

Lexan* & Ultem* resin and sheet



Keeping technology moving

High performance, light weight plastics with excellent flame, smoke and toxicity performance for your designs in railway interiors.

Railway and bus industry

SABIC Innovative Plastics serves the global rail interior industry with a broad portfolio of engineered resins, sheet, and film materials. Our products are designed for both interior and exterior use, representing a total solutions approach to this industry's rapidly expanding need for proven materials technologies.

Certificate & product overview

Test method	Opaque materials	Transparent materials
DIN5510 Part 2	Gepax* 72011N 2mm grey S3/SR2/ST2 Ultem* R16SG29 3mm S4/SR2/ST2	Lexan* F2000 112 & 82103 3mm S3/SR1/ST2
NF F31-112		Margard* MR5E/MRA3, (surface performance) G1/G2
NF 16 – 101	Lexan F6006 80098 3mm F1 Lexan F6006 80995 4mm F1 Ultem R16SG00 71025 3mm F1	Margard MR5EFR Bronze 3 – 6mm F1 Margard MR5EFR Opal white 4mm F2 Lexan F2000 112 2 – 8mm F2 Lexan Margard MR5EFR 112 6mm F2
NF P92 - 501	Ultem R16SG00 71025 3mm M1 Lexan F6006 80995 2mm M2	Lexan F2000 112 2 – 8mm M2 Lexan F2000 Opal white 2 – 3mm M2 Lexan MR5EFR 112 3-9,5 mm M2
UNI 8457, 9174, 9176	Lexan F6006 all colors 2mm Class 1, F1 3mm Class 1B, F1 4mm Class 2B, F1	Lexan F2000 all colors 2mm Class 1A, F2 2mm Class 1A, F2
BS6853 & BS476 Part7	Ultem R16SG29 GY4097 3mm R = 0,32 AREA based Test; Class 1Y	Lexan MR5FR all colors 9,5mm Class 1B, F1 Lexan F2000 112 3mm Class 1Y



Internal cladding – seats & other components

Opaque sheet materials	
Azdel® Rail-Lite® composite	Lightweight, glass-fiber-reinforced composite
Ultem R16SG00 sheet	VO-1.6 [mm], flame resistant (ASTM E162), low smoke (ASTM E662) and toxicity (BSS 7239 and SMP 800 C)
Lexan F6000 sheet	VO-1.5 [mm], flame resistant (ASTM E162), low smoke (ASTM E662) and toxicity (BSS 7239 and SMP 800 C)
Gepax 7200 sheet	VO-3 [mm], flame resistant



Injection molding resins	
Ultem resin:	Flame retardant, chemical and heat resistant. Various grades† are compliant with DIN 5510 S3/S4/SR2/ST2
Cycloyl* C3650 resin	Flame retardant. Compliant with VDE. Meets NF 16.101 (M1 & combination F0-F3)
Cycloyl C2100 resin	Meets railway regulation NF 16.101 (M1 & combination F0-F3)
Cycloyl C6200 resin	Compliant with railway regulation DIN 5510 (S3/S4/SR2/ST2)
Starflam* PF10042270 resin	Compliant with railway regulation DIN 5510 (S3/S4/SR2/ST2)
Lexan resin	Various grades† are compliant with railway regulation DIN 5510 (S3/S4/SR2/ST2)
Lexan 2034 resin	Meets railway regulation NF 16.101 (M1 & combination F0-F3)
Noryl* LS175 resin	Non-halogenated, flame retardant (ASTM E162). Low smoke (ASTM E662) and toxicity (BSS 7239 and ATS1000/ABD0031) Compliant with railway regulations DIN 5510 (S4, SR2, ST2) Compliant with regulation NF F 16.101 (F2/M2 at 2.00 and 4.00 mm) VO - 1,5 [mm] and V1- 1[mm], suitable for profile extrusion.



Windows – internal separations

Transparent sheet materials	
Lexan Margard MR5 IR sheet	2- side hard coated, solar control, high level protection against abrasion, cleaning fluids, paints, and adhesives; allows removal of graffiti
Lexan Margard MR5E sheet	2-side hard coated, highest optical certification and abrasion resistance
Lexan Margard MR5EFR sheet	2-side hard coated, flame resistant
Lexan Margard HLG5 sheet	1-side hard coated
Lexan Margard HLG A3 sheet	1-side hard coated
Lexan FRA25/236C sheet	2-side hard coated, flame resistant (FRA type 1 certified as dual glazed system) available only in US
Lexan FRA460 sheet	2-side hard coated, flame resistant (FRA type 1 certified as monolithic sheet) available only in US

Light diffusers – signs

Translucent sheet materials	
Lexan F2000/2100 sheet	Opal white, VO-3 [mm], flame resistant
Lexan 9600 sheet	Uncoated, textured
Lexan Margard MR5EFR sheet	Opal white, 2 sides hard coated, FR

Please contact SABIC Innovative Plastics offices to find out compliant grades.



SABIC Innovative Plastics worked together with Masterplex converter company on an Italian railway project, where Lexan® F2000 and F6006 sheets were used to help achieve the rail's most challenging interior feature, a train ceiling complete with light diffusers. Suspended from a large structure, the ceiling comprises opaque and transparent grades of flame-retardant Lexan polycarbonate sheet. Its lightweight structure provides passengers with a high-quality interior and comfortable journey. Lexan F2000 and F6006 sheets also offer ease of processing and excellent formability.

Italian railways also selected Lexan Margard® MR5FR sheet for the compartment partitions. Lexan Margard MR5FR sheet can be ordered in various transparent custom colors. Its hard coating on two sides provides UV-, marring- and fire resistance. Its high impact strength, forced entry protection and graffiti resistance all support SABIC Innovative Plastics' unique ten year limited warranty against breakage, and five year limited warranty against yellowing, loss of light transmission and coating failure.

