

OPTIMUM COMPOSITE CARRIERS

PRECISION ENGINEERED MADE-TO-ORDER SMT & THT SOLDERING FIXTURES

PRODUCT DATA SHEET

Custom PCBA Tooling • Series: OCC-Custom Tooling

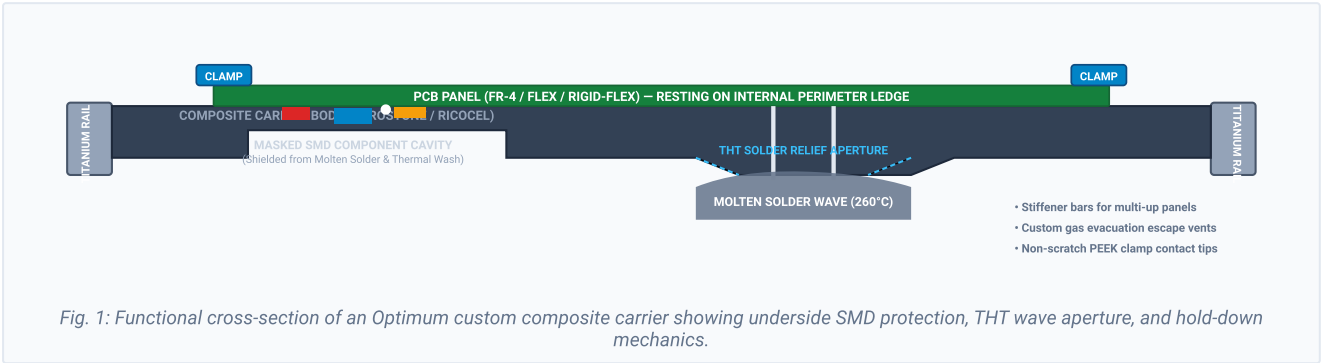
Optimum Custom Composite Soldering Carriers are bespoke, high-end production pallets manufactured to exact customer specifications for automated wave, selective, and reflow soldering environments. Fabricated from premium synthetic composites (Durostone®, Ricocel®, CDM®), these carriers solve critical manufacturing challenges: protecting pre-mounted underside SMD components from thermal shock and molten solder, stabilizing ultra-thin, flexible (Flex / Rigid-Flex), or heavy multi-layer boards against high-temperature sagging, and converting complex irregular board contours into rigid, standardized conveyor-friendly rectangular formats with positive mechanical clamping.

≥ 20,000 RATED CYCLIC SERVICE LIFE	300 °C CONTINUOUS HEAT RESISTANCE	10⁶–10⁹ Ω ESD SURFACE RESISTIVITY	±0.05 mm CNC MACHINING ACCURACY
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Key Engineering Capabilities & Process Applications

Wave & Selective Masking Cavities Deep underside CNC pockets shield bottom-side SMDs from thermal degradation, flux contamination, and molten solder wash, while precision-chamfered apertures direct laminar solder waves solely onto designated THT component terminations.	Flex & Rigid-Flex Anti-Sag Support Provides continuous coplanar backing and transverse stiffener bars to eliminate mid-panel laminate sagging, bow, and twist across reflow and wave tunnels. Essential for sub-1.0 mm thin laminates, flexible circuits, and heavy power components.
Irregular Contour Standardization Encapsulates circular, polygonal, and asymmetrical PCBs into standard square or rectangular conveyor footprints. Features durable titanium or hard-anodized edge inserts ensuring jam-free transport along pin-chain and roller conveyors.	Fast-Action Clamping & Panel Locks Configured with ergonomic spring-loaded rotary clips, sliding latches, or hinged top-cover plates to secure multi-circuit panels firmly in position. Prevents board lift, component shift, and wave-induced board float without requiring hand tools.

