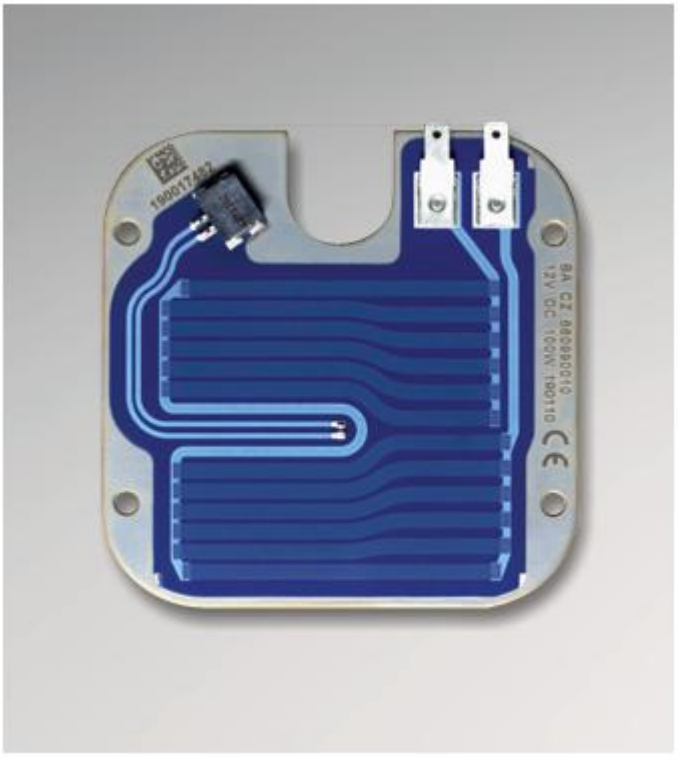
CLARIAN UK
A THERMAL HIRE LIMITED COMPANY

# THICK FILM HEATING ELEMENTS

## SAFETY · ENERGY EFFICIENCY · RELIABILITY

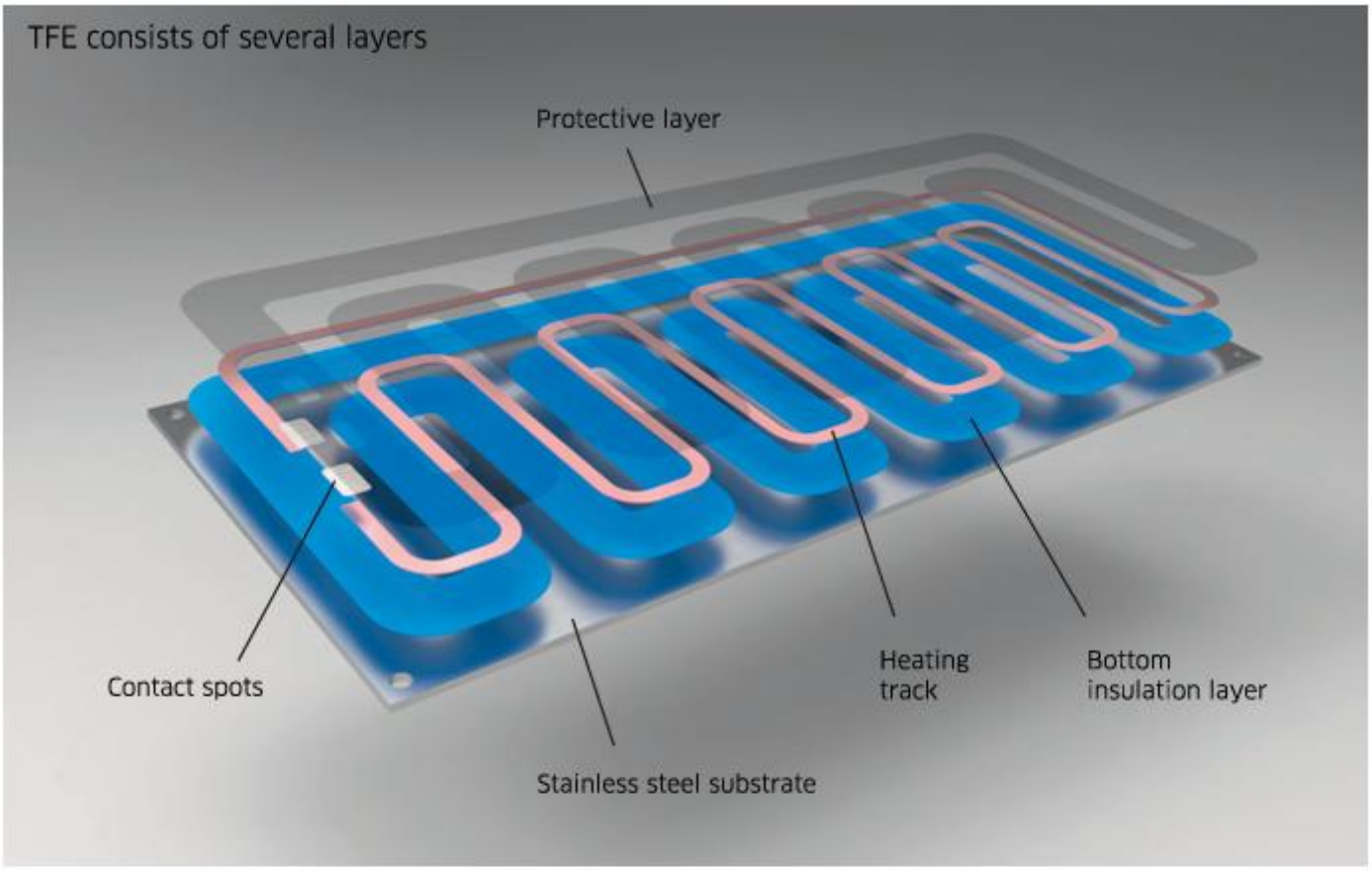
Our thick film elements (TFE) are manufactured in the European Union, with quick response to our customers specific design and logistical requirements.

