

SUB-COMMITTEE ON SHIP DESIGN AND
CONSTRUCTION
6th session
Agenda item 9

SDC 6/9/4
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**UNIFIED INTERPRETATION TO PROVISIONS OF IMO SAFETY, SECURITY,
AND ENVIRONMENT-RELATED CONVENTIONS**

**IACS Unified Interpretation (UI) SC123 machinery installations –
service tank arrangements**

Submitted by IACS

SUMMARY

Executive summary: This document provides in the annex the latest version of IACS UI SC123, which has been developed to facilitate the consistent and global implementation of SOLAS regulation II-1/26.11

*Strategic direction,
if applicable:* 6

Output: 6.1

Action to be taken: Paragraph 9

Related documents: None

Introduction

1 IACS members, in their capacities as Recognized Organizations, have discussed and reviewed typical fuel oil service tank arrangements for vessels trading in Emission Control Areas (ECAs) that use both low sulphur distillate and residual grade fuel oils. As a consequence, IACS has identified the need to revise its Unified Interpretation UI SC123.

2 The latest version of IACS UI SC123 presents examples for equivalent service tank arrangements for low sulphur distillate and residual grade fuel oils. It also addresses the issue of fuel switchover. Definitions of the fuel types have also been clarified.

Discussion

3 SOLAS regulation II-1/26.11 states:

"(...) Two fuel oil service tanks for each type of fuel used on board necessary for propulsion and vital systems or equivalent arrangements shall be provided on each new ship, with a capacity of at least 8 h at maximum continuous rating of the propulsion plant and normal operating load at sea of the generator plant."

4 The requirement to use fuel oil with a maximum sulphur content of 0.1% m/m within an ECA necessitates tank arrangements that satisfy the safety objectives of SOLAS regulation II-1/26.11. Recognizing the underlying SOLAS safety objective of maintaining an appropriate amount and quality of fuel readily available for propulsion machinery and "vital systems" (such a generators), the existing definitions of equivalency in IACS UI SC123 needed to be revised to recognise the use of low sulphur fuels.

5 Distillate fuel oil having minimal sulphur content (maximum of 0.1% m/m) and having low viscosity allows for direct injection to the engines without further conditioning. However, residual grades are expected to be stored under elevated temperatures in service tanks and further heated to the correct viscosity prior to injection into the engines.

6 Emergency conditions that necessitate the rapid switchover between low viscosity distillates and higher temperature and higher viscosity residual grades of fuel oil, may result in hazards which could adversely affect the engines.

7 During the revision of IACS UI SC123, the following issues have been considered:

- .1 typical fuel oil service tank arrangements for new and retrofitted vessels trading in ECAs that use low sulphur and residual grade fuels oils;
- .2 the potential hazards resulting from the emergency changeover of fuel oil of one grade to another; and
- .3 technical guidance from third parties, such as the temperature gradient in the fuel, as advised by engine manufacturers, to mitigate the risk of seizure in fuel injection equipment.

8 Based on the above, IACS has revised its UI SC123 and the latest version is provided in the annex. The Sub-Committee is invited to note that IACS members will implement revision 4 of UI SC123 from 1 January 2020, unless they are provided with written instructions to apply a different interpretation by the Administration on whose behalf they are authorized to act as a recognized organization.

Action requested of the Sub-Committee

9 The Sub-Committee is invited to:

- .1 consider the comments provided in paragraphs 4 to 7 above and the latest version of IACS UI SC123, as provided in the annex;
- .2 note the implementation provisions for IACS members, as discussed in paragraph 8 above; and
- .3 take action, as appropriate.

ANNEX

SC MACHINERY INSTALLATIONS – SERVICE TANK ARRANGEMENTS

123

(1998)

(Rev.1

Apr

1998)

(Rev.2

June

2002)

(Rev.3

Dec

2005)

(Rev.4

Nov

2018)

SOLAS Regulation II-1/26.11 states:

Two fuel oil service tanks for each **type of fuel** used on board necessary for propulsion and vital systems or **equivalent arrangements** shall be provided on each new ship, with a capacity of at least 8 h at maximum continuous rating of the propulsion plant and normal operating load at sea of the generator plant.

Interpretation

This requirement was derived from the need to have fuel immediately ready for use in the event of catastrophic contamination (e.g. by water ingress) of the fuel service tank in use.

Arrangements complying with this regulation and acceptable "equivalent arrangements", for the most commonly utilised fuel systems, are shown below.

A service tank is a fuel oil tank which contains only fuel of a quality ready for use i.e. fuel of a grade and quality that meet the specification required by the equipment manufacturer. A service tank is to be declared as such and not to be used for any other purpose.

Use of a settling tank with or without purifiers, or purifiers alone, and one service tank is not acceptable as an "equivalent arrangement" to two service tanks.

