Quality Specifications of Low Sulphur Marine Gas Oil (LS MGO)

[Conforms to ISO 8217-2017 DMA & MIL-DTL-16884M Standards]

Sl. No.	Characteristics	Unit	Test Methods*	Limit
1.	**Appearance**	-	ASTM D 4176 [1/] (Visual)	Clear, bright, and free from visible Particulates
2.	**Demulsification , @ 25^{0}C**	Minutes	ASTM D1401 [2/]	Max 10
3.	**Density at 15 ^{0}C**	kg/m3	ASTM D1298 (R), D4052, D287	Max 876
4.	**Distillation** **• 10 % V/V recovered at** **• 50 % V/V recovered at** **• 85 % V/V recovered at** **• 90 % V/V recovered at** **• 95 % V/V recovered at** **• Final Boiling Point** **• Residue+ Loss**	 °C °C °C °C °C °C % Vol	ASTM D86 (R) [3/], D2887 [4/]	 Report Report Max 357 Max 385 Max 3.00
5.	**Cloud Point**	°C	ASTM D5773 [5/], D2500(R), D5772 [5/], D5771 [5/]	Max (-) 1
6.	**Colour**	Number	ASTM D1500 (R), D6045	Max 3.0
7.	**Flash Point (PMCC)**	°C	ASTM D93 (R) [6/] , D6450 [6/], D3828 [6/]	Min 66
8	**Particulate contamination,**	mg/lit	ASTM D6217 (R), D5452 [7/]	Max 10
9.	**Pour Point**	^{0}C	ASTM D97 (R), D5949, D5950, D5985 [8/]	Max (-) 6
10.	**Kin. Viscosity at 40 ^{0}C**	cSt	ASTM D445	2.0 – 4.3
11	**Acid Number (Acidity)**	Mg KOH/g	ASTM D974 (R) [9/] , D664	Max 0.30
12.	**Ash content**	% wt	ASTM D482	Max 0.005
13.	**Carbon Residue on 10% bottoms**	% wt	ASTM D524 (R) [10/]	Max 0.20
			D189, D4530 [10/]	Max 0.14
14.	**Copper Corrosion, 3 hrs at 100^{0}C**	-	ASTM D130	Max 1
15	**Hydrogen content**	Wt %	ASTM D7171 (R), D4808, D5291	Min 12.3
16	**Cetane Number**	Number	ADTM D:613	Min 46
	Cetane Index	-	ASTMD 4737, D976	Min 45
17.	**Storage Stability (total Insoluble)**	mg/100ml	ASTM D5304 (R) [11/]	Max 3.0
			ASTM D2274 [12/]	Max 1.5
18.	**Sulfur content**	Wt %	ASTM D4294 (R) [13/] , D1266, D1552, D2622, D3120, D5453 (R) [14/] , D7039	Max 0.1

19.	**Trace metals** **Calcium** **Lead** **Sodium+Potassium** **Vanadium**	ppm	ASTM D7111 (R), D3605, D6728, ICP-MS	Max 1.0 Max 0.5 Max 1.0 Max 0.5
20.	**Lubricity, corrected WSD @ 60°C,**	µm	ISO 12156, ASTM D6079, D7688	Max 460
21.	**Water and sediment**	% v/v	ASTM D2709	Max 0.05
22.	**Cold filter plugging point (CFPP)**	°C	ASTM D6371	Max 0
23.	**Hydrogen Sulfide**	mg/kg	IP 570	Max 2.0
24.	**Fatty Acid Methyl Easter (FAME)**	% v/v	ASTM D7963, IP 579	Nil

* Equivalent test methods from IS, ISO & IP shall also be applicable.

TABLE I. Physical and chemical requirements – Continued…

NOTES:

1/ If the sample has no visible particulates, but is otherwise not "clear and bright" per ASTM D4176, Procedure 1, then the product shall meet the requirements of ASTM D2709, 0.05-percent volume of water and sediment, maximum. The fuel is acceptable for appearance if the water and sediment content is 0.05 percent volume or less. If the sample fails ASTM D4176, Procedure 1, because it contains visible sediment or particulate matter, but meets the requirements of 10 milligrams per liter, maximum, in accordance with ASTM D5452 or ASTM D6217, then the fuel is considered acceptable provided all other requirements are met.

2/ The demulsification test shall be conducted in accordance with ASTM D1401 with the following exceptions: (a) Synthetic seawater in accordance with ASTM D1141 shall be the emulsifying fluid. (b) The test temperature shall be 25 °C. (c) The demulsification time shall be that required for separation into two layers with no visible cuff at the interface. A lacy emulsion or cuff which does not form a band shall be disregarded. The fuel/water/emulsion layer volumes shall be recorded at 1-minute intervals and the demulsification time reported to the nearest minute.

3/ As the end point of the distillation is approached, if either a thermometer reading of 385 °C or a decomposition point is observed, the heating shall be discontinued and the procedure resumed as directed in ASTM D86.

4/ Results from ASTM D2887 shall be reported as "Predicted D86" results by application of the correlation in Appendix X5 of ASTM D2887 to convert the values. ASTM D86 shall remain as the referee method. Distillation residue and loss limits provide control of the distillation process during the ASTM D86 test method and do not apply to ASTM D2887.

5/ If either ASTM D5771, ASTM D5772, or ASTM D5773 is used, the temperature recorded in each respective test shall be rounded to the next lower integer and reported as the ASTM D2500 equivalent cloud point in accordance with ASTM D5771, ASTM D5772, or ASTM D5773.

6/ The flash point value is absolute and no value less than 60.0 °C is permissible.

7/ If ASTM D5452 is utilized, a minimum of 1-litre sample will be used to meet the sample requirement of ASTM D6217.

8/ If either ASTM D5949, ASTM D5950, or ASTM D5985 is used, the results from these tests should be based on the observations at 3 °C temperature intervals and reported as the ASTM D97 equivalent.

9/ The sample size when using ASTM D974 shall be 20.0±2.0 grams.

10/ If ASTM D189 or ASTM D4530 is performed in lieu of ASTM D524, the maximum allowable carbon residue shall be 0.14 mass percent.

11/ Only nylon membrane filter media (0.8 micrometer pore size) are acceptable as specified in ASTM D5304. Do not use glass fiber (Type A/E) filter media to obtain test results.

12/ This test is performed on the finished product. If ASTM D2274 is utilized, the test period shall be extended from 16 hours to 40 hours.

13/ Referee method for a sulfur range of 0.0150 to 0.1 wt. %.

14/ Referee method for a sulfur range of 0.0001 to 0.0150 wt. %.

15/ The lubricity requirement only applies to fuels containing <0.05 wt %(500 ppm Suplhur) Lubricity additives may only be used with prior approval of additive and dosage by the procuring activity and user.