



# Service News



## Use of Low-Sulfur Fuel Oil for MIURA Boilers

We inform you of our compliance with SOx emission regulation from 2020.

Depending on the type or the dynamic viscosity range of the fuel oil, it may be necessary to replace with the new fuel oil pump or the alarm sensor.

Refer to the attached documents (No. HAKU-HH-19020, HAKU-HH-19036) and let us know if you would like to request a quotation due to the above changes. Our engineer will send you the quotation.

<Subject model>

Boiler model	Boiler type
GK, GK-S	Composite boiler
VWH	Auxiliary boiler
HB, HB-T	Auxiliary boiler
HTB	Thermal oil heater

<Subject machinery>

Fuel oil pump, Fuel oil booster pump, Fuel oil temperature sensor

If you have any questions, please contact nearest MIURA's office.

## Use of Low-Sulfur Fuel Oil (ULSFO, VLSFO) for Our Boilers

The document summarizes our compliance with SOx emission regulation from 2020.  
Please confirm the corresponding method for each equipment.

### 1. Combustion performance

The use of the low-sulfur fuel oil does not affect the combustion performance of the burner.  
Although the combustion amount may be low depending on the burner types when the fuel oil viscosity decreases, the burner can be used without combustion adjustment. If the evaporation amount is extremely insufficient or the combustion condition worsens, please contact us for assistance.

### 2. Lubricity of the fuel oil pump

The ULSFO-DM or VLSFO-DM, previously defined as the MGO (DMA, DMZ) has low viscosity and poor lubricity. Such fuel oils will cause the fuel oil pump lock, so it is necessary to replace the pump with new one available for the low-sulfur fuel oil. The table below shows the fuel oil pumps currently used for our boilers. When the dynamic viscosity becomes significantly low than the conventional HFO during use of the ULSFO or VLSFO-RM, the fuel oil sensor may need to be modified.  
Please refer to the Attachment 1 for the definition of each fuel oil.

Boiler model	Fuel oil pump type	Available fuel oil
GK (all models using pilot burner), HB-025 to 18, VWH-400 to 2500, HTB (all models)	GFS-VEAD	ULSFO/VLSFO-DM *Available for MGO
GK (burner: 800 kg/h or less), VWH-400 to 1200, HTB-20 to 60 (pilot burner for cape bulk)	GFH-V3S	ULSFO/VLSFO-DM (DMB grade) ULSFO/VLSFO-RM/ HSHFO (380 cSt at 50°C)
GK (burner: 1000 kg/h or more), HB-025, VWH-1600 to 2500, HTB-80 to 150	GD-202H	
HB-03 to 05, HTB-175 to 250, HB-08T to 18T (using pilot burner)	GD-204H	
HB-06 and 08 (old models), HTB-300	GD-206H	
HB-08 to 12, HB-08T to 12T	25-6L8D-M	
HB-15 and 18, HB-15T and 18T	38-4LXA-M	ULSFO/VLSFO-DM ULSFO/VLSFO-RM HSHFO *Available for MGO
GK (all models), VWH (all models), HTB-30 to 100	PON-6, TAR	
HB-08T to 20T	MSE-2XA MSE-3XA	

Incinerator model	Fuel oil pump type	Available fuel oil
BGW-N (all models using waste oil burner)	TOP-21x	ULSFO/VLSFO-DM ULSFO/VLSFO-RM HSHFO *Available for MGO
BGW-N (all models using pilot burner)	VSKX125	ULSFO/VLSFO-DM *Available for MGO



3. Fuel oil booster pump

A fuel oil booster pump may be attached as an accessory for our boilers. Unlike the table above, when using not only the MGO (DMA, DMZ) but also the low-sulfur fuel oil with sulfur of 0.5% or less, replacement with new pump is required. The fuel oil booster pumps currently used for our boilers are as follows.

Boiler model	Fuel oil booster type		Available fuel oil
GK, HB, VWH, HTB (all models)	NHG-OOMA(B)	M-OOB	HSFHO
		M-OOBL	ULSFO, VLSFO, HSHFO *Available for the low-sulfur fuel oil

When you plan to use the low-sulfur fuel oil for our boilers, feel free to contact us.

<Attachment>

Attachment 1: Definition of Fuel Oils

Attachment 2: ISO8217-2017 FUEL STANDARD

## Attachment 1: Definition of Fuel Oils

Table 1 Classification of marine fuel oil in ISO8217:2017

Abbreviation	Classification of marine fuel	Description
DM	Distillate Marine Fuels	Fuel oils which the specifications of Distillate Oil required in ISO 8217:2017 are applied to (e.g. DMX, DMA, DMZ, DMB)
RM	Residual Marine Fuels	Fuel oils which specifications of Residual Oil required in ISO 8217:2017 are applied to (e.g. RMD80, RMG180)

Table 2 Fuel oil defined in accordance with their sulfur contents

Abbreviation	Generic term	Description
ULSFO	Ultra-Low Sulfur Fuel Oil	Fuel oils compliant with 0.10% sulfur limit required. It is subdivided into ULSFO-DM and ULSFO-RM depending on the production process.
VLSFO	Very Low Sulfur Fuel Oil	Fuel oils compliant with 0.50% sulfur limit required. It is subdivided into VLSFO-DM and VLSFO-RM depending on the production process.
HSFO	High Sulfur Heavy Fuel Oil	Fuel oils with a sulfur content of more than 0.50%.

