

DuPont LL602

Co-fired silver conductor

Technical Data Sheet

Product Description

DuPont LL602 is an internal silver ground plane conductor for the DuPont™ GreenTape™ 9K7 low temperature co-fired ceramic (LTCC) material system. It may also be used externally in applications where soldered adhesion is not required. The composition is cadmium and lead free*.

Product Benefits

When used with the GreenTape™ 9K7 LTCC system, DuPont LL602 offers the following benefits:

- Cofire processing
- High yields and reliability
- Cadmium and lead free*

*Cadmium and lead “free” as used herein means that cadmium and lead are not an intentional ingredients in and are not intentionally added to the referenced product. Trace amounts however may be present.

Processing

For detailed recommendations on the use of DuPont LL602 and the GreenTape™ 9K7 system, consult this data sheet and the GreenTape™ LTCC Design Guide. For compatible co-fired and post fired conductor compositions, reference the GreenTape™ 9K7 Product Selector Guide.

Printing

The composition should be thoroughly stirred for 1 to 2 minutes prior to use. This is best achieved by slowly stirring the paste by hand using a clean, burr-free spatula (flexible plastic or stainless steel). Care must be taken to avoid air entrapment.

DuPont LL602 directly on the preconditioned GreenTape™ 9K7 green sheets using appropriate thick film screen printing methods and a vacuum stone or other support structure which uniformly distributes a vacuum to secure the green sheet to the printer's stage plate.

Typical Properties

Property	Value
Viscosity, (Pa.s, 10 rpm, 25° C) ¹	180 - 300
Solids, (%) ²	68.0 - 71.0
Coverage, (cm ² /gram)	80 - 90
Clean-up solvent	1-Propoxy-2 Proponal
Thinner	8250
Line/space resolution, (um, dried)	125 / 125
Dry print thickness, (um)	13 - 18
Fired print thickness, (um)	7 - 10
Resistivity, (mOhms/sq) ³	<= 5

¹ Brookfield 2xHAT, SC4-14 / 6R spindle and utility cup
² 750° C
³ Normalized to 15 um dry thickness

The above table shows the anticipated typical physical and electrical properties for DuPont LL602 based on specific controlled experiments in our labs and are not intended to represent the product specifications, details of which are available upon request.

Printing is typically performed using a 325 mesh, stainless steel screen with a 10 to 12 micron emulsion thickness.

Printing should be performed in a clean, well ventilated area. Optimum printing characteristics are generally achieved when the room and paste container temperatures are in the 20 to 23°C range.

Drying

Allow conductor prints to level for 5 to 10 minutes at room temperature and then dry in a well ventilated oven or conveyor dryer for 5 minutes at 100°C. Do not over-dry.

Lamination

Collate, stack and laminate multiple sheets of the printed circuit patterns according to the recommended processing parameters detailed in the DuPont™ GreenTape™ LTCC Design Guide.

Typical lamination parameters are 3000 psi at 70°C for 10 minutes. Lamination pressures may vary slightly based upon part design and the individual tape lot shrinkage factors.

Firing

Fire in a well ventilated conveyor or static furnace. Air flows and extraction rates should be optimized to ensure that oxidizing conditions exist within the muffle and that no exhaust gases enter the room.

GreenTape™ 9K7 requires the use of dedicated, specially coated setters in order to prevent parts from sticking during firing.

Consult the DuPont™ GreenTape™ 9K7 low temperature co-fired ceramic system data sheet and DuPont™ GreenTape™ LTCC Design Guide for additional details.

For further information regarding firing profiles, furnace recommendations and setter tile choices, please contact your local DuPont Technical Service Representative.

Storage and Shelf Life

Containers should be stored, tightly sealed, in a clean, stable environment at room temperature (<25°C). Shelf life of material in unopened containers is six months from date of shipment. Some settling of solids may occur and compositions should be thoroughly mixed prior to use.

Safety and Handling

For Safety and Handling information pertaining to this product, read the Material Safety Data Sheet (MSDS).

