

DuPont 5915R

Copper Conductor Composition

EUROPEAN TECHNICAL DATASHEET

All values reported here are results of experiments in our laboratories intended to illustrate product performance potential with a given experimental design. They are not intended to represent the product's specifications, details of which are available upon demand

Product Description

DuPont 5915R is a high conductivity copper conductor, which is printed on 96% alumina substrates and fired at 600°C in a Nitrogen atmosphere. It is particularly suitable for applications requiring through hole printing and soldering. It is also used to print thick tracks with a good resolution.

Product Benefits :

- Excellent Thermal and Electrical conductivity
- Good solderability
- Through hole printable
- Phthalate, Cadmium, Nickel oxide free*

* Phthalate, Cadmium and Nickel oxide 'free' as used herein means that cadmium, phthalate and nickel oxide are not intentional ingredients in and are not intentionally added to the referenced product. Trace amounts however may be present

Processing Summary

- **Screen Type**
165-325 mesh stainless steel screen with a 15–20 µm emulsion build up.
- **Drying**
Allow prints to level for 2-5 minutes at room temperature, then dry at 120°C in air or 150°C in nitrogen .
- **Firing**
600°C peak held for 5 minutes on 30 minute cycle in a nitrogen atmosphere (the oxygen level should be between 2-5 ppm in the nitrogen supply to the furnace)

Compatibility

Whilst DuPont has tested this composition with the materials specified above and the recommended processing conditions, it is impossible or impractical to cover every combination of materials, customer processing conditions and circuit layouts. It is therefore essential that customers thoroughly evaluate the material in their specific situations in order to completely satisfy themselves with the

overall quality and suitability of the composition for its intended application (s).

Storage and Shelf Life

Containers may be stored in a clean, stable environment at room temperature (between 5°C – 30°C) with their lids tightly sealed. Storage in high temperature (>30°C) or in freezers (temperature <0°C) is NOT recommended as this could cause irreversible changes in the material. The shelf life of compositions in factory-sealed (unopened) containers between (5°C – 30°C) is 6 months from date of shipment.

TABLE 1. TYPICAL PHYSICAL PROPERTIES

Viscosity (Pa.s.) (Brookfield HBT, Utility cup & spindle, (SC4-14/6R), 50rpm, 25°C ± 0.2°C)	150– 220
Coverage [cm²/g] Based on fired thickness of 30µm	35-40
Thinner	9450
Shelf Life (months)	6

Substrates

Substrates of different compositions and from various manufacturers may result in variations in performance properties

Thinner

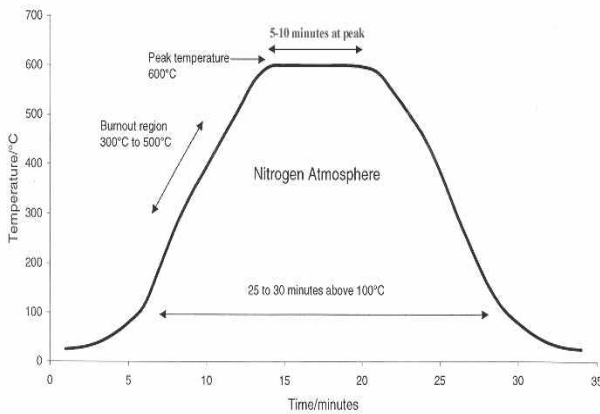
5915R composition is optimized for screen printing and thinning is not normally required. Use the DuPont recommended thinner for slight adjustments to viscosity or to replace evaporation losses. The use of too much thinner or the use of a non recommended thinner may affect



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CHART 1. FIRING PROFILE

Typical 600°C Peak Cu Conductor Firing Profile



the rheological behaviour of the material and its printing characteristics. Please refer to table 1. Typical Physical Properties'

Printing

The composition should be thoroughly mixed before use. This is best achieved by slow, gentle hand stirring with a clean burr-free spatula (flexible plastic or stainless steel) for about 1-2 minutes. Care must be taken to avoid air entrapment. Printing should be performed in a well ventilated area. Additional information on requirements for printing areas is contained in DuPont Technical Guide EUT 7.3 'Processing-Screen Printing Rooms' available on request.