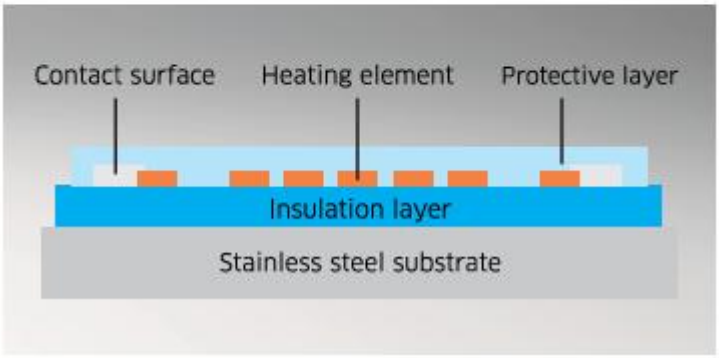


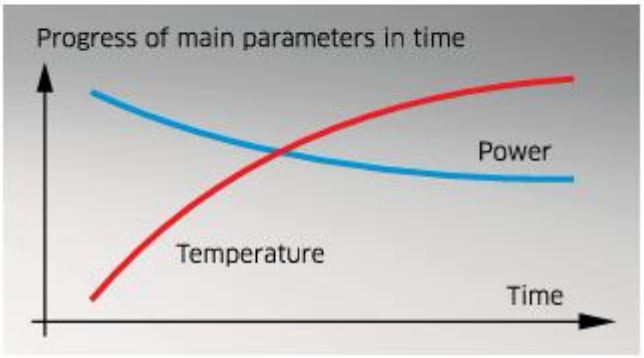
TÜV SÜD

Our QMS is certified according to IATF 16949 for automotive industry,
ISO 9001, ISO 14001 and ISO 45001 by TÜV Certification.

