# Exhaust Emission Control: Superior Catalyst Solutions

**We're passionate about helping your business, your people, and the environment by reducing harmful diesel engine emissions.**

Exhaust Control Industries (ECI) Australia is the leading provider of substrates and complete catalyst systems for the passenger car, aftermarket and heavy duty retrofitting in Australasia. ECI Australia introduced the first catalysts for this market segment as early as the late 1980s, well before respective legislation. Considerable experience in this market - combined with the latest technology, local presence and wide partner network - is the key to serving our customers' needs in terms of cost, quality and reliability.

*Experts at the World Health Organisation (WHO) say diesel engine exhaust fumes can cause cancer in humans.*

*They say they belong in the same potentially deadly category as asbestos, arsenic and mustard gas…diesel emissions cause lung cancer and increase the risk of bladder cancer.*

*Source: 'WHO confirms diesel fumes carcinogenic'. http://www.abc.net.au/worldtoday/. June 13, 2012.*

ECI Australia is a major producer of universal catalytic converters and direct fit models. We offer great flexibility in design parameters such as diameter, length, cell density, wash coat type and loading. Our products are suited to high volume production or tailored for specific applications.

In addition, we have a series of substrates for retrofitting purposes, originally designed for heavy duty EURO IV/V applications. Typical construction is a metallic substrate having a diameter of 75-1100mm, length of 74mm to 150mm and cell density between 100-500cpsi canned inside a stainless steel sleeve. This can be directly welded with end cones and clamped to muffler assemblies, or alternatively we can build complete clones of the original muffler, which includes the catalyst substrate suitable for a specific application.

## Solution options for diesel powered engines

ECI Australia provides catalyst solutions that achieve high-level emission reductions. These reductions are suitable for national and international regulatory bodies for product performance in both Carbon Monoxide (CO) and Diesel Particulate Matter (DPM) reduction.

In the early 1990s, ECI Australia supplied ceramic diesel oxidation catalysts, and later replaced the conventional laminar flow substrates with superior metallic substrate and silicon carbide products. Today, these are used commercially in high volumes for retro-fit, EURO IV/V on-road and mining applications in order to provide the right solution to reduce the harmful effects of DPM.

1. **Solution: Diesel Oxidation Catalyst (DOC)**
   ***Up to 90% reduction of Carbon Monoxide (CO)***
   The Diesel Oxidation catalyst (DOC) is the first option to treat emissions from a diesel engine. The primary function of the DOC is designed for the reduction of Carbon Monoxide (CO) and

Hydro Carbons (NMHC), and as a bi-product of oxidizing these pollutants, total Particulate Matter (PM) is also reduced by up to 25%.

Housed inside a T304 stainless steel sleeve, the metallic substrate – being the core component of a catalyst – is coated with measured levels of platinum and palladium to ensure maximum CO and HC reduction efficiencies of up to 90% at exhaust gas temperatures as low as 300°C. In addition, we can integrate our catalyst into an existing design and/or a Selective Catalytic Reduction (SCR) system.

## 2. Solution: Selective Catalytic Reduction

***Over 95% Nox reduction***

ECI Australia has been a leading supplier of Selective Catalytic Reduction (SCR) systems in Australasia since 1996. We can supply customized emission treatment systems for all types of applications, including power generation, marine, mining, industrial plants, transport, construction and tunneling equipment. 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 power stations and process plant applications around the world.

Traditionally, the pollutant of most concern from gensets is Nitrous Oxides (Nox), 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 ECI Australia SCR system selectively reduces Nox by combining liquid Urea/Ammonia ($NH_3$) and Oxygen ($O_2$) with Nox in the exhaust gas in the presence of a catalyst to form molecular nitrogen ($N_2$) and water ($H_2O$). SCR, in conjunction with an oxidation catalyst, produces beneficial and accountable Nox, Carbon (C) and Volatile Organic Compounds (VOC) emission reductions.

The ECI Australia SCR for Nox abatement system is capable of reducing Nox emissions by over 95%. 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.

