

INDIAN REGISTER OF SHIPPING

# CLASSIFICATION NOTES

## Fuel Oil Treatment System

*Revision-1, July 2021*



**IRCLASS**  
Indian Register of Shipping

**CLASSIFICATION NOTES****Fuel Oil Treatment System****Rev-1, July 2021****TABLE 1 – AMENDMENTS INCORPORATED IN THIS VERSION***These amendments will come into force on 1 July 2021*

<b>Clause</b>	<b>Subject/ Amendments</b>
<b>Section 1 : Introduction</b>	
1.1.2	Term 'requirements' is deleted.
<b>Section 2 : Treatment of Fuel on-board ships</b>	
2.2.1	Editorial amendments are made to the definition for 'service tank'.
2.2.2	The definition for 'fuel oil' is amended to include petroleum fuels used in other machinery.
2.2.3	It is clarified that the fuel oil treatment system does not cover the use of additives.
2.4.1, 2.4.3.2.4, 2.4.3.2.5, 2.5.1.6.2.2, 2.5.5.5.1.2	The referenced standards are updated.
2.4.2.2	Referenced IMO MEPC Circular is updated.
2.5.1.2.1, 2.5.1.5.1, 2.5.2.1, 2.5.2.2, 2.5.4.2.1, 2.5.4.5.1,	Editorial changes are made to better clarify the requirements.
<b>Section 3 : Test Procedures to confirm the ability of RMF fuel oil pumps operation with marine fuels with low viscosity</b>	
3.1.1	It is clarified that requirements in Section 3 are applicable when operating with low viscosity marine fuels.
3.3.1.1	It is specified that fuel oil pumps may be manufactured and tested under an Alternative Certification Scheme in accordance with Pt.1 Ch.1, Sec 4 of Rules and Regulations for the Construction and Classification of Steel Ships.
3.3.2.1, 3.3.2.2, 3.3.2.5	The referenced standards are updated.

# **CLASSIFICATION NOTES**

## **Fuel Oil Treatment System**

**Revision -1  
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### **Contents**

#### **Section**

- 1 Introduction
- 2 Treatment of Fuel Oil on Board Ships
- 3 Test Procedures to confirm the ability of RMF fuel oil pumps operation with marine fuels with low viscosity

## Section 1

### Introduction

#### 1.1. Background

1.1.2 This document recognizes that there is a disparity between the quality of fuel bunkered and delivered in accordance with ISO 8217: 2017, and the fuel quality typically specified by marine diesel engine manufacturers. The performance of the system and equipment contained in fuel oil treatment system is fundamental to reducing the level of contaminants to within the oil fuelled machinery manufacturers specifications.

## Section 2

### Treatment of Fuel Oil on Board Ships

#### 2.2 Definitions

2.2.1 A **service tank** is a fuel oil tank intended to contain only fuel of a quality ready for use, i.e. fuel with properties that meet the specification recommended by the equipment manufacturer.

2.2.2 **Fuel oil** means petroleum fuels for use in marine diesel engines and other machinery.

2.2.3 **Fuel oil treatment system** means a system intended for:

- Cleaning of the fuel oil by removal of water, catalyst fines (cat fines), water bound ash constituents (e.g. sodium) and particulate matter,
- Conditioning of the fuel oil to ensure efficient combustion.

(Note: The 'fuel oil treatment system' does not cover the use of additives.)

#### 2.4 System interfaces

2.4.1 Bunkered fuels are to meet the requirements of ISO 8217:2017 or an oil fuelled machinery manufacturers' specification.

#### 2.4.2 Locations of sampling points

2.4.2.2 The sampling points are to meet the requirements of MEPC.1/Circ.864/ Rev.1 '*Guidelines for on board sampling and verification of the sulphur content of the fuel oil used on board ships*' and are to be located as follows:

- .1 after the transfer pump discharge,
- .2 before and after the fuel cleaning equipment, and
- .3 after the fuel oil service tank, before any fuel change over valve,
- .4 before fuel enters the oil fuelled machinery.

### **2.4.3 Verification requirements**

#### 2.4.3.2 Shipboard verification

2.4.3.2.4 Records of fuel sample analysis according to the relevant revision ISO 8217:2017 is to be retained on board the ship and should be presented to the surveyor during regular surveys.

2.4.3.2.5 It is recommended that a drip sample of fuel should be taken during bunkering in accordance with ISO 13739:2020, in particular its Section 9 and taking into account ISO 3170:2004 for manual sampling or ISO 3171:1988 for automatic sampling as applicable.