Note: optimum printing characteristics are generally achieved in the room temperature range of 20°C-23°C. It is therefore important that the material, in its container, is at the temperature prior to commencement of printing. Class 10,000 printing area is

recommended for building complex hybrids and multilayer circuits, otherwise severe yield losses could occur. Refer to 'Processing Summary'.

Drying

Allow prints to level at room temperature, then dry in a well ventilated oven or conveyor dryer. Refer to 'Processing Summary'.

Firing

The dried prints must be fired in a conveyor furnace in a nitrogen atmosphere. The oxygen levels in the nitrogen supply and firing section of the furnace should be 2-5 ppm. Fire in well ventilated belt, conveyor furnace or static furnace. Nitrogen flows and extraction rates should be optimized to avoid formation of oxidizing conditions within the muffle and that no exhaust gases enter the room.

Full information on requirements for firing is contained in DuPont Technical Guide EUT 7.4 'Process Guide-Firing'. Refer to 'Processing Summary'. The recommended firing profile is shown in Chart 1.

General

Performance will depend to a large degree on care exercised in screen printing. Scrupulous care should be taken to keep the composition, printing screens and other tools free of metal contamination. Dust, lint and other particulate matter may also contribute to poor yields.

Safety and Handling

DuPont thick film compositions are intended for use in an industrial environment by trained personnel. All appropriate health/safety regulations regarding storage, handling and processing of such materials should be complied with. For information on health/ safety regulations please refer to the specific product MSDS and to the DuPont Safety Guide EUT 7.1 'Practical Safe Handling of Thick Film Compositions'.

TABLE 2. TYPICAL FIRED PROPERTIES¹

Fired Thickness (µm) (Using 165 mesh)	> 30
Resistivity on alumina [mΩ/□] (@ 30µm fired thickness)	≤ 1.7
Adhesion [N]² Initial (1xfiring)]	≥ 20

Test Procedure

1 Typical properties are based on laboratory data using recommended processing procedures. Unless expressly noted elsewhere the following processing conditions have been used:

Printing: 200 mesh stainless steel screen, 12-14µm emulsion thickness

Firing: 1x 30 minute cycles to a peak temperature of 850°C for 10 minutes

Tested on 96% alumina substrates

2 90° wire peel test on 2mmx 2mm pads soldered with 60Sn/40Pb solder at 230°C and using a mildly activated Alpha 611. See wire peel adhesion test procedure for details (E-3.12)

The information provided herein corresponds to our knowledge on the subject at the date of its publication. This information may be subject to revision as new knowledge and experience becomes available. The data provided fall within the normal range of product properties and relate only to the specific material designated; these data may not be valid for such material used in combination with any other materials or additives or in any process, unless expressly indicated otherwise. The data provided should not be used to establish specification limits or used alone as the basis of design; they are not intended to substitute for any testing you may need to conduct to determine for yourself the suitability of a specific material for your particular purposes. Since DuPont cannot anticipate all variations in actual end-use conditions DuPont makes no warranties and assumes no liability in connection with any use of this information. Nothing in this publication is to be considered as a license to operate under or a recommendation to infringe any patent rights.

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K-26859 07/2013

For more information on DuPont 5915R 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.: 1 919 248 5188

Europe

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

Asia

Japan

DuPont Kabushiki Kaisha

MCM Technical Lab
DuPont Electronics Center
KSP R&D B213
2-1, Sakado 3-chom, Takatsu-ku,
Kawasaki-shi, Kanagawa, 213-0012
Japan
Tel +81 44 820 7575

DuPont Taiwan Ltd.

45, Hsin-pong Rd,
Taoyuan,
Taiwan, 330
Tel : 886 3 377 3660

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

DuPont Company (Singapore) Pte Ltd

1 HarbourFront Place, #11-01
HarbourFront Tower One
Singapore 098633
Tel: 65 6586 3022

mcm.dupont.com



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