



Contents

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	20V4000G94LF				
Rated power [kW]	3308				
Rated speed [rpm]	1500				
Application Group	3D				
Legislative body	NEA Singapore for ORDE				
Test cycle	D2				
Data Set No.	XZ54954100068				
Data Set Basis	NEA Singapore for ORDE				
Fuel sulphur content [ppm]	7				

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Configurator	Lenhof, Torsten (TATP)	0	A4
Approver1	Kneifel, Alexander (TSLE)	Order no.	0
Approver2	Breuer, Joerg (TVA)	EDS-ID	841-01.11.2021
Approver3		Title Emission data sheet	
Approver4			
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General Disclaimers (valid for Measured and NTE values)

Please note that these data are physical and/or technical values only referring to and representing a normative defined operating condition. Any change in operating time and conditions will have impact on physical values and engine behavior, which must be considered and assessed within the complete propulsion system especially in regard to emission compliance and product safety.

Measurements listed in this EDS are representative of the listed engine rating at the time of testing. These measurements and results can change according to instrumentation, boundary condition, and engine to engine variability. In addition - changes to the engine family hard or software may occur which could result in changes to some of the listed values.

Emissions data measurement procedures are conducted according to applicable rules and standards as per "Emission Stage/Optimization". Potential deviations from these procedures are documented internally.

The listed emission values relate to the corresponding certification data. Seller doesn't take any responsibility or liability neither out or in connection with the contract nor on any other basis

- beyond these specified operating conditions of the engine
- and for any installation/modification of the entire propulsion system by the customer itself or any third party and the customer will indemnify MTU on first demand for any third party claim out or in connection with this.

Seller reserves the right to amend specifications and information without notice and without obligation or liability. No liability for any errors, facts or opinions is accepted. Customers must satisfy themselves as to the suitability of this product for their application. No responsibility for any loss as a result of any person placing reliance on any material contained in this data sheet will be accepted.

Seller reserves all rights in the information contained in this data sheet. It shall not be reproduced, made available to a third party or otherwise used in any way whatsoever.

When applicable, emission values are measured after combined exhaust streams.

Measured Emissions data is based on single operating points and thus cannot be used to compare to regulations which use values based on a weighted cycle.

Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures, and instrumentation. Over time deterioration may occur which may have an impact on emission levels.

The SO2 emission rates comprehend exclusively the SO2 content as found in the fuel source, oil consumption effects are not included. Variation of sulfur content in the fuel changes only the stated SO2 emissions, cross sensitivity to other emissions (e.g. particulates) is not possible.

All values based on metric units, inaccuracies for non metric values can occur, values are not binding.

Specific to gas engines: The listed emission values are based on gas composition at the time of certification measurement. Gas composition is as displayed in the EDS-document. Carbon dioxide and methane concentrations have direct influence on the corresponding displayed carbon dioxide and methane emissions.

EAT Specific Disclaimers (valid for EDS values)

NH3 emissions levels measured with AVL SESAM i60/ 4 FT Multi Component Exhaust Measurement System (FTIR) including EPA 40 CFR 1065 legislation compliant automated checks for linearity.

Generators or engines with exhaust after-treatment systems require a stabilization period of approximately 1 hour to ensure stable temperatures across SCR prior to performing an emissions test. Performing emissions measurements before a stable temperature has been achieved can result in inconsistent emission values. NOx Values only applicable if temperatures across SCR reached for DEF Dosing.

NTE Disclaimers (valid for NTE calculated values)

Calculated not to exceed values (NTE) are not proven by tests and therefore the accuracy is not guaranteed.

All emission data shown in chapters Emission Data Sheet, Not to Exceed Values, and Type Approval were gathered from a corresponding certification engine under test conditions shown above and complying to corresponding TEN data.

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		Engine model	20V4000G94LF	Title	Emission data sheet
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Engine data

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	20V4000G94LF				
Application Group	3D				
Legislative body	NEA Singapore for ORDE				
Test cycle	D2				
Fuel sulphur content [ppm]	7				
mg/mN ³ values base on residual oxygen value of [%]	5				

Engine raw emissions*

Cycle point	[-]	n1	n2	n3	n4	n5
Power	kW	3307	2480	1653	827	331
Power relative	[-]	1	0.75	0.5	0.25	0.1
Engine speed	1/min	1500	1499	1499	1500	1499
Engine speed relative	[-]	1	1	1	1	1
Filter smoke number	Bosch	0.2	0.23	0.62	0.97	0.07
Exhaust temperature after ETC	grdC	474.5	420.2	420.8	386.2	264
Exhaust back pressure after ETC (static)	mbar	39	23	9	6	2
Exhaust back pressure after ETC (total)	mbar	52	32	14	5	0
Exhaust mass flow wet	kg/h	19195.7	15929.6	12082.7	7484.8	5323.4
NOX-Emissions specific	g/kWh	6.6	5.94	4.79	4.41	9.06
SO2-Emissions specific	g/kWh	0.003	0.003	0.003	0.003	0.004
CO-Emissions specific	g/kWh	0.32	0.39	1.02	1.45	2.79
HC1-Emissions specific	g/kWh	0.05	0.07	0.09	0.16	0.72
NMHC-Emissions specific	g/kWh	0.05	0.06	0.08	0.16	0.71

