

## LTCC Materials

### CT 810



## Lead Free Low Temperature Cofireable Heratape / DPIS\*

\* Development Product Information Sheet

#### Description

CT 810 is a Low Temperature Co-firing Ceramic (LTCC) tape and designed to offer an alternative to producing insulating layer on Cr steel. CT 810 was especially developed for steel of following types:

German Standard	DIN Type	UK / US
1.4016	X6Cr17	AISI 430
1.4521	X2CrMoTi18-2	AISI 444

The recommended minimum thickness of steel is 1.5 mm.

CT 810 is entirely free of lead, cadmium and nickel, and REACH<sup>1</sup> and RoHS<sup>2</sup> compliant.

CT 810 is supplied at miscellaneous thicknesses (100 to 250 µm un-fired tape thickness) and usable width - it can be also provided as single sheet<sup>3</sup>.

#### Recommended Typical Process Guidelines

CT 810 can be processed with common LTCC process parameters. Recommended process guidelines are:

#### Storage and Pre-treatment

Storage	Keep in sealed bags at 20 - 25 °C in a dark and dry place.
Shelf Life	12 months with correct storage from date of shipment
Pre-Treatment	Not necessary

#### Lamination<sup>4</sup>

Equipment	Uniaxial or isostatic press
Pressure	20 - 27 N/mm <sup>2</sup> (2900 – 3900 psi)
Temperature	70 - 80 °C
Pre-heating	3 min
Total Time	Up to 10 min (incl. pre-heating)

#### Firing<sup>5</sup>

Peak	850 °C / 10 min dwell
Total Cycle	60 min

#### Typical Properties (Un-fired)

##### Tape Properties<sup>6</sup>

Color	Blue
Density	1.8 g/cm <sup>3</sup>
Laminated Density	2.0 g/cm <sup>3</sup>
Compressibility	12.2 %

#### Typical Properties (Fired)

##### Physical Properties<sup>6</sup>

Color	Blue
Tape Shrinkage (un-laminated to fired)	x, y: not applicable <sup>7</sup> z: approx. 50 %
Fired Density	3.3 g/cm <sup>3</sup>
Thermal Conductivity	4.3 W/mK

- 1 REACH: EC Regulation No. 1907/2006 Registration, Evaluation, Authorization and Restriction of Chemicals by European Chemicals Agency
- 2 RoHS Directives 2002/95/EC and its subsequent amendments: Restriction of Hazardous Substances Directives by European Union
- 3 Please contact us for more details.
- 4 Tape must be kept in a sealed, evacuated bag during lamination in order to prevent moistening by isostatic press media. Stack each printed and dried layer in a confined lamination die and onto top of a steel substrate
- 5 Common belt furnace can be used which is applicable for conventional thick film process. For a very thick build-up a slower profile may be necessary.
- 6 All physical testing is performed on 6-layer tape substrates (tape thickness: 200 µm) with no metallization, and processed according to Heraeus' recommended processing guidelines.
- 7 When applied on steel; x, y direction is not considered because of defined application on steel

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### Typical Fired Properties

#### Electrical Properties <sup>8</sup>

Break Down Voltage <sup>9</sup>	> 1500 V AC (for 60 s)
Rel. Diel. Constant (2.5 GHz, 25 °C)	8.7 ± 0.1
Dissipation Factor (2.5 GHz, 25 °C)	< 0.005

### Compatibilities

Application <sup>10</sup>	Ag System <sup>11</sup>
Top Overglaze Layer <sup>12, 13</sup>	CT 810 (blue)
Termination	TC 7303
Resistor Elements <sup>13</sup>	SR 21-350-025 SR 21-350-100
Ground Insulating Layer (on steel)	CT 810 (blue)

- 8 All electrical testing is performed on parts manufactured according to Heraeus' recommended process guidelines with silver-based conductor systems.
- 9 ≥ 75 µm fired tape thickness on Cr steel (X6Cr17)
- 10 For more details, please see separate "Application Note for Pb Free System for Heating on Steel".
- 11 The recommendation is for typical application only using CT 810 on steel. If other tape is used, user should test the compatibilities with his system for his final uses.
- 12 As top dielectric layer generally CT 810 is suitable. However, CT 819 is recommended, if excellent resistance vs citric acid and salt fog/spray is required.
- 13 The application is also possible without top overglaze layer based on requirement of customer who is responsible for such design.

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.

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