## THICK FILM ELEMENT CONFIGURATION




## TYPICAL ADVANTAGES

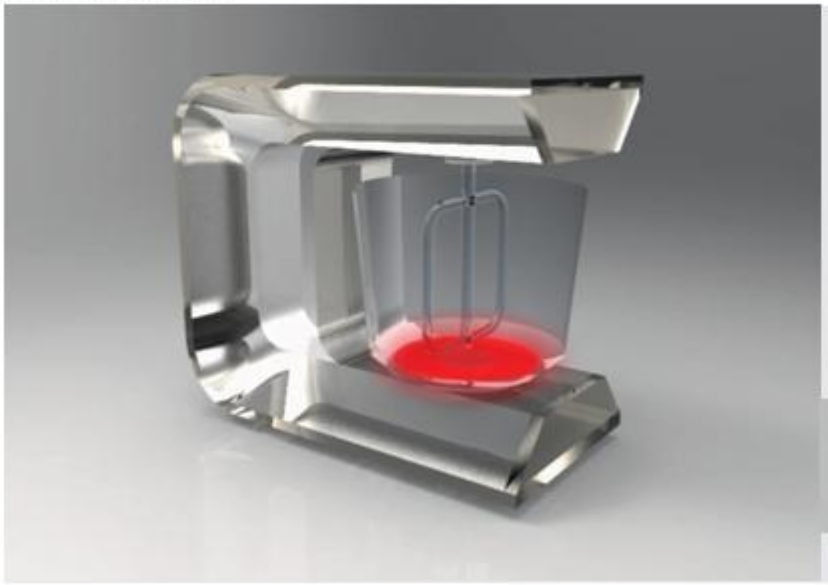
- Surface source of heat - flat tracks
- High performance - high power densities
- Possible high temperature up to 400°C
- Easy power management
- Electrical strength up to several kV
- Mechanical stable steel substrate
- Does not absorb humidity
- Temperature profile acc. to requirements

## MAIN AVAILABLE TECHNICAL PARAMETERS

| Dimensions | Maximal lenght | Max. power density on the heating track (W/cm2) | Substrate material |
|---|---|---|---|
| Flat TFE - max. width 240mm | 320 mm | 48 W/cm2 | AISI 444 |
| Tube - diameter 15mm | 200 mm | 53 W/cm2 | AISI 430 |
| Tube - diameter 20mm | 330 mm | 51 W/cm2 | AISI 304 |

# HOUSEHOLD APPLICATIONS

## Food processor



| | |
|---|---|
| Power range | 1000W - 2000W at 230V |
| Diameters | From 100mm up to 210mm |

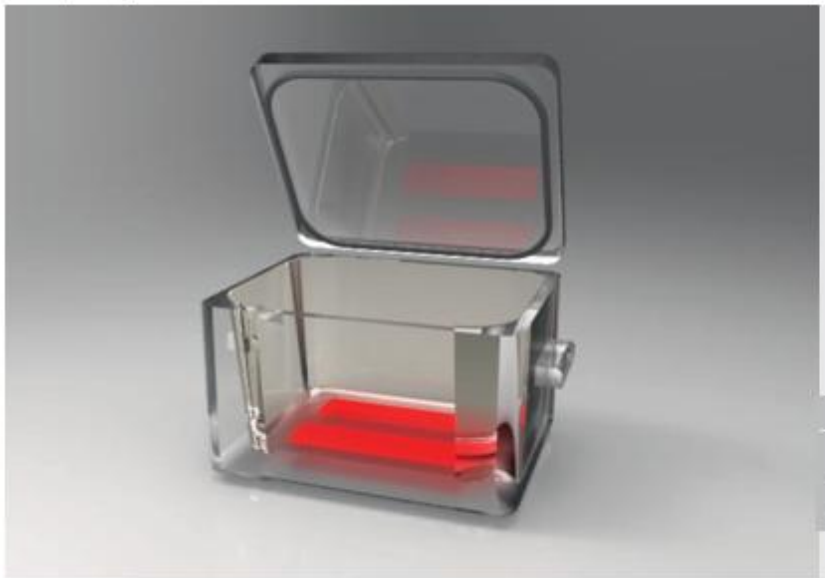
TFE can be equiped with NTC sensor and safety thermostat.

## Steam owen

| | |
|---|---|
| Power range | 2 heating tracks 700 + 1300W |
| Diameters | 130 mm |

TFE has got mechanical connectors for fastons.

