

**AVERAGE TESTED VALUE OF BUNKERS (DISTILLATE & RESIDUAL FUELS)
BY MARITIME PORT AUTHORITY SINGAPORE FOR 2nd QUARTER 2023**

A. Distillate Fuels

Characteristic	Unit	Average Tested Value 1Q 2023	Average Tested Value 2Q 2023	Test Method
Kinematic Viscosity @ 40°C	mm ² /s	3.782	3.877	ISO 3104
Density @15°C	kg/m ³	863.833	862.6	ISO 12185
Cetane Index	-	50.667	46.9	ISO 4264
Sulphur	% (m/m)	0.080	0.082	ISO 8754
Flash point	°C	69.900	70.0	ISO 2719
Hydrogen Sulfide	mg/kg	0.010	0.01	IP 570
Acid number	mg KOH/g	0.100	0.11	ASTM D664
Total Sediment Hot Filtration	% (m/m)	0.000	-	ISO 10307-1
Carbon Residue	% (m/m)	0.027	<0.10	ISO 10370
Cloud Point	°C	6.000	6	ISO 3015
CFPP	°C	-1.667	-1	ASTM D6371
Pour Point	°C	-6.667	-6	ISO 3016
Ash	mass %	0.001	0.001	ISO 6245
Lubricity	µm	358.333	314	ISO 12156-1
Water	% (m/m)	0.000	<0.003	ISO 12937
Oxidation Stability	g/m ³	8.667	11	ISO 12205
FAME	% (V/V)	0.090	0.06	IP 579 Range A

B. Residual Fuels - VLSFO

Characteristic	Unit	Average Tested Value 1Q 2023	Average Tested Value 2Q 2023	Test Method
Kinematic Viscosity @50°C	mm ² /s	151.890	121.2	ISO 3104
Density @15°C	kg/m ³	944.900	948.2	ISO 12185
CCAI	-	818.000	824.2	ISO 8217 Annex F
Sulphur	% (m/m)	0.480	0.48	ISO 8754
Flash point	°C	69.833	70.0	ISO 2719
Hydrogen Sulfide	mg/kg	0.010	0.01	IP 570
Acid number	mg KOH/g	0.600	0.74	ASTM D664
Total Sediment Potential	% (m/m)	0.020	0.02	ISO 10307-2
Carbon Residue	% (m/m)	5.913	6.10	ISO 10370
Pour Point	°C	15.000	15	ISO 3016
Water	% (V/V)	0.197	0.20	ISO 3733
Ash	% (m/m)	0.021	0.022	ISO 6245
Vanadium	mg/kg	7.333	8	IP 501
Sodium	mg/kg	20.000	18	IP 501
Aluminium plus Silicon	mg/kg	20.333	24	IP 501
Calcium	mg/kg	15.333	18	IP 501
Zinc	mg/kg	1.000	1	IP 501
Phosphorus	mg/kg	1.000	1	IP 501

C. Residual-HSFO

Characteristic	Unit	Average Tested Value 1Q 2023	Average Tested Value 2Q 2023	Test Method
Kinematic Viscosity @50°C	mm ² /s	340.770	338.3	ISO 3104
Density @15°C	kg/m ³	979.367	982.6	ISO 12185
CCAI	-	841.667	845.2	ISO 8217 Annex F
Sulphur	% (m/m)	2.983	2.94	ISO 8754
Flash point	°C	69.767	70.0	ISO 2719
Hydrogen Sulfide	mg/kg	0.017	0.01	IP 570
Acid number	mg KOH/g	0.367	0.28	ASTM D664
Total Sediment Potential	% (m/m)	0.023	0.03	ISO 10307-2
Carbon Residue	% (m/m)	12.720	13.94	ISO 10370
Pour Point	°C	9.333	9	ISO 3016
Water	% (V/V)	0.257	0.25	ISO 3733
Ash	% (m/m)	0.043	0.047	ISO 6245
Vanadium	mg/kg	149.667	159	IP 501
Sodium	mg/kg	24.667	24	IP 501
Aluminium plus Silicon	mg/kg	15.000	19	IP 501
Calcium	mg/kg	6.000	7	IP 501
Zinc	mg/kg	1.000	1	IP 501
Phosphorus	mg/kg	1.000	1	IP 501