

# AUTOTEX UV

## 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. In common with polycarbonate and PVC films Autotype's standard textured polyester, Autotex, does not perform well in external environments.

Autotex UV has been developed specifically to resist yellowing and premature embrittlement for outdoor applications.

### 1. PRODUCT DESCRIPTION

Autotex UV is a high quality textured polyester film, consisting of a base polyester and a flexible chemically bonded, UV cured textured coating. This product has been chemically modified to improve its UV resistance. It is available in sheets or rolls.

**Product Range:** Autotex UV Velvet V150, V200  
Velvet texture, 150 and 200 micron

**Primer:** Autotex UV has the same ink adhesion primer on the reverse surface as Autotex. This primer confers excellent adhesion to a wide range of graphic inks.

**Windows:** Windotex is not a UV resistant product and is therefore not recommended for prolonged use outdoors. Due to the stabilising chemistry used in Autotex UV, the adhesion of Windotex to the surface may be impaired. Contact Autotype for further information.

### 2. PRODUCT APPLICATIONS

Autotex UV may be used as a substrate in the following markets:

#### Markets

Membrane switch overlays  
Facia panels  
Signage  
Nameplates  
Labels/product marking

#### Major Benefits

- Increased UV resistance compared to standard Autotex
- Excellent scratch resistance
- Consistent textured surface
- Attractive appearance

### 3. PRODUCT PERFORMANCE

Property	Autotex UV	Test Method
<b>OPTICAL</b> <input type="checkbox"/> Gardner haze <input type="checkbox"/> Total luminous transmission <input type="checkbox"/> Yellowness index <input type="checkbox"/> UV transmission density	73% $\pm$ 5% 91% $\pm$ 2% 6.0 $\pm$ 0.5 0.7 $\pm$ 0.2	ASTM D1003-77 <sup>1</sup> ASTM D1003-77 <sup>1</sup> ASTM D1925-70 Autotype Method <sup>2</sup> 365nm narrowpass filter
<b>PHYSICAL</b> <input type="checkbox"/> Pencil hardness	2H	Autotype Method <sup>2</sup>
<b>THERMAL</b> <input type="checkbox"/> Dimensional stability	<0.3% at 120°C MD maximum shrinkage	Autotype Method <sup>2</sup>

<sup>1</sup> Adapted to Autotype Method - See Test Method Manual

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

### 4. UV RESISTANCE

The testing of Autotex UV has incorporated three separate techniques, one of which are detailed below.

#### 4.1 Accelerated ageing using an Atlas UVCON accelerated ageing cabinet utilising fluorescent sun lamps

##### 4.1.1 Test Conditions

Apparatus: Atlas UVCON Accelerated ageing cabinet  
 Lamps: 8 Phillips UVA 340 sun lamps  
 Cycle: Alternating cycle of 4 hours UV, 4 hours condensation  
 Temperature: 50°C throughout

##### 4.1.2 Results

Product	Yellowness Index		Flexibility
	Initial	After 1200 hour UVCON cycle	
Autotex	2.6	26.3*	16mm (5/8") - Poor
Autotex UV	5.0	9.1	Material can be folded completely back on itself (180°) without cracking - Very Good

Typical results for 200µ product

\*Flaking of the coating occurs between 1000 and 1200 hours with standard Autotex

**4.1.3 Switch life testing** - see section 8.4 Autotex UV Technical Data for test conditions

After a 1600 hour cycle switch life testing of Autotex UV on a non-embossed panel exceeded 5 million actuations with no adverse effect on the product.

**For more information see the Autotex UV Technical Data Sheet**

## **5. OZONE DEPLETING SUBSTANCES**

EC Regulation 594/91 classifies ozone depleting substances into a number of different groups, I-VI. Autotex UV does 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.

---

The information and recommendations in this publication are believed to be accurate and are offered in good faith but do not constitute specifications. Suggestions concerning uses and applications are only the opinion of Autotype International Limited and users should carry out their own testing procedures to confirm suitability for their purposes. Except in the case of death or personal injury caused by the materials, Autotype International Limited **MAKES NO WARRANTY OF ANY KIND AND EXCLUDES ANY STATUTORY WARRANTY EXPRESS OR IMPLIED** other than that materials conform to their current applicable standard specification. Statements herein therefore should not be construed as guarantees of satisfactory quality or fitness for purpose. The responsibility of Autotype International Limited for claims arising out of breach of guarantee, negligence, strict liability or otherwise is limited to the purchase price of the material.

