Conductive Polycarbonate Carrier 3000

Technical Data – December, 2004

Product Description

3M™ Conductive Polycarbonate Carrier 3000, used in conjunction with a suitable 3M cover tape, serves as a reliable and convenient means of helping protect and transport electrostatically-sensitive electrical and electronic devices, and precisely delivering them to the assembly point. 3M Polycarbonate Carrier 3000 is a continuous, splice free, conductive polycarbonate carrier with precisely formed pockets to ensure component fit to ANSI/EIA standards. Polycarbonate Carriers 3000 are available in a broad selection of pocket designs with dimensions to accommodate a variety of common electrical and electronic parts. Customized Polycarbonate Carrier 3000, including those for connectors, with dimensions specific to your requirements, is also available upon request.

Construction

Embossed, conductive, heat-resistant, polycarbonate film.

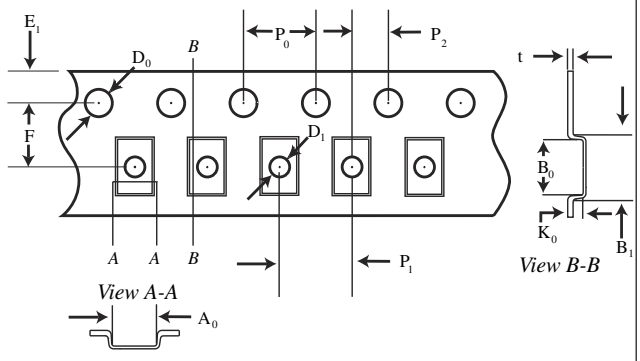
Dimensional Properties

Polycarbonate Carrier 3000 meets the ANSI/EIA-481-C Standard for the dimensions illustrated below.

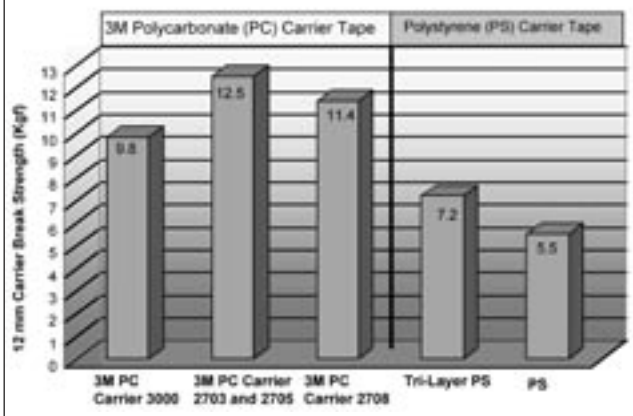
Product Format

Polycarbonate Carrier 3000 is available as continuous, splice-free, 8 mm through 120 mm carrier on recyclable 560 mm diameter cardboard supply reels in planetary wound format. Most 8 mm through 24 mm carriers are also available in a level-wound format, utilizing up to a 3" wide core. Reel capacity will typically be from 30 to 1,000 meters, depending upon the pocket depth, pitch and winding format.

EIA-481-C Standard Dimensions



Typical Carrier Tape Break Strength



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 many polyvinyl chloride and polystyrene carrier tapes, which typically shrink in excess of 0.5% after 24 hours of exposure to 60°C (140°F), 3M™ Polycarbonate Carrier 3000 exhibits shrinkage of less than 0.1%, even after 24 hours exposure at 85°C (185°F). This compares favorably to the EIA-481-C standard which stipulates that the P_0-10, or ten-pitch tolerance, maintain a dimension of 40.0 mm ± 0.2 mm, 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 can be rapidly accelerated by exposure to elevated temperature, and will depend upon the duration of exposure and the maximum temperature reached. Exposure of many 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-C dimensional tolerance.

Carrier Shrinkage after 24 Hours

Temperature	3M Carrier 3000	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%

Electrical Properties

The electrical and triboelectric properties of Polycarbonate Carrier 3000 have been engineered to help provide protection of static-sensitive components through an effective balance between the electrostatic shielding and electrostatic decay properties of the carrier. Polycarbonate Carrier 3000 is electrically conductive, exhibiting a nominal surface resistivity in the pocket of $\geq 10^4 \Omega$/square and $\leq 10^8$ Ω/square. Polycarbonate Carrier 3000 also exhibits desirable triboelectric properties which may be appropriate for packaging electrostatically-sensitive components.

Camber

Polycarbonate Carrier 3000 in a planetary format meets the EIA-481-C Standard for camber: not greater than 1 mm in 250 lineal millimeters. For 8 mm through 24 mm carriers in the level-wound format, camber will be not greater than 2 mm in 250 lineal millimeters.

Storage Conditions

It is recommended that Polycarbonate Carrier 3000 be stored indoors, in its original packaging, in a controlled climate environment, typically at or below 35°C (95°F) and 70% relative humidity. 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 Polycarbonate Carrier 3000 be used within five years from the date of manufacture when stored according to the recommended storage conditions.

Recyclability

Polycarbonate Carrier 3000 is a carbon-filled thermoplastic polymer film which can be recycled after use.

Cover Tape Recommendations

3M™ Heat Activated Adhesive 2675 or 3M™ Pressure Sensitive Adhesive Cover Tapes 2666 and 2668 and 3M™ Static Dissipative Pressure Sensitive Cover Tape 2684 are recommended for use with Polycarbonate Carrier 3000.

3M™ Conductive Polycarbonate Carrier 3000

Description		Units	Typical Performance	Test Notes	Test Method
Material Properties	Type		Polycarbonate	1	
	Max, Usable Temperature	°C (°F)	125 (257)		
Physical Properties	Tensile Strength (Yield)	MPa (Kpsi)	63 (9.1)	2	ASTM-D638
	Tensile Strength (Break)	MPa (Kpsi)	72 (10.5)	2	ASTM-D638
	Impact Strength	Nm (F-lb/in)	>.15 (1.32)	3	ASTM-D256
	Shrink	%	<0.1	4	ASTM-D955
	Camber (planetary format)	mm (in)	<1.0 (0.039)	5	EIA 481-C
	Optical	%	Opaque	6	ASTM-D1003
Electrical Properties	Resistivity	Ohms/sq	$5.0E10^{5}$	7	ASTM-D257
	Static Decay	Seconds	0.01	7	FTMS 101B, method 4046
Chemical Properties	Extractable Ionics (Cl^-, NO_3^-, $SO_4^=$, Na^+, K^+, Ca^{++})	ppm	<5	8	MIL STD 883E
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 100 mm/minute from an initial separation of 126 mm. 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 at 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 250 mm length.
6. Optical properties are measured using a spectrophotometer and measuring wavelengths from 450 to 800 mm. 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 at the sealing surface of a typical carrier using the defined test method. Specification tolerances for this carrier is $10^4 \leq Rs \leq 10^8$. Static decay is measured with an Electrotech Systems Static Decay Meter Model 406-C, according to Federal Test Method Standard 101, method 4046.
8. Chemical extraction is measured using 20-hour water extraction test as defined in the test method MIL STD 883E, test method 5011. Resultant solutions are measured using chromatography.

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Electronic Solutions Division
6801 River Place Blvd.
Austin, TX 78726-9000
800/MMM TAPE (800/666 8273)
FAX 800/826 8893
www.3M.com/esd

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