

Description

Lexan* 9030 sheet is the standard Lexan sheet without UV nor Mar resistant surface treatment. Lexan 9030 sheet combines high impact and temperature resistance with optical clarity and can be utilized for secondary glazing behind existing glazing for economical protection against breakage or intrusion. Lexan 9030 sheet can be cut, sawn, drilled and milled by using standard workshop equipment without the risk of cracking and breakage and is therefore an excellent candidate for fabricating a wide range of indoor applications such as machine guards etc. Lexan 9030 sheet can be easily thermoformed into complex parts while retaining its excellent properties necessary for demanding applications such as vandal proof street furniture. Lexan 9030 sheet may be decorated using a wide variety of modern techniques such as painting and screen printing.

Typical Property Values ♦

Property	Test Method	Unit	Value
Physical			
Density	ISO 1183	g/cm ³	1.20
Water absorption, 50% RH / 23 °C	ISO 62	%	0.15
Water absorption, saturation /23°C	ISO 62	%	0.35
Mould shrinkage	SABIC-Method	%	0.6-0.8
Poison's ratio	ASTM-D638	-	0.38
Mechanical			
Tensile stress at yield 50 mm/min	ISO 527	MPa	60
Tensile stress at break 50 mm/min	ISO 527	MPa	70
Tensile strain at yield 50 mm/min	ISO 527	%	6
Tensile strain at break 50 mm/min	ISO 527	%	120
Tensile modulus 1 mm/min	ISO 527	MPa	2300
Flexural stress at yield 2 mm/min	ISO 178	MPa	90
Flexural modulus 2 mm/min	ISO 178	MPa	2300
Hardness H358/30 95	ISO 2039/1	MPa	95
Impact			
Charpy impact, notched	ISO 179/1C	kJ/m ²	35
Izod impact, unnotched 23°C	ISO 180/4U	kJ/m ²	NB
Izod impact, unnotched -30°C	ISO 180/4U	kJ/m ²	NB
Izod impact, notched 23°C	ISO 180/4A	kJ/m ²	65
Izod impact, notched -30°C	ISO 180/4A	kJ/m ²	10
Thermal			
Vicat Softening Temperature, rate B/120	ISO 306	°C	145
HDT/Ae, 1.8 MPa edgew. 120*1*04/sp=100	ISO 75	°C	127
Thermal conductivity	ISO 8302	W/m.°C	0.2
Coeff.of Lin.Therm.Exp.extr. 23-80°C	ISO 11359-2	1/°C	7.00 E-05
Ball pressure test 125 ±2°C	IEC 60695-10-2	-	Passes
Relative Thermal Index. Electrical Properties	UL746B	°C	130
Relative Thermal Index. Mech. prop.with impact	UL746B	°C	125
Relative Thermal Index. Mech.prop.w/o impact	UL746B	°C	125
Electrical			
Volume Resistivity	IEC 60093	Ohm.cm	10 E15
Relative Permittivity 50/60Hz	IEC 60250	-	2.7
Relative Permittivity 1Mhz	IEC 60250	-	2.7
Dissipation Factor 50/60 Hz	IEC 60250	-	0.001
Dissipation Factor 1 Mhz	IEC 60250	-	0.01
Arc Resistance Tungsten ASTM-D495	sec.	119	
Optical			
Light transmission ^{*)} 3 mm	ASTM-D1003	%	89

- ♦ These property values have been derived from Lexan*resin data for the material used to produce this sheet product. Variation within normal tolerances are possible for various colors. These typical values are not intended for specification purposes. If minimum certifiable properties are required please contact your local SABIC Innovative Plastics, Specialty Film & Sheet representative. All values are measured at least after 48 hours storage at 23°C/50% relative humidity. All properties are measured on injection molded samples. All samples are prepared according ISO 294.

^{*)} Light transmission value may vary by + or - 5%.

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Lexan*

Light transmission

Transparent Lexan 9030 sheet have excellent light transmission, dependent of thickness between 84 - 87%.

Fire performance

Lexan* 9030 sheet has good fire behavior characteristics. Lexan sheet does not contribute significantly to the spread of fire or to the generation of toxic gases. For details please contact your local sales office.

