

# Green Square North Tower Project Brisbane Australia



## Exhaust Control Industries

Air and noise pollution control specialists

Phone +61 3 9588 2233 or 1800 730 158  
[www.exhaustcontrol.com.au](http://www.exhaustcontrol.com.au)

ECI worked with Leighton Contractors to achieve a 6 Star Green Star rating for their HQ Building project. ECI engineered, designed and manufactured the Tri-Generation Flue System to meet the building architectural design requirements as well as stringent Brisbane City Council air policy regulations.



### The History of SCR

SCR (Selective Catalytic Reduction) for NOx (oxides of Nitrogen) abatement was developed in Germany in the early 1950's with the first system commercialised in America in 1963. Over the past 40 years the fitting of this post combustion NOx control system on both diesel and gas fired engines and turbines, has resulted in major reductions in NOx in our urban environments.

Nitrous oxides are the precursor to smog and with the ever increasing need for power generation coupled with stringent air policy regulations, the SCR System for NOx abatement is widely used in large peak lopping power stations and process plant applications around Australia and in hundreds of projects in America and Europe.

### The Challenge

Traditionally the pollutant of most concern from gas gensets is NOx. NOx emissions are of particular concern due to their contribution to ground-level ozone formation and acid rain. In the lower atmosphere, NOx combines with reactive organic gases in the presence of sunlight to form ground-level ozone, which is the primary component of urban smog. In addition, nitric oxide and nitrogen dioxide are components of acid rain.

### The Solution

ECI (Exhaust Control Industries) worked with MMM Mechanical Services and Leighton Contractors to achieve a 6 Star Green Star rating. ECI's customised design met plant room requirements as well as stringent Brisbane City Council air policy regulations.

It was the first building in Australia to use a natural gas Co-gen system fitted with SCR (Selective Catalytic Reduction) for NOx abatement. The SCR System and Oxidation Catalyst was able to treat the exhaust gas prior to the direct fired absorption chiller, which supplied cooling for the building.

ECI designed and manufactured all components including the Silencer, Oxidation Catalyst and SCR System for the genset to meet stringent Australian Standards for the Industrial Gas Appliance Code, air policy regulations and plant room limitations.

### ECI SCR System Components

The Catalyst, comprising of parallel plates or honeycomb structures, was installed in the form of rectangular modules, downstream of the engine. Typically, an SCR system is comprised of a urea storage tank, vaporization and injection equipment for the urea, a mixing duct, SCR reactor with catalyst, and instrumentation and control equipment.



### ECI Oxidation Catalyst

In catalytic oxidation, a catalyst is used to oxidize carbon monoxide (CO). The addition of a catalyst to the basic thermal oxidation process accelerates the rate of oxidation by absorbing oxygen from the air stream and CO in the exhaust stream, onto the catalyst surface to react, to form carbon dioxide (CO<sub>2</sub>) and water vapour (H<sub>2</sub>O). Typical reduction efficiencies from an oxidation catalyst are from 80 to 90 percent.

### The Result

| Pollutants Tested               | Target                 | Result                                   |
|---------------------------------|------------------------|------------------------------------------|
| Oxides of Nitrogen (NOx)        | 50 mg/Nm <sup>3</sup>  | 19.74 mg/Nm <sup>3</sup> (96% Reduction) |
| Carbon Monoxide (CO)            | 100 mg/Nm <sup>3</sup> | 16 mg/Nm <sup>3</sup> (92% Reduction)    |
| Ammonia Slip (NH <sub>3</sub> ) | 0-4 mg/Nm <sup>3</sup> | 0.13 mg/Nm <sup>3</sup>                  |
| VOC (NMHC)                      | N/A                    | 0.3 mg/Nm <sup>3</sup>                   |

| PARAMETER                                 | Average Results | Guideline Limit | Unit of Measure    |
|-------------------------------------------|-----------------|-----------------|--------------------|
| Exhaust Gas temperature at sampling plane | 384             | N/A             | °C                 |
| Oxygen                                    | 9.10            | N/A             | %v/v               |
| Carbon Dioxide                            | 6.15            | N/A             | %v/v               |
| Carbon Monoxide                           | 16              | 100             | mg/Nm <sup>3</sup> |
| Moisture                                  | 13.9            | N/A             | %v/v               |
| Non Methane VOC's (NMHC)                  | <0.3            | N/A             | mg/Nm <sup>3</sup> |
| Oxides of Nitrogen (NOx)                  | 20              | 50              | mg/Nm <sup>3</sup> |
| Ammonia after oxidation catalyst          | 0.13            | 4               | mg/Nm <sup>3</sup> |

**ECI is the leader in Co-generation and SCR technology in Australia.**

**Exhaust Control Industries Pty Ltd** Air and noise pollution control specialists

31-33 Fonceca Street, Mordialloc, Victoria, 3195 Australia

Ph 1800 730 158 +61 3 9588 2233 Fax +61 3 9588 2567 [www.exhaustcontrol.com.au](http://www.exhaustcontrol.com.au) ABN 65 006 805 661

