



## ESL ELECTROSCIENCE

CERAMIC TAPES &  
THICK-FILM MATERIALS

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# SEALING GLASS PASTE

# 4026

ESL 4026 is a glass in a screen-printable paste that may be used for sealing alumina substrates together at medium temperature. Other ceramics or glass materials having thermal coefficients of expansion similar to alumina may be bonded as well. The paste contains vitreous, non-pigmented glasses in organic vehicles that burn off before the glasses melt. Failure to accomplish complete burnout may lead to gas leakage of the fired seal and will leave dark carbonaceous residues within the glass layer. The sealing temperature used is dependent upon the time at peak temperature and the degree of pressure (clamps or weights) that may be applied during firing. Longer sealing times and/or higher pressures allow lower temperatures. Weights of 0.5 - 1.0 kg have been used for packages 2 cm<sup>2</sup>. If clamps are used they should be arranged to equalise the pressures around the edge of the seal. This sealing glass is not recommended for sealing substrates that differ in thermal coefficient of expansion (TCE) by more than 10 - 15% from that of the sealant. By prefusing 4026 to alumina and 4011 or 4022 to soda lime glass, seals can be made between alumina and glass. It is also known that these sealing glasses have excellent acid resistance and may be used as chip resistor overglazes.

## PASTE DATA

**Rheology:** Thixotropic, screen-printable paste

**Viscosity:**  
(Brookfield RVT, 10 rpm,  
No.7 spindle, 25.5 ± 0.5 °C) 175 ± 25 Pa.s

**Colour:** Clear

**Shelf Life (20 - 25 °C):** 6 months

## PROCESSING

**Screen Mesh, Emulsion:** 200 or 325 S/S, 25 µm

**Levelling Time (at 20°C):** 5 - 10 min

**Drying Time (at 125°C):** 10 - 15 min

**Firing Temperature Range:**  
Burnout: 325 - 375 °C / 15 - 30 min  
Sealing: 550 - 625 °C / 1 - 2.5 hrs

**Substrate for Calibration:** 96% alumina

**Thinner:** ESL 401

ESL Europe 4026 0402-G

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See Caution and Disclaimer on other side.

## TYPICAL PROPERTIES

Thermal Coefficient of Expansion (TCE):

$76 \times 10^{-7}/^{\circ}\text{C}$

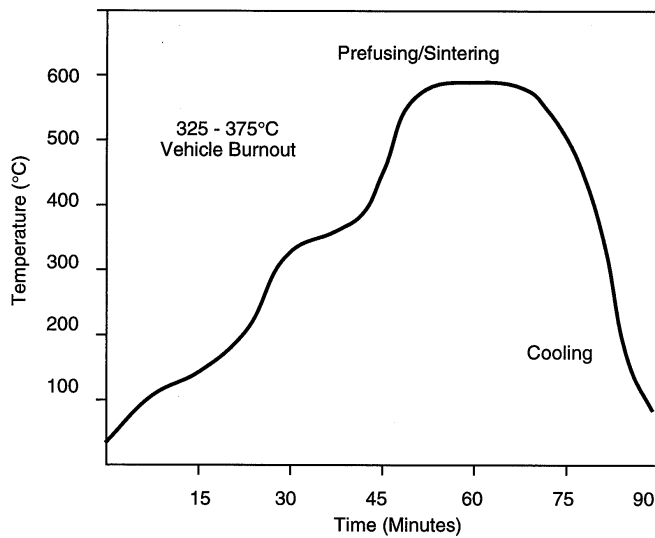


Figure 1: Generalised temperature profile for drying, burnout, prefusing/sintering for 4026

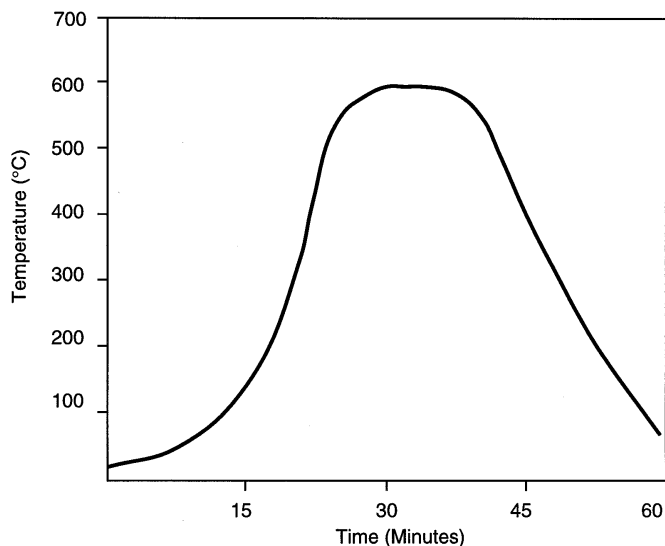


Figure 2: Generalised temperature profile for sealing (for use only after drying, burnout and prefusing/sintering steps) 4026

ESL Europe 4026 0402-G

**CAUTION:** Proper industrial safety precautions should be exercised in using these products. Use with adequate ventilation. Avoid prolonged contact with skin or inhalation of any vapours emitted during use or heating of these compositions. The use of safety eye goggles, gloves or hand protection creams is recommended. Wash hands or skin thoroughly with soap and water after using these products. Do not eat or smoke in areas where these materials are used. Refer to appropriate MSDS sheet.

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