## Attachment2: ISO8217-2017 FUEL STANDARD

# ISO 8217 2017 FUEL STANDARD

ISO 8217 2017 Fuel Standard  
for marine distillate fuels

### REQUIREMENTS FOR MARINE DISTILLATE FUELS

Characteristic	Unit	Limit	Category ISO-F-							Test method(s) and references
			DMX	DMA	DFA	DMZ	DFZ	DMB	DFB	
Kinematic viscosity at 40 °C	mm <sup>2</sup> /s <sup>a</sup>	Max	5,500	6,000		6,000		11,00		ISO 3104
		Min	1,400	2,000		3,000		2,000		
Density at 15 °C	kg/m <sup>3</sup>	Max	–	890,0		890,0		900,0		ISO 3675 or ISO 12185; see 6.1
Cetane index	–	Min	45	40		40		35		ISO 4264
Sulfur <sup>b</sup>	mass %	Max	1,00	1,00		1,00		1,50		ISO 8754 or ISO 14596, ASTM D4294; see 6.3
Flash point	°C	Min	43,0	60,0		60,0		60,0		ISO 2719; see 6.4
Hydrogen sulfide	mg/kg	Max	2,00	2,00		2,00		2,00		IP 570; see 6.5
Acid number	mg KOH/g	Max	0,5	0,5		0,5		0,5		ASTM D664; see 6.6
Total sediment by hot filtration	mass %	Max	–	–		–		0,10 <sup>c</sup>		ISO 10307-1; see 6.8
Oxidation stability	g/m <sup>3</sup>	Max	25	25		25		25 <sup>d</sup>		ISO 12205
Fatty acid methyl ester (FAME) <sup>e</sup>	volume %	Max	–	–	7,0	–	7,0	–	7,0	ASTM D7963 or IP 579; see 6.10
Carbon residue – Micro method on the 10 % volume distillation residue	mass %	Max	0,30	0,30		0,30		–		ISO 10370
Carbon residue – Micro method	mass %	Max	–	–		–		0,30		ISO 10370
Cloud point <sup>f</sup>	winter	°C	Max	–16	report	report		–		ISO 3015; see 6.11
	summer	°C	Max	–16	–	–		–		
Cold filter plugging point <sup>f</sup>	winter	°C	Max	–	report	report		–		IP 309 or IP 612; see 6.11
	summer	°C	Max	–	–	–		–		
Pour point (upper) <sup>f</sup>	winter	°C	Max	–	– 6	– 6		0		ISO 3016; see 6.11
	summer	°C	Max	–	0	0		6		
Appearance			Clear and Bright <sup>g</sup>					<sup>c</sup>		see 6.12
Water	volume %	Max	–	–		–		0,30 <sup>c</sup>		ISO 3733
Ash	mass %	Max	0,010	0,010		0,010		0,010		ISO 6245
Lubricity, corrected wear scar diameter (WSD) at 60 °C <sup>h</sup>	µm	Max	520	520		520		520 <sup>d</sup>		ISO 12156-1

<sup>a</sup> 1 mm<sup>2</sup>/s = 1 cSt.

<sup>b</sup> Notwithstanding the limits given, the purchaser shall define the maximum sulfur content in accordance with relevant statutory limitations. See Introduction.

<sup>c</sup> If the sample is not clear and bright, the total sediment by hot filtration and water tests shall be required, see 6.8 and 6.12.

<sup>d</sup> If the sample is not clear and bright, the test cannot be undertaken and therefore, compliance with this limit cannot be shown.

<sup>e</sup> See 5.1 and Annex A.

<sup>f</sup> Pour point cannot guarantee operability for all ships in all climates. The purchaser should confirm that the cold flow characteristics (pour point, cloud point, cold filter, plugging point) are suitable for the ship's design and intended voyage. See 6.11.

<sup>g</sup> If the sample is dyed and not transparent, then the water limit and test method as given in 6.12 shall apply.

<sup>h</sup> This requirement is applicable to fuels with a sulfur content below 500 mg/kg (0,050 mass %).