Eurostar, the first truly international train that connects Paris, London, and Brussels, incorporates SABIC Innovative Plastics Lexan Margard MR5FR sheet to create high performance light diffusers on its interior ceilings. This light weight (DIN 53479 -1.2 kg/dm³), highly energy absorbent material provides enhanced temperature resistance and flame retardancy [UL94, V0 at 3 mm.] for the light diffuser.

Lexan Margard MR5FR sheet complies with segment related certifications, such as

- ANSI Z26.1 /DOT for transportation
- EC 95/28 for flammability
- NF F31 -112 SNCF for anti-graffiti

For train exterior window and front light cover applications, Lexan Margard FMR5XT polycarbonate sheet can provide high-performance dual-formable hard coat protection against wear and tear. Because this material can be drape-formed and cold-curved, it can benefit applications such as curved windows, barrel vaults, skylights, partitions and other curved glazing applications. Additionally, Lexan Margard FMR5XT sheet can provide reduced weight, high impact strength and UV- and abrasion resistance.

SABIC Innovative Plastic's first hard-coated, solar control, polycarbonate (PC) sheet for the global public transportation industry, Lexan Margard MR5 IR sheet helps save energy and protect against potentially harmful UV radiation by effectively managing infrared heat from sunlight striking buses, trains, and other public transport and specialty vehicles. This reduces heat build-up and can help cut air conditioning costs on hot and sunny days, while at the same time provide insulation to retain heat and lower fuel costs on cold or cloudy days. Lexan Margard MR5 IR sheet is approximately half the weight of comparative glass products, which can lead to an overall weight reduction of the vehicle, potentially reducing fuel consumption. It also features SABIC Innovative Plastics' proven hard-coating technology on both sides delivering high level protection against abrasion, cleaning fluids, paints and adhesives and allows frequent cleaning or removal of graffiti without causing damage.

Because it can be easily formed into complex, aesthetically appealing shapes, Lexan F6000 sheet is a good choice for seat backs and seat tray applications. Available in variety of colors or metallic effects, Lexan F6000 sheet also offers high impact and heat performance. Lexan F6000 sheet is also able to pass stringent requirements for the British Rail Standard BS 6853 Category 1A. Because of its low weight and excellent flame, smoke and toxicity performance, the 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 parts.



Italian railway interior ceiling complete with light diffusers



Italian railways compartment separators



Eurostar international train interior



Starflam® resin exhibits the level of toughness, flame retardancy and color aesthetics Kiel required for bus and railway seats

Ultem* resin and sheet

Ultem resin is an inherently flame-retardant (FR) material with low smoke emission. It offers outstanding high heat resistance, high strength, modulus and broad chemical resistance. Grades of Ultem resin meet U.S. Federal Rail Administration (FRA) requirements and are suited for use in a broad range of transportation interior applications. Two new grades in particular – Ultem 9075 and Ultem 9076 resins – are especially good candidates for use in railway applications such as personal service units, air valve panels and other interior components. They are available from SABIC Innovative Plastics in a range of custom colors. Other high-performance Ultem resins for transportation interiors include Ultem 8015, Ultem CSR5001, Ultem 2100, and Ultem 1000 resin grades.

Ultem R16SG29 Sheet

In addition to satisfying regulations worldwide for flame, smoke and toxic emission, this material delivers exceptional cleanability, durability and vandal resistance. Ultem R16SG29 sheet can be an excellent candidate for window masks, cladding, walls and seating. The material already forms entire rail car interiors – from floor to ceiling – on Siemens' S70 Platform line of passenger trains for the U.S. cities of Houston, Texas and San Diego, California. It meets the several railway industry requirements for flame, smoke and toxicity.

- 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)
- French NF P 92-501/5 and NF F 16-101 (M1,F1 rating).

Other products for railway interiors from SABIC Innovative Plastics include

- Flexible Noryl* resin – a family of flexible modified-polyphenylene ether (MPPE) resins positioned as an alternative to polyvinyl chloride (PVC), flame-retarded polyethylene (FR-PE) and thermoplastic polyurethanes (TPUs) in wire coating applications.
- LNP* Verton* compounds – a line of specialty compounds that combine polypropylene, polyamide and other engineering resins with long glass fibers for exceptional rigidity, strength and performance.
- LNP Thermocomp* compounds – a family of high-performance specialty compounds that combine a number of base resins with glass or carbon fibers, minerals, or glass beads to help deliver outstanding mechanical and thermal capabilities for a diverse range of applications.
- LNP Lubricomp* compounds – a portfolio of specialty compounds that eliminate the need for external lubricants in molded applications.

Americas Headquarters

SABIC Innovative Plastics
Specialty Film & Sheet
One Plastics Avenue
Pittsfield, MA 01201
USA
T 800 451 3147
T 413 448 5400
F 413 448 7506

European Headquarters

SABIC Innovative Plastics
Specialty Film & Sheet
Plasticslaan 1
PO Box 117
4600 AC
Bergen op Zoom
The Netherlands
T +31 164 292911
F +31 164 292940

Pacific Headquarters

SABIC Innovative Plastics
Specialty Film & Sheet
1266 Nanjing Road (W)
Unit 902-907, Plaza 66
200040 Shanghai
China
T +86 21 3222 4500
F +86 21 6289 8998

Email

sfs.info@sabic-ip.com

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Train window mask from the Long island railroad, New York



Siemens train window panel made with Ultem R16SG29 sheet. Use of Ultem R16SG29 sheet is growing in train window masks, cladding, walls and seating, and other interior parts

