

# RTCHTE RTCHTEHP

Reverse Treated Copper Foils, Grade 3

- Simplifies multilayer processing and improves yield
- Eliminates aggressive surface precleaning
- Improves etching and inner layer yield
- Very low treatment profile (VLP)
- RTCHTEHP assures high bond to high performance resins

## Overview

### RTCHTE, Grade 3

Reverse treated copper foil is manufactured by applying copper nodularization, brass thermal barrier and passivation to the shiny smooth side of the foil rather than to the roughened matte side of the foil as is done when manufacturing conventional copper foil. A thin layer containing only passivation or anti-oxidants, which is the same to the shiny smooth side of all GOULD copper foils, is applied to the roughened matte side of

reverse treated foil. The fully treated drum side can be laminated to prepregs of a broad range of resin systems. Reverse treated foil is the best choice for fine-line inner layer processing.

### RTCHTEHP, Grade 3

is manufactured with higher nodularization to increase mechanical adhesion and peel strength to high performance laminate products.

## Advantages

### ■ Eliminates Costly, Aggressive Roughening of the Foil Surface

Reverse treated copper eliminates the need for aggressive precleaning of laminates by mechanical or chemical means. A simple wash with 10% sulphuric acid removes the passivation leaving the roughened matte surface available for photoresist processing.

### ■ Cleaner Etching and Higher Inner Layer Yield

The VLP treatment of RTCHTE foils compared to standard Grade 3 provides faster, cleaner etching with more vertical sidewalls. Inner layer yields can be higher due to the cleaner etching and less undercutting of photo-resist.

### ■ Simplifies Oxide Processing and Reduces Waste Disposal

The already roughened matte surface of reverse treated foils eliminates the need for microetching or roughening during oxide processing. The costly waste disposal associated with microetching is, of course, eliminated with RTCHTE.

### ■ Resistance to Thru Hole Cracking

The foils exhibit excellent ductility at elevated temperatures, and eliminate foil cracks near the plated through holes for dense MLBs with very high layer count.

### ■ Resistance to Recrystallization

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

Foils are formulated with a balance of tensile strength for good handleability and ductility for high resistance to inner layer foil cracks.

### ■ Improved Thermal Brass Barrier

GOULD's thermal brass barrier layer on treated drum side 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

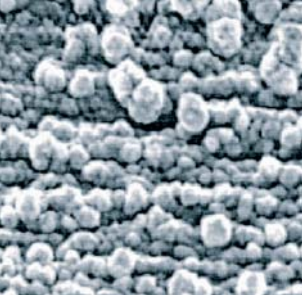
Generally, the bond strength of reverse treated foils is lower because of its very low profile treatment when compared with standard treated foils. But, the fine nodular TC treatment guarantees sufficient mechanical adhesion to a broad range of laminating resins and is supported by a tailored silane treatment.

However, RTCHTEHP can achieve higher bonds especially with high  $T_G$ , halogen-free or filled/unfilled high frequency substrates because of its special nodularization technology.

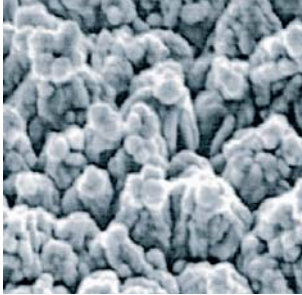
## Specifications

All properties meet and exceed the requirements of IPC 4562, Grade 3.

### Side Laminated to Prepreg

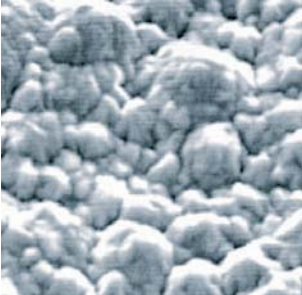


Reverse treated drum side



Conventional treated matte side

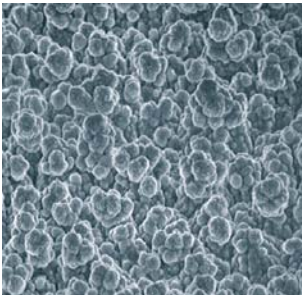
### Side Exposed to Photoresist



Matte side of RTCHTE



Conventional drum side



Nodularization of RTCHTE and RTCHTEHP in comparison, both 35  $\mu\text{m}$ .

### Typical Mechanical Properties:

Property	Unit	RTCHTE-Grade 3				RTCHTEHP-Grade 3		
		12 $\mu\text{m}$	18 $\mu\text{m}$	35 $\mu\text{m}$	70 $\mu\text{m}$	18 $\mu\text{m}$	35 $\mu\text{m}$	70 $\mu\text{m}$
Area weight	$\text{g}/\text{m}^2$	105	155	285	570	155	285	570
Tensile strength	$\text{N}/\text{mm}^2$	> 320	> 320	> 300	> 300	> 320	> 300	> 300
Elongation	%	> 3	> 4	> 10	> 14	> 4	> 10	> 14
Elongation 180°C	%	> 2	> 3	> 4	> 4	> 3	> 4	> 4
Peel strength FR4- $T_G$ 140	$\text{N}/\text{mm}$	> 1.05 <sup>1)</sup>	> 1.10 <sup>1)</sup>	> 1.42	> 1.88	> 1.30 <sup>1)</sup>	> 1.88	> 2.00
Treated drum side, $R_z$	$\mu\text{m}$	< 5.1	< 5.1	< 5.1	< 5.1	5...6	5...6	5...6
(Untreated) matte side, $R_z$	$\mu\text{m}$	2...4	3...5	4...6.5	5...8.5	3...5	4...6.5	5...8.5

<sup>1)</sup> Without plating up

## Supply

Reverse treated foils are routinely available in continuous rolls and sheeted formats. Roll products can be supplied in a variety of widths and thicknesses from 12  $\mu\text{m}$  (0.375 oz/ft<sup>2</sup>) to 105  $\mu\text{m}$  (3 oz/ft<sup>2</sup>) on cardboard cores with an ID of ~ 79 mm (3 1/8") or 152 (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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