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Form 2188

Dresser-Rand

Enginuity COMPLi

Catalytic Substrates and Cleaning Services

Dresser-Rand's leadership in technology, business processes, and operational excellence creates products and services capable of achieving the highest level of client satisfaction and long-term loyalty throughout the global energy industry.

Dresser-Rand's Enginuity brand represents high quality catalytic systems and replacement substrates for most converter housings being produced today. There is a difference in our quality, manufacturing processes, and cleaning capabilities because today's high technology coatings require careful application, packaging, installation, and cleaning to assure regulatory compliance and long life.

Catalytic substrates – The catalytic substrate is the heart of the system and will require periodic replacement. The catalytic converter in conjunction with your air-fuel-ratio control keep you in compliance by choosing the best quality products available. Our replacement substrates are available in many standard sizes and are competitively priced.

How The Catalytic Emissions System Works

Central to the catalytic converter/catalytic silencer is the catalyst substrate, comprising a cordierite (ceramic) or metallic foil honeycomb with flow-through channels, coated with a thin layer of catalytic materials. The number of channels in a substrate is typically between 200 and 400 cpsi (cells per square inch) for engine applications. This large number of channels provides a high geometric contact surface for the exhaust gas to pass through, enabling catalytic reactions to occur. The catalytic materials coated onto the surfaces of the channels consist of a refractory inorganic oxide, various substances which act as chemical promoters and stabilizers, and a combination of precious metals that can include platinum, palladium, and rhodium. The actual formulation of the coating and precious metals depends on the type of engine application. Dresser-Rand's Enginuity brand offers two main types of catalyst formulas for industrial engines:

- Three-way/NSCR catalysts to simultaneously reduce oxides of nitrogen (NOx), hydrocarbons (HC), and carbon monoxide (CO) from stoichiometric-operating engines
- Oxidation catalysts to reduce non-methane hydrocarbons (NMHC) and carbon monoxide (CO) from lean-burn engines. Oxidation catalysts also can be used with rich-burn engines if the engine is set to operate with excess oxygen in the exhaust, or if air is injected into the exhaust upstream of the catalyst.



The Cleaning Process

The cleaning process is closely controlled and important to follow from start to finish in order to ensure the best performance from your cleaned catalytic element.

- We first soak the substrate in a caustic solution for a specified period of time based on the application of the catalytic converter. This is done to remove the primary fouling and poisoning agents and inorganic masking that may be present.
- The units are then thoroughly rinsed in de-ionized water to remove the caustic solution in preparation for an acidic bath.
- They are then rinsed in the acidic bath to remove organic components from exhaust and lube oil contamination.
- The units are thoroughly rinsed again in de-ionized water to remove the acidic bath residuals and any remaining masking.
- The final step is to dry and inspect the substrate to visually identify any issues with the substrate that may have been revealed after the cleaning.

Enginuity's Catalytic Converters Feature

- Superior technology-based solutions that deliver predictable, reliable, and trouble-free operation
- Easy access for simplified catalyst maintenance
- Rugged stainless steel housing to resist thermal and mechanical stress
- Steel catalyst substrate with highly active coating to ensure high conversion efficiencies
- Space to add more catalyst substrates to meet more stringent emissions standards
- Ultra-thin metal substrate foils to increase the interior void space, which results in lower backpressure
- Cone-shaped inlet designed to achieve uniform flow distribution across the catalyst substrate

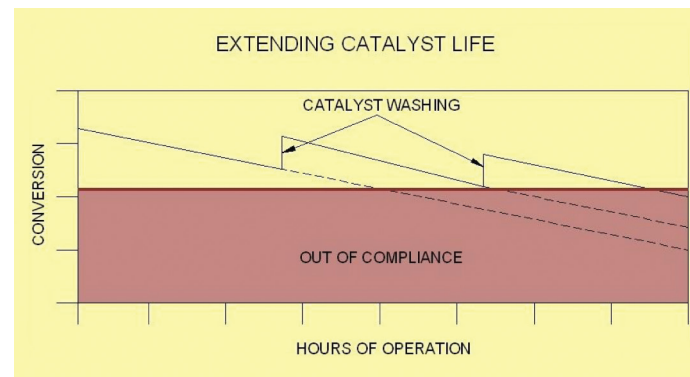
- Brazed substrate interior to eliminate telescoping, loosening, or cracking of the substrate honeycomb
- Interior design to prevent plugging and nesting caused by thermal expansion.

