

Leighton's HQ Building Project, Brisbane Australia



Exhaust Control Industries

Air and noise pollution control specialists

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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

Following on from the success of Green Square North Tower, ECI (Exhaust Control Industries) worked with Leighton Contractors to achieve a 6 Star Green Star rating for their HQ Building project. ECI engineered a full turnkey Tri-generation flue system to meet the building architectural design requirements as well as stringent Brisbane City Council air policy regulations.

HQ Building Tri-generation system includes a 1.5 Mw natural gas engine and direct fired absorption chiller fitted with a SCR (Selective Catalytic Reduction) for NOx abatement system. The SCR System and Oxidation Catalyst were designed to treat the exhaust gas pollutants and exhaust noise prior to the direct fired absorption chiller.

ECI designed and manufactured all components which included the Silencer, Oxidation Catalyst and the SCR System, Liquid Urea Bulk Supply Tank and supply lines, to meet stringent Australian standards for 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 PLC control equipment.

ECI Oxidation Catalyst

In catalytic oxidation, a catalyst is used to oxidize carbon monoxide (CO) and non methane Hydro Carbons (NMHC).

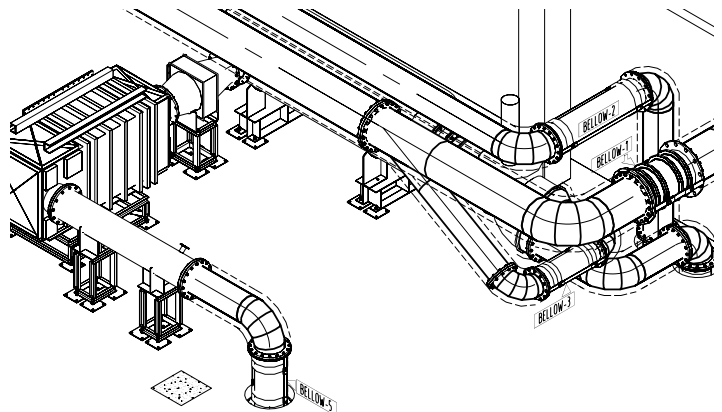
The addition of a catalyst to the basic thermal oxidation process accelerates the rate of oxidation by absorbing oxygen from the air stream and CO in the exhaust stream, onto the catalyst surface to react, to form carbon dioxide (CO₂) and water vapour (H₂O). Typical reduction efficiencies from an oxidation catalyst are from 80 to 90 percent.

The Result

Pollutants Tested	Target	Result
Oxides of Nitrogen (NOx)	50 mg/Nm ³	22.3 mg/Nm ³ (96% Reduction)
Carbon Monoxide (CO)	100 mg/Nm ³	61.3 mg/Nm ³ (94% Reduction)
Ammonia Slip (NH3)	0-4 mg/Nm ³	0.19 mg/Nm ³
VOC (NMHC)	N/A	0.9 mg/Nm ³

PARAMETER	Average Results	Guideline Limit	Unit of Measure
Exhaust Gas temperature at sampling plane	462	N/A	°C
Oxygen	618	N/A	%v/v
Carbon Dioxide	9.99	N/A	%v/v
Carbon Monoxide	61.3	100	mg/Nm ³
Moisture	6.85	N/A	%v/v
Non Methane VOC's (NMHC)	<0.9	N/A	mg/Nm ³
Oxides of Nitrogen (NOx)	22.3	50	mg/Nm ³
Ammonia after oxidation catalyst	0.19	4	mg/Nm ³

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



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