

High Technology, Innovative Products For Railway Interiors

GE Advanced Materials serves the global rail interior industry with a broad portfolio of advanced engineered thermoplastic resin, sheet, and film materials. These include products developed for both interior and exterior use, representing a total solutions approach to meeting this industry's rapidly expanding needs with proven materials technologies.

New Azdel* Rail-Lite* Composite for Interior Train Applications

A new breakthrough technology from Azdel, Inc., and GE – called Azdel* Rail-Lite* composite – is a new low-pressure, thermoformable, lightweight composite sheet that exhibits excellent flame, smoke, toxicity, and heat-release performance in large semi-structural panels for trains. The material also delivers outstanding mechanical properties, contributing to reduced weight, noise, and systems costs. Comprised of long glass fibers, Azdel Rail-Lite composite enables sturdy, lightweight components with approximately half of the specific gravity of lower performing composite materials. Azdel Rail-Lite composite meets U.S. FRA 49 CFR Part 238 flammability and smoke emissions standards for train passenger cars and locomotive cabs and complies with toxicity standard BSS 7239. It also meets Germany's DIN5510, Part 2 (S4/SR2/ST2 rating). Specific formulations are also able to pass the stringent requirements for the British Rail Standard BS 6853 Category 1A. Because of its low weight and excellent flame, smoke, and toxicity performance, the new material is an excellent candidate to replace polyvinyl chloride (PVC), polyester, vinyl ester, or phenolic FRP materials used in many interior train applications. Potential target applications include interior panels, window frames, ceilings, and other large interior train parts.

Siemens Metro Train with GE's Ultem* R16SG29 Sheet

GE's Ultem* R16SG29 sheet forms the entire interior of train cars – from floor to ceiling – on Siemens' S70 Platform line of passenger trains for the U.S. cities of Houston, Texas, and San Diego, California. Formed in a thickness of three millimeters, the material not only meets Siemens' demand for exceptional cleanability, durability, and vandal-resistance, but also meets the following flame, smoke, and toxicity requirements of the rail industry: U.S. FRA 49 CFR Part 238 flammability and smoke emissions standards for train passenger cars and locomotive cabs; toxicity standard Bombardier SMP 800C; Germany's DIN5510, Part 2 (S4/SR2/ST2 rating); and French NF P 92-501/5 and NF F 16-101 (M1,F1 rating). Use of Ultem R16SG29 sheet is growing in train window masks, cladding, walls and seating, and other interior parts.



Internal Claddin – Seats – Various components

Opague Sheet Materials

Azdel* Rail-Lite:	lightweight, glass fibers reinforced composite
Ultem* R16SG00 sheet:	V0-1.6 [mm], flame retardant
Lexan* F6000 sheet:	V0-1.5 [mm], flame retardant
Gepax* 7200 sheet:	V0-3 [mm], flame retardant



Injection Molding Resins

Ultem* resin:	flame retardant, chemical and heat resistant
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Windows – Internal Separations

Transparent Sheet Materials

Lexan* Margard* MR5E sheet:	2-side hard coated
Lexan* Margard* MR5EFR sheet:	2-side hard coated, flame retardant
Lexan* Margard* HLG5 sheet:	1-side hard coated
Lexan* Margard* HLG3 sheet:	1- side hard coated



Light Diffusers – Signs

Translucent Sheet Materials

Lexan* F2000 sheet:	opal white, V0-3 [mm], flame retardant
Lexan* Margard* MR5EFR sheet:	opal white, 2 sides hard coated, FR

Opaque Sheet

Product Property	Ultem* R16SG00 sheet	Lexan* F6006 sheet	Gepax* 7200 sheet
Specific Gravity	1.3	1.21	1.20
Impact	Good	Very Good	Very Good
Chemical Resistance	High	Medium	Medium
Repairable	Yes	Yes	Yes
Heat Distortion Temp	190°C	132°C	138°C
General Flammability			
Oxygen Index	>45	35	36
UL94	V0-1.6 [mm]	V0-1.5 [mm]	V0-3.0 [mm]
Glow Wire (960°C)	Pass (3.2mm)	Pass (2mm)	Pass (3.0 mm)
Specific Flammability			
Din 5510-II (German)	S4/SR2/ST2 (3mm)	S4/SR2/ST2 (3mm)	S4/SR2/ST2 (3-6mm)
NF P 92-501/5	M1	M1 (2mm)	—
NF F 16-101	F1	F1 / F2 (2mm)	F1/F2

Transparent Sheet

Product Property	Margard* MR5E sheet	Margard* MR5EFR sheet	Margard* HLG5 sheet	Margard*HLGA3 sheet
Specific Gravity	1.2	1.24	1.2	1.2
Impact	Excellent	Excellent	Excellent	Excellent
Chemical Resistance	Very Good	Very Good	Very Good	Very Good
Heat Distortion Temp	138°C	138°C	138°C	138°C
Taber Abrasion (500 cycles at 500 gr)	<12% Haze	<12% Haze	< 12% Haze	3% Haze
General Flammability				
Oxygen Index	25%	34%	25%	25%
Halogen Free	Yes	No	Yes	Yes
Specific Flammability				
RF1/RF3	Class 1/ Class 2	Class 1	—	—
NF P 92-501/5	M4(3mm)	M2 (3&12mm)	—	—
NF F 16-101	F1/F2	F1/F2	—	—

Note: This is a selection of the testing completed, please contact GE Advanced Materials for additional information.

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GE imagination at work