Product Availability *)

Lexan 9030TG sheet:

Standard Sizes	Masking	Standard Colors
Thin gauge in mm	0.75*-1-1.5	
625 x 1250#	Top side: Coex opal white PE	transparent code 112 and
1250 x 1250	dark blue print	opal white code 82103
Bottom Side:	Coex transparent PE	

Lexan 9030 sheet:

Standard gauge in mm	2-3-4-5-6-8-9.5-12-15	
2050 x 3050	Top side: Coex opal white PE	transparent code 112 and
2050 x 6050	dark blue print	opal white code 82103
Bottom Side:	Coex transparent PE	

#Dimensions only for 0.75 mm.

) Lexan 9030 sheet can be supplied by prior arrangements in non - standard widths, lengths and color. Such arrangements may affect prices, terms and/or other conditions of sales and are subject to minimum order quantities.



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Description

Lexan* F2000 sheet is a flame resistant transparent polycarbonate sheet. In addition to good flammability performance, it offers excellent impact resistance, high optical quality, good stiffness and strength and ease of processing, making it an excellent candidate for a wide variety of applications in the electrical, electronic, transportation, building and construction industries.

Typical Property Values ♦

Property	Test Method	Unit	Value
Physical			
Density	ISO 1183	g/cm ³	1.23
Water absorption, Equilibrium	ISO 62	%	0.35
Mechanical			
Tensile strength,	ISO 527	MPa	60
Tensile modulus	ISO 527	MPa	2300
Tensile elongation, yield	ISO 527	%	7
Tensile elongation, break		%	80
Flexural strength, yield	ISO 178	MPa	100
Flexural modulus	ISO 178	MPa	2300
Izod Notched Impact 20 °C	ASTM D256	J/m	600
-20 °C		J/m	100
-Gardner Impact 20°C	SABIC Method	J	>40
-40°C		J	>40
Thermal			
Vicat Softening Temp, Rate B/ 120	ISO 306	°C	145
Heat Deflection temperature 0.45 MPa	ISO 75/Be	°C	138
Thermal conductivity	ASTM C 177	W/m°C	0.2
Ball Pressure Test 75 °C	IEC 335-1		Pass
Ball Pressure Test 125 °C	IEC 335-1		Pass
Mold shrinkage	ISO 527	%	0.5-0.7
Thermal expansion	ASTM D696	1/ °C	7.10 ⁻⁵
Electrical			
Hot Wire Ignition	UL 746A	sec	44
High Voltage Arc Tracking Rate	UL 746A	mm/s	5.2
High Ampere Arc Ign. Surface	UL 746A		44
Comparative Tracking Index,	IEC 112/3	V	225
Comparative Tracking Index,	IEC 112/3	V	125
Volume Resistivity	IEC 93	Ohm.cm	>10 ¹⁵
Surface Resistivity	IEC 93	Ohm	>10 ¹⁵
Flammability			
Limited Oxygen Index	ISO 4589	%	34
Glow Wire Test, 960 °C	IEC 695-2-1		Pass
Optical			
Light Transmission	ASTM D1003	%	90
Taber Abrasion, CS10F, 500g, 100 cycles	ASTM D1044	% Haze	36

♦ These property values have been derived from Lexan* resin data for the material used to produce this sheet product.

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Processing

Lexan* F2000 sheet is ideally suited to thermoforming. It offers high, deep draw ratios, equal wall thickness distribution, and it can be formed into complex shapes using standard thermoforming equipment. Sandwich type heating systems give the best results. Lexan F2000 sheet has a forming temperature range of 185 - 205°C. When forming, a draft angle of at least 3° should be allowed, and post mold shrinkage of 0.5 - 1.0% taken into account.

Pre-drying

It is important to ensure that Lexan F2000 sheets are free of moisture prior to thermoforming. A hot air circulating oven set at 120°C is recommended. Pre-drying times vary from 3-24 hours, depending on sheet thickness.

Assembling

Parts made from Lexan F2000 sheet can be assembled with plastics, metals, rubber and other materials using many types of adhesive bonding, welding and mechanical fastening techniques. Since some of these materials can cause environmental stress cracking, please consult SABIC Innovative Plastics for advice on specific applications.

Painting

For either functional or decorative reasons it may be necessary to apply finish to Lexan F2000 sheets or vacuum formed parts. The product is ideally suited for use with a wide variety of modern decoration techniques. A list of approved paint systems and suppliers is available upon request.

Chemical Resistance

Lexan F2000 sheet has sufficient resistance to most mineral oils, greases, aliphatic hydrocarbons and acids under low or moderate stress levels. In applications where the Lexan F2000 sheet will come into contact with aggressive chemicals, specific (application related) testing is always advised. Effective painting systems can improve chemical resistance

Product Availability

Product code:	Lexan F2000 Sheet
Standard size:	1250 x 2050mm, 2050 x 3000mm
Gauges:	1.5 to 8.0 mm
Textures:	Polished/Polished
Colors:	Clear 112 Bronze 5109 Opale 82103 Opale 82052

Other colors/sizes are available by special request.



