

ISO 8217:2005 (E)

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Characteristic	Unit	Limit	Category ISO-F-				Test Method Reference
			DMX	DMA	DMB	DMC ^a	
Density at 15 °C	kg/m ³	max.	-	890,0	900,0	920,0	ISO 3675 or ISO 12185 (see also 7,1)
Viscosity at 40 °C	mm ² /s ^b	min.	1,40	1,50	-	-	ISO 3104
		max.	5,50	6,00	11,0	14,0	ISO 3104
Flash point	°C	min.	-	60	60	60	ISO 2719 (see also 7,2)
		min.	43	-	-	-	
Pour point (upper) ^c	°C	max.	-	-6	0	0	ISO 3016
		max.	-	0	6	6	ISO 3016
Cloud point		°C	max.	-16 ^d	-	-	ISO 3015
Sulfur	% (m/m)	max.	1,00	1,50	2,00 ^e	2,00 ^e	ISO 8754 or ISO 14596 (see also 7,3)
Cetane index	-	min.	45	40	35	-	ISO 4264
Carbon residue on 10% (V/V) distillation	% (m/m)	max.	0,30	0,30	-	-	ISO 10370
	% (m/m)	max.	-	-	0,30	2,50	ISO 10370
Ash	% (m/m)	max.	0,01	0,01	0,01	0,05	ISO 6245
Appearance	-	-	Clear and bright		f	-	See 7,4 and 7,5
Total sediment existant	% (m/m)	max.	-	-	0,10 ^f	0,10	ISO 10307-1 (see 7,5)
Water	% (V/V)	max.	-	-	0,3 ^f	0,3	ISO 3733
Vanadium	mg/kg	max.	-	-	-	100	ISO 14597 or IP 501 or IP 470 (see 7,8)
Aluminium plus silicon	mg/kg	max.	-	-	-	25	ISO 10478 or IP 501 or IP 470 (see 7,9)
Used lubricating oil (ULO)						The fuel shall be free of	
- Zinc	mg/kg	max.	-	-	-	ULO ^g 15	IP 501 or IP 470
- Phosphorus	mg/kg	max.	-	-	-	15	IP 501 or IP 500
- Calcium	mg/kg	max.	-	-	-	30	IP 501 or IP 470 (see 7,7)

a Note that although predominantly consisting of distillate fuel, the residual oil proportion can be significant.

b 1mm²/s = 1cSt.

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

d This fuel is suitable for use without heating at ambient temperatures down to - 16 °C.

e A sulfur limit of 1,5% (m/m) will apply in SO_x emission control areas designated by the International Maritime Organization, when it's relevant protocol enters into force. There may not be local variations, for example the EU requires that sulphur content of certain distillate grades be limited to 0,2% (m/m) in certain applications. See 0.3 and reference [7].

f If the sample is clear and with no visible sediment or water, the total sediment existant and water tests shall not be required. See 7.4 and 7.5.

g A fuel shall be considered to be free of used lubricating oils (ULOs) if one or more of the elements zinc, phosphorus and calcium are below or at specified limits. All three elements shall exceed the same limits before a fuel shall be deemed to contain ULOs.



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Characteristic	Unit	Limit	Category ISO-F-				Test Method Reference	
			DMX	DMA	DMZ	DMB		
Kinematic viscosity at 40 °C ^a	mm ² /s	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 ³	max.	-	890,0	890,0	900,0	ISO 3675 or ISO 12185 (see also 7.1)	
Cetane Index	-	min.	45	40	40	35	ISO 4264	
Sulfur ^b	mass %	max.	1,00	1,50	1,50	2,00	ISO 8754 ISO 14596 (see also 7.2)	
Flash Point	°C	min.	43,0	60,0	60,0	60,0	ISO 2719 (see also 7.3)	
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	ISO 10307-1 (see also 7.4)	
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 ^l			e.g.	(see 7.6)	
Water	volume %	max.	-	-	-	0,30 ^g	ISO 3733	
Ash	mass %	max.	0,010	0,010	0,010	0,010	ISO 6245	
Lubricity, corrected wear scar diameter (wsd 1,4) at 60 °C ^h	μm	max.	520	520	520	520 ^g	ISO 12156-1	

a 1mm²/s = 1cSt.

b Not withstanding 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 1st 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.

