

DESIGN NOTE

*delete as appropriate



Sheet No: 1 of 2	Generator Emission
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Project Title	NMGH – Phase 1 Generator Replacement	Date:	23/11/2022
Project No	21036 - 13199	Engineer:	Simon Ward
Doc Ref:	21036-SIS-XX-XX-RP-E-6023	Rev	P01
		Reviewer:	SW

Generator Emissions

Estimated exhaust gas emission data for a diesel generator has been produced for the size and type of generator proposed for the North Manchester General Hospital Phase 1 generator replacement scheme.

This data is shown in the table below.

(1500 kW/min⁻¹)

MODEL		S16R-PTA	
Prime Rating kW/min ⁻¹ (Without fan)		1480 / 1500	1590 / 1800
NOx	PPM	925	852
	g/Nm ³	3.8	3.7
	g/kW - h	8.7	7.7
CO	PPM	(310)	(21)
	g/Nm ³	(0.56)	(0.43)
	g/kW - h	(1.6)	(1.4)
HC	PPM	(110)	(120)
	g/Nm ³	(0.10)	(0.13)
	g/kW - h	(0.29)	(0.38)
CO ₂	g/Nm ³	6.7	6.5
	g/kW - h	619	612
PM	g/Nm ³	0.11	0.12
	g/kW - h	0.33	0.39

Notes

Allowance	25%
Condition	100kPa (750mmHg) barometric pressure 298K (25oC) ambient temperature and 30% relative humidity
NOx, CO, HC[PPM]	with 13% O2 level
NOx, CO, HC, Particulates[g/Nm3]	with 5% O2 level

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Sheet No: 2 of 2

Generator Emission

NOx, CO, HC, Particulates[g/Nm3]	with 13% O2 level
CO2[%]	Calculated Data
()	Estimated Data
*1	Standby Rating

Generator operation times

The proposed generator is to give added electrical resilience to the Phase 1 building at North Manchester General Hospital. The generator is to be a low voltage (LV) standby secondary power source should the primary power source fail. The primary power source to the phase 1 building is currently a transformer supplied from the energy network via the hospitals private high voltage (HV) ring. The generator has not been designed with the purpose of running in long term parallel to the energy network and shall only short term parallel for the purposes of load transfer (less than 500ms).

The exhaust gases shall be expelled from the proposed generator at a height of around 7m above ground level and 11m from the existing building.

The standby generator will be required to undergo routine testing in which the building load shall be applied to the generator. This is detailed in HTM 06-01, 17.83 which states "*The duration of the online test should be at least one hour, but preferably two hours.*" This type of testing shall be required to be undertaken monthly.

The generator will also be required to undergo annual testing in which it shall be ran at 100% load for a duration of 4 hours and 110% load for a duration of 1 hours.

This gives an annual generator run time under test conditions of 29 hours. It is not foreseen that the generator would undergo testing longer than this in any 12-month period.

HTM 06-01, 7.21 states that a transformer supply can have a reliability up to 99.999%. This equates to an annual downtime of 5.25 minutes.

In total it is estimated that the generator shall run for less than 30 hours in any 12-month period. This duration however could be extended due to extended periods of loss of power from the energy network.