ZENITH BUILDING
REPLACEMENT GENERATOR

ENVIRONMENTAL STATEMENT

APPENDIX A

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Application group	3D				
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Test cycle	D2				
Data Set No.	XZ57554150313				
Data Set Basis	fuel-optimized				
Fuel sulphur content [ppm]	5				

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					Datum/Date	Name/Name
				Bearbeiter/Drawn by	23.01.2013	Lenhof
a	neues Layout mit „not-to-exceed“ + NEA-Typezu.	03.06.15	Lenhof	Geprüft/Checked	08.03.2013	Kammerhofer
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Motordaten

engine data

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Application	X				
Engine model	12V1600G80F				
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Emission Stage/Optimisation	NEA Singapore for ORDE				
Test cycle	D2				
fuel sulphur content [ppm]	5				
mg/mN³ values base on residual oxygen value of [%]	measured				

Motor Rohemissionen*

*Engine raw emissions**

Cycle point	[-]	n1	n2	n3	n4	n5	n6	n7	n8
Power (P/PN)	[-]	1	0,75	0,50	0,25	0,10			
Power	[kW]	634	476	317	159	63			
Speed (n/nN)	[-]	1	1	1	1	1			
Speed	[rpm]	1500	1500	1500	1500	1500			
Exhaust temperature after turbine	[°C]	455	435	416	345	251			
Exhaust massflow	[kg/h]	3202	2562	1921	1315	1076			
Exhaust back pressure	[mbar]	87	54	33	14	7			
NOx	[g/kWh]	5,6	5,5	5,2	5,2	6,0			
	[mg/mN³]	1717	1575	1309	945	521			
CO	[g/kWh]	1,0	0,9	0,8	1,1	2,9			
	[mg/mN³]	271	228	190	183	228			
HC	[g/kWh]	0,12	0,13	0,18	0,34	1,05			
	[mg/mN³]	32	33	41	55	82			
O2	[%]	8,9	9,7	10,6	12,9	16,1			
Particulate measured	[g/kWh]	0,07	0,09	0,12	0,14	0,29			
	[mg/mN³]	20	22	28	23	22			
Particulate calculated	[g/kWh]	-	-	-	-	-			
	[mg/mN³]	-	-	-	-	-			
Dust (only TA-Luft)	[mg/mN³]	-	-	-	-	-			
FSN	[-]	0,6	0,7	1,0	0,7	0,6			
NO/NO2**	[-]	-	-	-	-	-			
CO2	[g/kWh]	620,2	619,7	644,0	699,0	860,6			
	[mg/mN³]	171301	159597	146598	114522	67358			
SO2	[g/kWh]	0,002	0,002	0,002	0,002	0,003			
	[mg/mN³]	0,5	0,5	0,5	0,4	0,2			

* Emission data measurement procedures are consistent with the respective emission evaluation process. Noncertified engines are measured to sales data (TVU/TEN) standard conditions.
These boundary conditions might not be representative for detailed dimensioning of exhaust gas aftertreatment, in this case it is recommended to contact the responsible department for more information.
Measurements are subject to variation. The nominal emission data shown is subject to instrumentation, measurement, facility, and engine-to-engine variations.
All data applies to an engine in new condition. Over extended operating time deterioration may occur which might have an impact on emission.
Exhaust temperature depends on engine ambient conditions.

** No standard test. To be measured on demand.

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Test cycle	D2				
fuel sulphur content [ppm]	5				
mg/mN³ values base on residual oxygen value of [%]	measured				

Not to exceed Werte*

*not to exceed values**

Cycle point	[-]	n1	n2	n3	n4	n5	n6	n7	n8
Power (P/PN)	[-]	1	0,75	0,50	0,25				
Power	[kW]	634	476	317	159				
Speed (n/nN)	[-]	1	1	1	1				
Speed	[rpm]	1500	1500	1500	1500				
Exhaust back pressure	[mbar]	87	54	33	14				
NOx	[g/kWh]	7,3	7,2	6,8	7,8				
	[mg/mN³]	2232	2048	1702	1418				
CO	[g/kWh]	1,7	1,5	1,6	2,2				
	[mg/mN³]	461	388	361	366				
HC	[g/kWh]	0,20	0,22	0,34	0,67				
	[mg/mN³]	54	56	78	110				
O2	[%]	8,9	9,7	10,6	12,9				
Particulate measured	[g/kWh]	0,11	0,14	0,18	0,21				
	[mg/mN³]	30	36	42	34				

* Calculated values are not proven by tests and therefore the accuracy cannot be guaranteed.

Emissions data measurement procedures are consistent with those described in the applicable rules and standards.

The NOx, CO, HC and PM emission data tabulated here were taken from a single new engine under the test conditions shown above and are valid for the following conditions:

- Ambient air pressure 1 bar
- Air intake temperature approx. 25°C
- Rel. Humidity 30%-60%
- New Engine
- New standard- air filter
- Exhaust gas back pressure according the given value in this EDS
- Fuel according to EN 590 or US EPA 40CFR89
- Coolant and Lubricants according MTU Fuels and Lubricants Specification

The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on single operating points and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle. Emissions data may vary depending on the type of exhaust gas aftertreatment that may be installed on the engine, therefore it is suggested that the engine manufacturer be contacted directly for further information.

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. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may results in elevated emission levels.

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Emissionsdatenblatt
Emission Data Sheet

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Typzulassung für NEA Singapur

Type approval for NEA Singapore

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Application	X				
Engine model	12V1600G80F				
Application group	3D				
Emission Stage/Optimisation	NEA Singapore for ORDE				
Test cycle	D2				
Data Set	XZ57554150313				
Serial-Number	16701002007				
Test-Report-Number	EDS16000133				
Test Location	Überlingen11				
Date of test	17.12.2010				
Tester	MTU Friedrichshafen GmbH				
Date of EDS	23.01.2013				

Emissions Zykluswerte*

*Engine cycle emissions**

Emission	Cycle Value [g/kWh]	U.S. T2-Limit [g/kWh]
NOX	5,41	-
HC	0,2	-
NOX+NMHC	5,60	6,4
CO	0,96	3,5
PM	0,110	0,20

* Cycle values based on not rounded values, differences between single values and added values, e.g. NOX/HC/NOX+HC.
NMHC = 0,98*HC (40 CFR Part 1065.650 (c)(5))

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