## Deep fryer

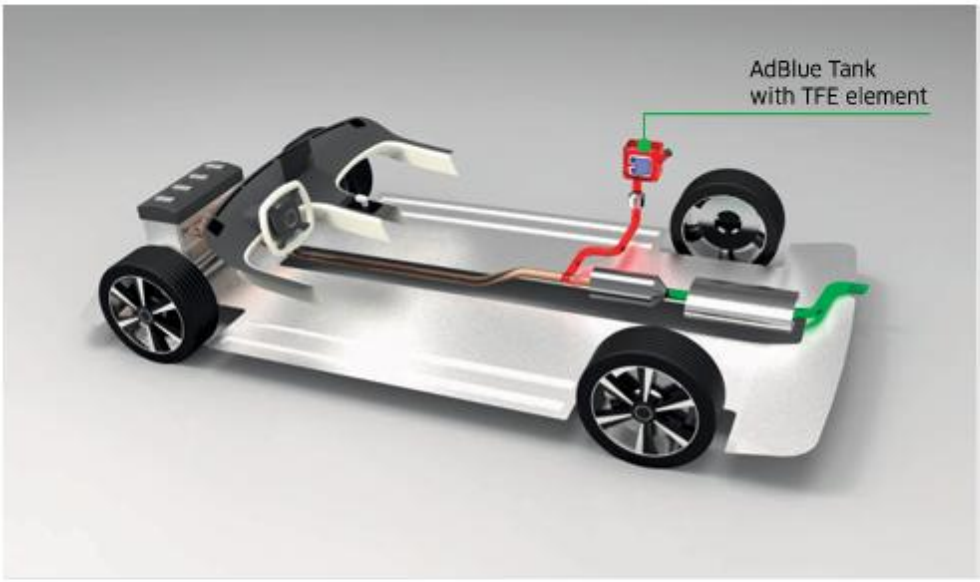


| | |
|---|---|
| Power range | 2 x 500, 1000 or 1500W |
| Max. dimensions | 330 x 220 mm |

Very large TFE installed on the bottom of the vessel.

