

autotype



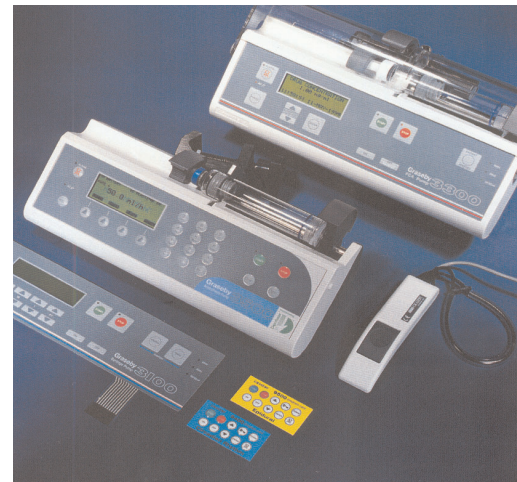
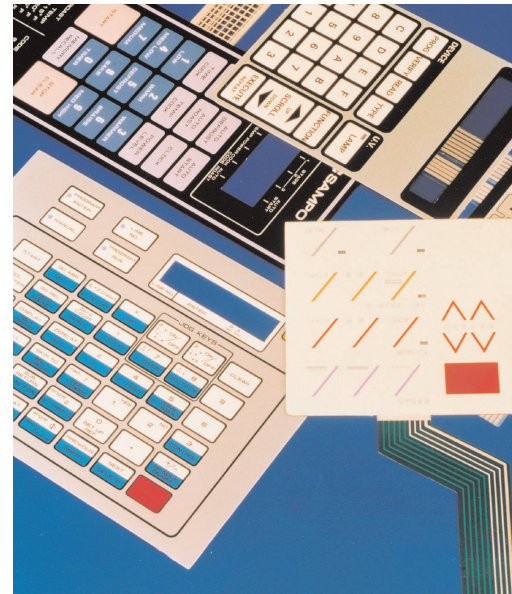
## AUTOTEX & AUTOFLEX EB TEXTURED, GLOSS AND ANTIGLARE HARDCOATED FILMS FOR MEMBRANE SWITCHES

Electronic displays are now incorporated into thousands of different products - with more on the drawing board at any given time. Membrane switches are used both indoors and outdoors, from the protected environment of our homes to military aircraft and ocean-going vessels. Almost all applications require a tough, durable display, capable of operating reliably in a range of conditions. Additionally, a membrane switch must confer excellent cosmetic quality to the finished product. The specifications for materials that are designed into membrane switches are, understandably, very rigid.

Autotype Industrial Film substrates have been proven performers in membrane switch technology for nearly 20 years. **Autotex** is our hardcoated, textured polyester film and **Autoflex EB**, our gloss and antiglare hardcoated films, effectively proved to the industry that a polyester overlay can add millions of actuations to the life of the switch. The switch life of the films can exceed five million actuations, even when embossed, ensuring the switch will work throughout the lifetime of the equipment. Both films provide excellent chemical and scratch resistance.

**Autotex** is offered in velvet and fine textures, in a selection of film thicknesses; Autoflex is available in gloss and antiglare hardcoated finishes. All the films have a hardcoated first surface and an ink receptive second surface. Both ranges of films include ink receptive coatings for solvent-based and UV curable inks.

Autotex and Autoflex are complimented with UV-curable, screen printable coatings. Use **Windotex** window lacquer with Autotex to produce clear windows on the textured surface. Use **Fototex** on Autoflex, to create a selective texture.



**INNOVATION AT THE INTERFACE**

## WINDOTEX

For Producing Clear Windows on Autotex

### APPLICATIONS

Windotex is a UV-curable lacquer, designed to be screen printed onto areas of Autotex (see Autotex product data sheet) to produce transparent windows. For specific application data, handling procedures and health & safety information, refer to the Windotex product information sheet included with the product.

### PRODUCT RANGE

**Windotex Gloss** >80% gloss level  
**Windotex Antiglare** 50-75% gloss level  
 Windotex Gloss and Antiglare can be mixed to obtain a wide range of finishes between these two gloss levels (see Windotex processing recommendations).

