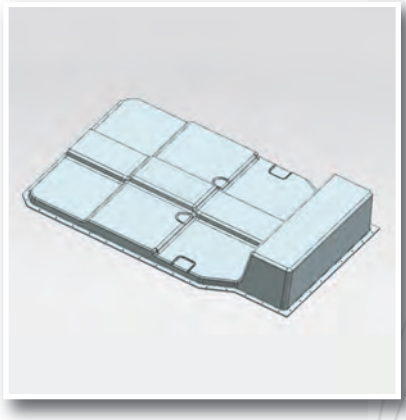
The Art And Science Of Thermoset Composites

BEV Battery Cover



IDI Composites® International

Ideas For Meaningful Results.

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Case Study

FLAMEVEX™
Flame Resistant Lightweight Composites

BEV Battery Cover

inquiry

For IDI's OEM and Tier 1 partners, the battery pack is a critical part for an electric vehicle. Depending on the level of power required for the electrical powertrain, the size of the pack can be over 2 square meters with 25 to 30 centimeters of depth. Due to its size, proximity to the source of energy, and the need for a perfect seal and complex shape, designers were tasked with finding a material solution which would perform at the highest fire resistance standards, offer high mechanical performance, and simultaneously reduce weight.

idea

IDI Composites International developed FLAMEVEX™: a series of highly flame-resistant SMCs with high mechanical properties and a low level of shrinkage, offering the ability to mold complex parts with dimensional stability from a lightweight solution.

IDI has developed a series of formulations and can customize mechanical properties and fire resistance depending on the structure of the part required by the OEM. This makes FLAMEVEX™ SMCs the solution for EV manufacturers seeking an alternative to traditional automotive solutions.

innovation

FLAMEVEX™ materials are not traditional thermoset composites. With FLAMEVEX™, IDI is advancing SMC to previously unknown fire performance levels without compromising thickness, strength, or moldability. Working with our OEM and Tier 1 partners, IDI's FLAMEVEX™ materials have been used on battery packs which have passed the stringent Chinese Standard GB/T 31467.3 (aka China Bonfire test) tests at thicknesses as low as 2.5 mm (with lower thicknesses in development).

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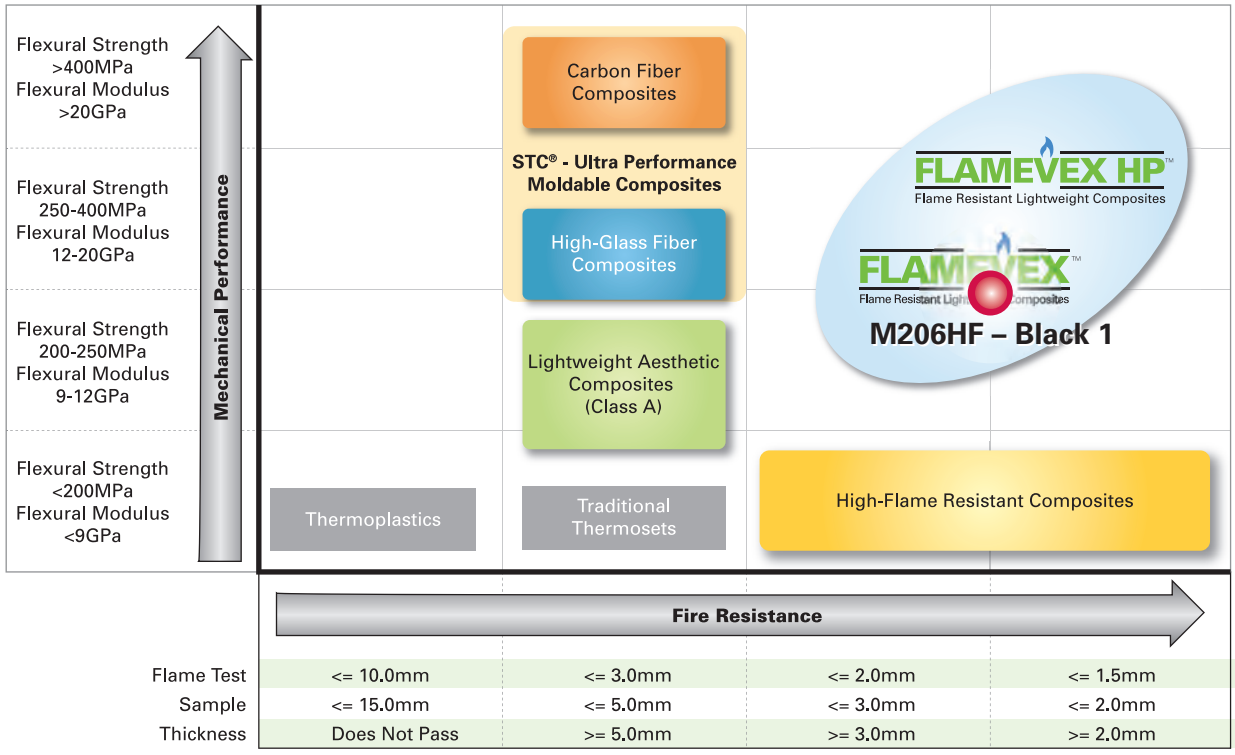
IDI 3i Composites Technology Center
inquiry • ideas • innovation

