

**Commercial Solutions Division**

# 3M™ Scotchcal™ Opaque Graphic Film

## Series 80

### Product Description

These excellent cast films are a range of colored films that have been specially developed to be knife cut on electronic systems. The film range is available in 84 colors including 8 metallic tones.

3M™ Scotchcal™ Opaque Graphic Film Series 80 have good conformability for application on flat or moderate curved surfaces, with or without rivets.

They are excellent for easy cutting of small letters or complex graphics.

Product Line	Electrocut	80-X	X = color code, opaque, glossy (and few matte), permanent adhesive.
	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)	
Adhesive type	solvent acrylic, pressure-sensitive	
Adhesive appearance	clear	
Liner	glassine paper	
Adhesion	20 N/25 mm	FTM 1: 180° peel, substrate: glass; cond: 24 h 23°C/50%RH
Application method	wet or dry	
Applied shrinkage	< 0.2 mm	FTM 14
Application temperature (minimum air and substrate)	+8°C	for flat surfaces
	+10°C	for curved to corrugated surfaces, with and without rivets
Service temperature (after application)	-40°C to +95°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	
	* Polycarbonate substrates may require oven drying before use due to outgassing of moisture from the polycarbonate causing the film to bubble. Refer to the manufacturers' instructions.	
Graphic removal	Fair to remove 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 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

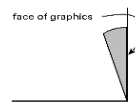
Unprocessed film                      The following durability data are given for unprocessed film only!

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 ±10° from vertical.

Interior:

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

<b>Vertical outdoor exposure</b>	<b>Zone 1</b>	<b>Zone 2</b>	<b>Zone 3</b>
white/black	10 years	8 years	6 years
colors	8 years	6 years	4 years
transparent	5 years	4 years	3 years
metallics	3 years	2 years	1.5 years
<b>Interior application</b>	<b>Zone 1</b>	<b>Zone 2</b>	<b>Zone 3</b>
interior	10 years	10 years	10 years

## 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.

- Graphics applied to
  - flexible substrates incl. 3M™ Envision™ Flexible Substrate FS-1 and 3M™ Panagraphics™ III Wide Width Flexible Substrate.
  - low surface energy substrates or substrates with low surface energy coating.
  - other than flat or moderate curved/corrugated surfaces.
  - painted or unpainted rough wallboards, gypsum boards and wallpapers.
  - stainless steel.
  - surfaces that are not clean and more than moderate textured.
  - surfaces with poor paint to substrate adhesion.
- Graphic removal from
  - signs or existing graphics that must remain intact.
- Graphics subjected to
  - gasoline vapors or spills.
- Important Notice
  - 3M Commercial Solutions products are not tested against automotive manufacturer specifications!
  - Non vertical applications will have a significant decrease in durability!
  - Thermoforming of applied film is not recommended!
  - 3M accepts no liability for glass breakage when using this film for window graphics.
  - 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.

# Graphics Manufacturing

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.

Shipping finished graphics

## Converting Information

Based upon cutting evaluations the minimum height for text is 25 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'<](#)

## 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:

- additional instruction bulletins
- a complete product overview about materials 3M is offering

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