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

h The 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.



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Characteristic	Unit	Limit	Category ISO-F-										Test Method Reference
			RMA 30	RMB 30	RMD 80	RME 180	RMF 180	RMG 380	RMH 380	RMK 380	RMH 700	RMK 700	
Density at 15 °C	kg/m ³	max.	960,0	975,0	980,0	991,0		991,0		1010,0	991,0	1010,0	ISO 3675 or ISO 12185 (see also 7,1)
Kinematic viscosity at 50 °C	mm ² /s ^a	max.	30,0		80	180,0		380,0			700,0		ISO 3104
Flash point	°C	min.	60		60	60		60			60		ISO 2719 (see also 7,2)
Pour point (upper) ^b													
- winter quality	°C	max.	0	24	30	30		30			30		ISO 3016
- summer quality		max.	6	24	30	30		30			30		ISO 3016
Carbon residue	% (m/m)	max.	10		14	15	20	18	22		22		ISO 10370
Ash	% (m/m)	max.	0,10		0,10	0,10	0,15	0,15			0,15		ISO 6245
Water	% (V/V)	max.	0,5		0,5	0,5		0,5			0,5		ISO 3733
Sulfur ^c	% (m/m)	max.	3,50		4,00	4,50		4,50			4,50		ISO 8754 or ISO 14596 (see also 7,3)
Vanadium	mg/kg	max.	150		350	200	500	300	600		600		ISO 14597 or IP 501 or IP 470 (see 7,8)
Total sediment potential	% (m/m)	max.	0,10		0,10	0,10		0,10			0,10		ISO 10307-1 (see 7,6)
Aluminium plus silicon	mg/kg	max.	80		80	80		80			80		ISO 10478 or IP 501 or IP 470 (see 7,9)
Used lubricating oil (ULO)			The fuel shall be free of ULO										
- Zinc		max.											IP 501 or IP 470 (see 7,7)
- Phosphorus	mg/kg	max.											IP 501 or IP 500 (see 7,7)
- Calcium		max.											IP 501 or IP 470 (see 7,7)

- a Annex C gives a brief viscosity / temperature table, for information purposes only. 1mm²/s = 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 SO_x emission control areas designated by the International Maritime Organization, when it's relevant protocol comes into force. There may be local variations.
- d A fuel shall be considered to be free of ULO if one or more of the elements zinc, phosphorus and calcium are below 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	80,0	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			ISO 3675 or ISO 12185 (see also 7.1)	
CCAI	-	max.	850	860	860	860	870				870			(see 6.3a)	
Sulfur^c	mass %	max.	Statutory Requirements										ISO 8754 ISO 14596 (see also 7.2)		
Flash Point	°C	min.	60,0	60,0	60,0	60,0	60,0				60,0			ISO 2719 (see also 7.3)	
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			ISO 10307-2 (see also 7.5)	
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			IP 501, IP 470 or ISO 14597 (see also 7.7)	
Sodium	mg/kg	max.	50	100	100	50	100				100			IP 501 or IP 470 (see also 7.8)	
Aluminium plus silicon	mg/kg	max.	25	40	40	50	60				60			IP 501, IP 470 or ISO 10478 (see also 7.9)	
Used lubricating oils (ULO): calcium and zinc; or calcium and phosphorus	mg/kg	-	The fuel shall be free from ULO. A fuel shall be considered to contain ULO when either one of the following conditions is met: calcium > 30 and zinc > 15; or calcium > 30 and phosphorus > 15										IP 501, IP 470 or IP 500 (see also 7.10)		

a This category is based on a previously defined distillate DMC category that was described in ISO 8217:2005, Table 1. ISO 8217:2005 has been withdrawn.

b 1 mm²/s = 1cSt.

c The purchaser shall define the maximum sulfur content in accordance with relevant statutory limitations. See 0.3 and Annex C.

d Due to reasons stated in Annex D, the implementation date for compliance with the limit shall be 1st July 2012. Until such time, the specified value is given for guidance.

e See Annex H.

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

