

Residual Marine Fuels & Distillate Marine Fuels - ISO 8217: 2005(E)

PARAMETER		UNIT	LIMIT	MF 380CST			MF 180CST		MDO		MGO	
				RMG380	RMH380	RMK380	RME180	RMF180	DMB	DMC	DMX	DMA
Density at 15 °C		kg/m ³	max	991.0		1010.0	991.0		900.0	920.0	-	890.0
Viscosity at 40 °C		mm ² /s ^a	max						11.0	14.0	5.5	6.0
			min								-	-
Viscosity at 50 °C		mm ² /s	max	380.0			180.0					
Water		% v/v	max	0.5			0.5		0.3	0.3	-	-
Micro Carbon Residue at 10% residue		% m/m	max						-	-	0.3	0.3
Micro Carbon Residue		% m/m	max						18	22		15
Sulfur ^c		% m/m	max	4.5			4.5		2.0	2.0	1.0	1.5
Ash		% m/m	max	0.15			0.1	0.15	0.01	0.15	0.01	0.01
Vanadium		mg/kg	max	300	600		200	500	-		-	-
Flash point		°C	min	60			60		60	60	43	60
Pour point ^b	summer	°C	max	30			30		6	6	-	0
	winter	°C	max	30			30		0	0	-	-6
Aluminium + silicon		mg/kg	max	80			80		-	25	-	-
Total sediment (Existent)		% m/m	max	0.1			0.1		0.1		-	-
Total sediment (Potential)		% m/m	max									
Cloud point		°C	max						-	-	-16	-
Caculated Centane Index			min									
Appearance									-	-	Clear & Bright	
Zinc ^d		mg/kg	max									
Phosphorus ^d		mg/kg	max						-	15	-	
Calcuim ^d		mg/kg	max						-	30	-	

a. Annex C gives a brief viscosity/temperature table, for information purposes only. 1mm²/sa = 1cSt

b. Purchasers should ensure that this pour point is suitable for the equipment on board, especially if the vessel operates in both the northern and southern hemispheres.

c. A sulfur limit of 1.5% (m/m) will apply in Sox emission control areas designated by the international Maritime Organization, when its relevant protocol comes into force. There may be local variations.

d. A fuel shall be considered to be free from ULO if one of more of the elements zinc, phosphorus and calcium are below or at the specified limits. All three elements shall exceed the same limits before a fuel shall be deemed to contain ULO.

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Characteristic	Unit	Limit	Category ISO-F-											Test method reference	
			RMA	RMB	RMD	RME	RMG				RMK				
			10 ^a	30	80	180	180	380	500	700	380	500	700		
Kinematic viscosity at 50 °C ^b	mm ² /s	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/m ³	max	920,0	960,0	975,0	991,0	991,0				1010,0			see 7.1 ISO 3675 or ISO 12185	
CCAI	-	max	850	860	860	860	870				870			see 6.3 a)	
Sulfur ^c	mass%	max	Statutory requirements											see 7.2 ISO 8754 ISO 14596	
Flash point	°C	min	60,0	60,0	60,0	60,0	60,0				60,0			see 7.3 ISO 2719	
Hydrogen sulfide ^d	mg/kg	max	2,00	2,00	2,00	2,00	2,00				2,00			IP 570	
Acid number ^e	mg KOH/g	max	2,5	2,5	2,5	2,5	2,5				2,5			ASTM D664	
Total sediment aged	mass%	max	0,10	0,10	0,10	0,10	0,10				0,10			see 7.5 ISO 10307-2	
Carbon residue: micro method	mass%	max	2,50	10,00	14,00	15,00	18,00				20,00			ISO 10370	
Pour point (upper) ^f	winter quality	°C	max	0	0	30	30	30				30			ISO 3016
	summer quality	°C	max	6	6	30	30	30				30			ISO 3016
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			see 7.7 IP 501, IP 470 or ISO 14597	
Sodium	mg/kg	max	50	100	100	50	100				100			see 7.8 IP 501 IP 470	

a. 1mm²/s=1cSt

b. Notwithstanding the limits given, the purchaser shall define the maximum sulfur content in accordance with relevant statutory limitations. See Annex C.

c. Due to reasons stated in Annex D, the implementation date for compliance with the limit shall be 1 July 2012.

Until such time, the specified value is given for guidance. For distillate fuels the precision data are currently being developed.

d. Purchasers should ensure that this pour point is suitable for the equipment on board, especially if the ship operates in cold climates

e. If the sample is not clear and bright, the total sediment by hot filtration and water tests shall be required, see 7.4 and 7.6

f. If the sample is not clear and bright, the test cannot be undertaken and hence the oxidation stability limit shall not apply.

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Characteristics		Unit	Limit	Category ISO-F-				Test method reference
				DMX	DMA	DMZ	DMB	
Kinematic viscosity at 40 °C ^a		mm ² /s	max	5,550	6,000	6,000	11,00	ISO 3104
		min	1,400	2,000	3,000	2,000		
Density at 15 °C		kg/m ³	max	-	890,0	890,0	900,0	see 7.1 ISO 3675 or ISO 12185
Centane index		-	min	45	40	40	35	ISO 4264
Sulfur ^b		mass%	max	1,00	1,50	1,50	2,00	see 7.2 ISO 8754 ISO 14596
			min	0,50	0,50	0,50	0,50	
Flash point		°C	min	43,0	60,0	60,0	60,0	see 7.3 ISO 2719
Hydrogen sulfide ^c		mg/kg	max	2,00	2,00	2,00	2,00	IP 570
Acid number		mg KOH/g	max	0,5	0,5	0,5	0,5	ASTM D664
Total sediment by hot filtration		mass%	max	-	-	-	0,10 ^e	see 7.4 ISO 10307-1
Oxidation stability		g/m ³	max	25	25	25	25 ^f	ISO 12205
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		°C	max	-16	-	-	-	ISO 3015
Pour point (upper) ^d	winter quality	°C	max	-6	-6	-6	0	ISO 3016
	summer quality	°C	max	0	0	0	6	ISO 3016
Appearance		-	-	Clear and bright ^j			^{e, f, g}	see 7.6
Water		volume %	max	-	-	-	0.30 ^e	ISO 3733
Ash		mass%	max	0,010	0,010	0,010	0,010	ISO 6245
Lubricity, corrected wear scar diameter		μm	max	520	520	520	520 ^g	ISO 12156-1

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d. Purchasers should ensure that this pour point is suitable for the equipment on board, especially if the ship operates in cold climates

e. If the sample is not clear and bright, the total sediment by hot filtration and water tests shall be required, see 7.4 and 7.6

f. If the sample is not clear and bright, the test cannot be undertaken and hence the oxidation stability limit shall not apply.

g. If the sample is not clear and bright, the test cannot be undertaken and hence the lubricity limit shall not apply.

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

j. If the sample is dyed and not transparent, then the water limit and test method as given in 7.6 shall apply.