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DIVISIONE:
DIVISION:

COSTRUZIONI

LABORATORIO:
LABORATORY:

TOSSICITA'

RAPPORTO DI PROVA
(Test Report)

Pag. 1
di/of
pag. 6

N° **DC01/804F06**

Data: **22.11.2006**
Date:

IDENTIFICAZIONE E DESCRIZIONE DEL CAMPIONE:
SPECIMEN DESCRIPTION:

Nome commerciale : **LEXAN F2000 3 mm**
Descrizione : **Lastre in policarbonato**
Peso per unità di superficie : **Dichiarato = / ; Misurato = 3375 ± 50 gr/m²**

DATI IDENTIFICATIVI DEL CLIENTE:
CLIENT:

Nome committente : **GENERAL ELECTRIC PLASTICS ITALIA S.R.L.**
Indirizzo : **Viale Brianza 181**
Città : **20092 Cinisello Balsamo (MI)**

NORMA DI RIFERIMENTO:
REFERENCE STANDARD:

Norma Tecnica: **UNI CEI 11170**
Linee guida per la protezione al fuoco dei veicoli ferrotranviari ed a via guidata.

DISTRIBUZIONE ESTERNA:
OUTSIDE DISTRIBUTION:

Originale cliente

DISTRIBUZIONE INTERNA:
INSIDE DISTRIBUTION:

Copia capo laboratorio

ENTE DI ACCREDITAMENTO:
ACCREDITATION BODY:



CSI
Certificazione e Testing

RAPPORTO DI PROVA (Test Report)

Pag. 2
di/of
pag. 6

N° **DC01/804F06**

Data: **22.11.2006**
Date:

DATI GENERALI :

- Data ricevimento campioni: **13.10.2006**
- Data esecuzione prove: **02.11.2006**
- Data fine esecuzione prove: **17.11.2006**
- Identificazione delle norme di riferimento: **E10.02.977.3 : 2001**
Determinazione dell'indice di tossicità secondo norme:
AFNOR NF X 70/100 – 2001,
NF 16-101 – 1988.
Determinazione della densità ottica dei fumi e calcolo dell'indice di fumo secondo norme:
AFNOR NF 10-702-1 -1995,
AFNOR NF 10-702-2 – 1994
AFNOR NF F 16-101 - 1988.

1) "DETERMINAZIONE DEI GAS EFFLUENTI DALLA COMBUSTIONE E/O PIROLISI DI MATERIALI ORGANICI E CALCOLO DELL'INDICE DI TOSSICITA' CONVENZIONALE"

Le combustioni e/o pirolisi, effettuate per la determinazione dell'indice di tossicità, vengono realizzate bruciando circa 1 gr di campione in un forno tubolare statico, preriscaldato a $600\text{ °C} \pm 5\text{ °C}$, al flusso d'aria di 2 l/min per 20 minuti.

- Procedura normalizzata: **SI**
- Deviazione dai metodi di prova: **SI (*)**
- Controllo calcoli e trasferimenti dati: **SI**

(*) Per la quantificazione di CO e CO₂ (metodo gascromatografico).

2) "DETERMINAZIONE DELLA DENSITÀ OTTICA DEI FUMI E CALCOLO DELL'INDICE DI FUMO"

- Procedura normalizzata: **SI**
- Deviazione dai metodi di prova: **NO**
- Controllo calcoli e trasferimenti dati: **SI**

CONDIZIONI DI PROVA

- Condizioni di prova : **Flaming / Non flaming**
- Tensione del fornetto : **158 mV**
- Temperatura iniziale della camera: **35 ± 3 °C**

CAMPIONAMENTO

Il campionamento iniziale è stato eseguito dal cliente e da ispettore Trenitalia con verbale di prelievo allegato a questo rapporto di prova.

Il campionamento eseguito per la prova è stato effettuato prelevando casualmente un provino dal campione in nostro possesso.



