



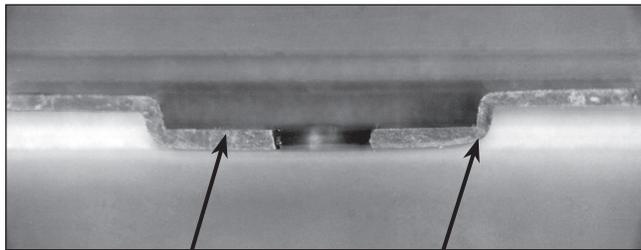
Conductive Polycarbonate Precision Carrier 3000BD

Technical Data – December, 2004

Product Description

3M™ Conductive Polycarbonate Precision Carrier 3000BD for bare die applications is designed to meet the demanding needs of many bare die, flip chip and micro BGA applications traditionally served by trays or other carrier devices. 3M innovation has led to the development of precision pockets, a technical breakthrough allowing 3M to produce highly precise and accurate pockets conforming to and helping protect your chip. Compare 3M Polycarbonate Carrier 3000BD to a typical, traditional heat-formed pocket:

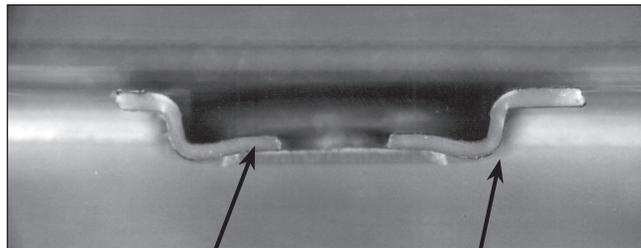
Precision Polycarbonate Pocket



Flat Pocket Bottom

<3° sidewall draft angle

Typical, Traditional Pocket



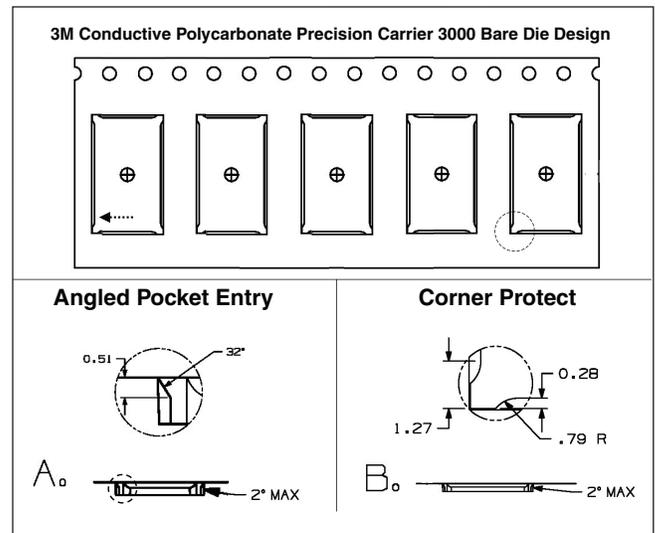
Curved Pocket Bottom

"Bathtub" Corners

A large sidewall draft angle in the traditional pocket allows chip movement up the wall and a pocket that is not flat allows Z-axis movement which can cause repeatability problems at the pick-up point.

Product Format

Polycarbonate Carrier 3000BD is available as a splice-free, 8 mm-44 mm carrier in planetary format on 330 m (13") plastic reels for cleanroom applications. For non-cleanroom applications, Polycarbonate Carrier 3000BD is available in planetary or level-wind format on a recyclable 560 mm (22") cardboard reel. Reel capacity will typically be from 30 to 1,000 meters, depending upon pocket depth, pitch and winding format.



