

## 3M™ Polycarbonate Precision Carrier 3000BD

### Product description

3M™ 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 carrier 3000BD to a typical, traditional heat-formed pocket:

#### Precision polycarbonate pocket



Flat pocket bottom       $\leq 5^\circ$  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.

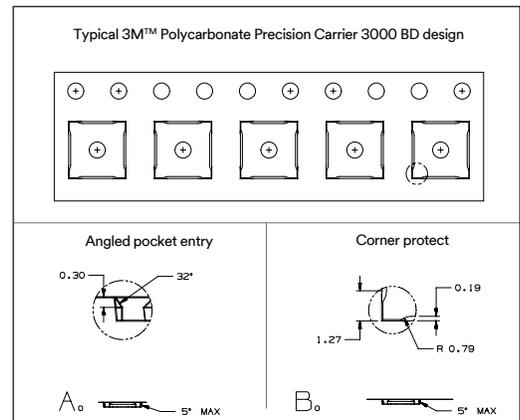
### Product format

3M carrier 3000BD is available as continuous, splice-free, mostly 8 mm through 44 mm carrier in level winding format on 330 mm (13") up to 560 mm (22") plastic reels for cleanroom applications. Planetary winding format is also available upon request. Reel capacity will typically be from 30 to 2,000 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. 3M carrier 3000BD corner protection helps prevent die edge chipping, one of the most common problems when shipping die products.\*

\* Corner-protect feature is not available in 8 mm carrier width.



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

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## Typical mechanical properties – shrinkage

3M™ Polycarbonate Precision Carrier 3000BD exhibits shrinkage of less than 0.1% for P<sub>0</sub>-10, even after 24 hours exposure at 85°C (185°F). This compares favorably to the EIA-481-E 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 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.

## Carrier P<sub>0</sub>-10 shrinkage after 24 hours

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Temperature	3M carrier 3000BD	Typical polystyrene
52°C (126°F) , 95%RH	< 0.1%	< 0.5%
85°C (185°F)	< 0.1%	< 0.5%

## Electrical properties

The electrical and triboelectric properties of 3M 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. 3M carrier 3000BD exhibits a nominal surface resistivity of  $\geq 10^4 \Omega/\text{square}$  and  $\leq 10^8 \Omega/\text{square}$ . 3M carrier 3000BD also exhibits desirable triboelectric properties which may be appropriate for packaging electrostatically-sensitive chip-size packages.

## Camber

3M carrier 3000BD meets the EIA-481-E Standard for camber which is not greater than 1 mm in 250 lineal millimeters in a planetary format. For carrier in a level winding format, camber will not be greater than 2 mm in 250 lineal millimeters.

## Packaging format

3M carrier 3000BD is available in a cleanroom compatible format for maximum protection from particle contamination. 3M carrier 3000BD is cleaned and packaged in a class 10,000 cleanroom environment. Each level winding or planetary reel is sealed individually into a static shielding bag for protection.

## Recyclability

3M carrier 3000BD is a carbon-filled thermoplastic polymer film which can be recycled after use. However, recycling programs for this product may not exist in your area.

## 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 Tapes are recommended.

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## Typical Physical Properties and Performance Characteristics

**Note:** The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is provided once the product is approved by 3M for general commercialization and development work is completed.

Description	Type	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)	57.2 (8.3)	2	ASTM-D638
	Tensile strength (break)	MPa (Kpsi)	57.2 (8.3)	2	ASTM-D638
	Impact strength	J/m (Ft-lb/in)	>70 (1.32)	3	ASTM-D256
	Camber (planetary format)	mm (in)	≤1.0 (0.039)	4	EIA-481-E
	Camber (level winding format)	mm (in)	≤2.0 (0.079)	4	EIA-481-E
	Optical	%	Opaque	5	ASTM-D1003
Electrical properties	Resistivity	Ohms/sq	5.0 x 10 <sup>5</sup>	6	ASTM-D257
	Static decay	Second	0.01	7	3M test method
Chemical properties	Extractable ionics (Cl <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , SO <sub>4</sub> <sup>2-</sup> , Na <sup>+</sup> , K <sup>+</sup> , Ca <sup>2+</sup> )	ppm	<5	8	3M test method
Product format	Reel type	Material	Plastic		
	Reel hub inside diameter	mm (in)	76.2 (3.0)		
	Pockets per reel	Count	Varies per pitch		
	Length	m (f)	Varies per Ko		

## Test notes

1. Engineering grade resin.
2. Tensile tests are conducted at 23°C (73°F), 50% RH under controlled conditions with a constant rate of jaw separation of 50 mm/minute from an initial separation of 115 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. Camber is a measurement of the weave of the material. Measured over a 250 mm length.
5. Optical properties are measured using a BYK-Gardner Haze-Gard Plus Transmission Meter, Model 4725.
6. Resistivity tests are conducted at 23°C (73°F), 50% RH under controlled conditions with Hiresta-UP equipment, model MCP-HT450. Resistivity is measured at the sealing surface of a typical carrier using the defined test method. Specification tolerances for this carrier is ≥10<sup>4</sup> Ω/square and ≤10<sup>8</sup> Ω/square.
7. Static decay is measured at carrier tape samples, with an Electrotech Systems Static Decay Meter Model 406-C under room condition.
8. 3M test method was used for the micro-contamination test for 3M carrier tapes.

## Storage conditions and shelf life

3M™ Polycarbonate Precision Carrier 3000BD 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. 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.

The shelf life of 3M carrier 3000BD is five years from the date of manufacture when stored according to the recommended storage conditions.

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## Certificate of Analysis (COA)

The 3M Certificate of Analysis (COA) for this product is established when the product is commercially available from 3M. The commercially available product will have a COA specification established. The COA contains the 3M specifications and test methods for the products performance limits that the product will be supplied against. The 3M product is supplied to 3M COA test specifications and the COA test methods. Contact your local 3M representative for this product's COA.

This technical data sheet may contain preliminary data and may not match the COA specification limits and/or test methods that may be used for COA purposes.

Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is shipped with the commercialized product.

**Safety Data Sheet:** Consult Safety Data Sheet before use.

**Regulatory:** For regulatory information about this product, contact your 3M representative.

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