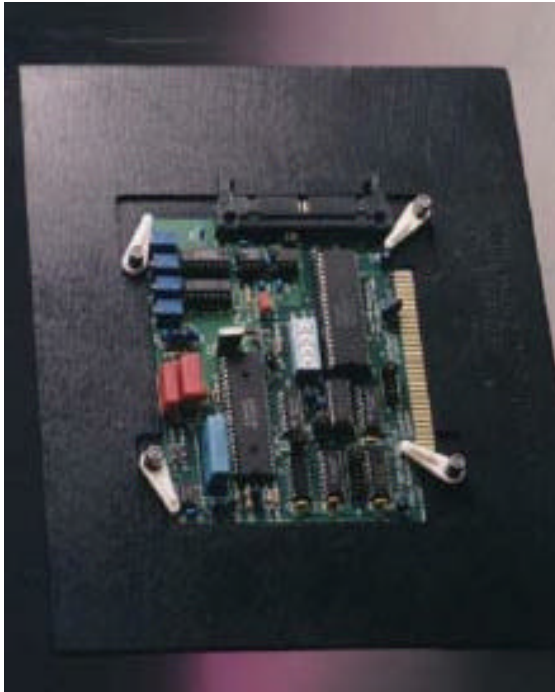


Test Electronics Industrial Test Equipment  
821 Smith Road, Watsonville CA. 95076  
Main (831) 763-2000 Fax (831)763-2085  
<http://www.testelectronics.com/>

## Process Carrier Materials for Wave Solder and Surface Mount Applications



### Specifications

### Materials

Pallet carrier materials are available in three grades to meet your needs. All grades are lightweight, and offer advantages over aluminum, titanium and other composite materials. Dimensional stability, flatness, thermal shock resistance and chemical resistance make these products ideal for the hostile environments presented in wave solder applications.

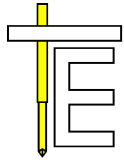
### Material Selection

1. We offer the industry's widest variety of pallet No Carbon is non-conductive
2. High Carbon is semi-conductive
3. Low Carbon is both semi-conductive and optically reflective.

### Quality

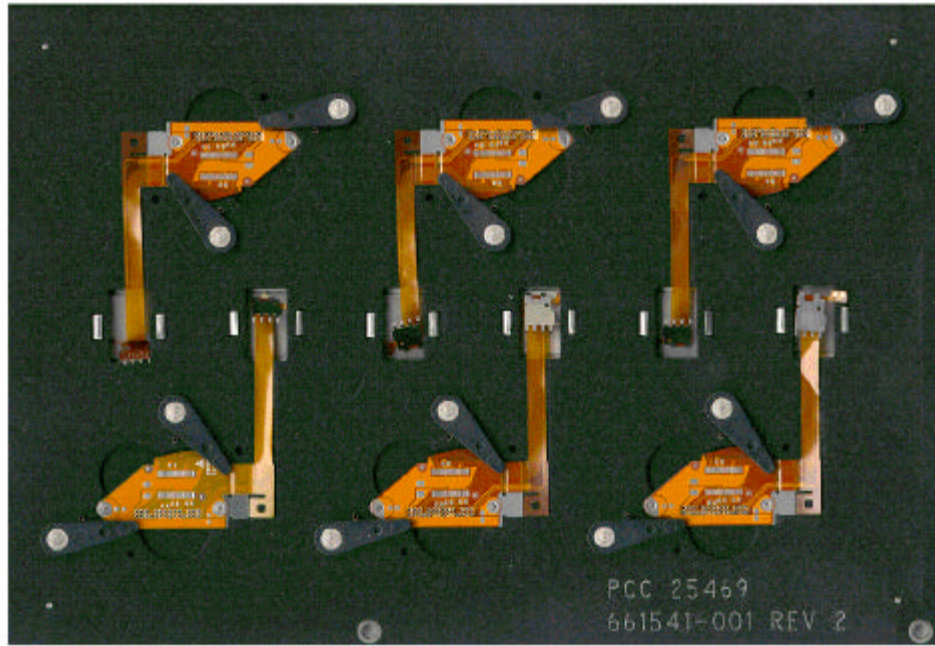
All versions of the Pallet materials are closely checked for warp, twist, surface resistivity and other key properties prior to being micro-sanded to the tightest tolerance control available.

