



Static Dissipative 2705 Clear Polycarbonate Carrier

Technical Data – September, 1999

Product Description

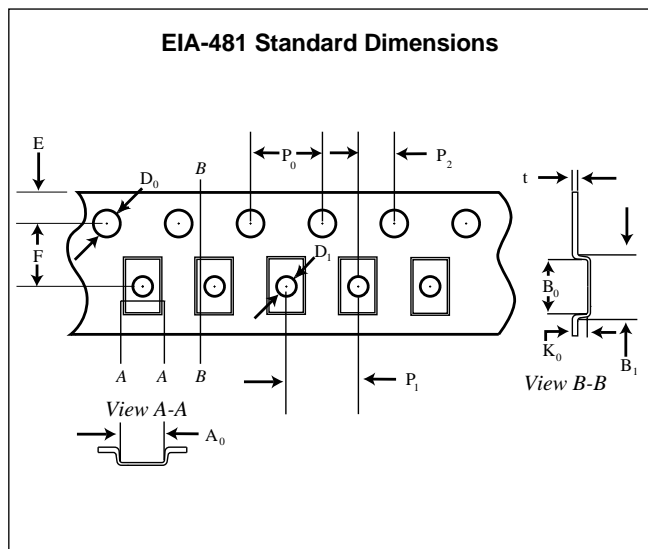
3M™ Static Dissipative 2705 Clear Polycarbonate Carrier used in conjunction with a suitable cover tape such as 3M Static Dissipative 2675 Heat Activated Cover Tape or 3M Conductive 2666 Pressure-Sensitive Cover Tape, serves as a reliable and convenient means of helping protect and transport electrical and electronic devices, and precisely delivering them to the assembly point. 2705 Clear Polycarbonate Carrier is a continuous, splice-free, static dissipative carrier tape with precisely formed pockets to ensure component fit to ANSI/EIA guidelines for standard or high precision carrier tape. 2705 Clear Polycarbonate Carriers are available in a broad selection of pocket designs with dimensions to accommodate a variety of common electrical and electronic parts. Customized 2705 Clear Polycarbonate Carrier with dimensions specific to your requirements is also available upon request.

Construction

Embossed, static dissipative, heat-resistant, clear polycarbonate film.

Dimensional Properties

2705 Clear Polycarbonate Carrier meets the ANSI/EIA-481 Standards for the dimensions illustrated below.

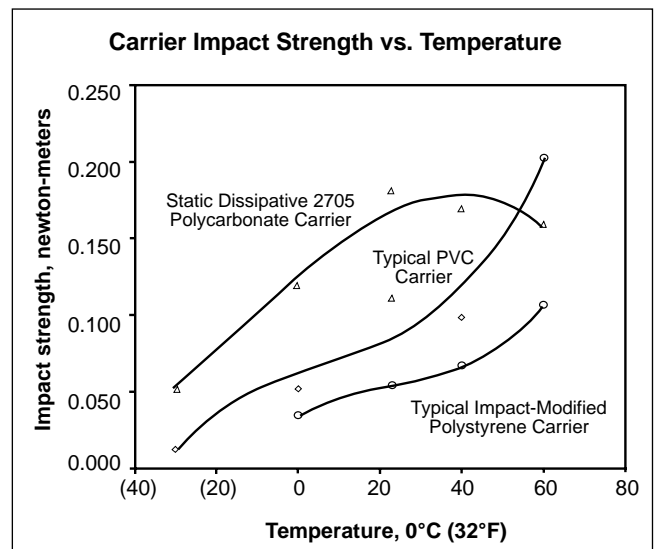


Product Format

2705 Clear Polycarbonate Carrier is available as continuous, splice-free, 8mm and 12mm tapes on 560mm diameter cardboard supply reels in level-wound format. Reel capacity can be up to 2,000 meters, depending upon the pocket depth, pitch, and carrier width. 2705 is also available in 16 mm through 44 mm widths.

Typical Mechanical Properties – Impact Strength

In practical use, many polymers exhibit poor impact and crack resistance at low temperature, and may prove inappropriate for use in carrier tape exposed to such temperatures during shipping. 2705 Clear Polycarbonate Carrier's tough polymer construction provides excellent resistance to cracking at temperatures where other typical carriers may fail. The following graph depicts the modified IZOD impact strength of SO-14 carriers tested at several temperatures. The impact-modified polystyrene carrier sample was too brittle to test below 0°C (32°F) in this study.



Note: The technical information and data presented here should be considered representative or typical only, and should not be used for specification purposes.

Typical Mechanical Properties – Shrinkage

Unlike polyvinyl chloride and polystyrene carrier tapes, which typically shrink in excess of 0.5% after 24 hours of exposure to 60°C (140°F), 2705 Polycarbonate Carrier exhibits shrinkage of less than 0.1%, even after 24 hours exposure at 85°C (185°F). This compares favorably to the EIA-481 standard which stipulates that the P₀-10, or ten-pitch tolerance, maintain a dimension of 40.0mm ± 0.2mm – an implied tolerance of ±0.5%. Carrier shrinkage can result in problems with feeding, pocket position, and, in the case of the pocket dimensions, parts sticking in the pockets. The extent of shrinkage in cold-formed polyvinyl chloride or polystyrene carrier pockets is rapidly accelerated by exposure to elevated temperature, and will depend upon the duration of exposure and the maximum temperature reached. Exposure of these other carriers to as little as 24 hours at 50°C (122°F) can cause shrinkage in such carriers to exceed the implied EIA-481 dimensional tolerance.

