



Contents

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	16V4000G74F				
Rated power [kW]	1965				
Rated speed [rpm]	1500				
Application Group	3D				
Legislative body	NEA Singapore for ORDE				
Test cycle	D2				
Data Set No.	XZ59554101100				
Fuel sulphur content [ppm]	388				

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Description of Revision Frequency Data generated by EDS Creator version 1.0 and unipilot. Ref.-dataset: 16V4000G03_50Hz_1965kW_D2.nc for 263 in EDS platform.		PDF	Name	Project no.	Size
		Configurator	Lenhof, Torsten (TATP)	Order no.	A4
		Approver1	Schmid, Tobias (TSLE)	EDS-ID	
		Approver2	Breuer, Joerg (TVA)	598-06.08.2021	
		Approver3			
		Approver4			
Emissionstage NEA Singapore for ORDE		User	FN2lgraeter	Title Emission data sheet	
		Engine model	16V4000G74F		
Configuration-ID	Documentation Request HDR	Emissionstage basis			Sheet
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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.

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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. NO_x 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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		Approver2	Breuer, Joerg (TVA)	598-06.08.2021	
		Approver3			
		Approver4			
		User	FN2lgraeter		
		Engine model 16V4000G74F		Title Emission data sheet	
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Data generated by EDS Creator version 1.0 and uniplot. Ref.-dataset: 16V4000G03_50Hz_1965kW_D2.nc for 263 in EDS platform.		All industrial property rights reserved. Disclosure, reproduction or use for any other purpose is prohibited unless our express permission has been given. Any infringement results in liability to pay damages.			
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Engine data

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	16V4000G74F				
Application Group	3D				
Legislative body	NEA Singapore for ORDE				
Test cycle	D2				
Fuel sulphur content [ppm]	388				
mg/mN ³ values base on residual oxygen value of [%]	3				

Engine raw emissions*

Cycle point	[-]	n1	n2	n3	n4	n5
Power	kW	1973	1475	984	492	198
Power relative	[-]	1	0.75	0.5	0.25	0.1
Engine speed	1/min	1503	1503	1503	1503	1503
Engine speed relative	[-]	1	1	1	1	1
Exhaust temperature after ETC	grdC	497.3	473	442.3	361.1	275.3
Exhaust mass flow wet	kg/h	10946.1	9064.7	6901.2	4979.5	4151.3
NOX-Emissions specific	g/kWh	6.44	5.72	5.12	4.54	8.44
SO2-Emissions specific	g/kWh	0.155	0.157	0.162	0.181	0.249
CO-Emissions specific	g/kWh	0.68	0.68	0.82	1.73	3.02
HC1-Emissions specific	g/kWh	0.21	0.28	0.43	0.93	1.67
NMHC-Emissions specific	g/kWh	0.21	0.27	0.42	0.91	1.64
NOX+HC1-Emissions specific	g/kWh	6.66	6	5.55	5.47	10.11
NOX+NMHC-Emissions specific	g/kWh	6.65	5.99	5.54	5.45	10.08
CO2-Emissions specific	g/kWh	625.8	632.8	656	729.3	1004.4
PM-Emissions specific (Meas.)	g/kWh	0.05	0.058	0.117	0.337	0.526

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NOX-Emissions (based on 3% O2)	mg/m3N	2505	2171	1849	1452	2083
NOX+HC1-Emissions (based on 3% O2)	mg/m3N	2589	2278	2007	1753	2482
NOX+NMHC- Emissions (based on 3% O2)	mg/m3N	2587	2276	2004	1747	2474
CO2-Emissions (based on 3% O2)	mg/m3N	244589	243092	240442	236237	240215
CO-Emissions (based on 3% O2)	mg/m3N	266.1	261.9	302	558.9	721.5
HC1-Emissions (based on 3% O2)	mg/m3N	83.8	107	157.6	301.2	398.9
SO2-Emissions (based on 3% O2)	mg/m3N	60.5	60.1	59.5	58.6	59.5
PM-Emissions (based on 3% O2)	mg/m3N	19.5	22.1	42.7	109.2	125.9
Oxygen (O2)	%	9.4	10.4	11.3	13.5	16.2

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		Approver3							
		Approver4							
User	FN2lgraeter								
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Engine data

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	16V4000G74F				
Application Group	3D				
Legislative body	NEA Singapore for ORDE				
Test cycle	D2				
Fuel sulphur content [ppm]	388				
mg/mN ³ values base on residual oxygen value of [%]	3				

Not to exceed emission values*

Cycle point	[-]	n1	n2	n3	n4	n5
Power	kW	1973	1475	984	492	198
Power relative	[-]	1	0.75	0.5	0.25	0.1
Engine speed	1/min	1503	1503	1503	1503	1503
Engine speed relative	[-]	1	1	1	1	1
NOX-Emissions specific	g/kWh	8.37	7.43	6.65	6.8	
CO-Emissions specific	g/kWh	1.16	1.16	1.57	3.45	
HC1-Emissions specific	g/kWh	0.37	0.47	0.82	1.86	
NMHC-Emissions specific	g/kWh	0.36	0.47	0.8	1.83	
NOX+HC1-Emissions specific	g/kWh	8.74	7.91	7.47	8.67	
NOX+NMHC-Emissions specific	g/kWh	8.73	7.9	7.45	8.63	
PM-Emissions specific (Meas.)	g/kWh	0.075	0.092	0.175	0.506	
NOX-Emissions (based on 3% O ₂)	mg/m ³ N	3257	2822	2404	2177	
NOX+HC1-Emissions (based on 3% O ₂)	mg/m ³ N	3399	3004	2703	2780	
NOX+NMHC-Emissions (based on 3% O ₂)	mg/m ³ N	3396	3000	2697	2768	

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CO-Emissions (based on 3% O2)	mg/m3N	452.4	445.2	573.7	1117.8	
HC1-Emissions (based on 3% O2)	mg/m3N	142.5	182	299.5	602.4	
PM-Emissions (based on 3% O2)	mg/m3N	29.3	35.4	64.1	163.8	

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Cycle information for NEA Singapore for ORDE

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	16V4000G74F				
Serial-number	527109013				
Application Group	3D				
Legislative body	NEA Singapore for ORDE				
Test cycle	D2				
Data Set No.	XZ59554101100				
Test-Report-Number	598-06.08.2021				
Test location	SWRI				
Date of test	10.06.2012				
Tester	MTU a Rolls-Royce Solution				
Date of EDS	06.08.2021				

Engine cycle emissions*

Emission	Unit	Cycle value	NEA Singapore for ORDE-Limit
CO cycle value	g/kWh	0.942	3.5
NOX+NMHC cycle value	g/kWh	5.919	6.4
Particulate (measurement) cycle value	g/kWh	0.13	0.2

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