### OPTICAL PROPERTIES

Property	Windotex	Test Method
Gardner Haze	Gloss <8% Antiglare 10-30%	ASTM D1003-77 <sup>1</sup>
Gloss Level (60°)	Gloss >80% Antiglare 50-75%	ASTM D2457-70 <sup>1</sup>
Total Luminous Transmission (TLT)	Gloss 91% ± 2% Antiglare 91% ± 2%	ASTM D1003-77 <sup>1</sup>
UV Transmission Density	Gloss 0.1 Antiglare 0.1	Autotype Method <sup>2</sup> 365 nm narrow pass filter
Yellowness Index <sup>3</sup>	Gloss 1.5-3.0 Antiglare 1.5-3.0	ASTM D1925-70

<sup>1</sup> Adapted to Autotype Method, see Test Method Manual

<sup>2</sup> Autotype Method, see Test Method Manual

### PHYSICAL PROPERTIES

Property	Windotex	Test Method
Abrasive resistance (Gloss)	10% haze	ASTM D1044-82 50 cycles, 250g load CS10F wheels
Adhesion to texture	100%	Autotype Method <sup>1</sup>
Density (uncured)	Gloss 1.1g/cm <sup>2</sup> Antiglare 1.2g/cm <sup>2</sup>	Gravimetric
Pencil hardness	2H	Autotype Method <sup>1</sup>

<sup>1</sup> See Test Method Manual

## FOTOTEX

For Selective Texturing On Autoflex EB

### APPLICATIONS

**Fototex** texturing varnishes are designed for use with Autoflex for producing selective textures. This provides a simple and cost effective way of producing high quality textured finishes, and extremely durable scratch resistant windows.

Fototex also produces excellent results when used with pre-treated polyester and polycarbonate films (see Fototex processing and safety recommendations).

Fototex is designed to be screen printed onto Autoflex (see Fototex processing and safety recommendations) to produce selectively textured areas for use in applications

such as membrane switch overlays, fascia panels, automotive displays, nameplates and product markings.

Fototex N Supermatt has been specifically designed to produce a deadfront finish for polycarbonate automotive displays. This product is not recommended for use with Autoflex hardcoat, where adhesion may be compromised.

### PRODUCT RANGE

**Fototex N Supermatt, Fototex N Matt:**  
 For Linde type UV/Nitrogen curing units  
**Fototex UV Matt:**  
 For use with conventional UV curing equipment.

### OPTICAL PROPERTIES

Property	Fototex		Fototex UV	Test Method
	Supermatt	Matt	Matt	
Gardner Haze	99%	92%	62%	ASTM D1003-77 <sup>1</sup>
Gloss Level (60°)	0.5%	2.2%	9.4%	ASTM D2457-70 <sup>1</sup>
Total Luminous Transmission (TLT)	92%	88%	87%	ASTM D1003-77 <sup>1</sup>
UV Transmission Density	0.4	0.2	0.4	Autotype Method <sup>2</sup> 365 nm narrow pass filter
Yellowness Index <sup>3</sup>	2.6	2.6	3.0	ASTM D1925-70

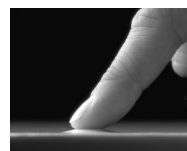
<sup>1</sup> Adapted to Autotype Method, see Test Method Manual

<sup>2</sup> Autotype Method, see Test Method Manual

### PHYSICAL PROPERTIES

Property	Fototex		Fototex UV	Test Method
	Supermatt	Matt	Matt	
Density (uncured)	1.2g / cm <sup>2</sup>	1.2g / cm <sup>2</sup>	0.95g / cm <sup>2</sup>	Gravimetric
Pencil Hardness	2B-B	H	2H	Autotype Method <sup>1</sup>
Texture Profile	Ra Rtm	3.4μ 18.6μ	3.0μ 13.7μ	Autotype Method <sup>1</sup>

<sup>1</sup> See Test Method Manual



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## MECHANICAL PROPERTIES

Property	Autotex & Autoflex EB	Test Method
Burst strength <sup>1</sup>	1.75 Mpa	ASTM D774-67
Elastic modulus (1% secant) 0.008", 200μ	4-5.5 Gpa	ASTM D882-83 23°C, @ 50% RH. Strain rate - 10%/minute
Elongation at break 0.008", 200μ	MD 125% TD 80%	ASTM D882-83 23°C, @ 50% RH. Strain rate - 50%/minute
MIT fold durability	>20,000 folds TD	ASTM D2176-69 <sup>2</sup>
Switch life	>5 million flexes	Autotype Method <sup>3</sup>
Tensile strength at break: 200μ	160-250 MPa (160-250N/mm <sup>2</sup> )	ASTM D882-83
Yield point	6%	ASTM D882-83
Yield strength	95-140 Mpa TD	ASTM D882-83

1 Data derived from Dupont Teijin Films literature for 125μ Melinex<sup>®</sup> OD polyester film.

2 Adapted to Autotype Method, see Test Method Manual

3 See Test Method Manual

## CHEMICAL PROPERTIES

Property	Autotex & Autoflex EB	Test Method
Coefficient of hygroscopic expansion <sup>1</sup>	MD $8 \times 10^{-6}$ (per 1% RH) TD $7 \times 10^{-6}$ (per 1% RH)	ICI Method <sup>1</sup> Between 40-80% RH
Moisture vapor transmission rate (MVTR) <sup>1</sup>	3.57g/m <sup>2</sup> /24 hours	ASTM F372-73
Oxygen transmission rate <sup>1</sup>	8.2ml/m <sup>2</sup> /24 hours	ASTM D1434-82 @ 25°C, 77% RH
Chemical Resistance	See Solvent Resistance Data	