Embossed Carrier Shrinkage after 24 Hours

Temperature	3M 2705 Carrier	Typical PVC	Typical Polystyrene
60°C (140°F) , 85%RH	<0.1%	≥1.0%	≤0.5%
85°C (185°F)	<0.1%	>1.0%	>0.5%

Camber

3M™ Static Dissipative 2705 Clear Polycarbonate Carrier in a planetary format meets the EIA-481 Standard for camber: not greater than 1mm in 250 lineal millimeters. For 8mm and 12mm carriers in the level-wound format, camber will be not greater than 2mm in 250 lineal millimeters.

Storage Conditions

2705 Clear Polycarbonate Carrier should be stored indoors, in its original packaging, in a controlled climate environment, typically at or below 35°C (95°F) and 70% relative humidity. Storage conditions should not exceed 85°C (185°F) for prolonged periods and the product must be protected from exposure to direct sunlight. Exposure to elevated humidity reduces the compressive strength of corrugated, cardboard containers. The recommended stacking height must be followed to avoid damaging the packaged product. It is recommended that the product be used on a “first-in, first-out” basis.

Shelf Life

It is recommended that 2705 Clear Polycarbonate Carrier be used within 5 years from the date of manufacture when stored according to the recommended storage conditions.

Static Dissipative 2705 Clear Polycarbonate Carrier

Description	Units	Typical Performance	Test Notes	Test Method	
Material Properties	Type Max, Usable Temperature	°C (°F)	Polycarbonate 125 (257)	1	
Physical Properties	Tensile Strength (Yield)	MPa (Kpsi)	63 (9.1)	2	ATSM D 638
	Tensile Strength (Break)	MPa (Kpsi)	72 (10.5)	2	ATSM D 638
	Impact Strength	Nm (F-lb/in)	>.15 (1.32)	3	ATSM D 256
	Shrink	%	<0.1	4	ASTM D 955
	Camber	mm (in)	<1.0 (0.39)	5	EIA 481
	Optical	%	<75	6	ASTM D 1003
Electrical Properties	Resistivity	Ohms/sq	1.0E10 ⁰	7	ASTM D 257
	Static Decay	Seconds	0.01	7	FTMS 101B, Method 4046
Chemical Properties	Extractable Ionics (Cl ⁻ , NO ₃ ⁻ , SO ₄ ⁻ , Na ⁺ , K ⁺ , Ca ⁺⁺)	ppm	<50 Cl: Only <5 all others	8	MIL STD 883E
	Flammability Rating	UL94	HB	9	UL94
Product Format	Reel Type	Material	Reinforced Cardboard		
	Reel Hub Inside Diameter	mm (in)	76.2 (3.0)		
	Pockets Per Reel	Count	Varies per pitch		
	Length	m (f)	Varies per Ko		

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Test Notes:

1. Engineering grade resin.
2. Tensile tests are conducted at 21°C (70°F), 50% RH under controlled conditions with a constant rate of jaw separation of 100mm/minute from an initial separation of 126mm. Yield strength is the force which produces 5% elongation of the sample. Breaking strength is the ultimate strength for the material at the break point.
3. Impact strength testing utilizes a mandrel to hold a section of the material under test. A weight is allowed to strike the material from a known radius and after the strike the swing is measured vs free swing and the strength of the material is calculated from the difference.
4. Shrink is measured at 60°C (140°F)/85% RH as well as the 85°C (185°F) after 24 hours exposure and expressed in percentage of the initial measurement.
5. Camber is a measurement of the weave of the material. Measured over a 250mm length.
6. Optical properties are measured using a spectrophotometer and measuring wavelengths from 450 to 800nm. Material is considered opaque if light transmission is less than 1%.
7. Resistivity tests are conducted at 21°C (70°F), 50% RH under controlled conditions. Resistivity is measured in the bottom of the pocket of the carrier using the defined test method. Specification tolerances for this carrier is $10^8 \leq R_s \leq 5 \times 10^{11}$. Static decay is measured with an Electrotech Systems Static Decay Meter Model 406-C, using Federal Test Method Standard 101B, Method 4046.
8. Chemical extraction is measured using 20-hour water extraction test as defined in the test method MIL STD 883C, test method 5011. Resultant solutions are measured using chromatography.
9. Flammability rating is defined within the UL94 test method from Underwriters Laboratories. Thickness tested was 1.57mm. Flammability results are based on small-scale laboratory tests for comparison purposes only and do not necessarily represent the hazard presented by this or any other material under actual fire conditions.

Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-666-8273. Address correspondence to: 3M Electronic Handling & Protection Division, 6801 River Place Blvd., Austin, TX 78726-9000. Our fax number is 1-800-826-8893.

Important Notice

Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use.

Warranty; Limited Remedy; Limited Liability.

This product will be free from defects in material and manufacture as of the date of purchase. 3M MAKES NO OTHER WARRANTIES

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