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## Attachment2: ISO8217-2017 FUEL STANDARD

# ISO 8217 2017 FUEL STANDARD

ISO 8217 2017 Fuel Standard  
for marine residual fuels

### REQUIREMENTS FOR MARINE RESIDUAL FUELS

Characteristic	Unit	Limit	Category ISO-F-											Test method reference	
			RMA	RMB	RMD	RME	RMG				RMK				
			10	30	80	180	180	380	500	700	380	500	700		
Kinematic viscosity at 50 °C	mm²/s <sup>a</sup>	Max	10,00	30,00	80,00	180,0	180,0	380,0	500,0	700,0	380,0	500,0	700,0	ISO 3104	
Density at 15 °C	kg/m³	Max	920,0	960,0	975,0	991,0	991,0				1010,0			ISO 3675 or ISO 12185; see 6.1	
CCAI	—	Max	850	860	860	860	870				870			see 6.2	
Sulfur <sup>b</sup>	mass %	Max	Statutory requirements											ISO 8754 or ISO 14596 or ASTM D4294; see 6.3	
Flash point	°C	Min	60,0	60,0	60,0	60,0	60,0				60,0			ISO 2719; see 6.4	
Hydrogen sulfide	mg/kg	Max	2,00	2,00	2,00	2,00	2,00				2,00			IP 570; see 6.5	
Acid number <sup>c</sup>	mg KOH/g	Max	2.5	2.5	2.5	2.5	2.5				2.5			ASTM D664; see 6.6	
Total sediment – Aged	mass %	Max	0.10	0.10	0.10	0.10	0.10				0.10			ISO 10307-2; see 6.9	
Carbon residue – Micro method	mass %	Max	2.50	10,00	14,00	15,00	18,00				20,00			ISO 10370	
Pour point (upper) <sup>d</sup>	winter	°C	Max	0	0	30	30	30				30			ISO 3016
	summer	°C	Max	6	6	30	30	30				30			
Water	volume %	Max	0.30	0.50	0.50	0.50	0.50				0.50			ISO 3733	
Ash	mass %	Max	0.040	0.070	0.070	0.070	0.100				0.150			ISO 6245	
Vanadium	mg/kg	Max	50	150	150	150	350				450			IP 501, IP 470 or ISC 14597; see 6.14	
Sodium	mg/kg	Max	50	100	100	50	100				100			IP 501, IP 470; see 6.15	
Aluminium plus silicon	mg/kg	Max	25	40	40	50	60				60			IP 501, IP 470 or ISC 10478; see 6.16	
Used lubricating oil (ULO): – Calcium and zinc; or – Calcium and phosphorus	mg/kg	—	Calcium > 30 and zinc > 15 or Calcium > 30 and phosphorus > 15											IP 501 or IP 470, IP 500; see 6.17	

**a** 1 mm<sup>2</sup>/s = 1 cSt.

**b** The purchaser shall define the maximum sulfur content in accordance with relevant statutory limitations. See Introduction.

**c** See Annex E.

**d** Purchasers should confirm that this pour point is suitable for the ship's intended area of operation.



MIURA CO.,LTD.  
SHIP MACHINERY DEPT.  
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JAPAN 799-2696

No. HAKU-HH-19020-00

Date: Nov. 8 2019

**Dear Customers:**

MIURA CO.,LTD.  
Ship Machinery Quality Improvement Dept.

**Replacement of Fuel Oil Temperature Sensor**

Thank you for your cooperation always.

It has been confirmed that the dynamic viscosity of low-sulfur fuel oil may be lower than that of conventional heavy fuel oil significantly in accordance with the SOx emission standard that will start in 2020.

When the low dynamic viscosity fuel oil is used, it may be necessary to replace a fuel oil temperature sensor installed on our boilers and other equipment for issuing an alarm of fuel oil temperature low.

1. Object product

Name: Steam boiler, Exhaust gas thermal oil heater

Model: GK (all types), HB (all types), VWH, HTB

2. Burner atomizing optimum dynamic viscosity and setting of alarm temperature

Burner atomizing optimum dynamic viscosity : 12 (to 15) cSt

Setting point of fuel oil temperature low : -25°C from setting temperature of heater

Setting point of fuel oil temperature high : 150°C (Remain unchanged)

The lower limit temperature of the conventional fuel oil temperature sensor is approximately 60 to 70°C, although it may vary depending on the sensor's individual specifications.

In this case, when the dynamic viscosity is lower than 50cSt (at 50°C) or less, the sensor's temperature range is exceeded, so the sensor needs to be replaced.

\*When replacing the fuel oil with diesel oil, our products are equipped with a switch that temporarily cancels the fuel oil temperature low alarm, so it is possible to use temporarily.

However, the use with the alarm cancelled violates the classification rules and the replacement is required.

3. Countermeasure

The sensor replacement method varies depending on the product specifications.

In addition, applying to the classification society is required for the replacement.

The replacement procedure and drawings necessary for the application will be provided separately, so please feel free to contact our engineers.