ESL ELECTRO-SCIENCE
CERAMIC TAPES & THICK-FILM MATERIALS
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INSULATING COMPOSITION 4924

HOS Heaters on Steel® • COS Circuits on Steel® • TFOS Thick Film on Steel®

Cadmium, Lead, Nickel and Barium-Free*

ESL 4924 is a dielectric composition designed to insulate unabraded, unoxidized, ferritic steels. The 4924 is non-porous and its TCE closely matches that of BS970/1449 Type 430-S17 or AISI Type 430 stainless steel. Three separately fired layers of 4924, having a total minimum thickness of 80 micrometers, provide excellent breakdown voltage between top conductive prints and the stainless steel base. It is essential that the stainless steel is only handled using protective gloves and that all printing is carried out in clean room conditions. With ESL 9695 or 9501-CH terminations and 29XXX Series resistors used as heating elements 4924 is recommended as an 850°C firing overglaze. These materials are also useful in other TFOS (Thick Film on Steel)® applications.

PASTE DATA

RHEOLOGY:	Thixotropic, screen printable paste
VISCOSITY: (Brookfield RVT, ABZ Spindle, 10 rpm, 25.5°C ± 0.5°C)	120 ± 20 Pa·s
COLOR:	Dark blue
SHELF LIFE: (25 °C)	6 months

PROCESSING

SCREEN MESH/EMULSION:	165 S/S, 0.0 μm
LEVELING TIME:	5-10 minutes
DRYING AT 125 °C: (Depending upon substrate volume)	> 15 minutes
FIRING TEMPERATURE:	850 °C to 930 °C
OPTIMUM:	850 °C
TIME AT PEAK:	10 minutes

4924 0412-C

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See Caution and Disclaimer on other side.

SUBSTRATE FOR CALIBRATION: Unabraded, unoxidized 430 S17 stainless steel

122.5 mm diameter x 1.2 mm

THINNER: ESL 401

TYPICAL PROPERTIES

FIRED THICKNESS:
(At least 3 layers between 9695 and 430 S 17 stainless steel, measured using an Elcometer 345 thickness gauge) > 80 μm

BREAKDOWN VOLTAGE:
(Measured on an 88 mm diameter 9695 print on a 108 mm diameter area of dielectric at 25 °C in air, using a standard Clare Flash Tester) >1800 VAC

APPROXIMATE COVERAGE: (80 μm thickness) 40 cm^2/g

INSULATION RESISTANCE:
(Measured on an 88 mm diameter 9695 print on a 108 mm diameter area of dielectric using 500 VDC at 25 °C in air)

After storage at 93 % ± 2 % RH, 25 °C ± 2 °C for 48 hours	> 10^9 Ω
At 300 °C	> 10^9 Ω

A wide range of ESL materials are compatible with 4924 permitting the fabrication of other COS (Circuits on Steel) ®.