

PELAGIC 100 Subsea Control Fluid

Subsea Production Control Fluid

Product Code: 114844

DESCRIPTION

PELAGIC 100 Subsea Control Fluid is a high performance, high temperature water based hydraulic fluid for use in open and closed loop Subsea Production control systems.

PELAGIC 100 has an operational temperature range from -25°C to 170°C (-13°F to 338°F). It is stable up to 190°C (374°F) & remains mobile until it freezes at <-30°C (<-22°F).

PELAGIC 100 Subsea Control Fluid offers excellent technical and environmental performance.

PELAGIC 100 Subsea Control Fluid contains a fluorescent leak tracer dye. PELAGIC 100 fluids are available with levels of glycol for all climates (PELAGIC 100 M for warm/tropical climates, PELAGIC 100 H for temperate climate & PELAGIC 100 HC for cold/arctic climates and hydrate resistance).

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

Features	Benefits
Stable up to 170°C / 338°F	Specified for high temperature wells, downhole temperature ≤170°C / 338°F (ISO 13628-6 & API 17F apply a 10°C safety margin)
Excellent corrosion protection (liquid & vapour phase) and lubrication properties	Ideal for projects with long design life (≥25 years) & recommended for long term equipment storage
Approved for use by major equipment manufacturers	Suitable for use in modern subsea production control equipment
Resistant to microbial infection	Extends operational life of fluid
Stable towards high levels of seawater ingress	No solids formation in hydraulic lines even with 10% seawater contamination
Fluorescent Dye	Aids identification and subsea leak detection
Fully compatible with other PELAGIC 100 fluids, OCEANIC HW 443, HW 500, HW 500 E, HW 500 P fluid ranges, HW 740 R & XT 900.	Facilitates flushing from one PELAGIC or OCEANIC control fluid to another



TECHNICAL DATA SHEET

Features	Benefits
Fully compatible with OCEANIC SST 5007 fluids, OCEANIC EPF, OCEANIC Glycol Mixes and OCEANIC 2/00 fluids	Enables flushing to and from OCEANIC preservation, storage & testing fluids
Excellent environmental profile	Meets stringent global environmental discharge regulations
Manufactured & supplied to AS4059 Class ≤6 cleanliness	Good cleanliness minimises equipment wear
Free Fluid Monitoring Program	Helps ensure long service life

PHYSICAL PROPERTIES

Property	Typical Value	Notes
Appearance	Clear Fluorescent Colourless fluid	$\lambda = 340 \text{ nm}$
pH	9.5	
Specific Gravity @15.6°C	1.05	
Kinematic Viscosity (cSt) 0°C (32°F) 20°C (68°F) 40°C (104°F)	9.1 4.0 2.2	
Pour Point	-30°C (<-22°F)	
Volumetric Coefficient of Thermal Expansion per °C	0.00062	Ambient Pressure
Bulk Modulus (Nm ⁻² x 10 ⁻⁹)	3.20	5°C
Compressibility (Bar)	3.28 x10 ⁻⁵	5°C
Specific Heat Capacity J.kg ⁻¹ .K ⁻¹	3445	
AS4059 Fluid Cleanliness Class	≤6	Filtration required to maintain Class



APPROVALS

API 6A Temperature Classification(s)

PELAGIC 100 Subsea Control Fluid is suitable for use in equipment designed to meet API 6A Classes P, R, S, T, U & V.

Equipment Manufacturers

Tested in accordance with FMC PRD 0000021632 Rev D, approved fluid of major equipment manufacturers.

Environmental

MacDermid maintain worldwide environmental approvals and can offer PELAGIC & OCEANIC Subsea production control fluids suitable for use in every Exploration & Production region around the world.

The current environmental status of PELAGIC 100 Subsea Control Fluid in your area can be obtained from our environmental specialists.

