DuPont QS174

PLATINUM SILVER CONDUCTOR

Technical Data Sheet

Product Description

DuPont QS174 is intended to be applied to ceramic substrates by screen printing and fired in a conveyor furnace in an oxidizing atmosphere (air) to form interconnection tracks and pads for component and lead attachment, in hybrid microcircuits and networks.

Product Benefits

- Suitable for use on a 15 minute profile
- Excellent adhesion on alumina
- Cadmium, Phthalate & Nickel oxide free

Compatibility

While DuPont has tested this composition with specified materials and under the recommended processing conditions, it is impossible or impractical to cover every combination of materials, customer processing conditions and circuit layout. It is therefore essential that customers thoroughly evaluate this material in their specific situations, in order to completely satisfy themselves as to the overall quality and suitability of the composition for its intended application(s).

Processing

Substrates

Properties are based on tests on 96% alumina substrates. Substrates of other compositions and from various manufacturers may result in variations in performance properties, as may different lots of substrates, and any subsequent processing of substrates (e.g. laser scribing or drilling) prior to printing. It is the responsibility of users to determine the effects of any of the above variables in their particular situations.

Typical Physical Properties[1]	
Test	Properties
Fired Thickness	10 – 12 μm
Resistivity (1x fired)	< 2.8mΩ/sq at a fired thickness of 12 μm
Solder Acceptance[2] 62Sn/36Pb/2Ag @ 220°C	≥90% coverage
Adhesion[3] - Initial (x1 fired) - Aged 48 hrs at 150°C	 > 22N > 22N
Composition Properties	
Viscosity (Pa.s) [Brookfield HBT, utility cup & spindle (SC4-14/6R) @10 rpm, 25°C ± 0.2°C]	80 - 150
Thinner	DuPont 4553

Test Procedure:

[1] Typical fired properties are based on laboratory tests. Unless expressly noted elsewhere the following processing conditions have been used.
Printing: 325 mesh stainless steel screen, 12-14□m emulsion thickness.
Firing: 3x30 minutes cycle to a peak temperature of 850°C for 10 minutes. All tests performed on 96% alumina substrates.

[2] Using Alpha 611 flux. Solder coverage measured after a 5 s. dip in solder.

[3] 90° wire peel test on 2mm x 2mm pads soldered with 62Sn/36Pb/2Ag solder at 220°C and using mildy-activated flux, Alpha611.

Table 1 & 2 shows anticipated typical physical properties for DuPont QS174 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

Conductor composition DuPont QS174 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 1-2 minutes.
Printing should be carried out in a clean, 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 of DuPont QS174 are generally achieved in the temperature range 20°C - 23°C. It is therefore important that the material, in its container, is at this temperature prior to commencement of printing.

Drying

Allow prints to level for 5-10 minutes at room temperature in a clean, draught-free environment, followed by drying for 10-15 minutes at 150°C in a well ventilated oven or conveyor dryer.

Firing

Fire in a well ventilated belt or conveyor furnace, in air with a 30 minute cycle to a peak temperature of 850°C fore 10 minutes.
Care must be taken to ensure that any gases/vapors from other chemicals/materials (e.g. halogenated solvents) do not enter the furnace muffle. It is also essential that the air supply to the furnace is clean, dry and free of contaminants.
Air flows and extraction rates should be optimized to ensure that oxidizing conditions exist within the muffle, and that no furnace exhaust gases enter the room.
Additional information on requirements for firing is contained in DuPont Technical Guide, EUT 7.3 “Processing-Screen Firing”.

General

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

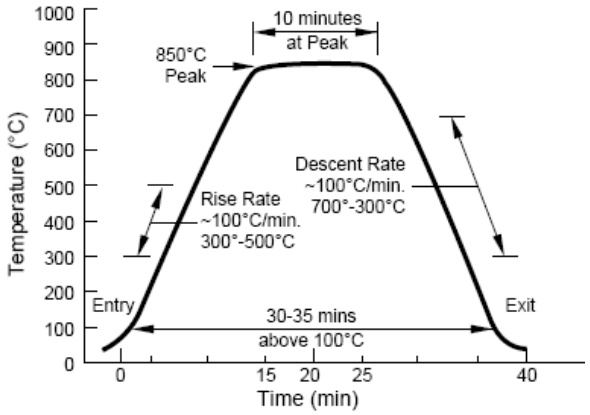
Storage and Shelf Life

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).

Typical 30 Minute Firing Profile



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.

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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.

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MCMQS174 (1/2010)