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MIRATECH Unveils Two New Catalyst Substrates

NEXT™ and VORTEX ™ are more efficient and durable than traditional industrial engine catalyst substrates.

Tulsa, Oklahoma – MIRATECH Corporation (www.miratechcorp.com) has released two new industrial engine catalyst substrates based on years of research and product development with Ecocat Oy: NEXT™, primarily for round catalyst elements and VORTEX™, primarily for rectangular catalyst elements. A catalyst substrate is the support material upon which the catalyst is applied.

NEXT and VORTEX both give end-users two important category improvements, according to MIRATECH VP/Sales, Marketing and Engineering, Bill Clary. "Because of their designs NEXT and VORTEX provide industrial engine operators greater catalyst element strength, durability and resistance to telescoping, as well as increased catalyst performance and efficiency. Both benefits come while still accommodating back pressure limits," says Clary.

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Increased "Turbulence Factor" Improves Catalyst Performance

Looked at under a microscope the surface of a catalyst substrate's coating is rough and uneven and looks something like the surface of a sponge. This microscopic sponge-like surface where the catalyst's precious metals (usually some combination of platinum, palladium and rhodium) reside is full of nooks, crannies, pockets and pores – "The Thomas' English Muffin Effect" says Jim McDonald, East Coast Sales Manager for MIRATECH. It's a design that is anything but flat. To reach the precious metals embedded in this uneven surface, and thus achieve catalysis, good mixing of the engine exhaust with the catalyst precious metals is essential. "Good mixing comes from turbulence in the exhaust flow," Clary explains.

Laminar (straight-line) exhaust flow of most traditional substrates produces mixing only in the first fraction of the total catalyst substrate. With no obstructions – or changes in the velocity of flow – traditional catalyst exhaust goes quickly from turbulent at the beginning of the substrate to laminar (straight-line) flow through the rest of the substrate. With traditional catalyst substrates (sometimes called "open-foil" substrates) exhaust flow is turbulent for less than 15% of the length of the substrate channel. The remaining 85% of the substrate channel length is straight-line laminar flow where little, if any, mixing occurs which means fewer pollutants are exposed to the precious metal compound that lines the walls of the substrate.

"Using two very different designs," according to Clary, "NEXT and VORTEX substrates increase catalyst performance and efficiency by maintaining a higher percentage of turbulent exhaust flow across the entire length of each catalyst substrate." Both NEXT and VORTEX produce what MIRATECH calls a high Turbulence Factor – the percent of turbulence across the length of the substrate – according to Clary.

NEXT substrate has creases or grooves in the foil to interrupt air flow and create more turbulent zones. Each groove in the NEXT substrate creates a following turbulent zone in the channel. Multiple grooves produce multiple turbulent zones which boosts

catalyst performance because more mixing means more pollutants react with more precious metals. NEXT also has a lower backpressure than traditional substrates, says Clary. "NEXT uses 60 degree triangular channels that give a higher percentage of open substrate frontal area than traditional straight-line flow substrates," says Clary. "That means NEXT is optimized not only for maximum catalyst reactivity, but also for low back pressure," he adds.

VORTEX substrate, because it's rectangular, takes a different path to a high Turbulence Factor than NEXT, MIRATECH's round substrate. VORTEX achieves a high Turbulence Factor through superior static mixing and mass transfer. VORTEX is a corrugated foil substrate that is layered and stacked in an off-setting, overlapping, angle-channel pattern where each overlap point is electronically resistant welded. The angled overlapping channels create a tortuous patch for the exhaust that results in turbulent air-flow through the entire length of the VORTEX substrate.

Increasing Element Durability and Strength through Advanced Substrate Design

Not only do both of the new MIRATECH substrates realize better turbulence for enhanced performance, but both substrates also offer a benefit many industrial engine end-users would say is even more important for catalytic converters – increased strength and durability. The very different designs of NEXT and VORTEX that produce better mixing also make each substrate stronger, more durable and less prone to nesting or telescoping than traditional straight-line flow substrates.

