

DuPont 5744R

GOLD CONDUCTOR COMPOSITION

EUROPEAN TECHNICAL DATA SHEET

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 5744R is a cadmium free* gold conductor. It has been specifically developed for automatic wire bonding with both Al and Au wires.

5744R is used for bonding pads on alumina and on DuPont 5704 dielectric, and as such, can be employed in single layer and crossover Pd/Ag circuits as well as in simple multilayer circuits using silver bearing conductors.

Product Benefits :

- Cadmium free* gold conductor and Phthalate free*
- Wide bonding window
- Suitable for manual and automatic gold and aluminum wire bonding
- High wire pull strengths after storage at 150°C for 1,000 hours using Au and Al wires

*Cadmium and Phthalate 'free' as used herein means that cadmium is not an intentional ingredient in and is not intentionally added to the referenced product. Trace amounts however may be present

Design Notes

Properties are based on tests on 96% alumina substrates. In crossover and simple multilayer circuits using silver bearing conductors, 5744R is compatible with many materials, however, when mixing conductor of different metallurgy (including Pd-Ag and Ag with Au), caution should be exercised. Consult with your DuPont representative for recommendations on design and processing.

Processing Summary

- **Screen Type**
325 stainless steel screen with a 12µm emulsion build up
- **Drying**
Allow prints to level for 10–5 minutes at room temperature, then dry for 10–15 minutes at 150°C

- **Firing**

850°C peak held for 10 minutes on 30-60 minute cycle in an air atmosphere

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.

Substrates

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

Thinner

5744R 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 the rheological behaviour of the material and its printing characteristics. Please refer to table 1. Typical Physical Properties'



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TABLE 1. TYPICAL PHYSICAL PROPERTIES

Viscosity (Pa.s.) (Brookfield HBT, 20rpm, SC4-14/6R utility cup and spindle, 25°C ± 0.2°C)	280 - 350
Coverage [cm²/g]	60 - 65
Thinner	7697
Shelf Life (months)	6

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'.

Firing

Fire in well ventilated belt, conveyor furnace 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. Full information on requirements for firing is contained in DuPont Technical Guide EUT 7.4 'Process Guide-Firing'. Refer to 'Processing Summary'.

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

Line resolution	≤ 175µm lines	≥ 175µm spaces
Fired Thickness (µm)		7 - 9
Resistivity [mΩ/□] (@ 8µm fired thickness)		≤ 6.5
Ultrasonic aluminum wire bonding 38µm wire ² (g)		
Initial pull strength		≥ 17
Thermosonic gold wire bonding 32µm wire ² (g)		
Initial pull strength		≥ 17

1 Typical properties are based on laboratory data using recommended processing procedures.

2 All wire breaks. No bond lifts, on alumina and on 5704 Bonding conditions:

Bonded using Al manual bonder, 38µm Al wire (1% silicon)

Bonded using Au automatic wire bonder, 32µm Au AW7 wire

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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