ISO 13628-6 : Design and Operation of Subsea Production Systems

Tested in accordance with ISO 13628-6 Annex C

Property	Performance
Thermal Stability – High Temperature	Stable at 170°C / 338°F (Stable @190°C / 374°F for >3 months)
Thermal Stability – Low Temperature	Stable at -25°C / -13°F
Thermal Stability – High Temperature with 10% Seawater contamination	Stable at 170°C / 338°F
Seawater compatibility	No visible solid or liquid separation with 10% seawater contamination.
Control Fluid compatibility	Compatible with all industry standard control fluids (e.g. OCEANIC HW 500 / HW 500 E / HW 500 P series, OCEANIC HW 443 Series, OCEANIC HW 740 R & Transaqua HT fluids)
Completion Fluid Compatibility	Compatible with monovalent completion brines (e.g. K formate & Cs formate). Flowable solids formed when mixed with divalent brines (e.g. CaCl ₂ , CaBr ₂ & ZnBr ₂).



TECHNICAL DATA SHEET

Property	Performance
Compatibility with Miscellaneous Operational Fluids	Compatible with methanol and up to 5% Hydrochloric acid contamination. Immiscible with Compensation fluid (Elf Nemis SN sank) and Reference oil (IRM903 floated)
Metal Compatibility	All ferrous metals tested met acceptance criteria at all test temperatures (5°C /41°F to 170°C / 338°F) Non-ferrous metals (Aluminium bronze, beryllium copper, WCNi and electroless Nickel) tarnish and corrosion rates increase with temperature and available air/oxygen. Borderline results observed with aluminium bronze & WCNi.
Elastomer Compatibility	NBR, HNBR, PTFE & PEEK compatible. FKM not recommended for use at ≥50 °C / 122°F.
Thermoplastic compatibility	Successful Umbilical hose pressure cycle test with Nylon 11 hose liner
Filterability	Excellent filterability, 90% (ISO13357-2, Stage II >80%)
Fluid Lubricity and Wear	Exceeds Falex & 4 Ball Test requirements (i.e. <25 in lb Torque with <40 wear teeth & <1.2mm 4 Ball MWSD)
Microbiological Resistance	No microbial activity after multiple challenges with mixed bacterial and fungal inoculum
Acid Buffer Capacity	Excellent buffer capacity (> 2.5% glycolic acid required to lower pH to <8
Metal Ion Compatibility	Good metal ion compatibility (>150ppm Ni or Cu ions required to form permanent solids)



MATERIAL COMPATIBILITY

PELAGIC 100 Subsea Control Fluid contains performance additives which ensure high levels of compatibility with materials typically used in subsea production control equipment. PELAGIC 100 contains a vapour phase corrosion inhibitor to protect small airspaces/headspaces where humidity/condensation from the control fluid could cause corrosion. Extensive material compatibility tests have been performed:

Material	Compatibility
Ferrous metals (cast iron, carbon steel, low & high alloy steels, stainless steels...)	Compatible
Non-ferrous metals (copper, brass, bronze)	Compatible with alloys typically used in subsea production control equipment.
Other metals and alloys (1)	Avoid Al, Cd, Mg, Pb and Zn metals. Aluminium has a tendency to blacken/tarnish. Hard anodizing improves compatibility, but is porous and susceptible when scratched.
Coatings and ceramic materials	Avoid porous coatings. Compatible with most ceramic parts. Check ceramic coatings
Packaging & sealing materials (2) (elastomers and thermoplastics)	Compatible with standard NBR, HNBR, FFKM, VMQ/FMVQ, CR, TFE/PTFE, PEEK. Some FKM & AU/EU/PU have proven to be incompatible at elevated temperature (i.e. $\geq 50^{\circ}\text{C}$ / 122°F)
Umbilical hose liner thermoplastics	Compatible with Nylon 11, PE and Polyether ester copolymers
Absorbent gasket materials	Avoid cork, leather, cotton impregnated materials
Paints	Avoid painting internal surfaces Cured epoxy, phenolic and nylon based paints are satisfactory. Avoid less resistant paints as they soften. Wash spillages immediately with water
Filter elements	Polypropylene and glass fiber filter elements recommended over paper filters

Note 1 : Alkaline fluids generally corrode these types of metal and alloys at rates that exceed guidance by ISO 13628-6 and API 17F. Processes such as hard anodizing of Aluminium have been reported to improve compatibility in certain cases.

Note 2 : As material compatibility varies from compound to compound and supplier to supplier, consult supplier for recommendations or request specific compatibility tests.



