



# 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                                          |        | mm2/s <b>a</b> | 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/m3          | Max   | –                         | 890,0  |     | 890,0  |     | 900,0         |                               | ISO 3675 or ISO 12185; see 6.1             |
| Cetane index                                                          |        | –              | Min   | 45                        | 40     |     | 40     |     | 35            |                               |                                            |
| Sulfur <b>b</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          |                               |                                            |
| 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 <b>c</b> |                               | ISO 10307-1; see 6.8                       |
| Oxidation stability                                                   |        | g/m3           | Max   | 25                        | 25     |     | 25     |     | 25 <b>d</b>   |                               | ISO 12205                                  |
| Fatty acid methyl ester (FAME) <b>e</b>                               |        | 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 <b>f</b>                                                  | winter | °C             | Max   | –                         | report |     | report |     | –             |                               | ISO 3015; see 6.11                         |
|                                                                       | summer | °C             | Max   | 16                        | –      |     | –      |     | –             |                               |                                            |
| Cold filter plugging point <b>f</b>                                   | winter | °C             | Max   | –                         | report |     | report |     | –             |                               | IP 309 or IP 612; see 6.11                 |
|                                                                       | summer | °C             | Max   | 16                        | –      |     | –      |     | –             |                               |                                            |
| Pour point (upper) <b>f</b>                                           | winter | °C             | Max   | –                         | – 6    |     | –6     |     | 0             |                               | ISO 3016; see 6.11                         |
|                                                                       | summer | °C             | Max   | –                         | 0      |     | 0      |     | 6             |                               |                                            |
| Appearance                                                            |        |                |       | Clear and Bright <b>g</b> |        |     |        |     |               | <b>e</b>                      | see 6.12                                   |
| Water                                                                 |        | volume %       | Max   | –                         | –      |     | –      |     | 0,30 <b>c</b> |                               | ISO 3733                                   |
| Ash                                                                   |        | mass %         | Max   | 0,010                     | 0,010  |     | 0,010  |     | 0,010         |                               | ISO 6245                                   |
| Lubricity, corrected wear scar diameter (WSD) at 60 °C <b>h</b>       |        | µm             | Max   | 520                       | 520    |     | 520    |     | 520 <b>d</b>  |                               | ISO 12156-1                                |

**a** 1 mm<sup>2</sup>/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 %).

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**OPTIMUM  
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# 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<br>10                                                            | RMB<br>30 | RMD<br>80 | RME<br>180 | RMG   |       |       |       | RMK    |       |       |                                                    |           |
|                                                                                   |  |          |       |                                                                      |           |           |            | 180   | 380   | 500   | 700   | 380    | 500   | 700   |                                                    |           |
| Kinematic viscosity at 50 °C                                                      |  | mm2/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/m3    | Max   | 920,0                                                                | 960,0     | 975,0     | 991,0      | 991,0 |       |       |       | 1010,0 |       |       | ISO 3675 or<br>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<br>ISO 14596 or ASTM<br>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                                                                 | 0         | 10,00     | 14,00      | 15,00 | 18,00 |       |       |        | 20,00 |       |                                                    | ISO 10370 |
| winter<br>summer<br>Pour point (upper) d                                          |  | °C       | Max   | 0                                                                    | 0         | 30        | 30         | 30    |       |       |       | 30     |       |       | ISO 3016                                           |           |
|                                                                                   |  | °C       | Max   | 0,30                                                                 | 6         | 30        | 30         | 30    |       |       |       | 30     |       |       |                                                    |           |
|                                                                                   |  | volume % | Max   | 0,040                                                                | 0,50      | 0,50      | 0,50       | 0,50  |       |       |       | 30     |       |       |                                                    |           |
| Water                                                                             |  | mass %   | Max   | 50                                                                   | 0,070     | 0,070     | 0,070      | 0,100 |       |       |       | 0,50   |       |       | ISO 3733                                           |           |
| Ash                                                                               |  | mg/kg    | Max   | 50                                                                   | 150       | 150       | 150        | 350   |       |       |       | 0,150  |       |       | ISO 6245                                           |           |
| Vanadium                                                                          |  | mg/kg    | Max   | 25                                                                   | 100       | 100       | 50         | 100   |       |       |       | 450    |       |       | IP 501, IP 470 or<br>ISO 14597; see 6.14           |           |
| Sodium                                                                            |  | mg/kg    | Max   |                                                                      | 40        | 40        | 50         | 60    |       |       |       | 100    |       |       | IP 501, IP 470; see<br>6.15                        |           |
| Aluminium plus silicon                                                            |  |          |       |                                                                      |           |           |            |       |       |       |       | 60     |       |       | IP 501, IP 470 or<br>ISO 10478; see 6.16           |           |
| Used lubricating oil (ULO):<br>– Calcium and zinc; or<br>– Calcium and phosphorus |  | mg/kg    | –     | Calcium > 30 and zinc > 15<br>or<br>Calcium > 30 and phosphorus > 15 |           |           |            |       |       |       |       |        |       |       | IP 501 or IP 470,<br>IP 500; see 6.17              |           |

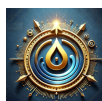
**a** 1 mm<sup>2</sup>/s = 1 cSt.

**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.

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