# AUTOMOTIVE

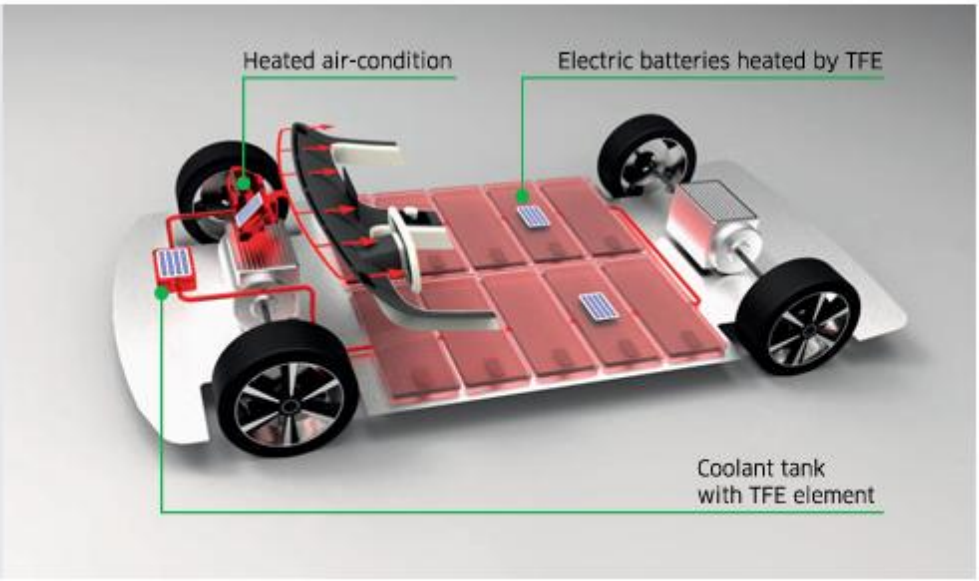
## AdBlue



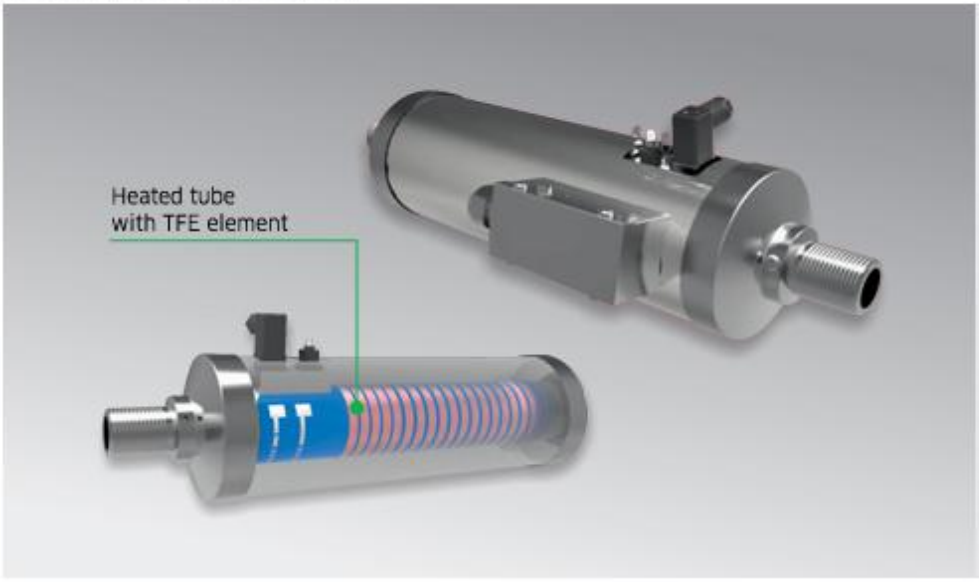

Our solution helps to reduce emission in cars. It works in more efficient systems for Co2 decreasing with help of AdBlue. Our company has a long-term experience with the deliveries of TFEs for the heating-up of urea (AdBlue) for the automotive suppliers. We produce over 1,5 Mil. pcs of TFEs for this application yearly.

## Coolant Heater

We cooperate with the suppliers to automotive on heat-up of cabin and tempering the batteries in electro mobiles and hybrid cars. Our thick film heating elements offer compact and quality solution. One of the advantages is high power density on cm2 in comparison with classic standard heating elements.



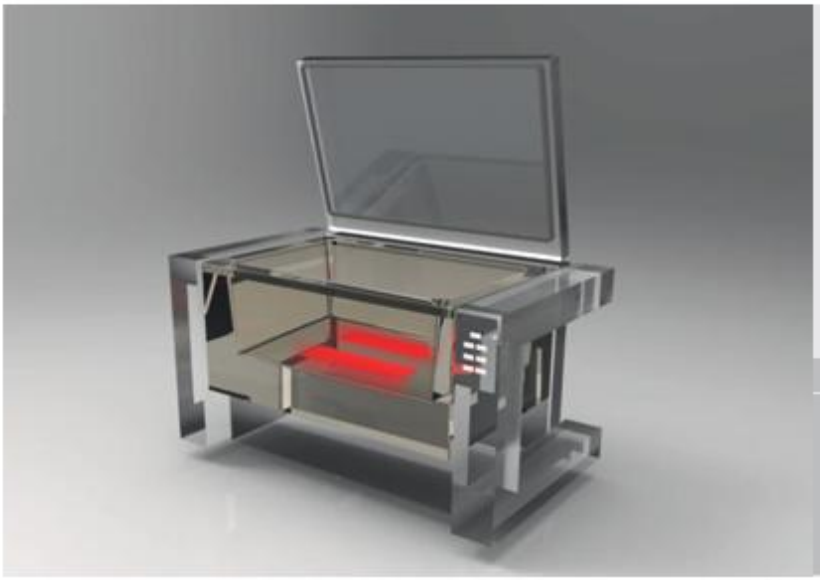

## Heating in electrobuses

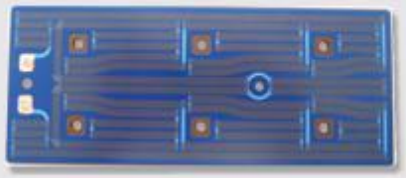



Compact solution with TFE offers various advantages - low weight, quick start of heat, high efficiency, etc. Robust and simple design improves reliability and lifetime. This solution with added value makes the power control easier.

