FootPrint Face Film™ UVJet

Product Data Sheet

FootPrint is a unique two part floor graphics system. Polyester film is tougher and more durable than polycarbonate and PVC films. The FootPrint range of hard coated Polyester films extends the functionality of polyester into areas demanding high quality graphics with anti-slip certification, chemical resistance and abrasion resistance.

PRODUCT DESCRIPTION

FootPrint face film is a high quality, hard coated polyester film, consisting of a base polyester and chemically bonded UV-cured hard surface coating. The films have ASTM anti-slip certification.

Product range:

FootPrint UVJet

- For use with UV cured digital inks
- 123cm x 50m rolls

Finish: FootPrint face films have a micro-fine textured matt finish with ASTM anti-slip certification.

PRODUCT APPLICATIONS

The FootPrint system is designed for the production of durable floor and cladding graphics.

- Exhibition and retail floor graphics
- Indoor floor and wall signage
- Point-of-purchase displays
- In-store Decoration & Cladding
- Floor mapping

Major Benefits

- ASTM anti-slip certification
- Clean, simple removal up to 6 months after application
- No need to over-laminate.
- Resistant to chemical & household cleaners
- Resistant to scratches, abrasion and impacts
- Consistent surface finish
- Global market leading technology

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PRODUCT PERFORMANCE

Chemical Properties

Property	Data	Test Method
Chemical resistance	Resistant to: Esters Alcohols Hydrocarbons Dilute acids Household cleaning Dilute alkalis agents*	DIN 42 115
Coefficient of hygroscopic expansion[1]	MD 8 x 10^{-6} (per 1% RH) TD 7 x 10^{-6} (per 1% RH)	DuPont Teijin Films Method[1] Between 40-80% RH

* For more information refer to SIGMAGraF solvent resistance sheet
[1]Data derived from DuPont Teijin Films literature. The hard coating slightly enhances most properties.

Optical Properties

Property	Data	Test Method
Gardner Haze	58% ± 5%	ASTM D1003-77[1]
Gloss Level (60°)	7% ± 1.5%	ASTM D2457-70 [1]
Texture Profile Ra Rtm	1.6µ ± 0.2µ 8µ ± 2µ	MacDermid Autotype Method[2]
Total Luminous Transmission	92% ± 2%	ASTM D1003-77[1]
Yellowness Index	<3	ASTM E313
UV Absorption	1.3-1.4	MacDermid Autotype Method[2]

[1]Adapted to MacDermid Autotype Method. [2]See Test Method Manual

Physical Properties

Property	Data	Test Method
Density[1]	1.39 g/cm^3	ASTM D1505
Thickness	150µ ±10%	MacDermid Autotype Method[2]

[1]Data derived from DuPont Teijin Films literature. [2]See Test Method Manual

Thermal Properties

Property	Data	Test Method
Coefficient of thermal expansion[1]	0.002%/℃	DuPont Teijin Films Method
Coefficient of humidity expansion[1]	0.009% per %RH	DuPont Teijin Films Method
Dimensional Stability	0.2% MD @ 120℃ maximum shrinkage	MacDermid Autotype Method[2]
Max use temperature Low Humidity (<10% RH) High Humidity (10-95%RH)	 85℃ <60℃	
Min use temperature	-40℃	MacDermid Autotype Method[2]

[1]Data derived from DuPont Teijin Films literature. [2]See Test Method Manual

WORKING INSTRUCTIONS

- Handle film at edge to avoid marking
- Print on outer surface of roll (media is wound print side out)
- Sub-surface printed
- Do not stack or roll until image is completely cured / dry
- Always run a print test to ensure optimum performance when using new media
- See FootPrint instructions insert for comprehensive printing and cutting guidelines.

Due to the wide range of ink jet printers and inks available, results may vary. Customers are urged to run a test print with FootPrint if either ink or printer is changed. A full list of compatible printers is available on request.

HAZARDS & WARNINGS

None associated with this product.

FIRE PRECAUTIONS

Polyester films will burn with difficulty. Extinguisher method: foam, water, CO_2 or PCF.

FIRST AID

No chemical related injury is anticipated from the use of this product.

ENVIRONMENTAL & DISPOSAL

EC Regulation 594/91 classifies ozone depleting substances into a number of different groups, I-VI. This range of products do 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

EU Directives 2003/11/EC; 2002/95/EC; 2002/525/EC; 2006/122/EC (ROHS)
Restriction on use of Pentabromodiphenyl ether CAS 32534-81-9
Octabromodiphenyl ether CAS 32536-52-0

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Polybrominated biphenyls
Polybrominated diphenylether
Lead, Mercury, Cadmium, Chromium VI
Perfluorooctanesulphonate, Perfluorooctanic acid & related compounds

In relation to the above directive, this range of products does not contain polybrominated biphenyl & diphenyl ethers, brominated compounds, perfluoroctane derivatives or any flame retardant agents. MacDermid Autotype products are also free of the heavy metals specified in the above Directives (lead, mercury, cadmium, chromium VI).

EU Directive 2002/96/EC (WEEE) relates to the Disposal and Recycling of Waste Electronic and Electrical Equipment. MacDermid Autotype products are compliant with this directive and do not contain any materials identified in Directives 2003/11/EC & 2002/53/EC (also 2037/2000). MacDermid Autotype Limited has no responsibility for the compliance of finished equipment, which will contain materials from other suppliers.

This range of products comprises films with a chemically treated surface which renders them difficult to recycle in appropriate material recovery schemes. The product contains no substances listed on the EC Black or Grey lists and may be safely disposed of in a landfill or by authorized incineration.

STORAGE

Store in original packaging, in a cool, dry place, away from direct sunlight / UV light source.

Revision 0709R1

FootPrint™ HT Adhesive

Product Data Sheet

PRODUCT DESCRIPTION

FootPrint HTA is a high performance, double-sided, pressure sensitive adhesive on a 50µ opaque white polyester carrier film. The first surface has a dry mounting solvent acrylic laminating adhesive, offering permanent adhesion to the face film. The second surface has an adhesive which offers strong cohesion to floors and other surfaces but is also repositionable and removable. FootPrint HTA has a wide variety of uses including cladding and application to plastics for self-adhesive labels and bond graphic overlays.

Construction

Product range:
Available in rolls:

- 1m x 30m
- 1.23m x 50m

Designed for use with:

- FootPrint Plus
- FootPrint UVjet
- FootPrint Screen

Also compatible with SIGMAGraF films (non floor applications)

PRODUCT APPLICATIONS

The FootPrint system is designed for the production of durable floor and cladding graphics.

- Exhibition and retail floor graphics
- Indoor floor and wall signage
- Point-of-purchase displays
- In-store Decoration & Cladding
- Floor mapping

Major Benefits

- Clean, simple removal up to 6 months after application
- Permanent adhesion to graphics
- Easy to lay and re-position

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- Global market leading technology

PRODUCT PERFORMANCE

- No yellowing of the adhesive
- Good adhesion to a variety of smooth substrates
- Moisture stable liner

Physical Properties

Property	
Opacity	0.85
Thickness	100µ
Carrier Thickness	50µ
Unwind Force	5 cN / 50mm
Release Value	15cN / 50mm
Adhesion to Stainless steel	750 cN / 20mm
Creep on BA-steel	0mm
Shear	180 N/4cm²

Detailed descriptions of test methods available on request. Above figures are average values.