1 Data derived from Dupont Teijin Films literature for 125μ Melinex<sup>®</sup> OD polyester film.

## THERMAL PROPERTIES

Property	Autotex & Autoflex EB	Test Method
Coefficient of thermal expansion <sup>1</sup>	MD $19 \times 10^{-6} \text{ cm cm}^{-1} \text{ } ^\circ\text{C}^{-1}$ TD $16 \times 10^{-6} \text{ cm cm}^{-1} \text{ } ^\circ\text{C}^{-1}$	ICI Method between 20-50°C
Dimensional stability	<0.3% at 120°C MD maximum shrinkage [Typical result <0.2%]	Autotype Method <sup>2</sup>
Maximum and minimum use temperatures	See Environmental Data.	Autotype Method <sup>2</sup>

1 Data derived from Dupont Teijin Films literature for 125μ Melinex<sup>®</sup> OD polyester film.

2 See Test Method Manual

## ELECTRICAL PROPERTIES

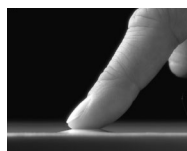
Property	Autotex & Autoflex EB	Test Method
Dielectric strength <sup>1</sup> 0.006", 150μ 0.008", 200μ	125kV/mm 105kV/mm	ASTM D149-81 6.35mm electrodes in dry air @ 25°C
Dissipation factor <sup>1</sup>	0.005	ASTM D150-70
Surface resistivity	$>10^{13} \Omega/\text{sq}$ 500Vd.c	ASTM D257-83 @ 20°C/54% RH
Volume resistivity <sup>1</sup>	$10^{15} \Omega\text{m}$ 100 Vd.c	ASTM D257-83 @ 25°C/1000s

1 Data derived from Dupont Teijin Films literature for 125μ Melinex<sup>®</sup> OD polyester film.

## OZONE DEPLETING SUBSTANCES

EC Regulation 594/91 classifies ozone depleting substances into a number of different groups, I-VI. Autotex and Autoflex do NOT contain any substance classified in groups I-VI nor have any of the substances been used by Autotype during manufacture.

For details of the content of each of the groups, please see separate Ozone Depleting Substances document.



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## Typical Data for Autotex and Autoflex EB

### ENVIRONMENTAL DATA

**Minimum use temperature:** -40°C (-40°F);

**Maximum use temperature:**

High humidity environments (>80% RH): at 40° C / 104° F.

Moderate humidity environments (10 - 80% RH): at 60° C / 140° F.

Low humidity environments (<10% RH): at 85° C / 185° F.

### SOLVENT RESISTANCE DATA

Autotex and Autoflex withstand exposure to the following chemicals, without significant visible change, for more than 24 hours duration under DIN 42 115 Part 2:

Acetonitrile	Ethanol	Pure Turpentine
Ajax / Vim in solution	Glycerine	SBP 60/95 <sup>1</sup>
Alkalicarbonate solution <sup>1</sup>	Glycol	Sulfuric acid (<10%)
Ammonia (<40%) <sup>1</sup>	Gumtion <sup>1</sup>	Tomato ketchup
Acetic acid (<50%)	Hydrochloric acid (<36%)	Trichloroacetic acid (<50%)
Ariel powder in solution <sup>1</sup>	Linseed oil	White Spirit
Bleach <sup>1</sup>	Methanol	Windex <sup>1</sup>
Castor oil	Nitric acid (<10%)	Wisk
Caustic soda (<40%) <sup>1</sup>	Paraffin oil	
Cutting oil	Persil powder in solution <sup>1</sup>	
Cyclohexanol	Petroleum spirit <sup>1</sup>	<sup>1</sup> Extremely faint glossing of the texture was noted.
Diacetone alcohol	Phosphoric acid (<30%)	
Diesel Downey / Lenor <sup>1</sup>	Potassium ferricyanide	
	Potassium hydroxide (<30%)	

Autotex and Autoflex are NOT resistant to the following. For full details, see the Autotype Industrial Films Technical Manual.