Fire Resistance + Strength: Filling The Void

IDI FLAMEVEX™ Material Performance



Flame Test	<= 10.0mm	<= 3.0mm	<= 2.0mm	<= 1.5mm	UL94 VO Testing
Sample	<= 15.0mm	<= 5.0mm	<= 3.0mm	<= 2.0mm	UL94 5VA Testing
Thickness	Does Not Pass	>= 5.0mm	>= 3.0mm	>= 2.0mm	Bonfire Testing*

***Bonfire Testing –** In collaboration with our OEM and Tier 1 partners, materials in the FLAMEVEX™ portfolio have been used on parts which have passed critical Chinese Bonfire and bonfire-like testing including:

GB/T 31467.3 v2017.Part 3: Safety requirements and test methods [Lithium-ion traction battery pack and system for electric vehicles]
ECE/TRANS/WP.29/GRSP/2017/2section6.2.4 Fire Testing
E/ECE/324/Rev.2/Add.99/Rev.2-E/ECE/TRANS/505/Rev.2/Add.99/Rev.2 ANNEX 8E Fire Testing

Flame Performance
Strength & Stiffness
Light Weighting
Dimensional Stability

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FLAMEVEX™ – M200HF series
Automotive Grade
Sheet Molding Compound (SMC)

FLAMEVEX™
Flame Resistant Lightweight Composites

M206HF BLACK-1

Properties	Typical Value
Specific Gravity Test Method: ISO 1183	1.80 -1.90 g/cm^3
Fiber Glass Content Test Method: IDI Internal Standard	30±3 %
Shrinkage Test Method: IDI Internal Standard	0.00 - 0.07 %
Water Absorption: ISO 62:2008(24h)	0.6%
Tensile Strength Test Method: ISO 527-4	105 MPa
Tensile Modulus Test Method: ISO 527-4	11.0 GPa
Elongation at break Test Method: ISO 527-4	1.6%
Flexural Strength Test Method: ISO 14125	220 MPa
Flexural Modulus Test Method: ISO 14125	12.0 GPa
Impact Strength – Un-Notched Test Method: ISO 179-1	85 kJ/m^2
Heat Distortion Temperature Test Method: ISO 75-1&ISO 75-2 Method A (1.8MPa)	≥250℃
Flame Resistance Test Method: UL94-2013	Classification: 5VA@2.0mm V-0@1.2mm
Limiting Oxygen Index Test Method: ISO4589-1:2017& ISO4589-2:2017	48%
Fire Exposure Test (part thickness 2.2mm-2.5mm) Test Method: GB/T 31467.3-2015 (*)	Passed

* GB/T 31467.3-2015: Lithium-ion traction battery pack and system for electric vehicles—Part 3: Safety requirements and test methods.

3/2020