Adhesion Performance

Property	Test Method					
Adhesion (cN/20mm)	2B Steel	PC	PVC	PMMA	PET	PP
	700	700	700	700	350	650
Cohesion						
20mm x 20mm/1kg/4h/23°C	0mm					
20mm x 20mm/0.5kg/4h/70°C	0.5mm					
Heat Resistance	175°C					

Detailed descriptions of test methods available on request. Above figures are average values.

Property (180°Peel adhesion N/m)	**1 min**	**20 mins**	**24 hours**
Stainless Steel	375	376	515
Terazzo Tiles	77	96	333
Quarry Tiles	42	63	312
Vinyl Tiles	74	128	356
Tarkett Tiles	102	129	170

Chemical Resistance

- Resistant to water, detergents, alcohols.

- Contact not recommended for with ketones, esters, aromatic, aliphatic and chlorinated hydrocarbons.

Technical Information

- See FootPrint working instructions for comprehensive printing and cutting guidelines.
- FootPrint High Traffic will reach 70% full adhesion within 4 hours of mounting.

Application Guidelines

- The surface to be bonded must be clean i.e. free of dust, release agents, processing oils and grease.
- The temperature of the application should not be below the dew point of the surrounding air
- The warmer the adhesive the better the adhesive will wet out and consequently the higher the immediate adhesion will be.

Removal

- FootPrint adhesive (surface adhesive side) can be removed from most substrates for 6-9 months after application.
- Removal can however be affected (adhesive residue or increase in adhesion with time) by the following substrates: acrylic glass, polystyrene, nitrocellulose painted surfaces and soft PVC.

Recommended Floor Surfaces

- Terazzo Tiles
- Quarry Tiles
- Vinyl Floor surfaces
- Tarkett Floor Surfaces

We do not recommend our floor graphics to be used on parquet flooring.

STORAGE

Store in original packaging, in a cool, dry place, away from direct sunlight / UV light source
Shelf life: 1 year when stored at 15/25℃ and 50% relative humidity.

HAZARDS & WARNINGS

None associated with this product.

FIRE PRECAUTIONS

Polyester films will burn with difficulty. Extinguisher method: foam, water, CO_2 or PCF.

FIRST AID

No chemical related injury is anticipated from the use of this product.

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ENVIRONMENTAL & DISPOSAL

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Octabromodiphenyl ether CAS 32536-52-0
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Polybrominated diphenylether
Lead, Mercury, Cadmium, Chromium VI
Perfluorooctanesulphonate, Perfluorooctanic acid & related compounds

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This range of products comprises films with a chemically treated surface which renders them difficult to recycle in appropriate material recovery schemes. The product contains no substances listed on the EC Black or Grey lists and may be safely disposed of in a landfill or by authorized incineration.

Revision 0609R1

SIGMAGraF™ Shield AG²

Product Data Sheet

SIGMAGraF AG² is an anti glare, hard-coated, polyester film with anti-graffiti certification.

PRODUCT DESCRIPTION

SIGMAGraF Shield AG² is a premium quality, hard-coated polyester film, consisting of a chemically bonded UV-cured hard surface coating on the first surface and a pressure sensitive, solvent acrylic adhesive on the second surface, which is protected by a release liner. It is designed to given industrial performance to films and graphics for use in demanding areas and industries.

Product Range:

SIGMAGraF Shield AG², 130µ

- Graphic & surface protection film
- Pressure sensitive clear laminating adhesive on second surface

Available in rolls 1.20m x 50m

PRODUCT APPLICATIONS

SIGMAGraF Shield is designed to given industrial performance to films and graphics for use in demanding areas in all industries:

- In-store decoration, cladding and POP displays
- Fascias, nameplates, industrial & design applications
- Demanding and durable display graphics
- Indoor signage in high-traffic areas
- Industrial & design applications

Major Benefits

- Certified resistance to chemicals, solvents & household cleaners
- Resistant to scratches, abrasion and impact
- Consistent surface finish
- Durable and lightweight
- Up-grade films such as solvent printable vinyls to give industrial performance solutions

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PRODUCT PERFORMANCE

Chemical Properties

Property	Data		Test Method
Chemical resistance (concerning physical integrity of coating)	Turpentine Hydrochloric acid (36%) Diacetone alcohol Butyl acetate Nitric acid (10%) Acetone Sodium Hydroxide (40%) Benzyl alcohol Diesel Lenor/Downey (fabric conditioner)	Bleach MEK White spirit Castor oil Acetaldehyde Acetic acid (50%) Acetonitrile Toluene IMS Cyclohexanone	DIN 42 115

* For more information refer to SIGMAGraF solvent resistance sheet

Optical Properties

Property	Data	Test Method
Gardner Haze	9% ±2%	ASTM D1003-77[1]
Gloss Level (60°)	56% ±2%	ASTM D2457-70[1]
Total Luminous Transmission	92% ±2%	ASTM D1003-77[1]
Yellowness Index	<3.5	ASTM D1925-70

[1]Adapted to MacDermid Autotype Method. [2]See Test Method Manual

Physical Properties

Property	Data	Test Method
Density[1]	1.40g/cm^3	ASTM D1505
Pencil Hardness	3H	MacDermid Autotype Method[2]
Thickness	130µ ±10%	MacDermid Autotype Method[2]

[1]Data derived from DuPont Teijin Films literature. [2]See Test Method Manual

Thermal Properties

Property	Data	Test Method
Coefficient of thermal expansion[1]	MD $19x10^{-6}$ cm/cm/℃ TD $16x10^{-6}$ cm/cm/℃	DuPont Teijin Films Method
Coefficient of humidity expansion[1]	$8x10^{-6}$ % per %RH	DuPont Teijin Films Method
Dimensional Stability	0.2% MD @ 120℃ maximum shrinkage	MacDermid Autotype Method[2]
Min use temperature	-40℃	MacDermid Autotype Method[2]

[1]Data derived from DuPont Teijin Films literature. [2]See Test Method Manual

PHYSICAL AND CHEMICAL ADHESIVE SPECIFICATION

High tack, high shear, pressure sensitive specifically designed for lamination to graphics, vinyl's and smooth surfaces.

- Adhesive type: Clear Solvent Acrylic (Pressure Sensitive)
- Adhesive thickness: 22µ
- Peel (20 min, stainless steel): 18N/25mm (FINAT test)
- Peel (24 hours, stainless steel): 23N/25mm (FINAT test)
- Initial tack: high
- Heat resistance: up to 130ºC
- Minimum operating temperature: -15ºC

WORKING INSTRUCTIONS

Process settings:

Roller Laminator	Press
Application temperature: Room temperature to 49º C (120º F) *Speed:* 0.3m to 1.75m (1 ft to 6 ft) per minute	**NOT RECOMMENDED**

Application guidelines:

- The surface to be bonded must be clean i.e. free of dust, release agents, processing oils and grease
- The temperature of the application should not be below the dew point of the surrounding air.
- The warmer the tape the better the adhesive will wet out and consequently the higher the immediate adhesion will be.
- Handle film at edge to avoid marking
- Always test adhesion properties with your substrate to ensure optimum performance and compatibility

<u>Application without a laminator</u>

- Apply when air & substrate surface temperature is at least 16℃
- Use water detergent solution in a spray bottle (2 ml conc. detergent to 1l water)
- Spray solution on clean substrate
- Slowly remove release liner from adhesive while spraying solution on exposed adhesive
- Align and apply film to substrate
- Use applicator squeegee from the centre out to smooth out wrinkles and bubbles

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HAZARDS & WARNINGS

None associated with this product.