Notes:

1. This Unified Interpretation is to be applied by IACS Members and Associates to all ships subject to the relevant SOLAS Regulation.
2. Changes introduced in Rev.2 are to be uniformly implemented by IACS Members and Associates from 1 January 2003.
3. Changes introduced in Rev.3 are to be uniformly implemented by IACS Members and Associate from 1 July 2006.
4. Rev.4 of this UI is to be uniformly implemented by IACS Societies on service tank arrangements on ships contracted for construction on or after 1 January 2020.
5. The "contracted for construction" date means the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. For further details regarding the date of "contract for construction", refer to IACS Procedural Requirement (PR) No. 29.

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"Type of fuel" is strictly interpreted as the exact grade of fuel. "Equivalent arrangements" to this are described in the examples below where grades of fuel may be grouped according to their sulphur content and viscosity as follows:

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- .1 Residual Marine Fuel (RMF) refers to fuel oils with a sulphur content above 0.1% that require some form of heating to achieve required injection viscosity for combustion.
- .2 Distillate Marine Fuel (DMF) refers to fuel oils with a sulphur content above 0.1% that do not require heating to achieve injection viscosity.
- .3 Low Sulphur Residual Marine Fuel (LSRMF) refers to fuel oils with a sulphur content not exceeding 0.1% that require some form of heating to achieve required injection viscosity for combustion.
- .4 Low Sulphur Distillate Marine Fuel (LSDMF) refers to fuel oils with a sulphur content not exceeding 0.1% having a minimum viscosity of 1.4 cSt at 40°C.

1. Example 1

1.1 Requirement according to SOLAS – Main and Auxiliary Engines and Boiler(s) operating with Residual Marine Fuels (RMF and LSRMF) (one fuel ship)

RMF/LSRMF Serv. TK 1 Capacity for at least 8 h Main Eng. + Aux. Boiler + Aux. Eng.	RMF/LSRMF Serv. TK 2 Capacity for at least 8 h Main Eng. + Aux. Boiler + Aux. Eng.	DMF/LSDMF TK For initial cold starting or repair work of Engines/Boiler or ECA operation
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1.2 Potential equivalent arrangement*

RMF/LSRMF Serv. TK Capacity for at least 8 h Main Eng. + Aux. Boiler + Aux. Eng.	DMF/LSDMF Serv. TK Capacity for at least 8 h Main Eng. + Aux. Boiler + Aux. Eng. or ECA operation
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This arrangement only applies where main and auxiliary engines can operate with RMF/LSRMF under all load conditions and, in the case of main engines, during manoeuvring.

For pilot burners of Auxiliary Boilers if provided, an additional DMF tank for 8 hours may be necessary.

* Conditions apply – See paragraph 3 below.

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(cont))

2. Example 2

2.1 Requirement according to SOLAS – Main Engine(s) and Auxiliary Boiler(s) can operate on both Residual Marine Fuels (RMF and LSRMF) and Distillate Marine fuels (DMF and LSDMF). Auxiliary Engines can only operate on Distillate Marine fuels (DMF and LSDMF) (multiple fuel ship).

RMF/LSRMF Serv. TK 1 Capacity for at least 8 h Main Eng. + Aux. Boiler	RMF/LSRMF Serv. TK 2 Capacity for at least 8 h Main Eng. + Aux. Boiler	DMF/LSDMF Serv. TK 1 Capacity for at least 8 h Main Eng. + Aux. Boiler + Aux. Eng.	DMF/LSDMF Serv. TK 2 Capacity for at least 8 h Main Eng. + Aux. Boiler + Aux. Eng.
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2.2 Potential equivalent arrangement*

RMF/LSRMF Serv. TK Capacity for at least 8 h Main Eng. + Aux. Boiler	DMF/LSDMF Serv. TK 1 Capacity for at least: 4 h Main Eng. + Aux. Boiler and 8 h Aux. Eng.	DMF/LSDMF Serv. TK 2 Capacity for at least: 4 h Main Eng. + Aux. Boiler and 8 h Aux. Eng.
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3. The potential equivalent arrangements in 1.2 and 2.2 are acceptable, provided the propulsion and vital systems which use the two types of fuel support an emergency fuel changeover and are capable of operating in all normal operating conditions at sea with both types of fuel. The emergency fuel changeover, including the following, should be able to be carried out within the time not exceeding 1 hour:

- Open and shut relevant changeover valves (to/from RMF/LSRMF and DMF/LSDMF service tanks or mixing valves, valves in fuel return pipes to RMF/LSRMF and DMF/LSDMF service tanks).
- Open and shut off heat tracing of fuel pipes.
- Open and shut valves to fuel heaters and coolers.
- Starting/stopping of pumps (if separate DMF/LSDMF and RMF/LSRMF pumps are provided).
- Taking into consideration the machinery manufacturers recommendations for safe changeover (e.g. prevention of temperature shock).

The emergency changeover procedure is to be kept available on board the ship.

* Conditions apply – See paragraph 3 below.