The grooves in NEXT that create multiple turbulent zones for better performance also increase substrate strength. The NEXT grooves interlock every layer of the catalyst substrate in a layer by layer pattern across the entire diameter and length of the substrate. This self locking system joins the flat and corrugated strips together and makes the entire matrix stronger and more stable.

MIRATECH's VORTEX rectangular substrate likewise traces its strength and durability to the design that also creates its increased turbulence. The off-setting angled channel pattern provides many thousands of electronic resistant weld-points and makes VORTEX a superior strength substrate when compared to straight-line substrate products.

Broad Product Application - Better Availability

Clary says NEXT and VORTEX substrates will be incorporated across MIRATECH and non-MIRATECH products and a stocking inventory will often allow same-day shipping of elements. NEXT elements will be used in MIRATECH's round product lines (MN, MBA, IQ elements and housings and RC series of converter/silencers). NEXT raw materials will be kept in stock as will a wide inventory of finished ready-to-ship elements. VORTEX elements' rectangular structure lets MIRATECH design catalyst elements of any size while providing off-the-shelf availability for many common sizes. In addition, VORTEX elements will be compatible with many non-MIRATECH housings (including GT Exhaust Systems, Johnson Matthey and Maxim Designs).

MIRATECH Corporation is headquartered in Tulsa, Oklahoma and provides engine emissions solutions to customers in Power Generation and Gas Compression markets in North America. The company is one of few reciprocating engine emission control firms to combine both U.S. based sales with service and technical support.

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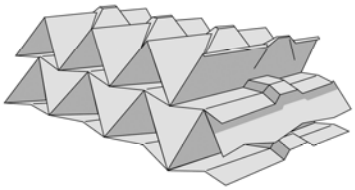
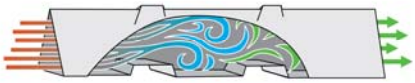
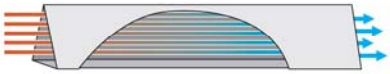
NEXT Graphics/Pictures



NEXT increases strength and durability because the grooves in NEXT interlock every layer of the substrate. This self locking system joins the flat and corrugated strips together and makes the entire matrix stronger and more stable to reduce telescoping.



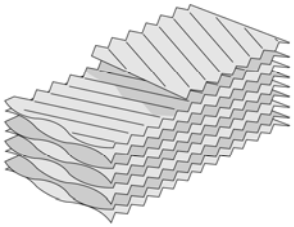
Each groove in the NEXT substrate creates a separate following turbulent zone in the channel. Multiple turbulent zones boost catalyst performance because more pollutants react with more precious metals.



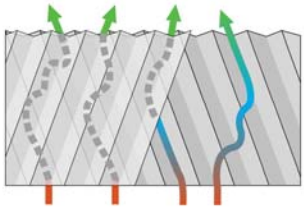
Straight-line flow (open-foil) substrates lack the turbulence-generating grooves found in NEXT, consequently airflow is primarily laminar which diminishes the catalytic capability because fewer pollutants are exposed to precious metals.

NEXT elements will be used in MIRATECH's round product lines (MN, MBA, IQ elements and housings and RC and QC series converter/silencers). NEXT raw materials will be kept in stock as will a wide inventory of finished ready-to-ship elements.

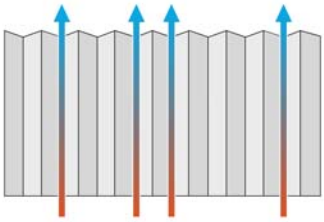
VORTEX Graphics/Pictures



The VORTEX off-setting angled channel pattern provides many thousands of electronic resistant weld-points and makes VORTEX a superior strength substrate when compared to straight-line substrate products.



VORTEX's corrugated substrate is layered in an off-setting mixing pattern that creates turbulence through the entire channel. VORTEX's static mixing increases catalytic reaction because more gases are allowed to react with the precious metals.



Straight-line catalysts lack the turbulence-generating corrugated substrate found in VORTEX. Airflow is laminar which diminishes catalytic capability because fewer pollutants are exposed to precious metals.

VORTEX elements' rectangular structure lets MIRATECH design catalyst elements of any size while providing off-the-shelf availability for many common sizes. In addition, VORTEX elements will be compatible with many non-MIRATECH housings.