Microcircuit Materials

QQ620 Encapsulant Composition

Thick Film Composition 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

QQ620 glass encapsulant composition is intended to form an insulating and protective layer over thick film circuits.
It is applied to ceramic substrates by screen printing and fired in an air (oxidising) atmosphere.

Key Features:

- ❑ Lead and Cadmium free encapsulant, green colour.
- ❑ Protection against reactive chemicals
- ❑ Fireable on a low temperature (620°C) profile

Compatibility

Whilst DuPont has tested this composition with 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).

Composition Properties

Viscosity [Pa.s] Brookfield HAT, Utility cup & Spindle (SC4-14/6R), 10rpm, 25°C ± 0.2°C	90 - 130
Solids [%]	71.8 - 73.8
Coverage [cm²/g at 9µm fired thickness]*	165
Shrinkage [%] (Dry to Fired)	≈30
Thinner	8250
Shelf Life [months]	6

Processing Conditions

Printing	325 mesh stainless steel with 10µm emulsion
Drying	Allow prints to level for 5-10 minutes at room temperature, then dry for 10-15 minutes at 150°C
Firing	620°C plateau for at least 4 minutes, 7 to 10 minutes above 600°C, and at least 25 minutes above 100°C on a 30 minute cycle in an air atmosphere

Typical Fired Properties

Fired Thickness [µm]	7 - 10

Recommended Processing Procedure

Storage

Containers may be stored in a clean, stable environment at room temperature (< 25°C), with their lids tightly sealed. Storage in freezers (temperature < 0°C) is NOT recommended as this could cause irreversible changes in the material.
For guidance regarding storage of material, please consult DuPont Technical Note EUT 7.2 "Shelf Life Policy".

Shelf life

This composition's shelf life is from date of shipment, for factory-sealed (unopened) containers, stored under room-temperature conditions. Refer to table - for shelf life period.

Substrates

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

Thinner

This composition is optimized for screen printing, 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. Refer to table - “Composition Properties”

Printing
The composition should be thoroughly mixed before use. This is best achieved by slow, gently, hand stirring with a clean burr-free spatula (flexible plastic or stainless steel) for 1-2 minutes. Care must be taken to avoid air entrapment.
Printing should be performed in a clean and 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 this 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 table - “Processing Conditions”

Drying
Allow prints to level at room temperature, then dry in a well ventilated oven or conveyor dryer. Refer to table - “Processing Conditions

Firing
Fire in a 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 table - “Processing Conditions”

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.

Health/Safety considerations
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”.

Typical Firing Profile