

3M™ Scotchcal™ Graphic Film Series 3650

Product Description

Scotchcal Graphic Marking Film Series 3650 are durable, dimensionally stable, glossy vinyl films intended for the production of attractive emblems, labels, markings, striping and signs for commercial and industrial applications which will withstand severe weather and handling conditions as well as occasional spills of petroleum products. These films are intended for use on flat surfaces with and without rivets

Key Features

- Suitable for screen printing
- Pigmented pressure sensitive adhesive on white and black films
- Resistant to occasional petrol spillage
- Up to 8 years warranty
- Meets Building Regulation Class 0

Applications and Uses

Film series 3650 is intended for making durable graphics. When used with the listed **Compatible Products** the graphics are covered by the 3M™ MCS™ Warranty.

Limitations of End Uses

Specifically, we do not warrant this film for the following:

- Application to corrugated surfaces
- Compound contours. For these surfaces please use 3M™ Controltac Plus Graphic Film IJ380, specially developed for highly irregular surfaces
- Graphics made for automotive Original Equipment Manufacturers (OEM). Please contact 3M Automotive Division

Product Line

Product Number	Colour
3650B	White
3655B	Black
3669D	Transparent

Custom colour matching is available on this product*:

* Contact the 3M Sales Office for lead times for colour matched material.

Compatible Products

Screen Print Applications

- 3M™ Screen Printing Ink Series 1900 (line colour and 4-colour)
- 3M™ Screen Printing UV Ink Series 9800 (line colour and 4-colour)
- 3M™ Screen Print Clear Coats

All Applications

- Selected 3M application tapes

Main Characteristics

Property	Description
Film Type	0.05 mm opaque vinyl
Adhesive type	Permanent pressure sensitive
Adhesive color	3650/3655 – grey pigmented 3669 – clear
Thickness (film plus adhesive)	0.08 to 0.10 mm
Liner	Premium Performance Liner 150g/m ²
Suitable application surface	Flat with and without rivets, simple curves.
Suitable application substrates	ABS resins, aluminum, chrome, glass fiberglass-reinforced plastic, paint (check adhesion to powder or water-base paints)
Minimum application temperature *	16°C

**For applications nearing the minimum temperature range, please contact your local technical service representative to confirm suitability of application*

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 (ISO 4593)	0.08 to 0.10 mm
Tensile Strength (ISO 1184-1983)	22 N/25mm min at 23°C
Elongation (ISO 1184-1983)	50% at 23°C
Dimensional Stability (FTM 14)	0.4mm
Temperature Range	-60°C to +107°C
Reverse impact Resistance at 23°C	No effect

Adhesion (FTM1)

Substrate	Metric Units (N/25mm)
Etched Aluminium	27
Anodised Aluminium	27
Chrome	22
Acrylic Enamel	18
ABS	18
Fruehauf Prepainted Panels	18

These adhesion values are 24 hours after application.

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

Flammability

Meets Building Regulation Class 0

Warranty

Only a Scotchprint® Graphics Authorised Manufacturer or 3M™ MCS™ Qualified Manufacturer can produce 3M™ MCS™ Warranted Graphics. The warranty period is based on field experience and exposure tests. When the graphics are processed and used according to the 3M recommendations, they should have the performance life shown in the table below. The actual performance depends on the:

- Correct combination of film and ink
- Ink formulation
- Drying methods
- Selection and preparation of the substrate
- Application methods
- Exposure conditions
- Cleaning methods

Warranted Durability

Colour	Ink Series	Protective Clears	Fleet			Exterior Sign 1st Surface			Interior		
			1	2	3	1	2	3	1	2	3
White/ Black	Unprinted	-	8	6	4	8	6	4	10	10	10
Colours	Unprinted	-	7	5	3	7	5	3	10	10	10
Transparent	Unprinted	-	5	3	2	5	3	2	8	8	8
White/ Black	1900/ 9800	1920/ 9720	8	5	4	8	5	4	10	10	10
White/ Black	1900/ 9800	9800CL	6	4	3	6	4	3	10	10	10
White/ Black	1900	1955abc	7	5	3	7	5	3	-	-	-
Colours	1900/9800	1920/1955abc 9720	7	5	3	7	5	3	10	10	10
Colours	1900/9800	9800CL	6	4	3	6	4	3	10	10	10
Transparent	1900/ 9800	1920/1955abc 9720/9800CL	5	3	2	5	3	2	8	8	8

1. Unprinted white film 3M™ Scotchcal™ Graphic Film Series 3650B has a tendency to chalk upon exterior exposure. Film intended for use on signs where cleaning is not practical must be clear coated with 3M™ Scotchcal™ Gloss Overprint Clear 1920 or 3M™ Scotchcal™ Gloss Overprint Clear 9720.
2. Metallic inks have a maximum warranty of 5 years in Zone 1.
3. 3M™ Scotchcal™ Matte Overprint Clear 1930 and 3M™ Scotchcal™ Overprint Clear 9730 (Low-Gloss) are warranted for a maximum of 3 years in Zone 1.
4. Horizontal applications can be used on the rooftops of vehicles where identification from the air is needed. Horizontal applications are subjected to the maximum sunlight and environmental conditions. The graphic will change colour, lose gloss, and chalk.