## INDUSTRY

### Gastro equipment for professional kitchens





| | |
|---|---|
| Power range | 1000W - 2400W |
| Dimensions | 100 x 130mm - 100 x 270mm |

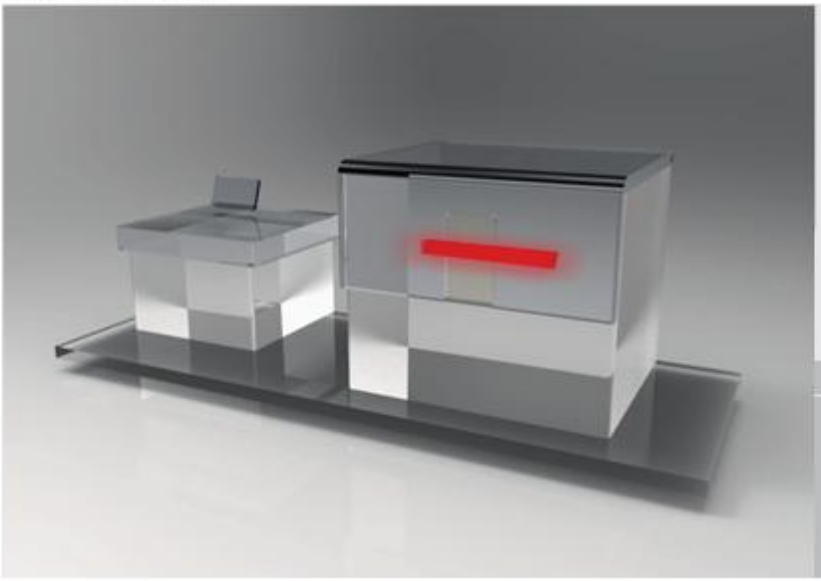
With TFE in this equipment you can get the quicker ramp-up to the desired temperature. In the comparison with standard tubular heating element the ramp-up is almost twice faster with use of TFE fixed to the bottom of the vessel.

### Mini-breweries

| | |
|---|---|
| Power range | 1000W on 1 element |
| Dimensions | 100 x 131mm |

One of the advantage in this application is that heating element is not immersed into the liquid inside the vessel. Also the solution with TFEs fixed to the bottom of the vessel is able to ensure the requested ramp-up of 1,5C° per minute.

### Digital printers

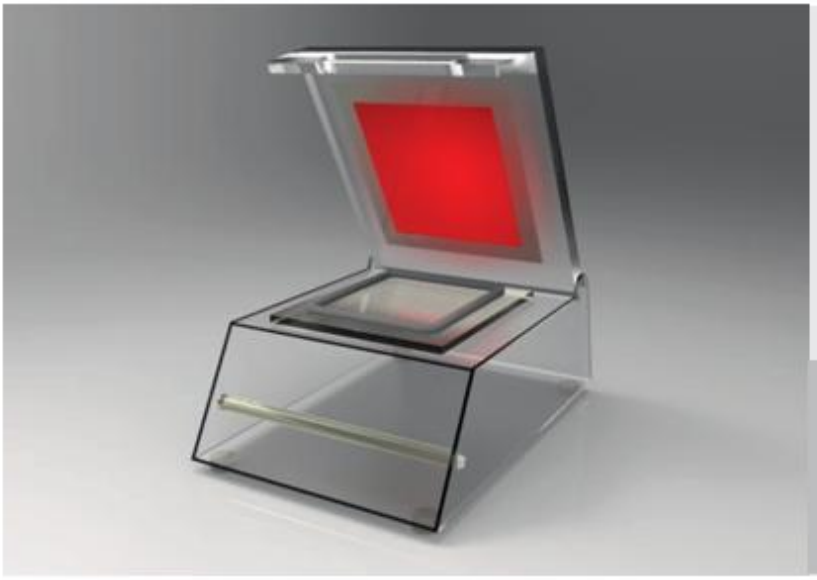


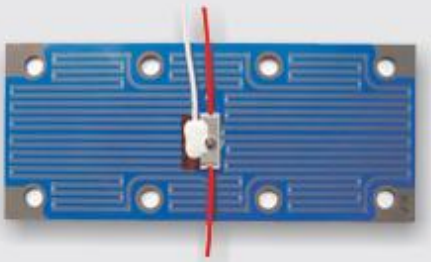
| | |
|---|---|
| Power range | 100W - 200W at 110/220/230V |
| Dimensions | 25 - 35 x 150 - 390mm |

TFE serves for tempering of inner space for printing of digital printer. These types of TFE are very slim and long. Minimum width is only 18 mm.

