

# DuPont 9615R

Glass Encapsulant

## 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

High temperature glass encapsulant composition DuPont 9615 is intended for use as a final encapsulant to provide hermetic protection for screen printed capacitors. DuPont 9615 is applied to ceramic substrate by screen printing and fired in an air (oxidizing) atmosphere.

### Product Benefits :

- Red color dried film, colorless fired film.
- Coefficient of thermal expansion  $6.3 \times 10^{-6}$  in/in/°C (0-300°C)
- Hermetic fired film with excellent chemical durability
- Fired at a peak temperature of 850°C
- 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**  
200 stainless steel screen to get a fired thickness of 12µm.
- **Drying**  
Allow prints to level for over 10 minutes at room temperature, then dry for  $\geq 10$  -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

TABLE 1. TYPICAL PHYSICAL PROPERTIES

<b>Viscosity (Pa.s)</b> (Brookfield HBF,10rpm, spindle #5,25°C±0.2°C)	170 – 230
<b>Coverage [cm<sup>2</sup>/g]</b> Based on wet thickness of 50µm	83
<b>Thinner</b>	9180R
<b>Shelf Life (months)</b>	6

### Thinner

9615R 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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### 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

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'.

CHART 1. FIRING PROFILE

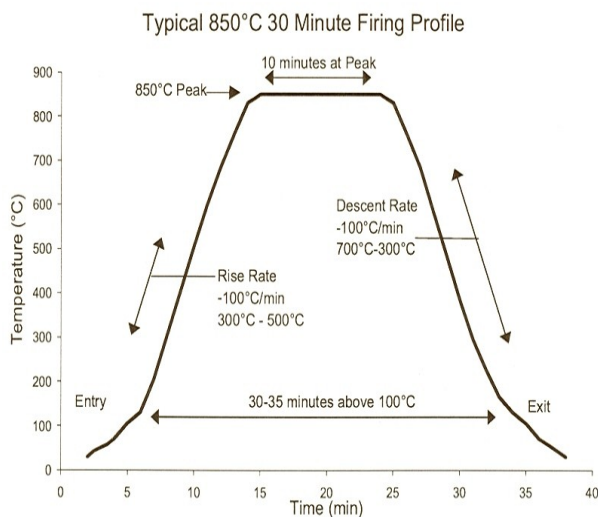
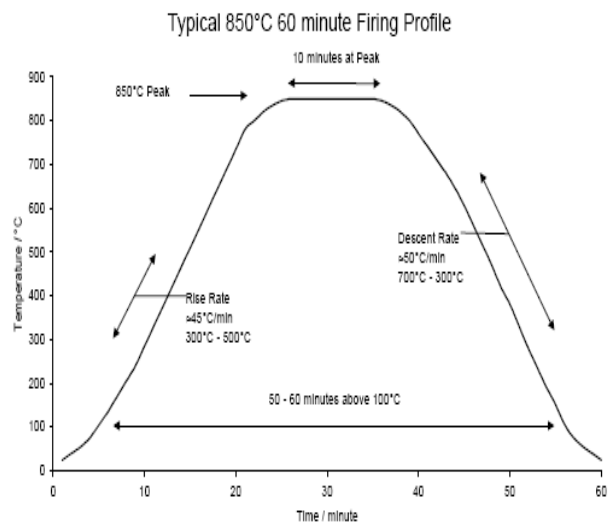


CHART 2. FIRING PROFILE



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