

**AVERAGE TESTED VALUE OF BUNKERS (DISTILLATE & RESIDUAL FUELS)
BY MARITIME PORT AUTHORITY SINGAPORE FOR 4th QUARTER 2024**

A. Distillate

Characteristic	Unit	Average Tested Value 3Q 2024	Average Tested Value 4Q 2024	Test Method
Kinematic Viscosity @ 40°C	mm ² /s	3.755	4.023	ISO 3104
Density @15°C	kg/m ³	868.9	868.7	ISO 12185
Cetane Index	-	45.2	46.1	ISO 4264
Sulphur	% (m/m)	0.086	0.087	ISO 8754
Flash point	°C	77.0	78.3	ISO 2719
Hydrogen Sulfide	mg/kg	<0.60	<0.60	IP 570
Acid number	mg KOH/g	<0.10	<0.10	ASTM D664
Total Sediment Hot Filtration	% (m/m)	-	-	ISO 10307-1
Carbon Residue	% (m/m)	<0.10	<0.10	ISO 10370
Cloud Point	°C	3	4	ISO 3015
CFPP	°C	0	1	ASTM D6371
Pour Point	°C	-6	-4	ISO 3016
Ash	mass %	<0.001	<0.001	ISO 6245
Lubricity	µm	343	331	ISO 12156-1
Water	% (m/m)	-	-	ISO 12937
Oxidation Stability	g/m ³	6	6	ISO 12205
Strong Acid Number	mg KOH/g	Zero	Zero	ASTM D664
Total Organic Halogen Content as Chlorine	mg/kg	<2	<2	EN 14077

B. Residual Fuels - VLSFO

Characteristic	Unit	Average Tested Value 3Q 2024	Average Tested Value 4Q 2024	Test Method
Kinematic Viscosity @50°C	mm ² /s	130.8	105.1	ISO 3104
Density @15°C	kg/m ³	957.4	954.3	ISO 12185
CCAI	-	832.6	832.6	ISO 8217 Annex F
Sulphur	% (m/m)	0.49	0.48	ISO 8754
Flash point	°C	83.5	89.5	ISO 2719
Hydrogen Sulfide	mg/kg	<0.60	<0.60	IP 570
Acid number	mg KOH/g	0.85	0.83	ASTM D664
Total Sediment Potential	% (m/m)	0.03	0.03	ISO 10307-2
Carbon Residue	% (m/m)	5.88	5.63	ISO 10370
Pour Point	°C	15	12	ISO 3016
Water	% (V/V)	0.26	0.23	ISO 3733
Ash	% (m/m)	0.026	0.024	ISO 6245
Vanadium	mg/kg	8	7	IP 501
Sodium	mg/kg	33	26	IP 501
Aluminium plus Silicon	mg/kg	39	32	IP 501
Calcium	mg/kg	26	24	IP 501
Zinc	mg/kg	1	1	IP 501
Phosphorus	mg/kg	1	1	IP 501
Strong Acid Number	mg KOH/g	Zero	Zero	ASTM D664
Total Organic Halogen Content as Chlorine	mg/kg	2	2	EN 14077

C. Residual-HSFO

Characteristic	Unit	Average Tested Value 3Q 2024	Average Tested Value 4Q 2024	Test Method
Kinematic Viscosity @50°C	mm ² /s	348.3	463.2	ISO 3104
Density @15°C	kg/m ³	979.4	985.8	ISO 12185
CCAI	-	842.2	844.8	ISO 8217 Annex F
Sulphur	% (m/m)	3.00	2.89	ISO 8754
Flash point	°C	90.0	89.4	ISO 2719
Hydrogen Sulfide	mg/kg	<0.60	<0.60	IP 570
Acid number	mg KOH/g	0.19	0.54	ASTM D664
Total Sediment Potential	% (m/m)	0.02	0.02	ISO 10307-2
Carbon Residue	% (m/m)	12.57	13.13	ISO 10370
Pour Point	°C	-1	0	ISO 3016
Water	% (V/V)	0.22	0.27	ISO 3733
Ash	% (m/m)	0.045	0.059	ISO 6245
Vanadium	mg/kg	152	210	IP 501
Sodium	mg/kg	25	26	IP 501
Aluminium plus Silicon	mg/kg	21	19	IP 501
Calcium	mg/kg	6	9	IP 501
Zinc	mg/kg	1	1	IP 501
Phosphorus	mg/kg	<1	1	IP 501
Strong Acid Number	mg KOH/g	Zero	Zero	ASTM D664
Total Organic Halogen Content as Chlorine	mg/kg	3	3	EN 14077

