



Fluids and Lubricants Specifications

Battery Energy Storage System (BESS)
MTU EnergyPack QL
Version 2.0

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1 Preface

1.1 Preface

These Fluids and Lubricants Specifications apply for Battery Energy Storage Systems (BESS) manufactured by MTU. Coolants for the inverter cooler are specified.

Up-to-dateness of this document

The Fluids and Lubricants Specifications are revised or supplemented as required. Prior to operation, make sure that the latest version is used.

The most recent version can be consulted under: <http://www.mtu-solutions.com>. If you have any questions, your contact person will be happy to help you.

Safety data sheets for coolants

Safety data sheets for the various coolants may be obtained from the manufacturers concerned or from MTU.

Used symbols and means of representation

The following instructions are highlighted in the text and must be observed:

Important

This field contains product information which is important or useful for the user. It refers to instructions, work and activities that have to be observed to prevent damage or destruction to the material.

Note:

A note provides special instructions that must be observed when performing a task.

Definition of MTU

MTU refers to Rolls-Royce Power Systems AG and MTU Friedrichshafen GmbH or an affiliated company pursuant to Section §15 AktG (German Stock Corporation Act) or a controlled company (joint venture).

2 Coolants

2.1 Coolants – General information

Definition of coolant

Coolant = coolant additive (concentrate) + freshwater to predefined mixing ratio ready for use in the inverter cooler.

The corrosion-inhibiting effect of coolant is only ensured with the coolant circuit fully filled.

Coolants must be prepared from suitable freshwater and a coolant additive. For coolant additives see (→ Page 7).

Coolant must be prepared outside the Battery Energy Storage System.

Important

Mixing of different coolant additives and supplementary additives is prohibited.
Flushing with suitable freshwater is required when changing to a different coolant product.

Cooling system damage – Prevention

- When topping up (following loss of coolant) it must be ensured that not only water but also concentrate is added. The specified antifreeze and/or corrosion inhibitor concentration must be maintained.
- Use antifreeze mixed to 35% +/- 1% by volume (anti-freeze protection down to -20 °C).
- Coolant circuits can not be completely drained as a rule. This means that residual quantities of old coolant or freshwater from the flushing process remain in the circuit. These residual quantities may dilute the coolant being filled. Check the coolant concentration in the coolant circuit and adjust as necessary.

Important

To ensure corrosion protection, the inverter cooler should never be operated with pure water without adding a recommended anti-corrosion and antifreeze agent.

2.2 Requirements imposed on freshwater

Only use clean, clear tap water to prepare the coolant. For water limit values see (→ Table 1).

If the limit values for the water are exceeded, hardness or mineral content can be decreased by adding demineralized water.

Parameters	Minimum	Maximum
Sum of alkaline earth metals *) (Water hardness)	0 mmol/l 0°d	2.7 mmol/l 15°d
pH value at 20 °C	5.5	8.0
Chloride ions		100 mg/l
Sulphate ions		100 mg/l
Total chloride + sulfate ions		200 mg/l
Bacteria		10 ³ cfu (colony forming unit)/ml
Fungi, yeasts	are not permitted!	

Table 1: Limit values of water for preparing coolants

*) Common designations for water hardness in various countries:

1 mmol/l = 5.6°d = 100 mg/kg CaCO₃

- 1°d = 17.9 mg/kg CaCO₃, USA hardness
- 1°d = 1.79° French hardness
- 1°d = 1.25° English hardness

2.3 Antifreeze

Only use coolants offering protection from freezing as the inverter cooler requires frost protection.

Note:

Rolls-Royce Power Systems and its subsidiaries do not provide the coolant.

The recommended antifreeze agents listed below offer good corrosion protection when used in the specified concentration.

The antifreeze concentration must be determined not only in accordance with the minimum anticipated temperatures but also with the corrosion protection requirements.

The inverter cooler manufacturer lists the following approved antifreeze agents as being permissible for use, see (→ Table 2).

Manufacturer	Brand name	Base	Minimum concentration to maintain freeze protection at -20 °C
BASF SE	Glysantin® G30® pink	MEG*	35% +/- 1% by volume
Clariant	Antifrogen® N	MEG*	35% +/- 1% by volume

* MEG = Monoethylene glycol

Table 2: Approved antifreeze recommended by the inverter cooler manufacturer

Based on field experience of inverter coolers, another antifreeze has proven effective, see (→ Table 3).

Manufacturer	Brand name	Base	Minimum concentration to maintain freeze protection at -20 °C
pro KÜHLSOLE GmbH	Glykosol N	MEG*	35% +/- 1% by volume

* MEG = Monoethylene glycol

Table 3: Recommended antifreeze based on field experience

Additional information provided by the relevant coolant manufacturer must be observed (storage, inspection intervals, etc.).

Note:

The inverter cooler manufacturer specifies the exclusive use of pure, low-viscosity, non-aggressive coolants.

The coolants must be free of any solid or long-fiber constituents, as well as admixtures of mineral oils.

The inverter cooler must not be operated with inflammable liquids, e.g. diesel or other fuels.

2.4 Operational monitoring

Inspection of the freshwater and continuous monitoring of the coolant are essential for trouble-free operation of the Battery Energy Storage System.

The freshwater and the coolant must be checked once a year or whenever it is filled up in accordance with the Maintenance Schedule.

Coolant monitoring

A hand-held corrosion antifreeze refractometer can be used to determine the antifreeze concentration in the field. Measuring must take place at the intervals specified in the Maintenance Schedule and in the event of any changes to the coolant, e.g. filling up after discovering a leak.

We also recommend determining the pH value of the coolant with the aid of pH measuring strips. The pH value should range between 7.5 to 9. Observe the specifications of the coolant manufacturer concerned.

The results must be recorded and retained as they may have to be submitted to MTU if necessary.

In addition to determining the antifreeze concentration, the effectiveness of the corrosion protection must also be checked at regular intervals. Coolant manufacturers among others offer such analyses.

Note:

For a holistic assessment of a coolant functionality, the respective coolant-specific characteristic data as well as the freshwater quality used must be taken into account in addition to limit values.

2.5 Coolant concentrates – Storage capability

The storage capability specifications refer to coolant concentrates in original, hermetically sealed packing with storage temperatures up to max. 30 °C.

The instructions of the manufacturer must also be observed.

Limit value	Brand name / Remarks
2 years	Clariant Antifrogen® N
3 years	BASF Glycantin® G30® pink
	Glykosol N

Table 4: Coolant concentrates – Storage capability

Important
<p>For reasons of corrosion protection, do not store in galvanized containers. Take this requirement into account when transferring coolant.</p> <p>Containers must be hermetically sealed and stored in a cool, dry place.</p> <p>Frost protection must be provided in winter.</p> <p>Further information can be obtained from the product and safety data sheets for the individual coolants. The relevant safety data sheet may be obtained from the manufacturer concerned or from MTU.</p>

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