	No Carbon	High Carbon	Low Carbon
Density	1.75	1.75	1.84
Water Absorption (%)	< 0.2	< 0.2	< 0.2
Avg. CTE (para) K-1	$7.1 \times 10^{-6}$	$7.1 \times 10^{-6}$	$7.1 \times 10^{-6}$
Avg. CTE (perp) K-1	$20.5 \times 10^{-6}$	$20.5 \times 10^{-6}$	$20.5 \times 10^{-6}$
Flexural Strength (psi)	55,000	55,000	45,000
Modulus in Flexure (psi)	2.8	2.8	2.8
Izod Impact Strength (ft. lbs.-/in.)	15	15	15
Thermal Conductivity (btu/hr/ft <sup>2</sup> /in/°F)	2	2	2
Surface Resistivity (ohms/square)	$10^{14}$	$10^5$ - $10^9$	$10^5$ - $10^9$
Surface Operating Temperatures	300°C	300°C	300°C
Chemical Resistance	Very Good	Very Good	Very Good
Color	Deep Blue	Black	Light Gray
ESD Safe	No	Yes	Yes
Barcol Hardness	65	65	65



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## Wave Solder and IR Reflow Pallets



### General

High Strength, high temperature, semiconductive composite board designed for use as circuit board and flex circuit carrying pallets for solder reflow ovens.

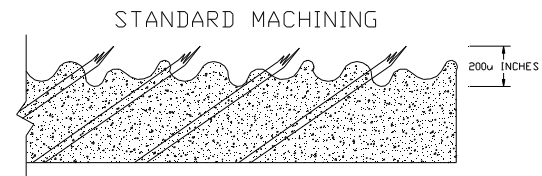
### Pallet Features

- High Strength to withstand operator abuse and repeated machine use without damage
- High Temperature Resistance that allows frequent cycles through wave soldering or IR reflow soldering without warping or delamination
- Dimensional stability so that fit and alignment are the same time after time.
- Chemical resistance which provides long pallet life through cleaning processes.
- Consistent Conductivity on the surface and through the sheet to preserve sensitive components.
- Low heat absorption allows the machines to run cooler and faster.
- Special pin fabrication and insertion techniques prevent loosening of circuit board alignment pins.
- White lettering provides easy to read part number labeling.

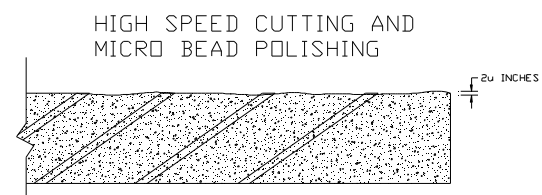
### Static Protection

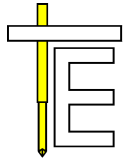
The pallet material is impregnated with a conductive carbon which acts to prevent static damage. Standard machining techniques can loosen and wash this

protective carbon away from the surface areas where it is most needed.



Test Electronics prevents this by using a high speed spindle speed of 30,000 rpm. This high speed promotes cleaner cutting of the fibers and minimizes breaking up and washing away the conductive carbon composite material. After the machining process, the pallet is then micro bead polished to a gloss ensuring that the fibers and carbon are blended smoothly at the surface for optimum static protection. . Polishing also provides better resistance to humidity and chemical intrusion. This helps increase dimensional stability by decreasing the potential for warpage and fiber delaminating





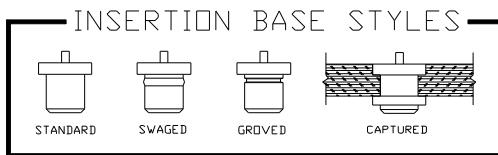
## Lower heat Absorption

In extra high volume applications, It may be desirable to run the conveyor at higher speeds. However, dark colored pallets may absorb too much heat causing the conveyor to have to be set to a slower speed in order to get proper reflow. We can help improve the speed in most cases. Our special machining and polishing techniques which enhance the surface conductivity allows the use of lower carbon content material. This lightens the color and reduces heat absorption. This allows the reflow soldering machines to run cooler and faster.

## Tooling Pins

Tooling pins are installed using an automated machine for positioning, and insertion. This technique provides perpendicularly exceeding 1/1000" per linear foot, and prevents drift due to side scoring and chipping. The end result is an extremely high degree of accuracy and repeatability in pin positioning. Above all, a tighter press fit for better mechanical reliability.

Other techniques for even higher reliability are:



1. Swaged pins.
2. Grove and glued pins.
3. Cap captured pins.

A variety of pin styles are available including:



- Straight pins
- Step pins
- Flanged Step Pins.

Different head styles also include:



- Round head for standard through holes
- Diamond head for slotted holes
- Elongated round head for precision aligning slotted holes

## Specifications:

Pinning accuracy	+/- 0.0005"
Cut accuracy	+/- 0.001"
Surface roughness	<ANSI-16
Water Absorption (%)	<0.2
Flexural Strength (psi)	55,000
Izod Impact Strength (ft lbs.)	15
Thermal Conductivity (W/ft <sup>2</sup> /in/°F)	13x10 <sup>-3</sup>
Surface Resistance Ω/in <sup>2</sup>	100K
Service Operating Temperature	300°C
Chemical Resistance	Good
ESD Safe	Yes
Barcole Hardness	65