



# Non-Conductive Polycarbonate Carrier 2703

Technical Data – December, 2004

## Product Description

3M™ Non-Conductive Polycarbonate Carrier 2703, used in conjunction with a suitable 3M 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. 3M Polycarbonate Carrier 2703 is a continuous, splice free, non-conductive carrier tape with precisely formed pockets to ensure component fit to ANSI/EIA guidelines. Polycarbonate Carrier 2703 is available in a broad selection of pocket designs with dimensions to accommodate a variety of common electrical and electronic parts. Customized Polycarbonate Carrier 2703, with dimensions specific to your requirements, is also available upon request.

## Construction

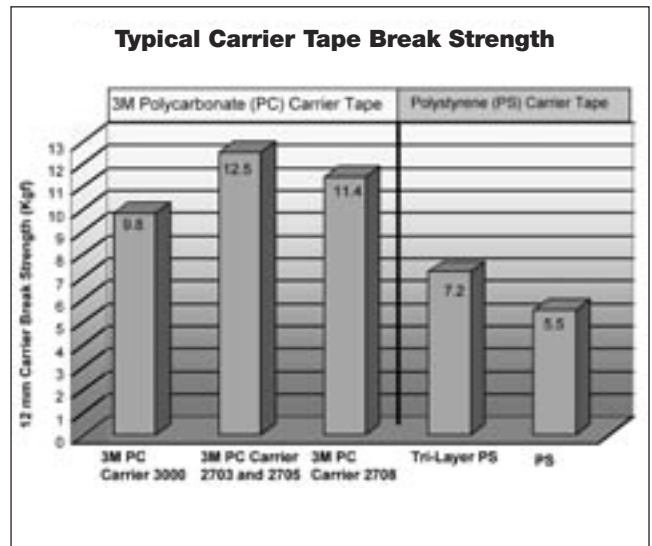
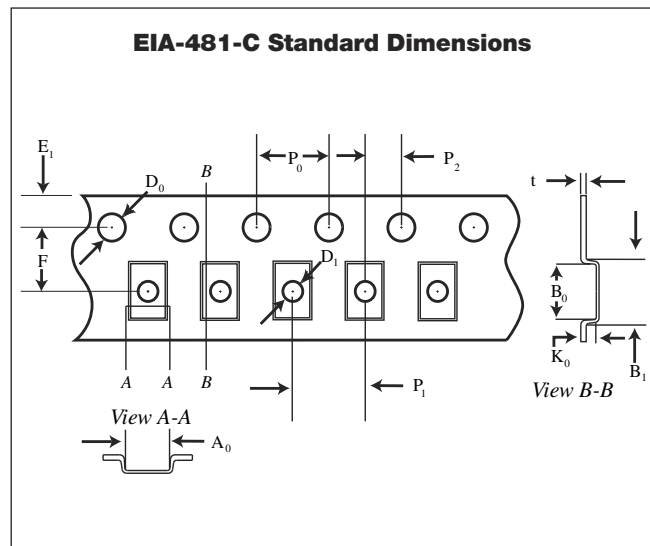
Embossed, non-conductive, heat-resistant, polycarbonate film.

## Dimensional Properties

Polycarbonate Carrier 2703 meets the ANSI/EIA-481-C Standard for the dimensions illustrated below.

## Product Format

Polycarbonate Carrier 2703 is available as continuous, splice-free, 8 mm – 120 mm carrier on recyclable 560 mm diameter cardboard supply reels in planetary format. Most 8 mm-24 mm carriers are also available in a level wound format utilizing up to a 7" wide core. Reel capacity will typically be from 500 to 1,000 meters, depending upon the pocket depth, pitch, and winding format.



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™ Non-Conductive Polycarbonate Carrier 2703 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<sub>0</sub>-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 2703	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 Polycarbonate Carrier 2703 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 2703 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 2703 be used within five years from the date of manufacture when stored according to the recommended storage conditions.

## Recyclability

Polycarbonate Carrier 2703 is a thermoplastic polymer film which can be recycled after use.

## Cover Tape Recommendations

3M™ Static Dissipative Heat Activated Adhesive 2675 and 3M™ Non-Conductive Pressure Sensitive Adhesive Cover Tapes 2656 and 2658 have been specifically designed for optimized performance on and are recommended for use with 3M’s Polycarbonate Carrier 2703.

# 3M™ Non-Conductive Polycarbonate Carrier 2703

Description	Units	Typical Performance	Test Notes	Test Method	
<b>Material Properties</b>	Type Max, Usable Temperature	°C (°F)	Polycarbonate 125 (257)	1	
<b>Physical Properties</b>	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
	Transmission	%	91.5	6	ASTM-D1003
	Haze	%	30.5	6	ASTM-D1003
	Clarity	%	99.1	6	ASTM-D1003
<b>Electrical Properties</b>	Resistivity	Ohms/sq	Non-Conductive	7	ASTM-D257
<b>Chemical Properties</b>	Extractable Ionics (Cl <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , SO <sub>4</sub> <sup>=</sup> , Na <sup>+</sup> , K <sup>+</sup> , Ca <sup>++</sup> )	ppm	<5	8	MIL STD 883E
<b>Product Format</b>	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		

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

## 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 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 250 mm length.
6. Optical properties are measured using a BYK-Gardner Haze-Gard Plus Transmission Meter, Model 4725.
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.
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.

3M is a trademark of 3M Company.

### Important Notice

All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. 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. Any statements related to the product which are not contained in 3M's current publications, or any contrary statements contained on your purchase order shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.



#### 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](http://www.3M.com/esd)

### Warranty; Limited Remedy; Limited Liability.

This product will be free from defects in material and manufacture for a period of one year from the time of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.**



Minimum 10%  
Post-Consumer Fiber

Printed in USA.

© 3M 2004 80-6111-0155-3