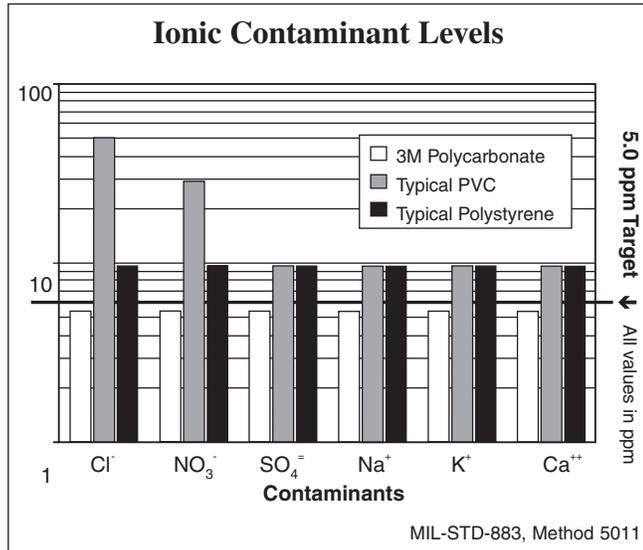
Component Protection is Critical

3M precision capabilities allow for innovative ways to help protect your chips from corner damage. Polycarbonate Carrier 3000BD corner protection helps prevent die edge chipping, one of the most common problems when shipping die products.*

* Corner-protect feature not available in 8 mm carrier widths

Chemical Analysis of Extractable Contaminants

The effect of contaminants on the solderability of SnPb, InPb, Au or Cu solder bumps is a concern to many manufacturers of flip chips. 3M™ Conductive Polycarbonate Precision Carrier 3000BD contains a minimum of identified corrosive, water-extractable ionic contaminants which are present in more significant levels in some other typical carriers. The following chart compares some typical carriers tested according to the requirements of MIL-STD-883E, Method 5011.



Electrical Properties

The electrical and triboelectric properties of 3M Polycarbonate Carrier 3000BD have been engineered to help provide protection of static-sensitive chip-size packages through an effective balance between the electrostatic shielding and electrostatic decay properties of the carrier. Polycarbonate Carrier 3000BD is electrically conductive, exhibiting a nominal surface resistivity in the pocket of $\geq 10^4 \Omega/\text{square}$ and $\leq 10^8 \Omega/\text{square}$. Polycarbonate Carrier 3000BD also exhibits desirable triboelectric properties which may be appropriate for packaging electrostatically-sensitive chip-size packages.

Packaging Format

Polycarbonate Carrier 3000BD is available in a cleaned and cleanroom compatible format for maximum protection from particle contamination. Polycarbonate Carrier 3000BD is cleaned and packaged in a class 10,000 cleanroom environment. Each planetary wound 13" plastic reel is then sealed individually into a 3M™ Static Shielding Bag for protection.

Note: Polycarbonate Carrier 3000BD is also available in standard 22" cardboard planetary and level-wind reels for less sensitive components and non-cleanroom applications.

Storage Conditions

It is recommended that Polycarbonate Carrier 3000BD 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 3000BD be used within five years from the date of manufacture when stored according to the recommended storage conditions.

Recyclability

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

Cover Tape Recommendations

Bare die, flip chip and microBGA components require extreme care during the de-taping process to prevent the components from bouncing out of the carrier. Therefore, 3M™ Pressure Sensitive Adhesive Cover Tape 2666 is recommended. For packaging components in 8 mm and 12 mm wide carrier tape, using 3M™ Conductive High Shear Pressure Sensitive Cover Tape 2668 is recommended for use on higher speed de-taping equipment. 3M PSA cover tapes provide a consistent peel force, which is ideal for many thin and small component applications.

3M™ Conductive Polycarbonate Precision Carrier 3000BD

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	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	mm (in)	<1.0 (0.039)	5	EIA 481
	Optical	%	Opaque	6	ASTM-D1003
Electrical Properties	Resistivity	Ohms/sq	5.0E10 ⁵	7	ASTM-D257
	Static Decay	Seconds	0.01	7	ASTM-D257
Chemical Properties	Extractable Ionics (Cl ⁻ , NO ₃ ⁻ , SO ₄ ⁼ , Na ⁺ , K ⁺ , Ca ⁺⁺)	ppm	<5	8	MIL STD 883E
Product Format	Reel Type	Material	Static Dissipative Plastic		
	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 in 100 mm sections over a 250 mm length.
6. Optical properties are measured using a spectrophotometer and measuring wavelengths from 450 to 800 nm. 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 a typical SOIC carrier using the defined test method. Specification tolerances for this carrier is $10^4 \leq R_s \leq 10^8$. Static decay is measured with an Electrotech Systems Static Decay Meter Model 406-C, using the manufacturer's suggested calibration and test methods.
8. Chemical extraction is measured using 20-hour water extraction test as defined in the test method MIL STD 883E, test method 501.1. Resultant solutions are measured for anion analysis using chromatography. Levels below 5.0 ppm are not reported.

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