DuPont THR61

Silver Platinum Through Hole Fill 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 THR61 is a 100:1 silver/platinum through-hole conductor designed to fill holes in alumina and AlN (aluminum nitride) substrates. It creates a highly conductive (electrically & thermally) front-to-back interconnect with reduced capacitance effects associated with coated through-holes in high frequency applications. It also provides a simple, low cost method to create surface planarity of thermal, and buried vias for double side and multilayer circuits using conventional equipment. DuPont THR61 is specifically formulated for minimal shrinkage from the dried to the fired state. Its low shrinkage makes DuPont THR61 ideal for filling 6-25 mil diameter holes in 10-25 mil thick substrates.

Product Benefits :

- High Electrical Conductivity
- High thermal conductivity enables circuit designers to use filled vias to improve thermal management alumina substrates
- No shrinkage away from side walls of 96% alumina substrates
- Dense and Planar Fill
- Single-step Processing
- Lead, Phthalate, Cadmium, Nickel oxide free*

* Lead, 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

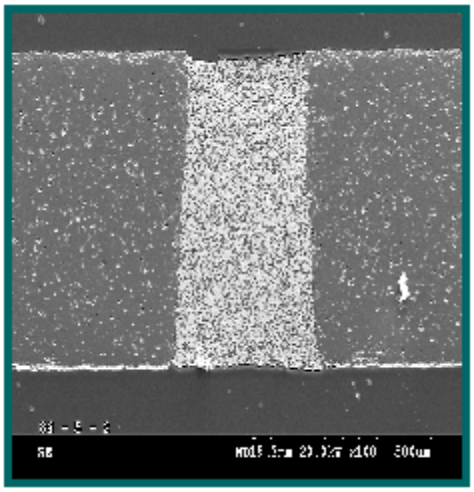
Recommended processing procedures are described in the Design Guideline for Filling Through-holes.

- **Printing**
  DuPont THR61 is formulated for use with either a screen printer or extrusion bladder filler. A stencil is recommended for achieving a uniform and void free fill.
- **Drying**
  Allow the filled through-holes to level for 5-10 minutes at room temperature, then dry for 10 min. at 150º C in a well ventilated oven or belt dryer. Additional drying time may be needed for large diameter holes or if there is poor airflow in the dryer.
- **Firing**
  850℃ peak held for 10 minutes on 30 minute cycle in an air atmosphere

TABLE 1. TYPICAL PHYSICAL PROPERTIES

Viscosity (Pa.s.) (Brookfield HAT, Utility cup & spindle, (SC4-14/6R), 1rpm, 25℃ ± 0.2℃)	5000– 8000
Thinner	9450
Shelf Life (months)	6

DuPont THR61 Silver/Platinum 100:1



15 mil Wide Hole
25 mil Thick Substrate

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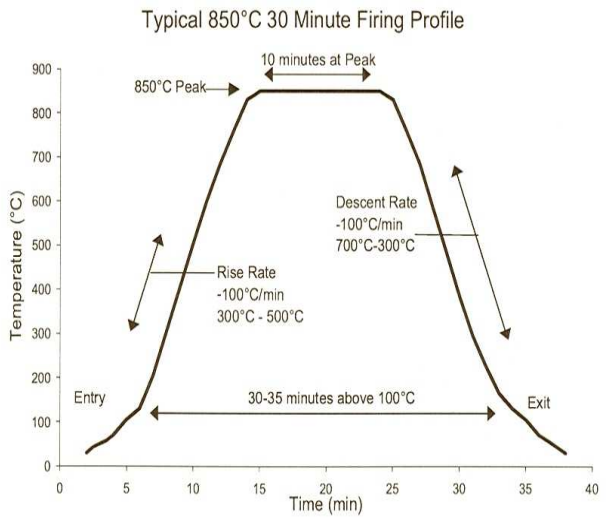
CHART 1. FIRING PROFILE



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

THR61 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'

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℃-23℃. It is therefor e 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

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 PROPERTIES[1]

Resistivity on alumina [mΩ/□] (@ 25µm fired thickness)	≤ 7

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-26856 06/2013

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