**Appendix 1**

**Comparative Table**

**Changes to *Low Sulfur Fuel Oil Futures Contract of the Shanghai International Energy Exchange***

Note: words with double strikethrough are deleted and those in red and bold are newly added.

|  |  |
| --- | --- |
| **Revised Version** | **Version on March 1, 2022** |
| **Appendix to *Low Sulfur Fuel Oil Futures Contract of the Shanghai International Energy Exchange*****II. Quality Standards**……**Quality Standards of Low Sulfur Fuel Oil of the Shanghai International Energy Exchange**

|  |  |  |
| --- | --- | --- |
| **Properties** | **Limit** | **Test Method** |
| Kinematic viscosity (50 °C, mm2/s) | 380.0 max100.00 min | ASTM D445 |
| Density (15 °C, kg/m3) | 991.0 max925.0 min | ASTM D1298 |
| Calculated Carbon Aromaticity Index (CCAI) | 870 max | ISO 8217:2017(E) |
| Sulfur content (m/m, %) | 0.50 max | ASTM D4294 |
| Flash point (closed cup) (°C) | 60.0 min | ASTM D93 |
| Hydrogen sulfide (mg/kg) | 2.00 max | IP 570 |
| Acid value (mg KOH/g) | 2.5 max | ASTM D664 |
| Total sediment (thermal aging test) (m/m, %) | 0.10 max | ASTM D4870 |
| Carbon residue (m/m, %) | 18.00 max | ASTM D4530 |
| Pour point (°C) | 30 max | ASTM D97 |
| Moisture (V/V, %) | 0.50 max | ASTM D95 |
| Ash content (m/m, %) | 0.100 max | ASTM D482 |
| Vanadium (mg/kg) | 350 max | IP 501 |
| Sodium (mg/kg) | 100 max | IP 501 |
| Aluminum + Silicon (mg/kg) | 60 max | IP 501 |
| Net calorific value (cal/g) | 9,500 min | ASTM D240 |
| Used lubricating oil (ULO) (mg/kg)Calcium and ZincCalcium and phosphorus | Fuel oil should be free of ULO, which is deemed to be present if any of the following conditions is met:Ca > 30 and Zn > 15orCa > 30 and P > 15 | IP 501 |
| Compatibility (level) | No higher than spot No. 2 | ASTM D4740 |
| Cleanness (level) | No higher than spot No. 2 | ASTM D4740 |
| Styrene (mg/kg) | **300** 50 max | GB/T 6041 |
| Phenol (mg/kg) | **300** 50 max | GB/T 6041 |

 | **Appendix to *Low Sulfur Fuel Oil Futures Contract of the Shanghai International Energy Exchange*****II. Quality Standards**……**Quality Standards of Low Sulfur Fuel Oil of the Shanghai International Energy Exchange**

|  |  |  |
| --- | --- | --- |
| **Properties** | **Limit** | **Test Method** |
| Kinematic viscosity (50 °C, mm2/s) | 380.0 max100.00 min | ASTM D445 |
| Density (15 °C, kg/m3) | 991.0 max925.0 min | ASTM D1298 |
| Calculated Carbon Aromaticity Index (CCAI) | 870 max | ISO 8217:2017(E) |
| Sulfur content (m/m, %) | 0.50 max | ASTM D4294 |
| Flash point (closed cup) (°C) | 60.0 min | ASTM D93 |
| Hydrogen sulfide (mg/kg) | 2.00 max | IP 570 |
| Acid value (mg KOH/g) | 2.5 max | ASTM D664 |
| Total sediment (thermal aging test) (m/m, %) | 0.10 max | ASTM D4870 |
| Carbon residue (m/m, %) | 18.00 max | ASTM D4530 |
| Pour point (°C) | 30 max | ASTM D97 |
| Moisture (V/V, %) | 0.50 max | ASTM D95 |
| Ash content (m/m, %) | 0.100 max | ASTM D482 |
| Vanadium (mg/kg) | 350 max | IP 501 |
| Sodium (mg/kg) | 100 max | IP 501 |
| Aluminum + Silicon (mg/kg) | 60 max | IP 501 |
| Net calorific value (cal/g) | 9,500 min | ASTM D240 |
| Used lubricating oil (ULO) (mg/kg)Calcium and ZincCalcium and phosphorus | Fuel oil should be free of ULO, which is deemed to be present if any of the following conditions is met:Ca > 30 and Zn > 15orCa > 30 and P > 15 | IP 501 |
| Compatibility (level) | No higher than spot No. 2 | ASTM D4740 |
| Cleanness (level) | No higher than spot No. 2 | ASTM D4740 |
| Styrene (mg/kg) | 300 max | GB/T 6041 |
| Phenol (mg/kg) | 300 max | GB/T 6041 |

 |