Heraeus

Technical Data Sheet



RoHS

THICK FILM MATERIALS

Product Type: Resistors Product Name: R400AR

Low Range Ohmic Resistor Paste

Description

Heraeus' R400AR Series is a low range, lead free, low TCR air-fired resistor system, compatible with lead free Pt/Ag and Pd/Ag conductors. This series gives a dense fired film and was designed to give very tight resistance distribution when co firing the front and back side of circuits. The series exhibits excellent print resolution for use in typical serpentine layouts. Heraeus' R400AR Series is laser trimmable and has outstanding power handling capability.

REACH

Key Benefits

- REACH¹ and ROHS² compliant
- Free of lead and cadmium
- Low range ohmic resistor
- Low TCRs
- Dense microstructure
- Tight as fired distribution

Typical Properties

	R405AR	R410AR	R415AR	R425AR	R450AR	R475AR	R490AR	R400AR-05	R400AR-10		
Resistance	50 ±	100 ±	150 ±	250 ±	500 ±	750 ±	1000 ±	5000 ±	10000 ±		
mΩ/□	15 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %		
TCR (ppm)	< 425	100	75	75	75	75	75	75	75		
Refine Stability											
∆R @ 500 °C	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %		
∆ R @ 850 °C	< -3 %	< -3 %	< -3 %	< -3 %	< -4 %	< -4 %	< -4 %	< 8 %	< 8 %		

* Measured on a 600 square serpentine pattern, 25 mil lines and spaces

Viscosity

180 – 260 Kcps, Brookfield HBT,

SC4 - 14 spindle and 6R utility cup at 10 rpm, 25 °C

Solids

R405AR and R410AR
 $77.0 \pm 1.0 \%$

All other values
 $70.0 \pm 1.0 \%$

Recommended Pb/Cd Free 500 °C overglaze – IP9035A Recommended Pb/Cd Free 600 °C overglaze – IP9036A Recommended Pb/Cd Free 850 °C overglaze – IP9217 Recommended Pb/Cd Free Termination Conductors – C2130B, C2180 and C4729

Heraeus

Technical Data Sheet



Low Range Ohmic Resistor Paste

Recommended Processing Guidelines

Printing Conditions

250 - 325 mesh, 1.1 mil wire and 0.5 mil emulsion screen

Drying Conditions

150 °C for 8 - 10 minutes

Firing Conditions

850 °C peak with a 10 minutes dwell time

Thickness Information (µm)

	R405AR	R410AR	R415AR	R425AR	R450AR	R475AR	R490AR	R400AR-05	R400AR-10
Dry	12 – 19	17 – 21	14 – 17	14 – 17	14 – 17	15 – 18	15 – 18	14 – 17	14 – 17
Fired	7 – 11	9 – 13	7 – 9	7 – 9	8 - 10	8.5 – 11	8.5 – 11	8.5 – 11	8.5 – 11

Warranty

Material guaranteed to meet specifications for 6 months from date of shipment.

Storage

Store in a dry location at 5 – 25 °C.

DO NOT REFRIGERATE.

Allow paste to come to room temperature prior to opening. Spatulate well before using, as settling may occur during storage.

Legend:

¹⁾ RoHS compliant according to the <u>latest</u> ** Directives (European Union) of Restriction of Hazardous Substances ("RoHS") and its subsequent amendments (including the exceptions related to Pb)

²⁾ RoHS compliant according to the <u>latest</u> ** Directives (European Union) of Restriction of Hazardous Substances ("RoHS") and its subsequent amendments (including the exceptions related to Pb)

* See the data sheet issue date (DD/MM/YY) as reference of validity of latest edition which is available on request

Heraeus Electronics Heraeus Deutschland GmbH & Co. KG Heraeusstraße 12 – 14 63450 Hanau, Germany www.heraeus-electronics.com Americas Phone +1 610 825 6050 electronics.americas@heraeus.com

Asia Pacific Phone +65 6571 7677 electronics.apac@heraeus.com China

Phone +86 21 3357 5457 electronics.china@heraeus.com

Europe, Middle East and Africa Phone +49 6181 35 3069, +49 6181 35 3627 electronics.emea@heraeus.com

The descriptions and engineering data shown here have been compiled by Heraeus using commonly-accepted procedures, in conjunction with modern testing equipment, and have been compiled as according to the latest factual knowledge in our possession. The information was up-to date on the date this document was printed (latest versions can always be supplied upon request). Although the data is considered accurate, we cannot guarantee accuracy, the results obtained from its use (unless this is contractually and explicitly agreed in withing, in advance). The data is supplied to not the outfort that the user shall conduct tests to determine materials suitability for particular applications.