Composite Carrier Anatomy & Soldering Wave Interface



Technical Specifications & Engineering Standards

1. SUBSTRATE MATERIALS & THERMAL PROPERTIES (LEAD-FREE / ROHS COMPLIANT)	
Base Composite Substrates	Durostone® (CAS761 / CFR767), Ricocel® (ES-3261A), CDM®, High-Tg FR4 / G10
Operating Thermal Envelope	Continuous: 260 °C – 280 °C • Short-term excursion limit: up to 350 °C (Lead-Free SnAgCu compatible)
Electrostatic Discharge (ESD) Rating	Surface resistivity: 10 ⁶ to 10 ⁹ Ω/sq (Static Dissipative across full material thickness, non-degrading)
Density & Specific Heat Capacity	Density: 1.80 – 1.95 g/cm³ • Specific Heat: ~1.2 kJ/kg·K (low heat absorption prevents thermal robbing)
Chemical & Flux Compatibility	Impervious to alcohol-based, water-soluble, synthetic, and VOC-free no-clean flux chemistries
2. CNC MACHINING PRECISION & SOLDER RELIEF ENGINEERING	
Machining Technology & Tolerance	High-speed 3-axis / 5-axis CNC routing; Planar contour: ±0.05 mm • Pocket depth accuracy: ±0.03 mm
SMD Clearance Pocket Depths	Engineered cavity clearance: minimum 0.5 – 1.0 mm above passive chips, ICs, and electrolytic capacitors
THT Aperture Wave Chamfer	45° to 60° machined flow lead-in chamfer to optimize solder meniscus dynamics and expel trapped gas
Minimum Masking Wall Thickness	1.0 mm to 1.5 mm structural composite barrier between shielded SMD cavity and open solder aperture
Gas Venting & Drainage Relief	Integrated perimeter micro-channels for flux gas venting and quick solder drainage upon wave exit
3. MECHANICAL CLAMPING, STIFFENERS & WEAR HARDWARE	
Board Retention Clamping Options	High-temp PPS/composite rotary clips, spring-loaded hold-down latches, and sliding rail locks
Top Cover Fixtures (Optional)	Hinged aluminum or composite top covers with magnetic catches for high-density connector holding
Anti-Sag Transverse Stiffeners	Hard-anodized aluminum or titanium bridges recommended for carriers wider than 250 mm or heavy loads
Conveyor Wear Protection	Optional hardened titanium side runner strips to eliminate composite track wear on chain conveyors
Maximum Pallet Footprint	Custom manufactured up to 650 mm × 550 mm (single-panel or multi-up nested arrays)
4. PROCESS COMPATIBILITY & DESIGN INPUT SPECIFICATIONS	
Compatible Soldering Equipment	Wave soldering (full tunnel / dual wave), selective soldering (Suneast, Pillarhouse, ERSA), reflow ovens
Supported Assembly Workflows	Flex & Rigid-Flex carriers, SMT stencil support nests, press-fit tooling, conformal coating pallets
Required Engineering Data	Gerber (RS-274X), ODB++, 3D CAD (.STEP / .IGES), component height BOM, and machine rail width specs
Traceability & Identification	Permanent high-contrast laser marking: 2D DataMatrix / QR codes, barcode, part number, and revision

Thermal Management & Solder Wave Fluidics

- **Zero Solder Robbing:** High-grade Durostone/Ricocel provides exceptional thermal insulation, preventing pallet mass from drawing heat out of the wave.
- **Anti-Bridge Chamfering:** Optimized departure angles prevent solder webbing, bridges, and icicles as the PCB exits the laminar wave.
- **Flux Gas Evacuation:** Dedicated relief micro-channels vent evaporating solvents, preventing solder skips, voids, and blowholes.

Rapid Turnaround & Precision DFM Engineering

- **In-House DFM Analysis:** Dedicated tooling engineers review component clearances, solder apertures, and clamp locations prior to machining.
- **Fast-Turn Delivery:** Rapid CNC prototyping available in 3–5 working days from approved Gerber/CAD data.
- **Long-Term Durability:** Engineered for over 20,000 thermal cycles with zero delamination, dimensional creep, or ESD loss.