenge Test Fungi Bacteria	ISO 13628-6 Annex C (2006 E)	N/A
Lubrication Shell 4 Ball – Mean Wear Scar Diameter (1hr, 30 kg, 1460 rpm)	IP239	0.44 mm typical
Environmental Performance	2007 OSPAR Requirements	Full environmental testing carried out to meet OSPAR 2007 requirements - all components tested for toxicity (4 species), biodegradation and bioaccumulation.
Compatibility	Metals	ISO 13628-6 Annex C (2006 E)
	Elastomers / Plastics	ISO 13628-6 Annex C (2006 E)
	Umbilical Testing	API 17E
Valve Testing	DCV	OEM specific
	SSSV	OEM specific & OTO99001

For a more extensive list of tested materials and detailed information on testing contact Castrol Offshore.

Table 3

Fluid - Castrol Brayco Micronic SV/200 Metal Compatibility		
Material	Compatibility	Comments
<i>Mild Steel A105</i>	Compatible	Unprotected carbon steel above the fluid surface may be subject to corrosion from condensed moisture if fluid contains excessive water.
<i>Alloy Steel 4140</i>	Compatible	
<i>Alloy Steel 440C</i>	Compatible	
<i>Stainless Steel 316</i>	Compatible	
<i>Stainless Steel 17-4PH</i>	Compatible	
<i>Nitronic 60</i>	Compatible	
<i>Monel 400</i>	Compatible	
<i>Nickel 200</i>	Compatible	
<i>Inconel 825</i>	Compatible	
<i>Super Duplex 2507</i>	Compatible	
<i>Aluminium Bronze (CDA945)</i>	Compatible	
<i>Tungsten Carbide - 10% Cobalt Bonded</i>	Compatible	
<i>Tungsten Carbide - 9% Nickel Bonded</i>	Compatible	
<i>Aluminium</i>	Compatible	
<i>Electroless Nickel Plating</i>	Compatible	
<i>Zinc and Cadmium Plating</i>	Compatible	

Castrol Brayco Micronic SV/200 is compatible with many materials commonly used in the construction of modern production subsea control systems. As with any fluid a complete materials review should always be carried out before using Brayco Micronic SV/200.

#### Metals to be avoided

Being a non-aqueous medium, galvanic corrosion is minimized and hence Castrol Brayco Micronic SV/200 is suitable for use where a wide variety of metals are used within the control system.

For coating compatibility data please contact Castrol Offshore.

Table 4

Fluid - Castrol Brayco Micronic SV/200 Elastomer & Plastic Compatibility		
Material	Compatibility	Comments
<i>Nitrile (NBR)</i>	Compatible	Widely used as standard seal material. Performance can vary according to grade.
<i>Hydrogenated Nitrile (HNBR)</i>	Compatible	
<i>Low permeability Nitrile</i>	Compatible	
<i>Fluorocarbon (FKM - Viton)</i>	Compatible	Performance can vary according to grade. Superior to Nitrile if higher temperatures involved (90°C or above)
<i>PTFE</i>	Compatible	Very inert, and suitable for high temperature and pressure applications.
<i>PEEK</i>	Compatible	Very inert, and suitable for high temperature and pressure applications.
<i>Perfluoroelastomer (FFKM - Chemraz)</i>	Compatible	Suitable for extreme temperature applications.
<i>Polyurethane</i>	Compatible	
<i>Ethylene Propylene (EPDM)</i>	Not compatible	<u>Important</u> EPDM is not suitable for use with any hydrocarbon based fluids or greases.
<i>Nylon 11</i>	Compatible	Tested to API 17 E
<i>Silicone</i>	Not compatible	

As with all elastomer compatibility testing, performance of materials can vary between manufacturers. The data reported above refer to "standard" compounds recognised by industry. In critical applications it is advisable to carry out additional testing on specific materials obtained from the component manufacturer.



### **Seal Materials to be avoided**

Ethylene Propylene rubbers (EPR, EPDM) are not compatible with Castrol Brayco Micronic SV/200. These materials must be changed out where equipment is to be used with Castrol Brayco Micronic SV/200

### **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.

### **Environmental Compliance**

In accordance with the OSPAR 2007 requirements, a CEFAS / DTi template and CHEMS shortform has been prepared for Castrol Brayco Micronic SV/200. These provide environmental information on Castrol Brayco Micronic SV/200 and indicate that the product contains some components marked for substitution. For more detailed information on environmental compliance please refer to the Castrol Brayco Micronic SV/200 environmental information sheet.

### **Product Supply**

Our products are available world-wide through our global sales and logistics network, with stocks held in all strategic offshore supply locations. All our Subsea products are supplied in 208 litre (55 US gallon) plastic drums as well as bulk containers and small packs; for details of specific packaging availability in your location contact your local Castrol Offshore sales office.

### **Storage**

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



## Health and Safety

The wearing of impervious PVC (or other suitable material) apron and gloves, together with eye protection is recommended. Contaminated clothing should be changed immediately and thoroughly cleansed before re-use. This applies especially to under garments.

Material safety data sheets are available for all Castrol subsea products from [www.subseadownloads.castrol.com](http://www.subseadownloads.castrol.com)

Or by contacting the addresses or website below.

## Disclaimer

Data reported in this datasheet are the result of work carried out in Castrol and other laboratories, and is believed to be accurate. Specific values are typical for the product, but must not be considered as constituting a specification.

Data included may be subject to revision, and additional data may be periodically added. Before using data in critical application, recipients are advised to consult Castrol Offshore at addresses below.

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## SYSTEM RELIABILITY

It must work: designing out all foreseeable early life and through life failures.

## ENVIRONMENTAL LEADERSHIP

Minimise environmental impact: preventing, reducing or eliminating pollution from subsea operations.

## GLOBAL SERVICE AND SUPPORT

Service excellence: we develop proactive, responsive and open relationships.

Authorised distributor of Castrol Offshore

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