## 3. Solution: Armour Tech Diesel Particulate Filter

***Over 99% CO and DPM reduction***

The Armour Tech DPF offers the highest DPM reduction performance available with a regeneration temperature as low as 250°C. The latest technology metal DOC substrate matrix provides optimum heat and mass transfer capability, superior strength and high resistance to thermal shock, coupled with a tailored catalytic wash coat to meet legislative requirements to limit the increase of $NO_2$ from DPF systems.

The DPF is 'state of the art' silicon carbide (SiC) technology with optimised wash coating to continuously reduce Particulate Matter (PM) emissions by up to 99.96% whilst keeping back-pressure in the exhaust low. The silicon carbide based diesel particulate filter has a thin sol-gel type catalytic wash coat that meets national and international legislative requirements to limit the increase of $NO_2$ from DPF systems.

Due to the catalytic wash coat, the DPF can operate without a DOC, but for maximum regeneration and oxidation of PM, a DOC and SiC DPF combination will provide the highest DPM reduction performance available. Benefits include:

- Superior CO and DPM emissions reduction by up to 99.96%
- Low regeneration temperature of 250°C
- Modular design for large and difficult retrofits
- The latest technology in Catalytic Wash Coats for $NO_2$ optimisation
- Heavy duty housing construction
- Designed and built for the toughest underground mining regulations worldwide

### 4. Solution: Diesel Particle Oxidation Catalyst 'PREDATOR Particulate Catalyst'™

***Up to 80% DPM reduction***

ECI Australia's PREDATOR is a 2-stage flow-through filter structure that can be easily fitted to your exhaust. It consists of a specifically catalytic-coated stainless steel DOC and PREDATOR stainless steel screen mesh substrate which traps and oxidizes DPM whilst simultaneously reducing CO and total NO2 in the exhaust gas. Benefits include:

- Reduces diesel smoke and particulate matter emissions up to 80%
- No loss in engine power when correctly sized and fitted
- Maintenance-free with low sulphur fuels
- High resistance against thermal and mechanical shock loading
- Can be custom retrofit to Silencers and Machine Mufflers
- Designed to suit some of the toughest applications
- Independently tested and verified by NATA Certified Vipac Australia.

### Gas Engines

ECI Australia has developed and supplied catalysts for different gas engine types for more than a decade. The company has developed unique differentiated chemistry technology where Platinum and Palladium have been separated from each other within the same matrix to enhance catalyst selectivity. For dual fuel (CNG/diesel) engines ECI offers catalysts which are a combination of a special diesel oxidation\unit and a lean burn methane catalyst concept.

The metallic substrate with superior strength and high resistance to thermal shock has proven to be the superior technology compared to that of conventional ceramic catalyst substrates. These products can be easily integrated into muffler concepts so the need for tooling can be minimized.

Small size and weight - easy to integrate into the exhaust system

- High heat and mass transfer
- Fast light off –low thermal inertia
- High resistance to thermal and mechanical shocks

***Please call us for more information or to discuss your requirements.***

# Comparison Emissions: % Reductions by ECI Product

eci exhaust control industries AUSTRALIA

EXCELLENCE · INNOVATION · SERVICE · 30 Years

| Emission | DOC | POC | DPF | CDPF | SCR |
|---|---|---|---|---|---|
| HC (Hydrocarbons) | 80% | 85% | N/A | 70% | N/A |
| CO (Carbon Monoxide) | 90% | 95% | 60% | 95% | N/A |
| NOx (Nitrogen Oxide) | N/A | N/A | N/A | N/A | 80-100% |
| PM (Particulate Matter) | Up to 15% | Up to 70% | Up to 99% | Up to 99% | N/A |

Where:

- DOC = Diesel Oxidation Catalyst
- POC = Particulate Oxidation Catalyst (Predator)
- DPF = Diesel Particulate Filter (Armour Tech without DOC)
- CDPF = Catalytic Diesel Oxidation Filter (Armour Tech with DOC)
- SCR = Selective Catalytic Reduction