FIRE PRECAUTIONS

Polyester films will burn with difficulty. Extinguisher method: foam, water, CO_2 or PCF.

FIRST AID

No chemical related injury is anticipated from the use of this product.

ENVIRONMENTAL & DISPOSAL

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EU Directives 2003/11/EC; 2002/95/EC; 2002/525/EC; 2006/122/EC (ROHS)

Restriction on use of
Pentabromodiphenyl ether CAS 32534-81-9
Octabromodiphenyl ether CAS 32536-52-0
Polybrominated biphenyls
Polybrominated diphenylether
Lead, Mercury, Cadmium, Chromium VI
Perfluorooctanesulphonate, Perfluorooctanic acid & related compounds

In relation to the above directive, this range of products does not contain polybrominated biphenyl & diphenyl ethers, brominated compounds, perfluoroctane derivatives or any flame retardant agents. MacDermid Autotype products are also free of the heavy metals specified in the above Directives (lead, mercury, cadmium, chromium VI).

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This range of products comprises films with a chemically treated surface which renders them difficult to recycle in appropriate material recovery schemes. The product contains no substances listed on the EC Black or Grey lists and may be safely disposed of in a landfill or by authorized incineration.

STORAGE

Store in original packaging, in a cool, dry place, away from direct sunlight / UV light source.

Shelf Life

2 years when stored at 18-25℃ and 40-60% relative humidity

Revision 0709R1

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SIGMAGraF™ Shield AM

Product Data Sheet

SIGMAGraF AM is a stabilized polyester film with Microban® antimicrobial protection permanently embedded in the micro-fine textured hard-coat. The film has a unique, tough hard-coat on the top surface with a clear pressure sensitive adhesive on the second surface. This hard-coat offers exceptional scratch, impact and chemical resistance while maintaining excellent clarity for colour and graphic detail.

PRODUCT DESCRIPTION

The Microban® technology is incorporated into the textured hardcoat during the manufacturing process.

- The process ensures even distribution of the antimicrobial agent throughout the textured hard coat and the film surface.
- When bacteria comes into contact with the SIGMAGraF AM Microban® hardcoat, the antimicrobial function disrupts the bacterial cell wall killing or inhibiting bacterial growth.
- As a result the film surface of SIGMAGraF AM provides dependable and constant protection against bacterial contamination and growth of mould & mildew.

Product Range:

SIGMAGraF Shield AM, 150µ

- Graphic & surface protection film
- Micro-fine textured matt finish
- Pressure sensitive clear adhesive on second surface

PRODUCT APPLICATION

SIGMAGraF AM is designed for use in the following applications:

- Signage in hygiene critical areas (hospitals, schools, etc.)
- Point-of-purchase displays
- In-store Decoration & Cladding
- Exhibitions & Temporary displays
- Wall, floor & counter graphics
- Membrane touch switch and fascia panels
- Protection for surfaces in ‘high traffic areas’

Major Benefits:

- Antimicrobial protection
- Outstanding clarity for maximum ‘color punch’
- Resistant to chemicals & household cleaners
- Resistant to scratches, abrasion and impacts
- Consistent low glare textured surface finish
- Durable and lightweight
- Global market leading technology

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PRODUCT PERFORMANCE

Antimicrobial Properties

Sample Description	Microbial Testing*	Test Result	Test Method
SIGMAGraF AM (Unprocessed samples[1])	*Effectiveness tested with:* Staphylococcus aureus (MRSA) Escherichia coli 0157 Pseudomonas aeruginosa Salmonella enteritidis Bacillus cereus Streptococcus faecalis Klebsiella pneumoniae Aspergillus niger Penicillium purpurogenum Phoma violacea Saccharmyces cerevisiae Listeria monocytogenes	 Biocidal Pass Biocidal Pass Biocidal Pass Biocidal Pass Biocidal Pass Biocidal Pass Biocidal Pass Biocidal Pass Biocidal Pass Biocidal Pass Biocidal Pass Biocidal Pass	AATCC Test Method 100[7]
Simulated printed sample[2]	Staphylococcus aureus (MRSA) Escherichia coli 0157	Biocidal Pass Biocidal Pass	AATCC Test Method 100[7]
Simulated wear test[3]	Staphylococcus aureus (MRSA) Escherichia coli 0157	Biocidal Pass Biocidal Pass	AATCC Test Method 100[7]
Simulated embossed sample[4]	Staphylococcus aureus (MRSA) Escherichia coli 0157	Biocidal Pass Biocidal Pass	AATCC Test Method 100[7]
15 Year Life time test[5]	Staphylococcus aureus (MRSA) Escherichia coli 0157 Aspergillus niger	Biocidal Pass Biocidal Pass Biocidal Pass	Work surface protocol AATCC Test Method 100[7]
24 Hour soak in: Ethanol[6] IPA MEK Phenol Based Disinfectant Quarternary Ammonium Based Disinfectant Bleach	Staphylococcus aureus (MRSA) Escherichia coli 0157	Biocidal Pass Biocidal Pass	AATCC Test Method 100[7]

* The bacteria chosen for each of the tests was recommended by an Independent Test House

Process Conditions for each Sample

[1] Unprocessed Samples: Film samples were tested straight from the pack

[2] Film samples were subjected to the following tests to simulate graphics printing:

- 10 Jet dryer passes (80℃ x 2 mins)
- 10 Fusion UV passes (500MJ/pass)
- 5 passes under IR lamps
- 1 Fusion UV pass (500MJ/pass) - (hardcoat surface)

[3] Film samples were vigorously sandpapered until the texture peaks were removed. The film surface was then polished with wire wool until smooth. This was carried out to simulate extreme surface wear.

[4] Film samples were stretched by 20% in both MD/TD directions. This simulates the process of embossing. (An embossed sample can not be AM tested as a flat surface is required by an Independent Test House)

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[5] Film samples are tested by an Independent Test house using standard test protocols that simulate real life cleaning regimes representing a period of 15 years.
[6] Film samples were soaked for 24 hours before subjected to antimicrobial testing
[7] Test Method and certificate available on request.

