

Commercial Solutions Division

# 3M™ Scotchcal™ Opaque Graphic Film

## Series 100

### Product Description

These high performance premium cast films are a range of colored films that have been specially developed to be knife cut on electronic systems.

3M™ Scotchcal™ Opaque Graphic Film Series 100 films have very good conformability for application on flat or moderate curved surfaces, with or without rivets. They are outstanding for easy cutting of small letters or complex graphics. The colorless adhesive suits this material for use on windows or other transparent substrates.

Product Line	Electrocut	100-X	X = color code, opaque, glossy (and few matte), permanent adhesive. Wide selection out of large color range. Special colors available on request.
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**Important Notice!** Some colors are less opaque than other colors. Before using, the user must determine the suitability of the film for its required or intended use.

### Product Characteristics

These are indicative values for unprocessed products. Contact your 3M representative for a custom specification.

Physical & Application	Material	cast vinyl	
	Surface finish	glossy and matte (see product line)	
	Thickness (film)	50 µm (0.05 mm)	
	Notice!	65 µm (0.065 mm) (products with X/5 color code, 100-13, 100-14, 100-266)	
	Adhesive type	solvent acrylic, pressure-sensitive	
	Adhesive appearance	clear	
	Liner	Kraft paper	
	Notice!	weight of Kraft paper is 120 g/m².	
	Adhesion	25 N/25 mm	FTM 1: 180° peel, substrate: glass; cond: 24 h 23°C/50%RH
	Application method	wet or dry	
	Applied shrinkage	< 0.15 mm	FTM 14
	Application temperature (minimum air and substrate)	+4°C	for flat surfaces
		+10°C	for curved to corrugated surfaces, with and without rivets
	Service temperature (after application)	-40°C to +110°C	(not for extended periods of time at the extremes)
	Surface type	flat to curved, incl. rivets	
	Substrate type	aluminum, glass, PMMA, PC*, ABS, paint**	
		The application of film onto glass can cause glass break by uneven heat absorption through sun exposure. 3M does not accept liability for glass breakage.	
		* Polycarbonate substrates may require oven drying before use due to the outgassing of moisture from the polycarbonate causing the film to bubble. Refer to the manufacturer's instructions.	
		** Check adhesion to powder-coated or water-based paints.	
		Some composites and plastics tend to outgas. Test composites and plastics prior to application.	

Graphic removal Removable with heat and/or chemicals from supported substrates.  
No liability is given for ease or speed of removal of any graphic. Pay attention to adequate air and substrate temperature.

The values above are the results of illustrative lab test measurements and shall not be considered as a commitment from 3M.

**Storage** Shelf life The shelf life is never more than 3 years from the date of manufacture on the original box. If you process the film, the shelf life is changed to 1 year from the processing date, but not later than the 3-year maximum from the manufacturing date.

Storage conditions +4°C to +40°C, out of sunlight, original container in clean and dry area.

The shelf life as defined above remains an indicative and maximum data, subject to many external and non-controllable factors. It may never be interpreted as warranty.

**Flammability** Flammability standards are different from country to country. Ask your local 3M contact for details, please.

## Durability

The durabilities mentioned in the table below are the results of illustrative lab tests. The values show the best performance expected from these products, provided that the film will be processed and applied professionally according to 3M's recommendations.

The durability statements do not constitute warranties of quality, life and characteristics.

The durability of products is also influenced by:

- the type of substrate and thorough preparation of the surface (with 3M™ Surface Preparation System)
- application procedures
- environmental factors
- the method and the frequency of cleaning

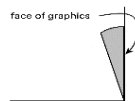
Unprocessed film The following durability data are given for unprocessed film only!

Climatic zones Graphic durability is largely determined by the climate and the angle of exposure. Find below a table showing the durability of a product according to the angle of exposure and the geographical location of the application.

- Zone 1 Northern Europe, Italy (north of Rome), Russia
- Zone 2 Mediterranean area without North Africa, South Africa
- Zone 3 Gulf area, Africa

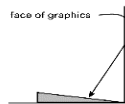
Exposure types

Vertical:



The face of the graphic is  $\pm 10^\circ$  from vertical.

Horizontal:



The face of the graphic is  $\pm 5^\circ$  from horizontal.

Interior: Interior means an application inside a building without direct exposure to sunlight.

### Vertical outdoor exposure

	Zone 1	Zone 2	Zone 3
white/black	12 years	10 years	8 years
colors	10 years	8 years	6 years
transparent	5 years	4 years	3 years
metallics	5 years	2,5 years	2 years

### Horizontal outdoor exposure

	Zone 1	Zone 2	Zone 3
white/black	5 years	4 years	3 years
colors	5 years	4 years	3 years

The following films are suitable for horizontal applications:

white -10, black -12, tomato red -13

Interior application	Zone 1	Zone 2	Zone 3
interior	12 years	12 years	12 years

3M™ Performance Guarantee and MCS™ Warranty

In addition, 3M provides a guarantee/warranty on a finished applied graphic within the framework of 3M™ Performance Guarantee and/or 3M™ MCS™ warranty programs. For detailed graphic construction and application options along with specific Warranty periods, please see the Warranty matrices and Warranty information on [3M Graphic Solutions/Warranties](#). Visit [www.3mgraphics.com](http://www.3mgraphics.com) for getting more details about 3M's comprehensive graphic solutions.

## Limitations of End Uses

3M specifically does not recommend or warrant the following uses, but please contact us to discuss your needs to recommend other products.