Suggestions concerning working practices and procedures are based on the practices adopted by existing users of the products and are made in good faith. **IT IS THE RESPONSIBILITY OF THE USER TO ENSURE THAT ALL RELEVANT HEALTH AND SAFETY LAWS AND REGULATIONS ARE COMPLIED WITH.** Autotype International Limited does not provide any advice on such laws and regulations and accepts no responsibility, express or implied, for breach of such regulations.

Statements concerning the use of products described herein should not be construed as recommending the infringement of any patent and no liability for infringement arising out of such use is assumed.

# AUTOTEX UV TECHNICAL DATA

## 1. CHEMICAL PROPERTIES

Property	Autotex UV	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)	DuPont Teijin Method <sup>1</sup> Between 40-80% RH
Moisture vapour 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 Autotex UV Solvent Resistance and Environmental data	

<sup>1</sup> Data derived from DuPont Teijin literature for 125μ Melinex OD. The Autotex UV coating slightly enhances most properties.

## 2. ELECTRICAL PROPERTIES

Property	Autotex UV	Test Method
Dielectric strength <sup>1</sup>	125μ 125kV/mm 175μ 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

<sup>1</sup> Data derived from DuPont Teijin literature for 125μ Melinex OD. The Autotex UV coating slightly enhances most properties.



## 5. PHYSICAL PROPERTIES

Property	Autotex UV	Test Method
Relative density <sup>1</sup>	1.40	ASTM D1505-85 modified to DuPont Teijin method at 23°C
Pencil hardness	2H	Autotype Method <sup>2</sup>
Thicknesses	V150 V200	150µ ±10% 200µ ±10%

<sup>1</sup>Data derived from DuPont Teijin literature for Melinex OD

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

## 6. THERMAL PROPERTIES

Property	Autotex UV	Test Method
Coefficient of thermal expansion <sup>1</sup>	MD $19 \times 10^{-6} \text{ cm cm}^{-1} \text{ }^{\circ}\text{C}^{-1}$ TD $16 \times 10^{-6} \text{ cm cm}^{-1} \text{ }^{\circ}\text{C}^{-1}$	DuPont Teijin Method between 20-50°C
Dimensional stability	<0.3% at 120°C MD maximum shrinkage	Autotype Method <sup>2</sup>
Maximum and minimum use temperatures	See Autotex UV solvent resistance and environmental data	Autotype Method <sup>2</sup>

<sup>1</sup>Data derived from DuPont Teijin literature for 125µ Melinex OD

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

## 7. UV RESISTANCE

The testing of Autotex UV has incorporated three separate techniques which are detailed below.

### 7.1 Accelerated ageing using an Atlas UVCON accelerated ageing cabinet utilising fluorescent sun lamps

#### 7.1.1 Test Conditions

Apparatus:	Atlas UVCON Accelerated Ageing Cabinet
Lamps:	8 Phillips UVA 340 sun lamps
Cycle:	Alternating cycle of 4 hours UV, 4 hours condensation
Temperature:	50°C throughout

### 7.1.2 Results

Product	Yellowness Index		Flexibility
	Initial	After 1200 hour UVCON cycle	
Autotex	3.6	26.3*	16mm (5/8") - Poor
Autotex UV	5.0	9.1	Material can be folded completely back on itself (180°) without cracking - Very Good

Typical results for 200µ product

\*Flaking of the coating occurs between 1000 and 1200 hours with standard Autotex

### 7.1.3 Switch life testing - see section 8.4 for test conditions

After a 1600 hour cycle switch life testing of Autotex UV on a non-embossed panel exceeded 5 million actuations with no adverse effect on the product.

## 7.2 Accelerated ageing by focusing direct sunlight onto test samples

### 7.2.1 Test Conditions

**Apparatus:** The South Florida Tests Service Sun Accelerated Weathering Device

**Test method:** Samples are subjected to Arizona (USA) sunlight (total UV 290-385nm) concentrated via mirrors/lenses into the target area. No temperature control is performed other than the use of a localised fan. Samples are subjected to a water spray (8 min/hour of active sunlight) to simulate rain.