Concentrated mineral acids	High pressure steam at over 100°C	Methylene chloride
Concentrated caustic solution	Benzyl alcohol	

### OPTICAL PROPERTIES

Property	Autotex	Autoflex EB	Test Method
BYK Gardner Haze	Fine 68% ± 5% Velvet 71% ± 5%	Gloss 1.5% ± 0.5% Antiglare 9% ± 2%	ASTM D1003-77 <sup>1</sup>
Gloss Level (60°)	Fine 5.5% ± 0.5% Velvet 4% ± 0.5%	Gloss 93% ± 2% Antiglare 60 ± 5%	ASTM D2457-70 <sup>1</sup>
Texture Profile	Fine Ra 1.9 ± 0.2μ; Rtm 10.0μ ± 2μ Velvet Ra 2.6 ± 0.2μ; Rtm 13.4μ ± 2μ	Not Applicable	Autotype Method <sup>2</sup>
Total Luminous Transmission	92% ± 2%	92% ± 2%	ASTM D1003-77 <sup>1</sup>
UV Transmission Density	Fine 0.7 ± 0.2% Velvet 0.7 ± 0.2%	Gloss 0.15 ± 0.05 Antiglare 0.15 ± 0.05	Autotype method <sup>2</sup> 365nm narrow pass filter
Yellowness Index <sup>3</sup>	3.35	3.35	ASTM D1925-70

<sup>1</sup> Adapted to Autotype method, see Test Method Manual.

<sup>2</sup> See Test Method Manual.

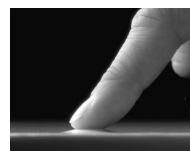
<sup>3</sup> Typical result on 150μm product tested using X-Rite SP68 spectrophotometer.

### PHYSICAL PROPERTIES

Property	Autotex	Autoflex EB	Test Method
Relative Density <sup>1</sup>	1.40	1.40	ASTM D1505-85 modified to ICI method at 23°C.
Pencil Hardness	Fine 2H Velvet 2H	Gloss 3H Antiglare 3H	Autotype Method <sup>2</sup>
Thicknesses			
0.005"	N/A	130μ ± 10%	
0.006"	150μ ± 10%	N/A	
0.007"	N/A	180μ ± 10%	
0.008"	200μ ± 10%	N/A	
0.010"	250μ ± 10%	250μ ± 10%	

<sup>1</sup> Data derived from Dupont Teijin Films literature for 125μ Melinex<sup>®</sup> OD polyester film.

<sup>2</sup> See Test Method Manual.



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# AUTOTEX AND AUTOFLEX EB PRODUCT RANGE

**Autotex** and **Autoflex** comprise of a range of hard coated, thermally stabilized polyester films for use in membrane switches and in touchscreens where the second surface requires a screen printed graphic.

**Autotex** is available in a Fine or Velvet texture finish and **Autoflex** is available in a Gloss or Antiglare finish on the

first surface. The second surface provides excellent adhesion properties for screen printing inks. Both Autotex and Autoflex offer high optical clarity and a flexible hard coated surface that combines excellent solvent and abrasion resistance. They are designed specifically for applications where enhanced chemical resistance and switch longevity is required.

Product	First Surface		Second Surface (Ink Receptive Coating)	
	Finish	Film Gauge	Solvent Based Inks	UV Curable Inks
<b>AUTOTEX</b>				
<b>Autotex F6</b>	Textured, Fine	6 mil (150µ)	■	
<b>Autotex F67</b>	Textured, Fine	6 mil (150µ)		■
<b>Autotex F8</b>	Textured, Fine	8 mil (200µ)	■	
<b>Autotex F87</b>	Textured, Fine	8 mil (200µ)		■
<b>Autotex F10</b>	Textured, Fine	10 mil (250µ)	■	
<b>Autotex V6</b>	Textured, Velvet	6 mil (150µ)	■	
<b>Autotex V67</b>	Textured, Velvet	6 mil (150µ)		■
<b>Autotex V8</b>	Textured, Velvet	8 mil (200µ)	■	
<b>Autotex V87</b>	Textured, Velvet	8 mil (200µ)		■
<b>Autotex V10</b>	Textured, Velvet	10 mil (250µ)	■	

AUTOFLEX	Finish	Film Gauge	Second Surface (Ink Receptive Coating)	
			Solvent Based Inks	UV Curable Inks
<b>Autoflex EBG5</b>	Gloss	5 mil (130µ)	■	
<b>Autoflex EBG7</b>	Gloss	7 mil (180µ)	■	
<b>Autoflex EBG77</b>	Gloss	7 mil (180µ)		■
<b>Autoflex EBG10</b>	Gloss	10 mil (250µ)	■	
<b>Autoflex EBA5</b>	Antiglare	5 mil (130µ)	■	
<b>Autoflex EBA7</b>	Antiglare	7 mil (180µ)	■	
<b>Autoflex EBA77</b>	Antiglare	7 mil (180µ)		■
<b>Autoflex EBA10</b>	Antiglare	10 mil (250µ)	■	

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