Chemical Properties

Property	Data	Test Method
Chemical resistance (concerning physical integrity of coating)	Turpentine Hydrochloric acid (36%) Bleach Diacetone alcohol MEK Butyl acetate White spirit Nitric acid (10%) Castor oil Acetone Acetaldehyde Sodium Hydroxide (40%) Acetic acid (50%) Acetonitrile Benzyl alcohol Toluene Diesel IMS Lenor/Downey (fabric conditioner) Cyclohexanone	DIN 42 115

* For more information refer to SIGMAGraF Solvent Resistance Sheet

Optical Properties

Property	Data	Test Method
Gardner Haze	55% ± 5%	ASTM D1003-77[1]
Gloss Level (60°)	7% ± 1.5%	ASTM D2457-70 [1]
Texture Profile Ra Rtm	 1.6µ ±0.2µ 8µ ±2µ	MacDermid Autotype Method[2]
Total Luminous Transmission	92% ±2%	ASTM D1003-77[1]
Yellowness Index	<3	ASTM E313
UV Absorption	1.3-1.4	MacDermid Autotype Method[2]

[1]Adapted to MacDermid Autotype Method. [2]See Test Method Manual

Physical Properties

Property	Data	Test Method
Density	1.39g/cm	ASTM D1505
Thickness	150µ ±10% 200µ ±10%	MacDermid Autotype Method[2]

[1]Data derived from DuPont Teijin Films literature. [2]See Test Method Manual

Thermal Properties

Property	Data	Test Method
Coefficient of thermal expansion[1]	0.002%/℃	DuPont Teijin Films Method
Coefficient of humidity expansion[1]	0.009% per %RH	DuPont Teijin Films Method
Dimensional Stability	0.2% MD @ 120℃ maximum shrinkage	MacDermid Autotype Method[2]
Min use temperature	-40℃	MacDermid Autotype Method[2]

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PHYSICAL AND CHEMICAL ADHESIVE SPECIFICATION

High tack, high shear, pressure sensitive specifically designed for lamination to graphics, vinyls and smooth surfaces.

- Adhesive type: Clear Solvent Acrylic (Pressure Sensitive)
- Adhesive thickness: 22µ
- Peel (20 min, stainless steel): 18N/25mm (FINAT test)
- Peel (24 hours, stainless steel): 23N/25mm (FINAT test)
- Initial tack: high
- Heat resistance: up to 130ºC
- Minimum operating temperature: -15ºC

WORKING INSTRUCTIONS

Process settings:

Roller Laminator	Press
Application temperature: Room temperature to 49º C (120º F) *Speed:* 0.3m to 1.75m (1 ft to 6 ft) per minute	**NOT RECOMMENDED**

Application guidelines:

- The surface to be bonded must be clean i.e. free of dust, release agents, processing oils and grease
- The temperature of the application should not be below the dew point of the surrounding air.
- The warmer the tape the better the adhesive will wet out and consequently the higher the immediate adhesion will be.
- Handle film at edge to avoid marking
- Always test adhesion properties with your substrate to ensure optimum performance and compatibility

Application without a laminator

- Apply when air & substrate surface temperature is at least 16℃
- Use water detergent solution in a spray bottle (2 ml conc. detergent to 1l water)
- Spray solution on clean substrate
- Slowly remove release liner from adhesive while spraying solution on exposed adhesive
- Align and apply film to substrate
- Use applicator squeegee from the centre out to smooth out wrinkles and bubbles

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HAZARDS & WARNINGS

None associated with this product.

FIRE PRECAUTIONS

Polyester films will burn with difficulty. Extinguisher method: foam, water, CO_2 or PCF.

FIRST AID

No chemical related injury is anticipated from the use of this product.

ENVIRONMENTAL & DISPOSAL

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STORAGE

Store in original packaging, in a cool, dry place, away from direct sunlight / UV light source.

Shelf Life:

2 years when stored at 18-25℃ and 40-60% relative humidity.

Revision 0709R1

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SIGMAGraF Shield

Graphic & Surface Protection

Hardcoated optically clear film with adhesive – for protection you can count on

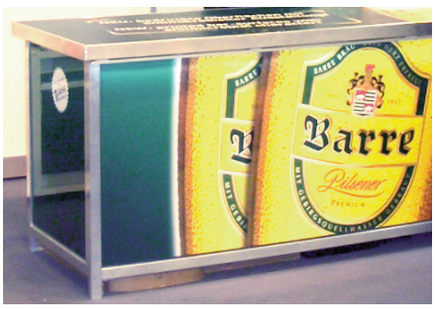
Key Features

- Scratch, impact and chemical resistant
- Three specialist finishes
- Amazing clarity and easy to clean
- Advanced pressure sensitive adhesive

MacDermid Autotype

SIGMAGraF Shield

Premium graphic and surface protection film you can count on. Stabilized, optical polyester film with SIGMAGraF's unique tough hardcoat on the top surface and pressure sensitive solvent acrylic adhesive on the bottom surface.



The super tough hardcoat offers exceptional scratch, impact and chemical resistance while maintaining excellent clarity with colour and graphic detail. SIGMAGraF Shield can be laminated to protect existing graphics and smooth surfaces.

Key Benefits

- The chemical resistant hardcoat can be cleaned with a variety of household and industrial cleaning products, allowing simple removal of accidental or intentional marks, stains and graffiti.
- The abrasion and impact resistance protects your existing graphics and surfaces from damage, reducing the need for costly repairs and maintenance.
- The Antimicrobial variant protects surfaces from harmful bacteria, mould and mildew - essential for hygiene sensitive areas.
- Unique combination of aesthetics and durability make SIGMAGraF Shield the premium choice of architects and specifiers

Specifications

	Chemical Resistant	Abrasion Resistant	Graffiti Resistant	Anti-Slip Coating	Antimicrobial	Anti Glare	Gauge
AG[2]	•	•	•			•	130µ
TM	•	•	• [1]	•		• [2]	150µ
AM with Microban®	•	•	• [1]	•	•	• [2]	150µ

[1] Passed ASTM AntiGraffiti test for all criteria except removal of blue marker pen

[2] Controlled textured matt surface reduces glare

AG = Anti Glare TM = Textured Matt AM = Antimicrobial

MacDermid Autotype

It takes more than innovation, high performance products and superior technical service to help our customers compete and win in today's global market place. It takes a total commitment to understand their needs and the ability to provide the right solutions – every time.

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1245/25789/0407

SIGMAGraF®Shield™TM

Product Data Sheet

Industrial performance polyester film with PSA. Unique, tough hard-coat on the film surface with a clear pressure sensitive adhesive on the second surface. The hard-coat offers exceptional scratch, impact and chemical resistance while maintaining excellent clarity for colour and graphic detail.

PRODUCT DESCRIPTION

SIGMAGraF Shield is a premium quality, hard-coated polyester film, consisting of a chemically bonded UV-cured hard surface coating on the first surface and a pressure sensitive, solvent acrylic adhesive on the second surface, which is protected by a release liner. It is designed to give an industrial performance to films and graphics for use in demanding areas and industries.