Zone 1: Northern and Central Europe

Austria, Baltic States, Belgium, Bosnia, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greenland, Hungary, Iceland, Ireland, Italy (North of Rome), Liechtenstein, Luxembourg, Netherlands, Norway, Poland, Romania, Serbia, Slovakia, Slovenia, Sweden, Switzerland, UK

Zone 2: Mediterranean Europe

Albania, Bulgaria, Corsica, Crete, Greece, Italy (South of Rome), Macedonia, Malta, Portugal, Russia, Sardinia, Spain, Turkey

Zone 3: Middle East and Africa

Afghanistan, Bahrain, Cyprus, Dubai, Israel, Kuwait, Iran, Iraq, Jordan, Lebanon, Oman, Pakistan, Qatar, Saudi Arabia, Syria, UAE, Yemen, Algeria, Angola, Benin, Botswana, Burkina, Burundi, Cameroon, CAR, Chad, Congo, Djibouti, Egypt, Eritrea, Gabon, Ghana, Guinea, Ivory Coast, Libya, Liberia, Madagascar, Mali, Mauritania, Morocco, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somali Republic, South Africa, Sudan, Togo, Tunisia, Uganda, Zaire, Zambia, Zimbabwe

Fabrication

This bulletin does not contain detailed printing, processing or application procedures for the subject products. The appropriate Instruction Bulletin(s) may be obtained by contacting your 3M sales representative or 3M Technical Service.

Cutting

The following are common cutting methods for this film. See Instruction Bulletin 4.1 for details.

Bandsawing	Guillotine
Hot kiss cutting	Hand cut
Drum-type electronic cutting	Cold and hot steel-rule die cutting
Flat-bed electronic cutting	

The following minimum values for cutting text from film series 3650 are based on upper case Helvetica medium type. Weeding is much more difficult with smaller text.

Minimum stroke width:	6.35 mm
Minimum height:	76.2 mm
Minimum radius for end of stripe:	3.18 mm

Premasking/Prespacing

The type of application tape to use depends on the type of graphic produced and the ink or overprint clear that was applied last. See Instruction Bulletin 4.3 for details.

- Use a prespacing tape if the graphic has large amounts of the liner exposed.
- Use a premasking tape if very little of the liner is exposed.

Overprint Clear	Prespacing Tape	Premasking Tape
Unprinted	SCPS-100	SCPM-19
1920 1930 1955abc	SCPS-100 SCPS-2	SCPS-100
9720UV 9730UV 9800CL	SCPS-44X	SCPM-44X

Application

Refer to the Instruction Bulletin 5.4 and 5.5 for application details.

The following application details are for film series 3650.

Temperature

The minimum application temperature for film series 3650 is 16°C for flat and riveted surfaces.

Positioning

This film has a pressure sensitive adhesive. On vehicles, do not use detergent and water or a commercial application liquid to position the graphic on vehicles.

Finishing

If an application requires edge sealing, use edge sealer 3950.

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).

Removal

3M™ Scotchcal™ Graphic Film Series 3650 can be removed using procedures recommended in Instruction Bulletin 6.5.

Shelf Life

The shelf life of the film is 2 years and should be applied within 2 years of the receipt of film if unprocessed. Processed film should be applied within 1 year of processing and within 2 years of receipt of the film.

Related 3M Literature

Listed below is related 3M Technical Literature which may be of interest:

Subject	Product Bulletin	Instruction Bulletin
Design of Markings		2.1
3M™ Screen Printing Ink Series 1900	1900	3.11, 3.12
3M™ Screen Printing Ink Series 9700UV	9700	3.4
3M™ Screen Printing UV Ink Series 9800	9800	3.20, 3.21
Scoring and Cutting		4.1
Premasking and Prespacing		4.3
Surface Preparation		5.1
Application		5.4, 5.5
Storage, Maintenance and Removal		6.5

Glossary of Terms

Matched Component System™ or MCS™

The system pursuant to which Finished Graphics are produced by a Graphic Manufacturer using only 3M Products and components and manufactured in accordance with 3M's Product or Instruction Bulletins, 3M Specification Document and using 3M Approved Technologies.

Permanent Adhesive

Films with a permanent adhesive can be difficult to remove and will often require heat and/or chemicals for effective removal.

Health & Safety

Refer to the package label and the Material Safety Data Sheet for health, safety, and handling information on the products referenced in this bulletin. For 3M products, if necessary, you may contact our Toxicology/Product Responsibility Department on 01344 858000.

Important Notice to Purchaser

The 3M products described in this publication are covered by a 3M warranty and limitation of liability.

3M's warranty provides that if 3M finds that goods are defective in material or workmanship they will be replaced or the price refunded at 3M's option but note that 3M does not accept liability for other direct losses (except for personal injury or death) or consequential losses relating to defective products or from information supplied by 3M.

Purchasers and users of 3M products, and not 3M supplying companies, are always solely responsible for deciding on the suitability of the 3M product for their required or intended use.

Technical Assistance

For help on specific questions relating to 3M Commercial Graphics Division Products, contact your local Technical Service Representative.

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Bulletin Change Summary

3M™ Screen Printing Ink Series 9700UV replaced with 3M™ Screen Printing UV Ink Series 9800. Warranty table updated.