Scotchcal™ ElectroCut™

Film Series 100

Note: This bulletin has been thoroughly revised; therefore black bars have not been used to indicate changes. Please read the entire bulletin thoroughly.

Description

3M™ Scotchcal™ ElectroCut™ Films Series 100 are durable, dimensionally stable, vinyl films that were specifically developed to be knife cut on electronic systems. The product contains the following features.

- Easy cutting of small letters or complex graphics
- Easy weed stripping
- Multi colour graphics ability
- Resistance to humidity and water
- Good lay-flat performance on flat bed plotters
- Special adhesive enables the enduser to apply graphics at +4°C
- Highly flexible films that may be applied on flat or corrugated surfaces with or without rivets and simple curved surfaces
- Film and adhesive can be easily removed even after years, with 3M Scotchcal™ Remover System
- Colourless adhesive which ideally suits them for use on windows or other transparent substrates by presenting the same appearance from both sides.

For the production of attractive emblems, labels, markings and striping for commercial and industrial applications Scotchcal™ Films Series 100 may also be screen printed, die cut or cold/hold kiss cut.

Series 100 Films are not intended for use where markings may be subjected to petrochemical spillage.

Construction

- Film - High gloss 50 m PVC, cadmium-free
- Adhesive - Transparent pressure sensitive acrylic adhesive, permanent
- Liner - White Kraft paper

Effective Performance Life

The warranty for Scotchcal ElectroCut™ Films Series 100 for commercial vehicles as stated herein does not extend to automotive or personal vehicle applications which have to conform to OEM automotive specifications. When applied in accordance with 3M recommended procedures, the following performance may be expected. Performance statements are based upon representative values obtained from testing throughout Europe, however, actual performance will be determined by substrate selection and preparation, exposure conditions and maintenance of the marking. The warranty applies to films that are exposed at a vertical angle (defined as +/-10°). A significant decrease in durability may be experienced if films are exposed other than vertically. Such non-vertical applications must be on a test and approval basis to determine acceptability. 3M does not warrant non-vertical exposures. Effective Performance Life of unprinted Scotchcal™ Films Series 100.

Vertical Exposure

	Northern/ Central Europe	Mediter-ranean Europe	Middle East/ North Africa
White and Black	10 years	8 years	6 years
Colours	8 years	6 years	4 years
Metallics and Transparent	6 years	4 years	2 years
Special Colours	8 years	6 years	4 years

Horizontal applications of markings and stripping can be used on the rooftops of commercially owned vehicles where identification from the air is desired. Horizontal applications are subjected to maximum sunlight and environmental effects. Therefore, colour change, loss of gloss and chalking may occur. The following performance statements are based on the premise that legibility is all that is required.

Only the following films are recommended for horizontal application

- 100-13 tomato red
- 100-15 bright yellow
- 100-12 black
- 100-10 white

Expected durability: 5 years

Fabrication

Cutting with Electronic Systems

Knife adjustment may be required as the product construction may differ from comparable products. The minimum height for text is 10 mm. This is based upon cutting and weeding evaluations using uppercase Helvetica Medium copy. The stroke width should not be lower than 1 mm. Users are encouraged to do their own evaluation for specific heights required for a particular job. The variable characteristics of electronically controlled cutting equipment require users to verify their specific requirements.

Factors that affect cutting quality and capability that the user needs to take into consideration are:

- Sharpness of knife blade (dull blades impart a serrated look to the edge of the cut film)
- Weight on knife blade
  - Ideal weight will result in a slight scoring of the liner
  - Too light a weight will cause incomplete cutting through film and adhesive
  - Excessive weight results in cut liner, the blade dragging (which will accelerate wear) and cause a serrated edge on the film
- Temperature and relative humidity are minor considerations, but extremes in high and low levels, as well as rapid fluctuations are to be avoided.
- Storage of stock film is recommended to be in the same environment as the cutting equipment.

Weeding

It is recommended that Series 100 Films have the excess film weeded (removed) as soon after cutting is practical. This is to minimise the effect of possible adhesive flow 24 or more hours after cutting.

