

Table 1 — Distillate marine fuels

Characteristics	Unit	Limit	Category ISO-F-						Test method(s) and references	
			DMX	DMA	DFA	DMZ	DFZ	DMB		DFB
Kinematic viscosity at 40 °C	mm ² /s ^a	Max	5,500	6,000	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 6.1	
Cetane index		Min	45	40	40	35			ISO 4264	
Sulfur ^b	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 ^c			ISO 10307-1; see 6.8	
Oxidation stability	g/m ³	Max	25	25	25	25 ^d			ISO 12205	
Fatty acid methyl ester (FAME) ^e	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 ^f	winter	°C	Max	-16	report	report	—		ISO 3015; see 6.11	
	summer	°C	Max	-16	—	—	—			
Cold filter plugging point ^f	winter	°C	Max	—	report	report	—		IP 309 or IP 612; see 6.11	
	summer	°C	Max	—	—	—	—			

^a mm²/s = 1 cSt.

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

^c 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.

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

^e See 5.1 and Annex A.

^f 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.

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

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

Table 1 (continued)

Characteristics	Unit	Limit	Category ISO-F-						Test method(s) and references	
			DMX	DMA	DFA	DMZ	DFZ	DMB		DFB
Pour point (upper) ^f	winter	°C	Max	—	-6	—	-6	0		ISO 3016; see 6.11
	summer	°C	Max	—	0	—	0	6		
Appearance			Clear & Bright ^g						c	see 6.12
Water	volume %	Max	—	—	—	—	0,30 ^c			ISO 3733
Ash	mass %	Max	0,010	0,010	0,010	0,010	0,010			ISO 6245
Lubricity, corrected wear scar diameter (WSD) at 60 °C ^h	µm	Max	520	520	520	520	520 ^d			ISO 12156-1

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^c 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.

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

^e See 5.1 and Annex A.

^f 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.

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

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

Table 2 — Residual marine fuels

Characteristics	Unit	Limit	Category ISO-F-											Test method(s) and references	
			RMA	RMB	RMD	RME	RMG				RMK				
			10	30	80	180	180	380	500	700	380	500	700		
Kinematic viscosity at 50 °C	mm ² /s ^a	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			ISO 3675 or ISO 12185; see 6.1	
CCAI		Max	850	860	860	860	870				870			See 6.2	
Sulfur ^b	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 ^c	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) ^d	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 ISO 14597; see 6.14	

^a 1 mm²/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 The purchaser should confirm that this pour point is suitable for the ship's intended area of operation.

Table 2 (continued)

Characteristics	Unit	Limit	Category ISO-F-											Test method(s) and references
			RMA	RMB	RMD	RME	RMG				RMK			
			10	30	80	180	180	380	500	700	380	500	700	
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 ISO 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 mm²/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 The purchaser should confirm that this pour point is suitable for the ship's intended area of operation.