Product Range:

SIGMAGraF Shield TM, 150µ

- Micro-fine textured matt finish

Available in rolls 1.20m x 50m

PRODUCT APPLICATIONS

SIGMAGraF Shield is designed to given industrial performance to films and graphics for use in demanding areas in all industries:

- Hoardings, boarding's, signage & interiors
- Visually demanding and durable display graphics
- Building & architectural
- Exhibition and Displays
- Retail
- Equipment manufacture
- In-store decoration, cladding and POP displays
- Fascias, nameplates, industrial & design applications
- Indoor signage in high-traffic areas
- Schools, hospitals, corporate
- Equipment manufacture
- Industrial & design applications

Major Benefits

- Resistant to chemicals, solvents & household cleaners
- Resistant to scratches, abrasion and impacts
- Resistant to graffiti
- Consistent surface finish
- Durable and lightweight
- Outstanding clarity for graphic and colour definition
- Global market leading technology

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PRODUCT PERFORMANCE

Chemical Properties

Property	Data	Test Method
Chemical resistance	Resistant to: Alcohols Dilute acids Dilute alkalis Esters Hydrocarbons Ketones Household cleaning agents*	DIN 42 115
Coefficient of hygroscopic expansion[1]	MD 8 x 10^{-6} (per 1% RH)	DuPont Teijin Films Method[1] Between 40-80% RH
	TD 7 x 10^{-6} (per 1% RH)	
Moisture vapour Transmission (MVTR)[1]	3.57g/m²/24hrs	RTM 607
Oxygen Transmission Rate[1]	8.2ml/m²/24hrs	RTM608

* For more information refer to SIGMAGraF solvent resistance sheet. [1]Data derived from DuPont Teijin Films literature. The SIGMAGraF coating slightly enhances most properties.

Optical Properties

Property	Data	Test Method
Gardner Haze	55% ±5%	ASTM D1003-77[1]
Gloss Level (60°)	7% ±1.5%	ASTM D2457-70 [1]
Texture Profile Ra Rtm	 1.6µ ±0.2µ 8µ ±2µ	MacDermid Autotype Method[2]
Total Luminous Transmission[1]	92% ±2%	ASTM D1003-77[1]
Yellowness Index	<3	ASTM E313
UV Absorption	1.3-1.4	MacDermid Autotype Method[2]

[1]Adapted to MacDermid Autotype Method. [2]See Test Method Manual [1] Data for SIGMAGraF without adhesive coating.

Physical Properties

Property	Data	Test Method
Density[1]	1.39 g/cm^3	ASTM D1505
Film Thickness	150µ ±10%	MacDermid Autotype Method[2]

[1]Data derived from DuPont Teijin Films literature. [2]See Test Method Manual

Thermal Properties

Property	Data	Test Method
Coefficient of thermal expansion[1]	0.002%/℃	DuPont Teijin Films Method
Coefficient of humidity expansion[1]	0.009% per %RH	DuPont Teijin Films Method
Dimensional Stability[1]	0.2% MD @ 120℃ maximum shrinkage	MacDermid Autotype Method[2]
Min use temperature[1]	-40℃	MacDermid Autotype Method[2]

[1]Data derived from DuPont Teijin Films literature. [2]See Test Method Manual [1] Data for SIGMAGraF without adhesive coating

PHYSICAL AND CHEMICAL ADHESIVE SPECIFICATION

High tack, high shear, pressure sensitive specifically designed for lamination to graphics, vinyl's and smooth surfaces.

- Adhesive type: Clear Solvent Acrylic (Pressure Sensitive)
- Adhesive thickness: 22µ
- Peel (20 min, stainless steel): 18N/25mm (FINAT test)
- Peel (24 hours, stainless steel): 23N/25mm (FINAT test)
- Initial tack: high
- Heat resistance: up to 130ºC
- Minimum operating temperature: -15ºC

WORKING INSTRUCTIONS

Process settings:

Roller Laminator	Press
Application temperature: Room temperature to 49º C (120º F) *Speed:* 0.3m to 1.75m (1 ft to 6 ft) per minute	**NOT RECOMMENDED**

Application guidelines:

- The surface to be bonded must be clean i.e. free of dust, release agents, processing oils and grease
- The temperature of the application should not be below the dew point of the surrounding air.
- The warmer the tape the better the adhesive will wet out and consequently the higher the immediate adhesion will be.
- Handle film at edge to avoid marking
- Always test adhesion properties with your substrate to ensure optimum performance and compatibility

Application without a laminator

- Apply when air & substrate surface temperature is at least 16℃
- Use water detergent solution in a spray bottle (2 ml conc. detergent to 1l water)
- Spray solution on clean substrate
- Slowly remove release liner from adhesive while spraying solution on exposed adhesive
- Align and apply film to substrate

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- Use applicator squeegee from the centre out to smooth out wrinkles and bubbles

HAZARDS & WARNINGS
None associated with this product.

FIRE PRECAUTIONS
Polyester films will burn with difficulty. Extinguisher method: foam, water, CO_2 or PCF.

FIRST AID
Skin contact: Not harmful. On contact with adhesive wash with soap and water
Eye contact: Rinse eye with plenty of water.

ENVIRONMENTAL & DISPOSAL

EC Regulation 594/91 classifies ozone depleting substances into a number of different groups, I-VI. This range of products do 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

EU Directives 2003/11/EC; 2002/95/EC; 2002/525/EC; 2006/122/EC (ROHS)

Restriction on use of
Pentabromodiphenyl ether CAS 32534-81-9
Octabromodiphenyl ether CAS 32536-52-0
Polybrominated biphenyls
Polybrominated diphenylether
Lead, Mercury, Cadmium, Chromium VI
Perfluorooctanesulphonate, Perfluorooctanic acid & related compounds

In relation to the above directive, this range of products does not contain polybrominated biphenyl & diphenyl ethers, brominated compounds, perfluoroctane derivatives or any flame retardant agents. MacDermid Autotype products are also free of the heavy metals specified in the above Directives (lead, mercury, cadmium, chromium VI).

EU Directive 2002/96/EC (WEEE) relates to the Disposal and Recycling of Waste Electronic and Electrical Equipment. MacDermid Autotype products are compliant with this directive and do not contain any materials identified in Directives 2003/11/EC & 2002/53/EC (also 2037/2000). MacDermid Autotype Limited has no responsibility for the compliance of finished equipment, which will contain materials from other suppliers.

This range of products comprises films with a chemically treated surface which renders them difficult to recycle in appropriate material recovery schemes. The product contains no substances listed on the EC Black or Grey lists and may be safely disposed of in a landfill or by authorized incineration.

STORAGE
Store in original packaging, in a cool, dry place, away from direct sunlight / UV light source.

Shelf life:
2 years when stored at 18-25℃ and 40-60% relative humidity

Revision 0709R1

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 MacDermid Autotype 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, MacDermid Autotype 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 MacDermid Autotype 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. MacDermid Autotype Limited does not provide any advice on such laws and regulations and accepts no responsibility, express or implied, for breach of such regulations. Statements

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SIGMAGraF™ UVJet AG²

Product Data Sheet

SIGMAGraF UVJet AG² is an anti glare, hard-coated polyester film with anti-graffiti certification.

PRODUCT DESCRIPTION

SIGMAGraF UVJet AG² is a high quality, hard coated polyester film, consisting of a polyester base and chemically bonded UV-cured hard surface coating. This film has extensive flexibility, chemical resistance and abrasion resistance.

This product is available in rolls.

