

## Autoflex EB

### Product data sheet

Polyester film is tougher and more durable than polycarbonate and PVC films. It offers enhanced chemical resistance and dramatically improved flex life. The Autoflex<sup>®</sup> range of hard coated polyester films extends the functionality of polyester film into areas demanding high abrasion resistance together with excellent receptivity to graphic inks and selective textures. Autoflex<sup>®</sup> EB has been developed for applications requiring a combination of high abrasion resistance and flexibility, such as embossed membrane switches and optical displays, e.g. touch screens.

#### PRODUCT DESCRIPTION

Autoflex<sup>®</sup> EB is a high quality, hard coated polyester\* film, consisting of a base polyester and an embossable, texturable, chemically bonded UV-cured hard surface coating. It is available in sheets and rolls and the print receptive surface is protected by a removable laminate as standard. Autoflex<sup>®</sup> EB is available with our standard ink-receptive coating for solvent based screen inks, our 7-series primer for UV and solvent screen inks, and non-primed (NP) for ITO sputtering applications\*\*

\* The term polyester is the generic term for a number of different polymers, of which polyethylene terephthalate (PET) is the most common. PET is used in MacDermid Autotype Industrial Polyester film products.

\*\*We recommend that you carry out your own full printing trials and in-house evaluation

#### Product range:

Autoflex EB Version	Finish	Gauge		
		130μ	180μ	250μ
Autoflex <sup>®</sup> EB with standard ink primer for solvent based inks	Gloss	G130	G180	G250
	Antiglare	A130	A180	A250
Autoflex <sup>®</sup> EB with 7-series ink primer for UV and solvent inks	Gloss	G137	G187	-
	Antiglare	A137	A187	-
Autotex <sup>®</sup> EB non-primed for ITO sputtering*	Gloss	G130 NP	G180 NP	-
	Antiglare	A130 NP	A180 NP	-

\* NP grades are not standard – please contact MacDermid Autotype to check availability

#### Laminate:

Polyester films with high gloss surfaces are prone to blocking when stored with the film surfaces touching each other. Blocking is the term given when two surfaces adhere or merge into each other and when separated leave un-removable marks on the film. For this reason



MacDermid Autotype supply the Autoflex® film range with a protective laminate on the ink primer surface and recommend that the laminate remains in place until the first print pass.

#### Textures:

Autoflex® EB can be screen printed with Fototex™ to obtain selective textures (see Fototex™ product data sheet).

#### Outdoor use:

In common with most other plastics, Autoflex® EB has limited long term resistance to UV light and therefore is not recommended for long term use outdoors. MacDermid Autotype has developed a textured, UV resistant film, which can be used outside. Please see Autotex® XE Product Data Sheet. No outdoor version of Autoflex® EB is available.

### PRODUCT APPLICATIONS

Autoflex® EB is used as a substrate in the following applications:

- Membrane switch overlays
- Touch screens
- Fascia panels
- Nameplates
- Labels/Product marking

#### Major Benefits:

- Excellent scratch resistance
- Chemical and household cleaner resistance even at the edges
- Receptive to Fototex™ texturing varnishes
- Embossable
- Consistent gloss/antiglare surface
- Attractive appearance
- Superior flex life

### CHEMICAL PROPERTIES

Property	Autoflex EB	Test Method
Chemical Resistance	Resistant to: Alcohols Dilute Acids Dilute Alkalis Esters Hydrocarbons Ketones Household Cleaning agents*	DIN 42 115
Coefficient of Hygroscopic expansion <sup>1</sup>	MD $8 \times 10^{-6}$ (per 1% RH) Between 40 and 80% RH	Base film manufacturers method

<sup>1</sup> Data derived from base film manufacturer's literature. The Autoflex® coating slightly enhances most properties.

\* For more detailed information refer to Autoflex® solvent resistance sheet.