### **2.5 Equipment level requirements**

#### **2.5.1 Fuel tanks**

##### **2.5.1.2 Performance requirements**

2.5.1.2.1 Provisions are to be made so that fuel is maintained at a temperature commensurate with the needs of system equipment to function in accordance with manufacturers' requirements.

##### **2.5.1.5 Physical characteristics**

2.5.1.5.1 The bottom of fuel settling tanks and fuel service tank are to slope towards the drainage outlet.

##### **2.5.1.6 Verification requirements**

###### 2.5.1.6.2 Factory acceptance testing

- .1 The sampling device is to be one of the following types:
  - a) manual valve-setting continuous-drip sampler; or
  - b) time-proportional automatic sampler; or
  - c) flow-proportional automatic sampler.
- .2 The sampling device is to be as per recognized standards such as ISO 3170:2004 or ASTM D 4057:2019.

## **2.5.2 Fuel temperature management equipment**

### **2.5.2.1 Functional requirements**

2.5.2.1.2 When the engines use low viscosity DMF (~ 2.0 – 3.0 cSt at 40 °C) it is recommended to install a cooler to the fuel oil return line to ensure that minimum fuel injection viscosity specified by the equipment manufacturers can be maintained.

### **2.5.2.2 Performance requirements**

2.5.2.2.2 Automatic viscosity controllers are to be provided as the primary means to control required injection viscosity with manual temperature control being only a secondary back up option in order to ensure that the broadening range of fuel formulations to meet the lower sulphur limits for both inside and outside ECA-SOx operations is addressed smoothly and not overlooked by the crew.

## **2.5.4 Filters**

### **2.5.4.2 Performance requirements**

2.5.4.2.1 Capacity of fuel filters is to be sufficient to reduce the level of contaminants in the fuel to a level commensurate with the downstream equipment manufacturers' specifications.

### **2.5.4.5 Physical characteristics**

2.5.4.5.1 Filters are to be fitted in the fuel oil supply lines to each oil fuelled machinery to ensure that only suitably filtered oil is fed to the combustion system.

## **2.5.5 Centrifugal Separators**

### **2.5.5.5 Verification requirements**

#### **2.5.5.5.1 Approval**

.1 Centrifugal separators are to be certified for a flow rating in accordance with a recognised standard, e.g. CEN Workshop Agreement (CWA) 15375 (latest revision).

.2 Centrifugal separators are to meet the safety requirements of a recognized standard, e.g. EN 12547:2014, Centrifuges — Common safety requirements.

## Section 3

### Test Procedures to confirm the ability of RMF fuel oil pumps operation with marine fuels with low viscosity

#### 3.1 Application

3.1.1 The following requirements are to be applied to the fuel oil pumps used in the fuel oil treatment and transfer systems when operating with marine fuels with low viscosity.

#### 3.3 Tests procedures to confirm the ability of HFO fuel oil pumps operation with marine fuels with a sulphur content of 0.10% and a minimum viscosity of 2,0 cSt

##### 3.3.1 Type testing

3.3.1.1 Each fuel oil pump intended for use in a fuel oil system on board a ship is to be subjected to testing in the presence of a surveyor. As an alternative, fuel oil pumps may be manufactured and tested under an Alternative Certification Scheme, see *Pt.1 Ch.1, Sec 4 of Rules and Regulations for the Construction and Classification of Steel Ships*.

3.3.1.2 Type tests carried out for a particular type of pump will be accepted for all pumps of the same type built by both Licensors and Licensees.

##### 3.3.2 Running test

3.3.2.1 A running test is to be carried out with a minimum or lower viscosity fuel oil with a sulphur content of 0.10 % m/m or less specified in ISO 8217:2017 Specifications for Marine Fuels; recommended fuel oil viscosity value for the test should be 2 cSt at the fuel pump.

3.3.2.2 The lubricity of fuel oil for running test is to be less than 520  $\mu\text{m}$  as determined by a high-frequency reciprocating rig test according to ISO 12156-1:2018.

3.3.2.3 The running test is to be conducted for a minimum of 250 hours for pumps for both continuous and non-continuous operation and at a discharge pressure equal to the nominal pump pressure rating.

3.3.2.4 During the running test the following data is to be verified:

- a) volume rate of flow  $Q$  [ $\text{m}^3/\text{h}$ ]
- b) delivery head  $H$  [ $\text{m}$ ]

c) pump power input P [kW]

d) speed of rotation n [min<sup>-1</sup>]

3.3.2.5 During the running test, the pump is to be checked for smooth running (for example ISO 10816 series and/or ISO 20816-1:2016 could be used as a basis for acceptance) and bearing temperature. The assessment is to be based on a recognized international standard. This may be based on the pump manufacturer's in-house testing procedures in agreement with IRS.

### **End of Classification Note**