Product range:

SIGMAGraF UVJet AG² 180µ

- For use with UV-cured digital inks (re UV curing ink-jet printers)
- Anti Glare finish
- Anti Graffiti certification

PRODUCT APPLICATIONS

- In-store decorative protection & cladding
- Industrial design applications e.g. MTS prototyping
- Hoardings, boarding's, signage & interiors
- Fascias, nameplates, industrial & design applications
- Demanding and durable display graphics

Major Benefits:

- Certified resistance to chemicals, solvents & household cleaners
- Resistant to scratches, abrasion and impact
- Consistent surface finish
- Durable and lightweight
- Combine with other substrates for industrial system solutions

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PRODUCT PERFORMANCE

Chemical Properties

Property	Data		Test Method
Chemical resistance (concerning physical integrity of coating)	Turpentine Hydrochloric acid (36%) Diacetone alcohol Butyl acetate Nitric acid (10%) Acetone Sodium Hydroxide (40%) Benzyl alcohol Diesel Lenor/Downey (fabric conditioner)	Bleach MEK White spirit Castor oil Acetaldehyde Acetic acid (50%) Acetonitrile Toluene IMS Cyclohexanone	DIN 42 115

* For more information refer to SIGMAGraF Solvent Resistance Sheet

Optical Properties

Property	Data	Test Method
Gardner Haze	9% ±2%	ASTM D1003-77[1]
Gloss Level (60°)	56% ±2%	ASTM D2457-70[1]
Total Luminous Transmission	92% ±2%	ASTM D1003-77[1]
Yellowness Index	<3.5	ASTM D1925-70

[1]Adapted to MacDermid Autotype Method

Physical Properties

Property	Data	Test Method
Density[1]	1.40g/cm^3	ASTM D1505
Pencil Hardness	3H	MacDermid Autotype Method[2]
Thickness	180µ ±10%	MacDermid Autotype Method[2]

[1]Data derived from DuPont Teijin Films literature. [2]See test method manual

Thermal Properties

Property	Data	Test Method
Coefficient of thermal expansion[1]	MD $19x10^{-6}$ cm/cm/℃ TD $16x10^{-6}$ cm/cm/℃	DuPont Teijin Films Method
Coefficient of humidity expansion[1]	$8x10^{-6}$ % per %RH	DuPont Teijin Films Method
Dimensional Stability	0.2% MD @ 120℃ maximum shrinkage	MacDermid Autotype Method[2]
Min use temperature	-40℃	MacDermid Autotype Method[2]

[1]Data derived from DuPont Teijin Films literature. [2]See test method manual

WORKING INSTRUCTIONS

- Handle film at edge to avoid marking
- Reverse / flip your image before printing
- Do not stack or roll until image is completely cured / dry
- Always run a print test to ensure optimum performance when using new media
- See SIGMAGraF instructions insert for printing and cutting guidelines.

Printing and Processing Guidelines

SIGMAGraF Film:	Sub surface print i.e. print on the underside
Blue Film Laminate:	Is applied to the print receptive surface of the SIGMAGraF AG[2] and needs to be removed before printing.
Film winding:	SIGMAGraF is wound print receptive side in; therefore the hard-coat side is on the outside of the roll.

UV curing ink jet ink laydown settings - for guidance only.
Specific trials need to be undertaken to determine best settings for printer, ink and substrate combination.

- SIGMAGraF UVJet - for lamination to another film substrate e.g. FootPrint white adhesive 100% ink laydown.
- SIGMAGraF UVJet - as a BackLit film 300% ink laydown.

Please Note: UV curing inks can take between 12 - 48 hours to reach maximum cure; hence maximum adhesion to the SIGMAGraF film.

HAZARDS & WARNINGS

None associated with this product.

FIRE PRECAUTIONS

Burns with difficulty. Extinguisher method: foam, water, CO_2 or PCF.

FIRST AID

No chemical related injury is anticipated from the use of this product.

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ENVIRONMENTAL & DISPOSAL

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EU Directives 2003/11/EC; 2002/95/EC; 2002/525/EC; 2006/122/EC (ROHS)

Restriction on use of
Pentabromodiphenyl ether CAS 32534-81-9
Octabromodiphenyl ether CAS 32536-52-0
Polybrominated biphenyls
Polybrominated diphenylether
Lead, Mercury, Cadmium, Chromium VI
Perfluorooctanesulphonate, Perfluorooctanic acid & related compounds

In relation to the above directive, this range of products does not contain polybrominated biphenyl & diphenyl ethers, brominated compounds, perfluoroctane derivatives or any flame retardant agents. MacDermid Autotype products are also free of the heavy metals specified in the above Directives (lead, mercury, cadmium, chromium VI).

EU Directive 2002/96/EC (WEEE) relates to the Disposal and Recycling of Waste Electronic and Electrical Equipment. MacDermid Autotype products are compliant with this directive and do not contain any materials identified in Directives 2003/11/EC & 2002/53/EC (also 2037/2000). MacDermid Autotype Limited has no responsibility for the compliance of finished equipment, which will contain materials from other suppliers.

This range of products comprises films with a chemically treated surface which renders them difficult to recycle in appropriate material recovery schemes. The product contains no substances listed on the EC Black or Grey lists and may be safely disposed of in a landfill or by authorized incineration.

STORAGE

Store in original packaging, in a cool, dry place, away from direct sunlight / UV light source.

Revision 0709R1

MacDermid Autotype

SIGMAGraF® UVJet Outdoor

Product Data Sheet

SIGMAGraF UVJet Outdoor is an industrial protective and image-receptive film all-in-one. It has been formulated for imaging on UV curing ink jet printers. SIGMAGraF UVJet Outdoor has been developed for applications where high or widely fluctuating temperatures, excessive humidity and strong levels of UV light are encountered, particularly outdoor or harsh industrial conditions.

PRODUCT DESCRIPTION

SIGMAGraF UVJet Outdoor comprises of specially constructed heat-stabilized polyester with exterior hard-coat on the top surface and UV curing ink jet receptive primer layer on the underside.

SIGMAGraF UVJet Outdoor is formulated to resist high UV light, moisture and wide variations in temperature and will not delaminate become brittle or flake under extreme conditions. The hard-coat top surface is resistant to harsh chemicals, solvents, scratches knocks and abrasion. The primer on the sub-surface bonds and flexes with the UV curing ink-jet inks to prevent cracking and crazing. No fillers or matting agents are used in the film manufacturing process making graphic and colour definition excellent

Product Range:
SIGMAGraF UVJet *Outdoor*

- Designed for extreme conditions
- Resistant to ultraviolet light, moisture and wide variations in temperature
- Resists the film going brittle or yellow in direct sunlight

Format and finish:

- Finish: Controlled Velvet textured matt
- Gauge: 150 micron – other thicknesses available upon request
- Size: 1230 mm x 50m rolls.
- Longer roll sizes and sheets available upon request

PRODUCT APPLICATIONS

- Signage
- Fascia, nameplates
- Durable and visually demanding graphics

For use in extreme weather and industrially demanding environments

Major Benefits:

- Resistant to high UV light, excessive temperature and humidity conditions
- Resistant to chemicals, solvents & household cleaners
- Resistant to scratches, abrasion and impacts
- Easily cleaned without surface damage
- Consistent surface finish
- Durable & lightweight and easy to handle
- Outstanding clarity for graphic and colour definition
- Global market leading technology