FLUID MONITORING PROGRAM

The Fluid Monitoring Program is designed to optimise fluid performance and service life. Fluid Monitoring laboratories are available on every continent, for your local laboratory, please contact MacDermid Offshore Solutions.

Sample test results are accessible via our secure website (www.macdermid.com/offshore).

FLUID MONITORING PROCEDURES & KITS

Sample frequency for Subsea Production Control fluids is typically 3-6 months. Fluid samples should be:

- good quality & representative of the system
- taken from a recognized sample point
- sufficient volume for all tests (typically 500ml/1 pint)
- taken in a clean container, suitable for transport
- in a clearly labelled container (Fluid Name, Sample Point, Installation/Site, Company Name and Date Taken) with any relevant comments & requests (e.g. Routine analysis, AS 4059 Cleanliness check, suspected contamination...)

Typical Fluid Sampling Procedure:

- Operate system for at least 30 minutes prior to sampling.
- Open sample point valve to produce a steady flow. Do not touch sample point again until sampling is complete.
- Flush valves and lines clean, into a catchment tray or bucket, with at least 500 ml (approximately 1 pint) of fluid.
- Inspect sample bottle and cap to ensure that they are visually clean.
- Collect at least 200ml without bottle or cap touching surfaces.
- Rinse the inner surfaces of the bottle and lid with the fluid and discard fluid.
- Repeat bottle flushing and rinsing steps
- Collect 250-500ml into sample bottle.
- Immediately cap and seal the sample bottle.
- Close the sampling point valve.
- Label sample fully, package securely and send to laboratory.

Sample bottles are available on request.

Fluid Cleanliness Kits:

Plant/Workshop Cleanliness Kit (Code# 5100550001)

Field/Offshore Cleanliness Kit (Code# 5100560001)



STORAGE INFORMATION

Recommended storage conditions are dictated by packaging, rather than the product.

Containers of PELAGIC 100 Subsea Control Fluid should be stored in dry conditions, ideally out of direct sunlight. Normal storage temperature range is -10°C (14°F) to 40°C (104°F).

Shelf life is 5 years from date of manufacture when sealed in the original packaging under recommended storage conditions.

Equipment containing PELAGIC 100 Subsea Control Fluid should be stored according to equipment manufacturer's recommendations. For guidance, in equipment PELAGIC 100 may be stored from -25°C (-13°F) to 50°C (122°F).

Fluid within equipment does not have a shelf/operational life. Regular condition checks on fluid are advised.



SAFETY & WARNING

MacDermid Offshore Solutions recommends that the company/operator read and review the Safety Data Sheets for the appropriate health and safety warnings before use.

Safety Data Sheets are available from MacDermid Offshore Solutions.

WASTE TREATMENT

Prior to using any recommendations or suggestions by MacDermid Offshore Solutions for waste treatment, the user is required to know the appropriate local/state/federal regulations for on-site or off-site treatment which may require permits. If there is any conflict regarding our recommendations, local/state/federal regulations take precedent.

ORDER INFORMATION

Product	Code
PELAGIC 100 Subsea Control Fluid	114844
PELAGIC 100 H	114852
PELAGIC 100 HC	114845
PELAGIC 100 M	114853

CONTACT INFORMATION

To confirm this is the most recent issue, please contact MacDermid Offshore Solutions

<http://www.macdermid.com/companies/macdermid-offshore-solutions>

USA / Americas MacDermid Offshore Solutions, LTD 223 N. Brockman St. Pasadena, TX 77506 USA Tel: 1.800.521.2589 +1.713.472.5081 offshore@macdermid.com	United Kingdom / EMEA MacDermid Offshore Solutions, UK Cale Lane, New Springs Wigan WN2 1 JR +44.(0).1942.501000 wigansales@macdermid.com	Australia/Asia Pacific MacDermid Offshore Solutions 29 Dennis Street Campbellfield, Melbourne Victoria 3061 +61.3.9303.5150 wigansales@macdermid.com
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Also read carefully warning and safety information on the Safety Data Sheet. This data sheet contains technical information required for safe and economical operation of this product. READ IT THOROUGHLY PRIOR TO PRODUCT USE. Emergency directory assistance Chemtrec 1 - 800 - 424 - 9300.

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