

JTCHTE JTCHTEVLP

Copper Foils for Innerlayers, Grade 3

- High reliability in multilayer circuit boards
- Low Profile for use in multilayer/mass lamination production
- Very Low Profile for highest demands, HDI and smart cards
- Resistance to recrystallization improves dimensional stability

Overview

JTCHTE, Grade 3

The growth of multilayer laminates has placed much more emphasis on printed circuit board reliability. This emphasis has been compounded by the direction of the industry to fabricate smaller, denser PCB packages. As the number of layers increased, additional concerns towards maintaining reliability were raised. These concerns involve the z-axis expansion or strain of the PCB raw materials. It has been well documented that the raw materials expand under thermal conditions such as PCB soldering processes. PCB reliability after this expansion is especially critical since the manufacturer cannot test the package until the later stages of the process.

GOULD developed JTCHTE foil, which exhibits excellent ductility at elevated temperature and, therefore, withstands the stress

caused by thermal z-axis expansion of the laminate. In addition to meeting IPC-4562 requirements and the qualities exhibited by standard GOULD foils, JTCHTE foil withstands the stresses near the edge of plated through holes without cracking. JTCHTE copper is produced in a unique manner so there is no sacrifice in handleability, lamination or PCB processing.

JTCHTEVLP, Grade 3

is very low profile foil in accordance with IPC 4562 (matte side $R_z < 5.1 \mu\text{m}$) and widely used in HDI packages like TAB, BGA or CSP just as for thin innerlayers in high layer count multilayer boards.

Advantages

■ High Etch Factor and Speed

Both, low and very low profile foils which are especially tailored for high density multilayer boards, are characterized by high etch factors (3 or better) and up to 20% faster etch time.

■ Resistance to Thru Hole Cracking

HTE foils exhibit excellent ductility at elevated temperatures, and eliminate foil cracks near the plated through holes. Foils are available also with a minimum elongation value of 6% at elevated temperature, assuring maximum reliability and resistance to foil cracking for dense MLBs with very high layer count.

■ Resistance to Recrystallization

GOULD's HTE foils are formulated to resist recrystallization or grain growth after thermal processing which could degrade laminate dimensional stability, warp & twist and drilling characteristics (nail heading).

■ Resistance to Innerlayer Cracking

JTCHTE foils are formulated with a balance of tensile strength for handleability and ductility for resistance to innerlayer foil cracks. Tensile strengths equivalent to Grade 1 foils permit JTCHTE foils to be processed with the same handleability and dent resistance like standard Grade 1 foils.

■ Improved Thermal Brass Barrier

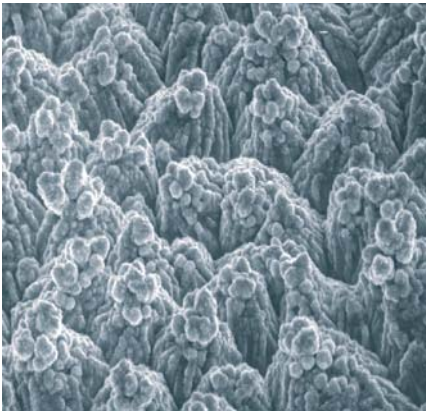
GOULD's thermal brass barrier layer responsible for the unique yellow matte side color acts as a physical diffusion barrier preventing any adverse chemical reactions with the resin system and stabilizes bond during thermal aging.

■ Good Adhesion to Substrates

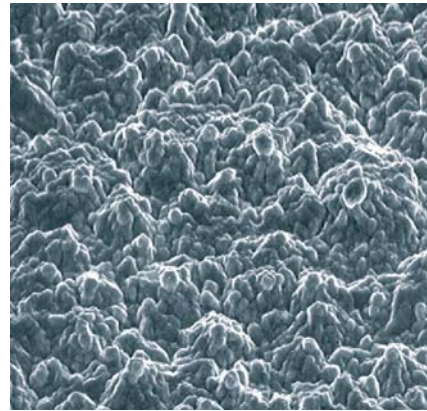
The fine nodular TC treatment increases mechanical adhesion through increased surface area for good bonding to a wide range of laminating resins. A silane treatment applied to the matte side of the foils maximizes the bond strength. The copper surface is easily cleaned by common chemical processes.

Specifications

Properties meet and exceed the requirements of IPC 4562, Grade 3



JTCHTE-35 μm



JTCHTEVLP (Very Low Profile)-35 μm

The following table details the typical properties of JTCHTE foils in comparison to industry standards.

Typical Mechanical Properties:

Property	Unit	HTE-Grade 3						HTEVLP-Grade 3			
		9 μm	12 μm	18 μm	35 μm	70 μm	105 μm	12 μm	18 μm	35 μm	70 μm
Area weight	g/m ²	80	105	155	285	570	870	105	155	285	570
Tensile strength	N/mm ²	> 320	> 320	> 320	> 300	> 300	> 276	> 320	> 320	> 400	> 340
Elongation	%	> 2	> 3	> 4	> 10	> 14	> 14	> 3	> 4	> 10	> 14
Elongation 180°C	%	> 2	> 2	> 3	> 4	> 4	> 4	> 2	> 3	> 4	> 4
Peel strength FR4-T _G 140	N/mm	> 1.00 ¹⁾	> 1.05 ¹⁾	> 1.18 ¹⁾	> 1.69	> 2.28	> 2.75	> 1.05 ¹⁾	> 1.18 ¹⁾	> 1.57	> 2.16
Shiny side, R _a	μm	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43
Matte side, R _z	μm	3...5	3...3.5	4...7	5...8	8...13	12...18	< 5.1	< 5.1	< 5.1	< 5.1

¹⁾ Without plating up

Supply

JTCHTE foil is routinely available in continuous rolls and sheeted formats. Roll products can be supplied in a variety of widths and thicknesses from 9 μm (0.250 oz/ft²) to 105 μm (3 oz/ft²). Other thicknesses on request. JTCHTEVLP is available from 9 to 70 μm (2 oz/ft²). Products are supplied on cardboard cores with an ID of ~ 79 mm (3 1/8") or 152 mm (6").

GOULD Electronics is part of the Nikko Materials group. The company is a leading supplier of materials to the electronics industry.



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