The samples were exposed to  $333 \text{ mJ/m}^2$  (total UV) which is calculated to simulate one year's real time exposure in Arizona.

### 7.2.2 Results

Product	Yellowness Index		Flexibility
	Initial	Final	
Autotex	2.8	10.6	9.5mm (3/8") - Poor
Autotex UV	5.2	7.5	Material can be folded completely back on itself (180°) without cracking - Very Good

Typical results for 200µ product

**7.2.3 Switch life testing** - see section 8.4 for test conditions

After exposure, switch life testing of Autotex UV on a non-embossed panel exceeded 5 million actuations with no adverse effect on the product.

**7.3 Real time continuous exposure in Houston, Texas**

**7.3.1 Test Conditions**

Apparatus: South facing 45° angled mounting frame in Houston, Texas, USA.

Test method: Samples of Autotex UV were subjected to real time ageing in Texas continuously for 15 months from November 1990 to February 1992.

**7.3.2 Results**

Product	Yellowness Index		Flexibility
	Initial	Final	
			Minimum diameter of curvature material can be formed into before cracking occurs (coating side outwards)
Autotex	2.7	9.4	32mm (1 1/4") - Very Poor
Autotex UV	5.0	8.2	Material can be folded completely back on itself (180°) without cracking - Very Good

Typical results for 200µ product

**7.3.3 Switch life testing** - see section 7.4 for test conditions

Upon completion of the test a non-embossed panel of Autotex UV was switch life tested to 5 million actuations with no signs of material failure.

**7.4 Switch Actuation Testing**

**7.4.1 Test Conditions**

Apparatus: Itronic Fuchs Pneumatic A8274 PS/IEC system with A8274 ZB cylinders rated at 10N at 6 Bar  
 $(6.08 \times 10^5 \text{ Nm}^{-2})$   
 Actuator finger: 8.5mm diameter, 45° Shore D hardness rubber.  
 Actuation rate: 120 per minute

All testing is performed on a flat panel with a total spacer thickness of 200µ and a spacer hole diameter of 13mm.

Depending on the nature of the emboss and the level of exposure to sunlight, switch life is likely to be reduced compared to an unembossed overlay due to the increased stresses experienced during actuation.

Although conclusions may be drawn it is important to note that any accelerated ageing technique is unique and cannot be related directly to real time performance.

The use of Windotex on Autotex UV is not recommended as it will yellow and embrittle when exposed to sunlight. Due to the stabilising chemistry used in Autotex UV the adhesion of Windotex to the surface may be impaired, contact Autotype for further information.

All results published are offered in good faith but due to the variations in the weather they do not constitute a specification and no guarantee is given or implied. Customers are therefore encouraged to carry out their own tests to establish whether the product has sufficient durability for the proposed end use.

---

The information and recommendations in this publication are believed to be accurate and are offered in good faith but do not constitute specifications. Suggestions concerning uses and applications are only the opinion of Autotype International Limited and users should carry out their own testing procedures to confirm suitability for their purposes. Except in the case of death or personal injury caused by the materials, Autotype International Limited MAKES NO WARRANTY OF ANY KIND AND EXCLUDES ANY STATUTORY WARRANTY EXPRESS OR IMPLIED other than that materials conform to their current applicable standard specification. Statements herein therefore should not be construed as guarantees of satisfactory quality or fitness for purpose. The responsibility of Autotype International Limited for claims arising out of breach of guarantee, negligence, strict liability or otherwise is limited to the purchase price of the material.

Suggestions concerning working practices and procedures are based on the practices adopted by existing users of the products and are made in good faith. IT IS THE RESPONSIBILITY OF THE USER TO ENSURE THAT ALL RELEVANT HEALTH AND SAFETY LAWS AND REGULATIONS ARE COMPLIED WITH. Autotype International Limited does not provide any advice on such laws and regulations and accepts no responsibility, express or implied, for breach of such regulations.

Statements concerning the use of products described herein should not be construed as recommending the infringement of any patent and no liability for infringement arising out of such use is assumed.