Screen Printing and Clear Coating

Whilst Scotchcal™ Films Series 100 can be screen printed, other products such as the Controltac™ *Plus* series of films, for example, are more suitable for this process. If screen printing is necessary, then 3M™ Screen Printing Ink Series 1900 must be employed. It would be prudent for converters to evaluate the optimum printing and drying conditions for themselves. The 4 colour half tone printing is not recommended or warranted.

Kiss and Die Cutting

The liner of Scotchcal™ ElectroCut™ Films Series 100 is hard and thin. These features provide advantages for cold kiss cutting processes:

- Less cutting pressure
- Extended durability of dies

Die Cutting

Only steel rules which have vertical bevels are recommended. The vertical bevel has to face the graphic and not the side that will be weeded. Shaped bevels bear the risk of tearing the film, especially when several layers are being cut.
Note: The release rubbers glued onto the plywood should not exceed the knife at a minimum of 0.5 mm.

Cold Kiss Cuting

Steel rule dies have to be used for kiss cutting Scotchcal™ Films Series 100. It is recommended that a sheet made out of steel be used as a support during kiss cutting.
Note: The release rubbers glued onto the plywood should not exceed the knife at a minimum of 0.5 mm.

Hot Kiss Cutting

Etched zinc or magnesium as well as steel rule dies can be used for hot kiss cutting of Scotchcal™ Films Series 100.

Hot Stamping

Films may be hot stamped using material available from several suppliers. Assurance of performance must be obtained from the foil manufacturer.

Premasking

SCPS-100 is recommended for premasking large graphics of areas 0.5 m² and over.

Prespacing

SCPS-2 is recommended for prespacing small and medium size graphics up to 0.5 m².

Preparation of Substrates

Specific information: Instruction Bulletin 5.1 and 5.2.

Application of Markings

Damp weather conditions and high humidity do not influence Scotchcal™ Films Series 100 outdoor applications significantly. Provided minimum application temperature is achieved, graphics may be applied outdoors even in severe conditions.

Specific information: Instruction Bulletin 5.5

Chemical and Physical Properties

Values given are typical and are not for use in specifications. If a custom specification is desired, a request should be submitted through your sales representative. The data given below is for unprinted film

Physical Properties

Property	Metric Units
Thickness (Film + Adhesive) (ISO 4593)	0.07 mm - 0.10 mm
Elongation (ISO 1184-1983)	> 50%
Dimensional Stability (FTM 14)	> 0.4 mm
Temperature Range	-40°C to +95°C
Reverse impact Resistance at 23°C at 4°C	 No effect No effect

Adhesion (FTM1)

Substrate	Metric Units (N/25 mm)
Etched Aluminium	> 25
Anodised Aluminium	> 25
Stainless Steel	> 25
Chrome Plating	> 25
ABS	20 – 25
Acrylic Enamel	20 – 25
Urethane Paints	17 – 20
Glass	> 25

Note: ISO refers to standards of the International Standards Organisation. FTM (Finat Test Methods) refers to test methods listed by Finat, the Association of European Tape Manufacturers

Chemical Resistance

- Resists mild acids, alkalis and salts
- Excellent water resistant

These films are not intended for use nor warranted where they are subject to spillage of petroleum products.

Shelf Life, Storage and Shipping

The fabricator may store unprinted film for a period of up to two years. Film markings applied with SCPS-100 or SCPS-2 may be stored up to one year but should not exceed the total two years' storage time. Film and markings must be stored in a clean area, free from excessive moisture and direct sunlight, with ambient temperatures of 35°C of less.

Removal

Scotchcal™ Films Series 100 is removable with 3M™ Graphic Remover System.

The Bosch steam remover PTL1 can be used..

Important Notice

This bulletin provides technical information only. 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.

3M Related Literature

Listed below is related 3M technical literature that may be of interest.

Subject	Bulletin No.
Instruction Bulletins	
Design of Markings	2.1
Premasking and Prespacing	4.3
Surface Preparation Non-vehicular Vehicular	 5.1 5.2
Application	5.5
Storage, Maintenance and Removal	6.5
Warranty of Products	-

For Further Assistance

For help on specific questions relating to Scotchcal™ ElectroCut™ Film Series 100, or any other Commercial Graphics Division products, contact your local Technical Service representative or

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