For more information on DuPont LL602 or other DuPont Microcircuit Materials products, please contact your local representative:

Americas

DuPont Microcircuit Materials
14 T.W. Alexander Drive
Research Triangle Park, NC 27709
Tel.: 800-284-3382

Europe

Du Pont (U.K.) Limited
Coldharbour Lane
Bristol BS16 1QD
U.K.
Tel.: 44-117-931-3191

Asia

DuPont Kabushiki Kaisha
Sanno Park Tower, 11-1
Nagata-cho 2-chome
Chiyoda-ku, Tokyo 100-611
Japan
Tel.: 81-3-5521-8650

DuPont Taiwan Ltd
45, Hsing-Pont Road,
Taoyuan, Taiwan 330
Tel.: 886-3-377-3616

DuPont China Holding Co. Ltd
Bldg 11, 399 Keyuan Rd., Zhangji Hi-Tech Park,
Pudong New District, Shanghai 201203, China
Tel.: 86-21-6386-6366 ext.2202

DuPont Korea Inc.
3~5th Floor, Asia tower #726,
Yeoksam-dong, Gangnam-gu
Seoul 135-719, Korea
Tel.: 82-10-6385-5399

E. I. DuPont India Private Limited
7th Floor, Tower C, DLF Cyber Greens,
Sector-25A, DLF City, Phase-III,
Gurgaon 122 002 Haryana, India
Tel.: 91-124-4091818

Du Pont Company (Singapore) Pte Ltd
1 HarbourFront Place, #11-01
HarbourFront Tower One,
Singapore 098633
Tel.: 65-6586-3022

<http://www.mcm.dupont.com>



Copyright, disclaimer and caution statements for use in MCM product technical data sheets in all regions and countries.

Copyright © 2009 DuPont. All rights reserved. The DuPont Oval, DuPont™, The miracles of science™, Green Tape™ and all products or words denoted with ® or ™ are registered trademarks or trademarks of E. I. du Pont de Nemours and Company or its affiliates (“DuPont”).
NO PART OF THIS MATERIAL MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR BY ANY MEANS ELECTRONIC, MECHANICAL, PHOTOCOPYING, RECORDING OR OTHERWISE WITHOUT THE PRIOR WRITTEN PERMISSION OF DUPONT.

Caution: Do not use in medical applications involving implantation in the human body or contact with internal body fluids or tissue unless the product is provided by DuPont under a formal written contract consistent with the DuPont Policy Regarding Medical Applications of DuPont Materials H-50103-2 (“Medical Applications Policy”) and which expressly acknowledges the contemplated use. For additional information, please request a copy of DuPont Medical Caution Statement H-50102-2 and the DuPont Medical Applications Policy.

The information provided herein is offered for the product user’s consideration and examination. While the information is based on data believed to be reliable, DuPont makes no warranties, expressed or implied as to the data’s accuracy or reliability and assumes no liability arising out of its use. The data shown are the result of DuPont laboratory experiments and are intended to illustrate potential product performance within a given experimental design under specific, controlled laboratory conditions. While the data provided herein falls within anticipated normal range of product properties based on such experiments, it should not be used to establish specification limits or used alone as the basis of design. It is the product user’s responsibility to satisfy itself that the product is suitable for the user’s intended use. Because DuPont neither controls nor can anticipate the many different end-uses and end-use and processing conditions under which this information and/or the product described herein may be used, DuPont does not guarantee the usefulness of the information or the suitability of its products in any given application. Users should conduct their own tests to determine the appropriateness of the products for their particular purpose.

The product user must decide what measures are necessary to safely use the product, either alone or in combination with other products, also taking into consideration the conditions of its facilities, processes, operations, and its environmental, health and safety compliance obligations under any applicable laws.

This information may be subject to revision as new knowledge and experience become available. This publication is not to be taken as a license to operate under, or recommendation to infringe any patent.



The miracles of science™