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NOX+HC1-Emissions specific	g/kWh	6.65	6.01	4.88	4.57	9.78
NOX+NMHC-Emissions specific	g/kWh	6.65	6.01	4.88	4.57	9.76
CO2-Emissions specific	g/kWh	645.7	632.1	669.3	721.6	844.5
PM-Emissions specific (Meas.)	g/kWh	0.02	0.029	0.098	0.178	0.052
NOX-Emissions (based on 5% O2)	mg/m3N	2362	2172	1639	1375	2411
NOX+HC1-Emissions (based on 5% O2)	mg/m3N	2381	2195	1668	1426	2598
NOX+NMHC-Emissions (based on 5% O2)	mg/m3N	2381	2195	1667	1425	2594
CO2-Emissions (based on 5% O2)	mg/m3N	223605	223062	222523	222036	219217
CO-Emissions (based on 5% O2)	mg/m3N	111.4	138.5	339.2	444.6	723
HC1-Emissions (based on 5% O2)	mg/m3N	18.5	23.1	28.8	50.4	186.9
SO2-Emissions (based on 5% O2)	mg/m3N	1	1	1	1	1
PM-Emissions (calculated) (based on 5% O2)	mg/m3N	16.9	20	34.2	52.1	31.8
PM-Emissions (based on 5% O2)	mg/m3N	6.9	10.3	32.7	54.6	13.5
Oxygen (O2)	%	9.9	11.2	11.9	13.1	15.8

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Engine data

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	20V4000G94LF				
Application Group	3D				
Legislative body	NEA Singapore for ORDE				
Test cycle	D2				
Fuel sulphur content [ppm]	7				
mg/mN ³ values base on residual oxygen value of [%]	5				

Not to exceed emission values*

Cycle point	[-]	n1	n2	n3	n4	n5
Power	kW	3307	2480	1653	827	331
Power relative	[-]	1	0.75	0.5	0.25	0.1
Engine speed	1/min	1500	1499	1499	1500	1499
Engine speed relative	[-]	1	1	1	1	1
NOX-Emissions specific	g/kWh	8.58	7.72	6.23	6.61	17.21
CO-Emissions specific	g/kWh	0.55	0.67	1.94	2.89	5.57
HC1-Emissions specific	g/kWh	0.09	0.11	0.16	0.33	2.09
NMHC-Emissions specific	g/kWh	0.09	0.11	0.16	0.32	
NOX+HC1-Emissions specific	g/kWh	8.67	7.84	6.39	6.94	19.3
NOX+NMHC-Emissions specific	g/kWh	8.67	7.83	6.39	6.93	
PM-Emissions specific (Meas.)	g/kWh	0.03	0.046	0.147	0.266	0.192
NOX-Emissions (based on 5% O ₂)	mg/m ³ N	3071	2824	2130	2063	4581
NOX+HC1-Emissions (based on 5% O ₂)	mg/m ³ N	3103	2863	2185	2164	5123
NOX+NMHC-Emissions (based on 5% O ₂)	mg/m ³ N	3102	2862	2184	2162	

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CO-Emissions (based on 5% O2)	mg/m3N	189.4	235.5	644.5	889.1	1446
HC1-Emissions (based on 5% O2)	mg/m3N	31.5	39.2	54.7	100.8	542
PM-Emissions (based on 5% O2)	mg/m3N	10.4	16.4	49	81.9	49.8

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Cycle information for NEA Singapore for ORDE

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	20V4000G94LF				
Serial-number	V122				
Application Group	3D				
Legislative body	NEA Singapore for ORDE				
Test cycle	D2				
Data Set No.	XZ54954100068				
Test-Report-Number	841-01.11.2021				
Test location	P126				
Date of test	29.03.2017				
Tester	MTU a Rolls-Royce Solution				
Date of EDS	01.11.2021				

Engine cycle emissions*

Emission	Unit	Cycle value	NEA Singapore for ORDE-Limit
CO cycle value	g/kWh	0.802	3.5
NOX+NMHC cycle value	g/kWh	5.567	6.4
Particulate (measurement) cycle value	g/kWh	0.074	0.2

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