D. Bio-Residual¹

Characteristic	Unit	Average Tested Value 3Q 2024	Average Tested Value 4Q 2024	Test Method
Kinematic Viscosity @50°C	mm ² /s	45.83	39.63	ISO 3104
Density @15°C	kg/m ³	936.0	928.8	ISO 12185
CCAI	-	824.2	824.1	ISO 8217 Annex F
Sulphur	% (m/m)	0.42	0.43	ISO 8754
Flash point	°C	102.0	95.0	ISO 2719
Hydrogen Sulfide	mg/kg	<0.60	<0.60	IP 570
Acid number	mg KOH/g	0.67	0.62	ASTM D664
Total Sediment Potential	% (m/m)	0.02	0.02	ISO 10307-2
Carbon Residue	% (m/m)	5.67	5.41	ISO 10370
Pour Point	°C	14	15	ISO 3016
Water	% (V/V)	0.19	0.18	ISO 3733
Ash	% (m/m)	0.023	0.022	ISO 6245
Vanadium	mg/kg	10	14	IP 501
Sodium	mg/kg	23	18	IP 501
Aluminium plus Silicon	mg/kg	24	33	IP 501
Calcium	mg/kg	18	19	IP 501
Zinc	mg/kg	2	1	IP 501
Phosphorus	mg/kg	1	1	IP 501
FAME content	% (m/m)	23.8	24.3	ASTM D7963

¹ Based on COQs received.

E. B100²

Characteristic	Unit	Average Tested Value 3Q 2024	Average Tested Value 4Q 2024	Test Method
Ester Content	% (m/m)	98.5	97.5	EN 14103
Density @15°C	% (m/m)	875.9	877.3	EN 14103
Kinematic Viscosity @ 40 °C	mm ² /s	4.471	3.890	EN ISO 3104
Flash Point, PMCC	°C	165.5	158.0	EN ISO 2719
Cetane Number	-	60.5	59.7	EN ISO 5165
Copper Corrosion @ 50°C (122°F) for 3hrs	-	1a	1a	EN ISO 2160
Oxidation Stability @ 110°C	hours	>8	>8	EN 14112
Acid Value	mg KOH/g	0.35	0.43	EN 14104
Iodine Value	g iodine /100g	51.8	62.5	EN 14111
Linolenic Acid Methyl Ester Content	kg/m ³	1	1	EN ISO 12185
Polyunsaturated (>= 4 Double Bonds) Methyl Esters	% (m/m)	<0.60	<0.60	EN 15779
Methanol Content	% (m/m)	0.026	0.046	EN 14110B
Monoglycerides Content	% (m/m)	0.29	0.17	EN 14105
Diglycerides Content	% (m/m)	<0.10	<0.10	EN 14105
Triglycerides Content	% (m/m)	<0.10	<0.10	EN 14105
Free Glycerol	% (m/m)	0.009	0.007	EN 14105
Total Glycerol	% (m/m)	0.091	0.065	EN 14105
Water content	ppm (m/m)	263	188	EN ISO 12937

² Based on COQs received.

Total Contamination	mg/kg	13.8	13.5	EN 12662
Sulfated Ash Content	% (m/m)	<0.02	<0.02	ISO 3987
Sulfur Content	mg/kg	5	4	EN ISO 20846
Group II Metals (Ca + Mg)	mg/kg	<2	<2	EN 14538
Group I Metals (Na + K)	mg/kg	<2	<2	EN 14538
Phosphorus Content	mg/kg	<4	<4	EN 14107
Cold Filter Plugging Point (CFPP)	°C	11	9	EN 116