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|--|--|
| Graphics applied to                    | <ul style="list-style-type: none"> <li>- flexible substrates incl. 3M™ Envision™ Flexible Substrate FS-1 and 3M™ Panagraphics™ III Wide Width Flexible Substrate.</li> <li>- low surface energy substrates or substrates with low surface energy coating.</li> <li>- other than flat or moderate curved/corrugated surfaces.</li> <li>- painted or unpainted rough wallboards, gypsum boards and wallpapers.</li> <li>- stainless steel.</li> <li>- surfaces that are not clean and more than moderate textured.</li> <li>- surfaces with poor paint to substrate adhesion.</li> </ul>   |
| Graphic removal from                   | <ul style="list-style-type: none"> <li>- signs or existing graphics that must remain intact.</li> </ul>  |
| Graphics subjected to Important Notice | <ul style="list-style-type: none"> <li>- gasoline vapors or spills.</li> <li>- 3M Commercial Solutions products are not tested against automotive manufacturer specifications!</li> <li>- Non vertical applications will have a significant decrease in durability!</li> <li>- Thermoforming of applied film is not recommended!</li> <li>- 3M accepts no liability for glass breakage when using this film for window graphics.</li> <li>- To avoid color variations all pieces of applied film of one colored area should be processed out of one lot of material.</li> <li>- The color appearance of metallic film is dependent on the viewing angle to the product! Therefore the job design should be done that all parts of metallic film are applied the same orientation.</li> </ul> |

## Graphics Manufacturing Converting Information

Flat, or rolled film side out on 130 mm (5 inch) or larger core. These methods help to prevent the liner from wrinkling or application tape, if used, from popping off.

Based upon cutting evaluations the minimum height for text is 10 mm using upper and lowercase Helvetica Medium. The stroke width should not be lower than 1 mm.

**Electronic Cutting** The variable characteristics of electronically controlled cutting equipment require users to verify their specific requirements.

**Sharpness of knife blade** Dull blades impart a serrated look to the edge of the cut film.

**Weight of knife blade** The ideal weight slightly scores the liner. Too little weight does not cut completely through the film and the adhesive. Excessive weight cuts the liner and causes the blade to drag, accelerating wear and creating a serrated cut edge on the film.

**Weeding** The excess film should be weed (removed) as soon after cutting as practical. This is to minimize the effect of possible adhesive flow.

**Temperature and relative humidity** Temperature and relative humidity are minor considerations, but avoid extreme or rapid fluctuating conditions.

**Roll storage** Store the film in the same environment as the cutting equipment.

**Further information** For more details refer to our instruction bulletin 4.1 'Sheeting, Scoring, Film Cutting', please.

[>Instruction Bulletin 4.1'Sheeting, Scoring, Film cutting'<](#)

## Application

See product bulletin ATR 'application tape recommendations' for information about selection and use of suitable application tapes for this product, please.

[> Product Bulletin Application Tape Recommendations <](#)

Refer to Instruction Bulletin 5.1 'select and prepare substrates for graphic application', for general application information.

[>Instruction Bulletin 5.1 'select and prepare substrates for graphic application'<](#)

Check material on color consistency before application. Color deviations of different lots or from different manufacturing sites cannot be excluded.

## Maintenance and Cleaning

Use a cleaner designed for high-quality painted surfaces. The cleaner must be wet, non-abrasive, without strong solvents, and have a pH value between 3 and 11 (neither strongly acidic nor strongly alkaline).

Refer to Instruction Bulletin 6.5 'storage, handling, maintenance and removal of films and sheetings', for general maintenance and cleaning information.

[>Instruction Bulletin 6.5 'Storage, Handling, Maintenance and Removal of Films and Sheetings'<](#)

## Important Safety Remark

### Application to glass

The application of colored or printed film onto glass with sunlight exposure can lead to glass breakage through thermal expansion of the glass. The local conditions must be examined for the danger of glass break by uneven heat absorption through sun exposure. Type of glass (insulation glass, float glass, LSG, toughened safety glass, semi-tempered glass, etc.), glass dimension, joint condition, flexibility of the sealant, quality of the edge finishing, geographical orientation and partial shadow during sun exposure are the determining factors. Light color designs and application on the outside of the window are to be preferred. A free non-applied framework of 4 mm around the entire window front can help to dissipate the absorbed warmth. According to common knowledge a thermal crack can occur at temperature differences of approx. 130°C (toughened safety glass), approx. 40°C (float glass) or approx. 110°C (semi-tempered glass). Coldest place is usually under the framework in the embedded joined window part, the warmest place is typically on the darkest place in the format. Because of the many above mentioned factors, glass breakage cannot be fully predicted, therefore 3M does not accept liability for glass breakage when using this film for window graphics.

## Remarks

This bulletin provides technical information only.

### Important notice

All questions of warranty and liability relating to this product are governed by the terms and conditions of the sale, subject, where applicable, to the prevailing law.

Before using, the user must determine the suitability of the product for its required or intended use, and the user assumes all risk and liability whatsoever in connection therewith.

As outdoor graphics age, natural weathering occurs causing a gradual reduction in gloss, slight color changes, some lifting of the graphic at the edges or around rivets, and ultimately a minor amount of cracking.

These changes are not evidence of product failure and are not covered by a 3M warranty.

### Additional information

Visit the web site of your local subsidiary at [www.3Mgraphics.com](http://www.3Mgraphics.com) for getting:

- more details about 3M™ MCS™ Warranty and 3M™ Performance Guarantee
- additional instruction bulletins
- a complete product overview about materials 3M is offering

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