**ELECTRICAL PROPERTIES**

Property	Autoflex EB	Test Method
Dielectric strength <sup>1</sup> 125µ 175µ	125kV/mm = 15.6kV 105kV/mm = 18.4 kV	ASTM D149-81 6.35mm electrodes in dry air @ 25°C
Dissipation factor <sup>1</sup> 125µ	0.006 (1kHz)	ASTM D150-70
Surface resistivity <sup>1</sup>	>10 <sup>13</sup> Ω/sq 500V dc	ASTM D257-83 @ 20°C/54% RH
Volume resistivity <sup>1</sup>	10 <sup>15</sup> Ωm 100V dc	ASTM D257-83 @ 25°C/1000s

<sup>1</sup> Data derived from base film manufacturer's literature. The Autoflex® coating slightly enhances most properties.

**MECHANICAL PROPERTIES**

Property	Autoflex EB	Test Method
Young's modulus (1% secant) 125µ	3600 N/mm <sup>2</sup>	ASTM D882-88
Elongation at break <sup>1</sup>	MD 125% TD 80%	ASTM D882-88 23°C, @ 50% RH Strain rate - 50%/minute
Switch life	>5 million flexes	MacDermid Autotype Method <sup>2</sup>
Tensile strength at break <sup>1</sup> 125µ	175 N/mm <sup>2</sup>	ASTM D882-83 Strain rate 50%/min
Yield strength 125µ	100 N/mm <sup>2</sup>	ASTM D882-88

<sup>1</sup> Data derived from base film manufacturer's literature.

<sup>2</sup> Adapted to MacDermid Autotype Method, see Test Method Manual

**OPTICAL PROPERTIES**

Property	Autoflex EB	Test Method
Gardner Haze	Gloss <2% Antiglare 9% ±2%	ASTM D1003-77 <sup>1</sup>
Gloss Level (60°)	Gloss 96% ±2% Antiglare 56% ±2%	ASTM D2457-03 <sup>1</sup>
Total luminous transmission	Gloss 91% ±2% Antiglare 91% ±2%	ASTM D1003-77 <sup>1</sup>
Yellowness index	Gloss <3.5 Antiglare <3.5	ASTM E313

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



**PHYSICAL PROPERTIES**

Property	Autoflex EB	Test Method
Density <sup>1</sup>	1.40g/cm <sup>3</sup>	ASTM D1505-79 modified to Melinex test method at 23 °C
Taber Abrasion	Gloss <5% haze Antiglare Not applicable	ASTM D1044-82 100 cycles, 500g load CS10F wheels
Pencil Hardness <sup>2</sup>	3H	MacDermid Autotype Method <sup>3</sup>
Thicknesses	G130/A130 130µ ± 10% G180/A180 180µ ± 10% G250/A250 250µ ± 10%	

<sup>1</sup> Data derived from base film manufacturer's literature

<sup>3</sup> See Test Method Manual

<sup>2</sup> For more information, please refer to MacDermid Autotype statement on pencil hardness testing

**THERMAL PROPERTIES**

Property	Autoflex EB	Test Method
Coefficient of thermal expansion <sup>1</sup>	MD $19 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ TD $16 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$	Base film manufacturers method (20-50 °C)
Dimensional stability	<0.2% maximum shrinkage MD at 120 °C	MacDermid Autotype Method <sup>2</sup>
Maximum long term use temperature	Low humidity (<10%RH) 85 °C High humidity (10-95%RH) ≤60 °C	
Minimum use temperature	-40 °C (-40 °F)	MacDermid Autotype Method <sup>2</sup>

<sup>1</sup> Data derived from base film manufacturer's literature for 125µ polyester.

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

**IMDS ID-No 14800122**

**LEGISLATIVE DIRECTIVES**

This product does not knowingly contain any phthalates, or substances listed in the European End-of-Life Vehicles (ELV), Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS) or Waste Electrical and Electronic Equipment (WEEE) Directives.

EC Regulation 594/91 classifies ozone depleting substances into a number of different groups, I-VI. Autoflex® EB does NOT contain any substance classified in groups I-VI nor have any of the substances been used by MacDermid Autotype during manufacture. For details of the content of each of the groups, please see separate ozone depleting substances document.



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