

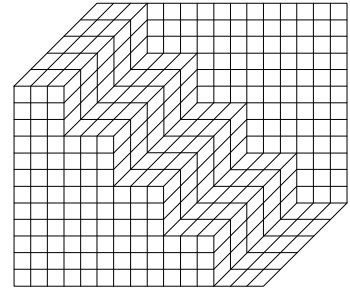
# CHP EMISSIONS

**Project:** St Giles Circus

**Subject:** CHP Technical Note

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**Date:** June 2014



**Buro Happold**

## 1 Executive Summary

This document has been written in response to the pre-commencement planning clause;

*'Prior to commencement of development full details of the location and height of the proposed CHP flue, including full modelling calculations of NO<sub>2</sub> emissions, necessity of carbon filters and mitigation measures shall be submitted and approved in writing by the Local Planning Authority.'*

The CHP unit size has been sized at 200kWth (thermal).

The target emissions for the CHP is **95 mg/Nm**

A typical CHP manufacturer can achieve emissions < **27 mg/Nm<sup>3</sup>**

## 2 GLA Requirement

The emissions target is set by Sustainable Design and Construction Supplementary Planning Guidance, April 2014 <http://www.london.gov.uk/>



Extract from Appendix 7: emissions standards for solid biomass and CHP plant

### SUSTAINABLE DESIGN AND CONSTRUCTION SPG

Emission Standards for Solid Biomass Boilers and CHP Plant in Thermal Input Range 50kWth to less than 20MWth for development in Band B

Combustion Appliance <sup>A</sup>	Pollutant/Parameter	Emission Standard at Reference O <sub>2</sub> (mg Nm <sup>-3</sup> )	Equivalent Concentration at 0% O <sub>2</sub> (mg Nm <sup>-3</sup> )	Likely Technique Required to Meet Emission Standard
Spark ignition engine (natural gas/biogas) <sup>B</sup>	NO <sub>x</sub>	95	125	SCR (lean burn engines) NSCR (rich burn engines)

The target for Band B is **95 mg/Nm<sup>3</sup>**

### 3 Manufacturers Data

The following is a copy of a manufacturer's proposal for a CHP unit to meet the required emissions criteria;

The data on page 2 indicates an the emissions can be reduced to <27mg/Nm.

This is achieved using a high performance MINE-X catalytic converter

Manufacturers that maybe approached to provide the CHP include;

- Helec
- EnerG
- Hoval



## Super low CAT with PB138SNG CHP

Cat info:

### **General information (Three Way Catalytic Converters):**

MINE-X® catalytic converters are metallic elements contained in a stainless steel mantle. The catalyst material is coated on a metal honeycomb substrate containing a series of alternating flat and corrugated FeCrAlloy foils, wound together and contained within a stainless steel outer shell. The ultra-thin foils increase the interior void space and provide low backpressure values. The foils are brazed, both to each other, as to the steel mantle, to provide added stability and prevent substrate telescoping. A variety of standard and customized housing designs, equipped with monitoring ports, clamps and flanges are offered to ensure optimal fit in existing or new exhaust systems. The overall length and connection sizes of each system are to be built according to customer specifications.

MINE-X® Industrial designs feature either a welded or clamped body connected to reducing cones and, optionally, flanges, diffuser, or additional ports.

The MINE-X® QUICK-LID® and Mini QUICK-LID® series feature a reactor-style housing with a quick-release lid, providing easy access to the catalytic elements for servicing and maintenance.

This structure, coupled with the flexibility in design and coating choice, make MINE-X® catalytic converters a perfect choice for emission reduction in industrial engines worldwide.

### **CHP with extra low NOx Cat from Helec Ltd**

CHP operation	Mains parallel
	Synchronous
CHP make	PB138SNG
Electrical Power modulation	55 kWe – 138 kWe
Thermal Output	207 kWt
Overall efficiency	89%
Power factor	cos phi 0.98
Fuel consumption	392 kW
Flow temperature max	90°C
Return temperature max	78°C
Upgraded insulated enclosure	65 dBA @ 1 metre
Engine Make and Model	MAN E2876 E312
Engine Power (hp or kW) at Speed (RPM)	150 kW at 1500 RPM / 50 Hz
Exhaust Temperature (°C)	590
Exhaust Gas Flow/Volume (Nm³/h, kg/h)	503 kg/h
Lambda (λ) / AFRC Quality	1.0 / Good

Lye Cross Road, Redhill, Bristol BD40 5RH 01934 862264



Max. allowable backpressure (kPa)	10 mbar
Fuel used	Natural Gas
Three way extra low NOx Cat inside unit	MINE-X® catalytic converter
Emission Levels: (mg/Nm <sup>3</sup> at 5% O <sub>2</sub> )	CO: <60 NOx: <27
CHP unit Overall Dimensions	3600mm(Length) 1200mm (Width) 1900mm (Height) + Separate secondary silencer – horizontal or vertical outside of unit