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PRODUCT PERFORMANCE

CHEMICAL PROPERTIES

Property	Data	Test Method
Chemical Resistance	Resistant to: Alcohols Dilute acids and alkalis Esters Hydrocarbons Ketones Household cleaning agents	DIN 42 115
Coefficient of hygroscopic expansion[1]	MD 8 x 10^{-6} (per 1% RH) TD 7 x 10^{-6} (per 1% RH)	DuPont Teijin Films Method[1] Between 40-80% RH
Moisture vapour transmission rate (MVTR)[1]	3.57g/m^2/24 hours	ASTM F372-73
Oxygen transmission rate[1]	8.2ml/m^2/24 hours	ASTM D1434-82 @ 25°C, 77% RH
Chemical Resistance	See SIGMAGraF Solvent Resistance and Environmental data	

[1] Data derived from DuPont Teijin Films literature for 125µ Melinex OD. [2] The Autotex XE coating slightly enhances most properties

OPTICAL PROPERTIES

Property	Data	Test Method
Gardner Haze	71% ±5%	ASTM D1003-77[1]
Gloss Level (60°)	4.3% ±0.5%	ASTM D2457-70[1]
Texture profile Velvet Ra Velvet Rtm Fine Ra Fine Rtm	 2.8µ ±0.2µ 13.4µ ±2µ 1.6µ ±0.2µ 8µ ±2µ	MacDermid Autotype Method[2]
Total luminous transmission	92% ±2%	ASTM D1003-77[1]
UV absorption	2.5 - 3	MacDermid Autotype Method[2] (370 nm)
Yellowness index	<5	ASTM D1925-70

[1] Adapted to MacDermid Autotype Method, see Test Method Manual [2] See Test Method Manual

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PHYSICAL PROPERTIES

Property		Data	Test Method
Density[1]		1.39g/cm3	ASTM D1505
Thicknesses	V150 V200 F200	150µ ±10% 200µ ±10% 200µ ±10%	

[1] Data derived from DuPont Teijin Films literature for Melinex OD. [2] See Test Method Manual

THERMAL PROPERTIES

Property	Data	Test Method
Coefficient of thermal expansion[1]	0.002% degree	DuPont Teijin Films Method
Coefficient of humidity expansion[1]	0.0009% RH	DuPont Teijin Films Method
Dimensional stability	<0.2% at 120 °C MD maximum shrinkage	MacDermid Autotype Method[2]
Maximum and minimum use temperatures	High humidity (85% RH) 85°C Low humidity (<10%RH) 85°C Minimum temperature -40°C	MacDermid Autotype Method[2]

[1] Data derived from DuPont Teijin Films literature for 125µ Melinex OD. [2] See Test Method Manual

MECHANICAL PROPERTIES

Property	Data	Test Method
Young's modulus[1]	3700N/mm2	ASTM D88[2]
Elongation at break	70%	ASTM D1505
Tensile strength at break	150N/mm2	ASTM D88[2]
Tensile strength at yield point	100N/mm2	ASTM D88[2]
Tensile strength at yield	100N/mm2	ASTM D88[2]
Tear strength	350N/mm2	ASTM D88[2]

[1] Data derived from DuPont Teijin Films literature for Melinex OD. [2] Adapted to MacDermid Autotype Method

WORKING INSTRUCTIONS

- Handle film at edge to avoid marking
- Reverse / flip your image before printing
- Do not stack or roll until image is completely cured
- Always run a print test to ensure optimum performance
- See SIGMAGraF instructions insert for comprehensive printing and cutting guidelines.

Printing and Processing Guidelines:

SIGMAGraF Film:	Sub surface print (in reverse) i.e. print on the underside
Film winding:	SIGMAGraF is wound print receptive side in; therefore the hard-coat side is on the outside of the roll

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UV curing ink jet ink laydown settings - for guidance only:
Specific trials need to be undertaken to determine best settings for printer, ink and substrate combination.

- 100% ink lay-down – for lamination to another film substrate after imaging
  e.g. FootPrint High Traffic White Adhesive
- 300% ink lay-down - for use as a Back-Lit film

Please Note: UV curing inks can take between 12 - 48 hours to reach maximum cure; i.e. optimum adhesion to the SIGMAGraF film.

TECHNICAL DATA

UV Resistance:
The testing of SIGMAGraF UVJet Outdoor has incorporated three separate techniques:

Test 1
Real time continuous exposure in Miami, Florida
Test Conditions
Apparatus: South facing 45° angled mounting frame in Miami, Florida, USA. Samples of SIGMAGraF UVJet Outdoor - were subjected to real time ageing in Florida continuously for 12 months.

RESULTS

Product	Yellowness Index		Flexibility
	Initial	Final	Minimum diameter of curvature to which material can be formed before cracking occurs (coating side outwards)
SIGMAGraF UVJet Outdoor	4.8	7.55	Material can be folded back on itself (180°) with only slight cracking. Good

Test completed on film without imaging as inks vary.

Test 2
Accelerated ageing using an Atlas UVCON accelerated ageing cabinet utilizing fluorescent sun lamps.
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: 40°C during condensation cycle
60248C during UV cycle

RESULTS

Product	Yellowness Index		Film Flexibility
	Initial	After 1600 hour UVCON cycle	Minimum diameter of curvature to which material can be formed before cracking occurs (coating side outwards)
SIGMAGraF UVJet Outdoor	4.8	8.1	Material can be folded completely back on itself (180°) without cracking, Very Good.

Test completed on film without imaging as inks vary.

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Test 3
The South Florida Tests Service Sun Accelerated Weathering Device
Test conditions
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 localized fan. Samples are subject to a water spray (8 min / hour of active sunlight) to simulate rain.

The samples were exposed to 333mJ/m² (total UV) which is calculated to simulate one year's real time exposure in Arizona.

RESULTS

Product	Yellowness Index		Flexibility
	Initial	Final	Minimum diameter of curvature to which material can be formed before cracking occurs (coating side outwards)
SIGMAGraF UVJet Outdoor	4.7	7.5	Material can be folded completely back on itself (180°) without cracking, Very Good

Test completed on film without imaging as inks vary.

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.

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 their proposed end use.

HAZARDS & WARNINGS
None associated with this product.

FIRE PRECAUTIONS
Polyester films will burn with difficulty. Extinguisher method: foam, water, CO_2 or PCF.

FIRST AID
No chemical related injury is anticipated from the use of this product.

ENVIRONMENTAL & DISPOSAL

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EU Directives 2003/11/EC; 2002/95/EC; 2002/525/EC; 2006/122/EC (ROHS)
Restriction on use of
Pentabromodiphenyl ether CAS 32534-81-9
Octabromodiphenyl ether CAS 32536-52-0
Polybrominated biphenyls
Polybrominated diphenylether
Lead, Mercury, Cadmium, Chromium VI
Perfluorooctanesulphonate, Perfluorooctanic acid & related compounds
In relation to the above directive, this range of products does not contain polybrominated biphenyl & diphenyl ethers, brominated compounds, perfluoroctane derivatives or any flame retardant agents. MacDermid Autotype products are also free of the heavy metals specified in the above Directives (lead, mercury, cadmium, chromium VI).