CSI
Certificazione e Testing

RAPPORTO DI PROVA (Test Report)

Pag. 3
di/of
pag. 6

N° **DC01/804F06**

Data **22.11.2006**
Date:

CAMPIONI ANALIZZATI :

- Provette campione denominate:

LEXAN F2000 3 mm

DICHIARAZIONE

- I risultati di prova contenuti nel presente rapporto si riferiscono esclusivamente al campione provato.
- Il presente rapporto non può essere riprodotto parzialmente senza l'autorizzazione del Responsabile del Centro.
- I dati tecnici riportati nella descrizione del campione sono desunti dalla scheda tecnica del campione inviataci ed allegata al rapporto di prova.
- I campioni riportano la sigla dell'ispettore Trenitalia che ha effettuato il prelievo presso il cliente.



CSI
Certificazione e Testing

RAPPORTO DI PROVA
(Test Report)

N° **DC01/804F06**

Pag. 4
di/of
pag. 6

Data **22.11.2006**
Date:

RISULTATI

1) "DETERMINAZIONE DEI GAS EFFLUENTI DALLA COMBUSTIONE E/O PIROLISI DI MATERIALI ORGANICI E CALCOLO DELL'INDICE DI TOSSICITA' CONVENZIONALE"

GAS	CONCENTRAZIONE [mg/g]	S
ANIDRIDE CARBONICA	1051	18
OSSIDO DI CARBONIO	414	13
ACIDO CLORIDRICO	<0,1	-
ACIDO BROMIDRICO	13,4	0,3
ACIDO FLUORIDRICO	<0,1	-
ACIDO CIANIDRICO	<0,1	-
ANIDRIDE SOLFOROSA	<0,1	-

S = SCARTO

METODI DI ANALISI:

CO, CO ₂	GAS-CROMATOGRAFIA
HCl, HBr, HF	POTENZIOMETRIA, ELETTRODI IONOSELETTIVI, CROMATOGRAFIA IONICA
SO ₂	TITOLAZIONE ACIDIMETRICA, CROMATOGRAFIA IONICA
HCN	CROMATOGRAFIA IONICA, TITOLAZIONE

INDICE DI TOSSICITA' CONVENZIONALE (ITC) = 32,79



CSI
Certificazione e Testing

RAPPORTO DI PROVA
(Test Report)

Pag. 5
di/of 5
pag. 6

N° **DC01/804F06**

Data **22.11.2006**
Date:

2) "DETERMINAZIONE DELLA DENSITÀ OTTICA DEI FUMI E CALCOLO DELL'INDICE DI FUMO"

• **Condizione Non Flaming**

	<u>1 NF</u>	<u>2 NF</u>	<u>3 NF</u>	<u>Valori medi</u>	<u>Scarto tipo</u>
Peso, grammi	19,020	-	-	-	-
Densità ottica specifica massima (Dm)	2,6	-	-	-	-
Tempo per raggiungere Dm, min	18,0	-	-	-	-
Densità ottica specifica massima corretta	2,6	-	-	-	-
Tempo per raggiungere Ds 16, min	Non raggiunto	-	-	-	-
VOF4	4,6	-	-	-	-
Scarto massimo fra Dm su 3 determinazioni	-				

• **Condizione Flaming**

	<u>1 F</u>	<u>2 F</u>	<u>3 F</u>	<u>Valori medi</u>	<u>Scarto tipo</u>
Peso, grammi	19,17	18,98	19,06	-	-
Densità ottica specifica massima (Dm)	295	261	291	283	18
Tempo per raggiungere Dm, min	9,0	7,5	6,7	7,7	1,2
Densità ottica specifica massima corretta	295	261	291,2	283	18
Tempo per raggiungere Ds 16, min	2,2	2,0	2,2	2,1	0,1
VOF4	113	187	159	153	37
Scarto massimo fra Dm su 3 determinazioni	34				

Lo scarto tipo è calcolato su tre determinazioni.

Osservazioni :

La scala dei valori prevista dalla norma è compresa tra zero (niente fumo) a 924 (massimo fumo).
In condizione Flaming il campione si infiamma.

Calcolo dell'indice di fumo "I.F.":

$$I.F. = \frac{Dm}{100} + \frac{VOF4}{30} + \frac{ITC}{2} = 24,3$$



CSI

Certificazione e Testing

RAPPORTO DI PROVA
(Test Report)

Pag. 6
di/of
pag. 6

N° **DC01/804F06**

Data **22.11.2006**
Date:

CLASSE DI FUMO : F 2 (Effe DUE)

Il Resp. Divisione Costruzioni
Head of Construction Division

Ing. Paolo MELE

Il Resp. Del Centro
Managing Director

Ing. Pasqualino CAU