

IsoMat® AV5

Unifrax Corporation is pleased to introduce the IsoMat® AV5 catalytic converter and diesel particulate filter support mat system. IsoMat AV5 is designed to function as mechanical support for the ceramic substrate and act as an exhaust gas seal while providing thermal insulation.

As a manufacturer of fibers used in a variety of catalytic converter mounting systems, Unifrax has successfully combined fiber-making expertise with a state-of-the-art paper manufacturing process to maximize the performance of IsoMat AV5. IsoMat AV5 offers superior low-temperature performance compared to other traditional intumescent support mats and has excellent thermal stability with a continuous use temperature of 750°C average mat temperature. Low-temperature mounting pressure is provided by a structural support matrix of Isofrax fibers held together by a proprietary binder system. Low-temperature performance and mounting pressure of IsoMat AV5 parallels typical non-intumescent support mat systems. The fiber matrix also provides resistance to hot gas mat erosion.

At elevated temperatures, the fiber matrix support is complemented by vermiculite expansion to absorb additional gap expansion.

Fiber Technology

Developed to meet European Regulatory requirements, IsoMat AV5 support mat is engineered utilizing Isofrax® 1260°C fiber – a revolutionary new fiber produced using a patented magnesia-silicate chemistry. Isofrax 1260°C fiber is the product of a long-term research and development effort by Unifrax to produce a soluble fiber with high-temperature performance characteristics to 1260°C.

Isofrax 1260°C fiber exhibits excellent chemical stability and resistance to attack from most corrosive agents including combustion by-products of gasoline and diesel fuels.

Isofrax Fiber – Health and Safety Information

Isofrax 1260°C fiber from Unifrax, according to Directive 97/69/EC, possesses a chemistry within the regulatory definition of a “man-made vitreous (silicate) fiber with an alkaline earth oxide content greater than 10% by weight.” Isofrax fibers have been tested pursuant to EU protocol ECB/TM/26 Revision 7, Nota Q, Directive 97/69/EC, with results that are below the regulatory thresholds. As a result, Isofrax 1260°C fiber does not require additional labeling, further testing, or special handling practices. In addition, Intratracheal Instillation Biopersistence Testing per the German Hazardous Substances Ordinance has been conducted on Isofrax fibers with results below German regulatory thresholds. Requirements of the German Hazardous Substances Ordinance [October 26, 1993 as amended June 18, 1998] do not apply. Certifications are available upon request.



Applications

Performance characteristics of IsoMat AV5 make it an ideal support mat system for diesel particulate filter applications. IsoMat AV5 can also be used in typical underbody and close coupled catalytic converter applications as well as heavy-duty diesel NOx aftertreatment systems. IsoMat AV5 is capable of exerting required holding pressure necessary to resist any movement of the substrate caused by exhaust gas forces or axial acceleration forces. The mat will accommodate tolerance stack-up between the substrate and shell and absorb thermal expansion differences of the aftertreatment system.

Typical Product Properties

Basis Weight (g/m²): 2300, 2700, 2900

Bulk Density (g/cc): 0.293 +/- 0.1 g/cc

LOI @900°C: 2.5 – 7.5%

Typical Composition:

	<u>Weight %</u>
Magnesia-Silica Fiber*	65-75%
Vermiculite	15-25%
Binder	6-13%

*High Index Raw Material Feedstock

Canning Performance

As a function of the application, IsoMat AV5 support mat is typically installed at a nominal gap bulk density (GBD) between 0.64 and 0.69. The compressive force of IsoMat AV5 support mat is shown in Figure 1. **P_{peak}** is the maximum pressure measured during canning of the converter. **Pres300** is the residual pressure measured five minutes after canning.

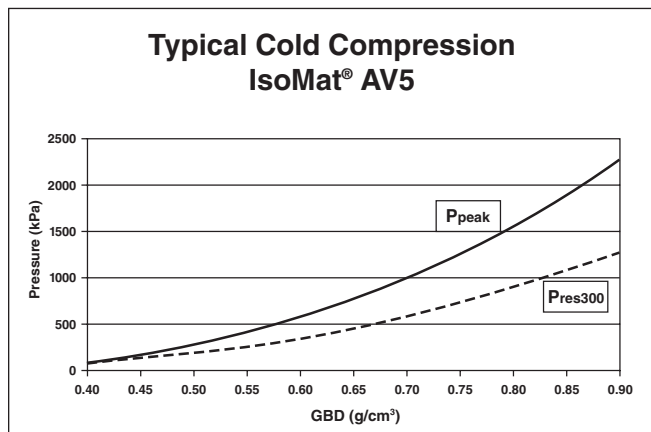


Figure 1: Typical cold compression curves for IsoMat AV5 support mat.

Performance

At relatively low inlet temperatures, when average mat temperature between the substrate and shell is limited to about 300°C, laboratory testing indicates IsoMat AV5 can provide 5 times more holding pressure than current Advanced Intumescent systems.

When compared to a non-intumescent support mat system, at elevated inlet temperatures when the average mat temperature approaches 750°C, low-level concentrations of vermiculite present in the fiber matrix will expand, serving to increase holding force as the gap between the substrate and shell increases, thereby adding support.

Erosion Durability

The durability of a catalytic converter support material is of major importance to long-term converter efficiency and integrity. Mat erosion is most often the result of low mat pressure caused by the inability of a design to maintain targeted GBD. A design is unable to maintain GBD either due to shell spring deformation or when the temperature of the converter causes shell expansion to be too great for the mat to absorb. Pulsating exhaust gases then attack and erode the unsupported mat, resulting in bypass and a decrease in converter efficiency. The data provided in Figure 2 was generated in a laboratory test apparatus, which simulates a 4-cylinder engine running at 6000 rpm. Support mat is installed in the apparatus at GBD conditions that are below recommended design limits. Erosion loss is calculated by measuring the volume loss of support mat

material. The lower the measured volume loss, the better the resistance to erosion. Unifrax IsoMat AV5 has similar erosion resistance when compared to other commercially available traditional intumescent support mats when evaluated at their respective minimum GBD conditions.

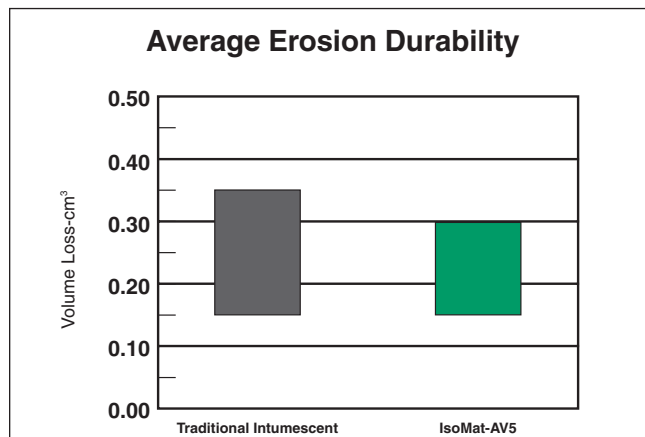


Figure 2: Average Erosion Durability measured as volume loss.

Unifrax is a worldwide sales and service organization with several international locations and representatives. The services that we provide include thermal modeling, system design engineering assistance, and failure analysis as well as technical exchanges programs. For additional information regarding IsoMat AV5 or any of our catalytic support mats, please contact the Unifrax Automotive Application Engineering Department at 716-278-3983. In Germany, contact Unifrax at 49 (0)211 87 746 0.

Refer to the product Material Safety Data Sheet (MSDS) for recommended work practices and other safety information.

Data are average results of tests conducted under standard procedures and are subject to variation. Results should not be used for specification purposes.