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This range of products comprises films with a chemically treated surface which renders them difficult to recycle in appropriate material recovery schemes. The product contains no substances listed on the EC Black or Grey lists and may be safely disposed of in a landfill or by authorized incineration.

STORAGE

Store in original packaging, in a cool, dry place, away from direct sunlight / UV light source.

PACKAGING

Rolls: Standard roll length 50m, Maximum width 1232cm

OZONE DEPLETING SUBSTANCES

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

Revision 1010V1

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SIGMAGraF® UVJet™ TM

Product Data Sheet

Polyester film is tougher and more durable than polycarbonate and PVC films. The SIGMAGraF UVJet range of hard coated Polyester films extends the functionality of polyester into areas demanding flexibility, chemical resistance and abrasion resistance with excellent receptivity to a wide range UV cured digital inks and solvent screen printing inks.

Product Range:

SIGMAGraF UVJet TM, 150µ

- Micro-fine textured matt finish
- Other gauges may be available on request

PRODUCT DESCRIPTION

SIGMAGraF UVJet is a high quality, hard coated polyester film, consisting of the base polyester and chemically bonded UV-cured hard surface coating. It is available in sheets and rolls.

PRODUCT APPLICATIONS

SIGMAGraF UVJet is designed for use in the following markets:

- Hoardings, boarding's, signage & interiors
- Visually demanding and durable display graphics
- In-store decoration, cladding and POP displays
- Fascias, nameplates, industrial & design applications
- Indoor signage in high-traffic areas
- Industrial & design applications
- Exhibition and Displays
- Building & architectural
- Retail
- Schools, hospitals, corporate
- Equipment manufacture

Major Benefits

- Resistant to chemicals, solvents & household cleaners
- Resistant to scratches, abrasion and impacts
- Resistant to graffiti
- Consistent surface finish
- Durable and lightweight
- Outstanding clarity for graphic and colour definition
- Global market leading technology

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PRODUCT PERFORMANCE

Chemical Properties

Property	TM	Test Method
Chemical resistance	Resistant to: Alcohols Dilute acids Dilute alkalis Esters Hydrocarbons Ketones Household cleaning agents	DIN 42 115
Coefficient of hygroscopic expansion[1]	MD 8 x 10^{-6} (per 1% RH)	DuPont Teijin Films Method[1] Between 40-80% RH
	TD 7 x 10^{-6} (per 1% RH)	
Moisture Vapour Transmission (MVTR)[1]	3.57g/m²/24hrs	RTM 607
Oxygen Transmission Rate[1]	8.2ml/m²/24hrs	RTM608

* For more information refer to SIGMAGraF solvent resistance sheet
[1]Data derived from DuPont Teijin Films literature. The SIGMAGraF coating slightly enhances most properties.

Optical Properties

Property	TM	Test Method
Gardner Haze	55% ±5%	ASTM D1003-77[1]
Gloss Level (60°)	7% ± 1.5%	ASTM D2457-70 [1]
Texture Profile Ra Rtm	 1.6µ ±0.2µ 8µ ±2µ	MacDermid Autotype Method[2]
Total Luminous Transmission	92% ±2%	ASTM D1003-77[1]
Yellowness Index	<3	ASTM E313
UV Absorption	1.3-1.4	MacDermid Autotype Method[2]

[1]Adapted to MacDermid Autotype Method. [2]See Test Method Manual

Physical Properties

Property	TM	Test Method
Density[1]	1.39 g/cm^3	ASTM D1505
Thickness	150µ ±10%	MacDermid Autotype Method[2]
	200µ ±10%	

[1]Data derived from DuPont Teijin Films literature. [2]See Test Method Manual

Thermal Properties

Property	TM	Test Method
Coefficient of thermal expansion[1]	0.002%/℃	DuPont Teijin Films Method
Coefficient of humidity expansion[1]	0.009% per %RH	DuPont Teijin Films Method
Dimensional Stability	0.2% MD @ 120℃ maximum shrinkage	MacDermid Autotype Method[2]
Max use temperature Low Humidity (<10% RH) High Humidity (10-95%RH)	 85℃ <60℃	
Min use temperature	-40℃	MacDermid Autotype Method[2]

[1]Data derived from DuPont Teijin Films literature. [2]See Test Method Manual

WORKING INSTRUCTIONS

- Handle film at edge to avoid marking
- Reverse / flip your image before printing
- Do not stack or roll until image is completely cured / dry
- Always run a print test to ensure optimum performance when using new media
- See SIGMAGraF instructions insert for comprehensive printing and cutting guidelines.

Printing and Processing Guidelines

SIGMAGraF Film: Sub surface print i.e. print on the underside

Film winding: SIGMAGraF is wound print receptive side in; therefore the hard-coat side is on the outside of the roll

UV curing ink jet ink lay-down settings - for guidance only.
Specific trials need to be undertaken to determine best settings for printer, ink and substrate combination.

- SIGMAGraF UVJet - for lamination to another film substrate e.g. FootPrint white adhesive 100% ink lay-down.
- SIGMAGraF UVJet - as a Back-Lit film 300% ink lay-down.

Please Note: UV curing inks can take between 12 - 48 hours to reach maximum cure; hence maximum adhesion to the SIGMAGraF film.

HAZARDS & WARNINGS
None associated with this product.

FIRE PRECAUTIONS
Polyester films will burn with difficulty. Extinguisher method: foam, water, CO_2 or PCF.

FIRST AID
No chemical related injury is anticipated from the use of this product.

ENVIRONMENTAL & DISPOSAL

EC Regulation 594/91 classifies ozone depleting substances into a number of different groups, I-VI. This range of products do 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.

EU Directives 2003/11/EC; 2002/95/EC; 2002/525/EC; 2006/122/EC (ROHS)

Restriction on use of
Pentabromodiphenyl ether CAS 32534-81-9
Octabromodiphenyl ether CAS 32536-52-0
Polybrominated biphenyls
Polybrominated diphenylether
Lead, Mercury, Cadmium, Chromium VI
Perfluorooctanesulphonate, Perfluorooctanic acid & related compounds

In relation to the above directive, this range of products does not contain polybrominated biphenyl & diphenyl ethers, brominated compounds, perfluoroctane derivatives or any flame retardant agents. MacDermid Autotype products are also free of the heavy metals specified in the above Directives (lead, mercury, cadmium, chromium VI).

EU Directive 2002/96/EC (WEEE) relates to the Disposal and Recycling of Waste Electronic and Electrical Equipment. MacDermid Autotype products are compliant with this directive and do not contain any materials identified in Directives 2003/11/EC & 2002/53/EC (also 2037/2000). MacDermid Autotype Limited has no responsibility for the compliance of finished equipment, which will contain materials from other suppliers.

This range of products comprises films with a chemically treated surface which renders them difficult to recycle in appropriate material recovery schemes. The product contains no substances listed on the EC Black or Grey lists and may be safely disposed of in a landfill or by authorized incineration.

STORAGE

Store in original packaging, in a cool, dry place, away from direct sunlight / UV light source.

PACKAGING

Sheets: 100 sheets per pack, sealed in black plastic and packed in MacDermid Autotype Limited logo board box

Rolls: Standard roll length 50m, Maximum width 122cm

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