

## Technical Data Sheet



### THICK FILM MATERIALS

Product Type: Resistors

Product Name: HTR12000AR

## CELClON

2 Ω/□ to 10 Ω/□ Resistor System



#### Description

The HTR12000AR series is a Pb-free resistor series that was developed for applications which require peak firing temperatures lower than traditional thick film resistors series. The HTR12000AR series is formulated to fire at a 550 °C peak firing temperature, which makes this series compatible with the Celcion materials. This resistor series makes heaters on aluminum possible.

#### Key Benefits

- REACH<sup>1</sup> and ROHS<sup>2</sup> compliant
- Free of lead
- Low temperature 550 °C firing
- Compatible with the IP6075 and C8829D

#### Typical Properties

HTR12000AR Series	HTR12045AR	HTR12019AR	HTR12020AR	HTR12035AR	HTR12038AR
Resistance (Ω/□) Termination: C8829D fired at 550 °C. Resistor geometry 1 x 1 mm printed with 280 mesh screen.	2 ± 10 %	10 ± 10 %	20 ± 10 %	40 ± 10 %	100 ± 10 %
TCR (ppm/°C) Cold TCR: -55°C to +25 °C Hot TCR: +25 °C to +125 °C	± 700	± 700	± 700	± 700	± 700
ESD (1 %) 1 x 1 mm resistor % resistance change after 2 x 2000 volt pulses	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

#### Viscosity

100 – 200 Kcps, Brookfield HBT,  
SC4 – 14 spindle and 6R utility cup at 10 rpm, 25 °C

#### Solids

R405A and R410A            77.0 ± 1.0 %  
All other values              70.0 ± 1.0 %

Recommended Pb/Cd Free 500 °C overglaze – IP9035A, IP9038A  
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

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# CELCION

2 Ω/□ to 10 Ω/□ Resistor System



### Recommended Processing Guidelines

#### Printing Conditions

280 – 400 mesh, 1.1 mil wire and 0.5 mil emulsion screen  
Allow prints to level for 5 – 10 minutes at room temperature

#### Print Speed

Up to 10 in/sec (25 cm/sec)

#### Drying Conditions

150 °C for 10 minutes

#### Firing Conditions

Firing range between 550 °C  
Recommended 550 °C peak temperatures with a 2 – 3 minutes dwell time  
Total cycle time of 30 minutes

#### Thinner

RV-372

#### Thickness Information (µm)

	HTR12045AR	HTR12019AR	HTR12020AR	HTR12035AR	HTR12038AR
Dry	21 – 25	21 – 25	20 – 24	10 – 12	10 – 12
Fired	20 – 24	20 – 24	18 – 22	9 – 11	9 – 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) REACH compliant according to the latest \*\* Annex XIV to Regulation (EC) of the European Parliament and of the council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (“REACH”) by European Chemicals Agency and its subsequent amendments; the material does not contain any substance listed in Annex XIV.

2) RoHS compliant according to the latest \*\* 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

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