

Advanced Materials

Heratape® CT2000

Low Temperature Co-Fireable Tape

Description:

Heraeus' low temperature co-fireable tape, Heratape® CT 2000 is designed to allow production of high performance wireless and multilayer circuits.

Heratape® CT 2000 is available in sheet or roll form in thicknesses of 2.0 mils, 3.9 mils and 5.1 mils. (Other tape thicknesses available by request).

● Key Benefits:

- Silver conductor compatible
- Lead and cadmium free
- Excellent handling properties
- Dimensionally stable on 850°C refire
- For use in a variety of high frequency, high performance applications
- Low cost and design flexibility
- High Q
- Near zero T_f (temperature coefficient of frequency)
- Mixed metal capability

● Typical Fired Electrical Properties:

Dielectric Constant:

@ 2.5GHz, 25°C
 $9.1 \pm .1$

Dissipation Factor:

@ 2.5 GHz
 $\leq 2 \times 10^{-3}$

Thermal Coefficient of Expansion

25°C to 300°C
 5.6 ppm/°C

Breakdown Voltage

> 1 kV @ 25 μ m

Surface Roughness

< 0.22 μ m

Camber

Conforms to setter

Insulation Resistance

@ 25°C
 > 10^{13} Ω cm

Temperature Coefficient of Frequency (T_f)

<10 ppm/°C (-40 to 80 °C)

● Typical Unfired Properties:

Green Density

2.45 g/cm³

Tensile Strength

240 psi (dependent on test method)

Unfired Sheet Thickness

2.0 mils (50.8 μ m), 3.9 mils (99.1 μ m), 5.1 mils (130 μ m)

● Typical Fired Properties:

Shrinkage (Co-Firing Process)

Nominal lamination pressure is 4000 psi @ 65°C for 10 minutes.

Burn out and firing should be done in a box oven.

Recommended firing profile:

- 3°C/minute to 100°C
- 1-2°C/minute to 450°C
- 5.5°C/minute to 865-875°C, hold for 20 – 30 minutes.
 Cooling rate is approximately 6 - 10°C/minute (furnace cooling rate)

Firing should be done on flat setter material (e.g. 96% alumina) since the tape will conform to the setter material.

x,y 10.6 \pm 0.3 %

z 16.0 \pm 1.5%

*Laminated to fired shrinkage. To calculate green to fired thickness, add 6.3% to the z shrinkage as a compressibility factor.

Fired Density

> 3.05 g/cm³

Flexural Strength

310 Mpa (ASTM # F394-78)

Fired Sheet Thickness

1.6 mils (40.6 μ m), 3.1 mils (78.7 μ m), 4.1 mils (104.1 μ m)

Note: For processing details for CT2000, see Design Guidelines for Heratape® CT2000 Materials System

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Co-fireable Conductor Materials

	Silver System	Gold System	Mixed Metal
Inner Layer – Printable	TC2306	TC7102	TC2306 (Ag)
Via Fill	TC2305	TC7101	TC7406 (Ag/Pd)
Top Conductor	TC2603	TC7102	TC7102 (Au)
Ground Plane	TC2306	TC7103	TC2306 (Ag)
Co-fireable Solder Mask	TO2001	TO2001	TO2001

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The descriptions and engineering data shown here have been compiled by Heraeus using commonly-accepted procedures, in conjunction with modern testing equipment, and have been compiled as according to the latest factual knowledge in our possession. The information was up-to date on the date this document was printed (latest versions can always be supplied upon request). Although the data is considered accurate, we cannot guarantee accuracy, the results obtained from its use, or any patent infringement resulting from its use (unless this is contractually and explicitly agreed in writing, in advance). The data is supplied on the condition that the user shall conduct tests to determine materials suitability for a particular application.

Americas
 Heraeus Incorporated
 Thick Film Materials Division
 24 Union Hill Road
 West Conshohocken, PA 19428
 USA
 Phone: +1 (610) 825-6050
 E-Mail: techservice.hcd@heraeus.com
 Internet: www.thickfilm.net

Europe
 W.C. Heraeus GmbH
 Thick Film Materials Division
 Heraeusstr. 12-14
 63450 Hanau
 Germany
 Phone: +49 (6181) 35-5466
 E-mail: th-info@heraeus.com
 Internet: www.heraeus-th.com

Asia
 Heraeus Materials Technology
 Shanghai Ltd.
 No. 1 Guang Zhong Road
 Zhuanqiao Town, Minhang District
 Shanghai 201108
 People's Republic of China
 Phone: + 86 (21) 6442-6838
 E-Mail: th.hmts@heraeus.com
 Internet: www.heraeus-th.com