The iCS Air/Fuel System

- Increase your ROI by reducing operating costs and using the latest technology. Your investment is enhanced by a strong commitment to service and client satisfaction — the Enginuity hallmark.

Catalytic Converter

- Cleans exhaust of stationary IC engines
- Results in worry-free, cost-effective emissions compliance
- Ideal solution for many four-stroke engines
- Catalyst types offered:
 - Three-way/NSCR catalysts for rich-burn engines
 - Oxidation catalysts for lean-burn engines
 - Diesel-oxidation catalysts for diesel engines
- Designed for continuous operation, the catalytic converter is reliable and can withstand high mechanical and thermal shock
- The catalyst substrate is easily accessible, reducing maintenance cost
- Metal components will not seize under the stress of high operating temperatures



- Catalytic converters are available in a wide variety of sizes and configurations that can connect to any type of exhaust system, including those in ASA and metric flanges
- Design can be configured to fit into tight spaces, allowing catalytic converter to be used with large or existing silencers
- Custom measurement ports, support saddles, and more can be added as required.

Converter Cleaning Price List		
Add \$25.00 environmental fee each		
Converter Size	Horsepower Rating	Cost to Clean
33 .5"	1600 HP	\$ 635.00
30 .25"	1300 HP	\$ 515.00
26 .5"	1000 HP	\$ 400.00
25 .0"	875 HP	\$ 375.00
23 .5"	750 HP	\$ 315.00
21 .5"	625 HP	\$ 260.00
19 .5"	500 HP	\$ 200.00
17 .0"	375 HP	\$ 145.00
14 .5"	250 HP	\$ 105.00

Catalyst Substrates

- Used to clean the exhaust of stationary IC engines and bring industrial machinery into emissions compliance
- Available in all shapes and sizes, they are used in catalytic converters and catalytic silencers
- Ultra-thin metal substrate foils to increase the interior void space which results in a lower backpressure
- Extremely reliable and can withstand high mechanical and thermal shock
- A custom shell or handles can be added as required, and substrates can be easily adapted to fit into most housing designs

- Catalyst coatings are platinum group catalyst technology:
 - Three-way catalysts used to simultaneously reduce oxides of nitrogen (NOx), hydrocarbons (HC), and carbon monoxide (CO) from stoichiometric-operating engines
 - Oxidation catalysts used to reduce non-methane hydro-carbons (NMHC) and carbon monoxide (CO) from lean-burn engines
 - Advanced diesel oxidation catalysts used to reduce hydrocarbons (HC), odor (or aldehydes), carbon monoxide (CO), and soluble organic fraction (SOF) of diesel particulate emissions from diesel engines
- Unique design features create a strong, compact, and efficient unit and prevent the substrate interior from experiencing nesting, plugging, or cracking of the cells in the face of extreme mechanical and thermal shock
- Alternative design provides additional rigidity, as well as increased interior void space to give a low backpressure.

Engine Exhaust Trends

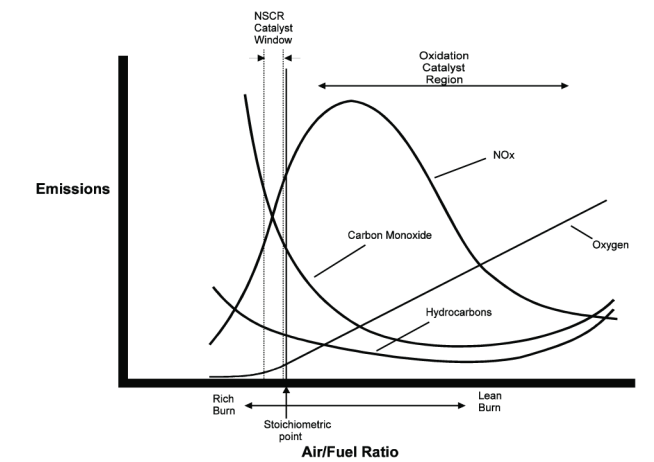


Figure 1 - Emission Trends for Spark-Ignited Engines.