

Zoppas Industries
Heating Element Technologies

Flexible Heaters for Space Applications

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RICA Flexible Foil description

- RICA Flexible foil is, basically, a “sandwich “ made of a conductive material laminated between two insulated foils
- The flexible heating foils are the result of printed circuit technology.
- They are used to solve specific problems in advanced market sectors such as Space and Aviation fields.
- The physical dimension range of the heaters for Space applications are defined in the ESA ESCC 4009 – 4009/002 , specifications.



RICA Flexible Foil description

- **RICA, under the ESA ESCC 4009 -4009/002 certification ambit, manufactures two standard type of the heating elements**
- 1) single layers
- 2) double layers, according to two different technologies:
- **a) RICA Patch**
- **b) Nicolitch Patch**
- **RICA Patch Cables sealing -**
- The RICA patch cables sealing is the most used in the production of heating elements for RICA.
- It consists in sealing the connection cables of the electric circuit between the two Kapton layers, which represent the heater external insulation. With this type of sealing can be manufactured heating elements with one or more circuits, single or double layers. In the ESA ESCC 4009 -4009/002 certification circle, as RICA patch is concerned cables having AWG 30 to AWG20, can be used.
- **Nicolitch Patch Cables sealing -**
- The Nicolitch Patch cables sealing consists in sealing the cables of connection of the electric circuit through the application of a patch, constituted by some layers, positioned on the external surface of the Kapton.
- Nicolitch patch is mostly used for heaters having high ohm density . In the ESA ESCC 4009 -4009/002 certification circle, as Nicolitch patch is concerned, cables AWG 30 till AWG24 can be used.
- Using the above mentioned technologies, the additional following heating elements types can be manufactured:
- **3) “Magnetically Compensated Heater” (Double Layer)**
- **3a) “Magnetically Compensated Heater” -**
- This type of heater of recent manufacturing upon specific request from the market, represents a very limited production and it is done when there is the specific necessity of reducing till zero also the heater residual magnetism.
- The finished heater can have one or more circuits distributed on two faces electrically separated and connected through one or more electric “bridges” done putting into connection the circuits of the two faces. These heaters are generally manufactured with RICA patch.
- **4) Heaters with cables sealing “RICA DL Flat Heaters” (Double Layer)**
- **4a) “RICA DL Flat Heaters” -** This type of assembly is applied to all the double face heaters, where the planarity request of the side in contact with the structure is a “MUST”. Therefore these heaters are made according to the same production process of Nicolitch patch described on point 2 but the cables sealing is done as described in point 1, that is to say, with RICA patch..
- The product types described on point 3, 4, represent different methods of assembly both “single and double layer heaters” in order to satisfy the customer’s/market requests.
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RICA Flexible Foil description

These products are characterized by:

- Minimum weight and thickness
- flexibility, minimum heat dispersion when the heater is applied on a surface
- possibility to have various heat concentrations to optimize thermal distribution are the main characteristics of this product
- At ,RICA the Flexible Heating Elements, Single and Double Layers have special applications
- Rica ,since 1990 has been approved ISO 9001 and since April 1992 has been approved by ESA (ESCC 4009- 4009/002) as Supplier of flexible heaters , single and double layer, for use in space projects . Since then, more then one hundred satellites have been equipped with our heaters.