## INDUSTRY

### Packing Machine

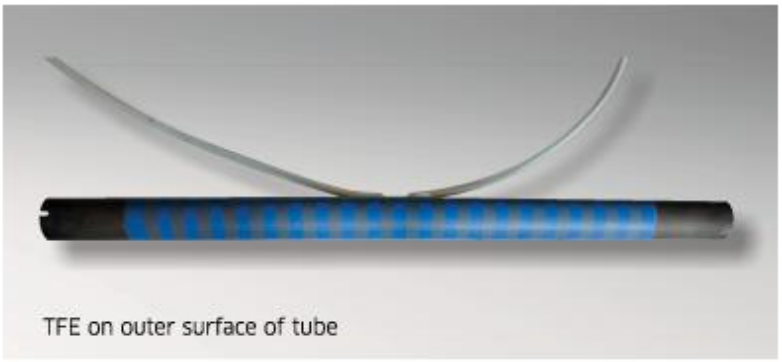




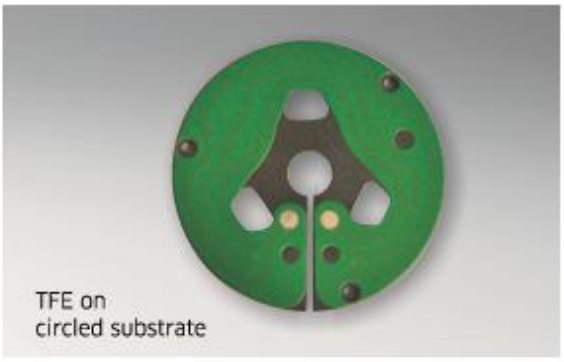
| | |
|---|---|
| Power range | 1500W at 230V |
| Dimensions | 112 x 230mm |

The customized TFE with wery accurate sensor Pt100 joined to the central part of TFE for optimal maintaining the requested temperature for sealing process.

## OTHER DESIGNS OF TFE ELEMENTS

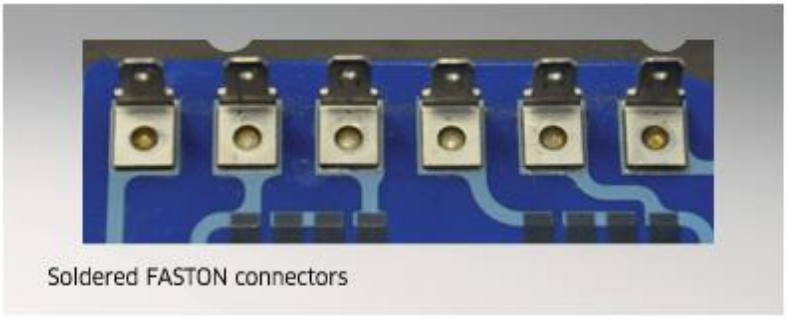


TFE on outer surface of tube



TFE on circled substrate

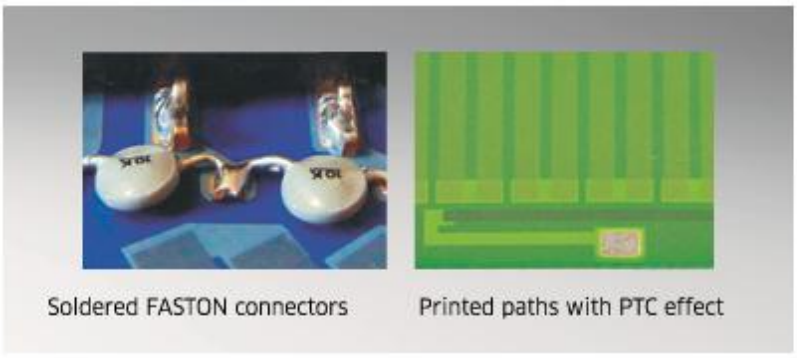
## CONNECTORS



Soldered FASTON connectors

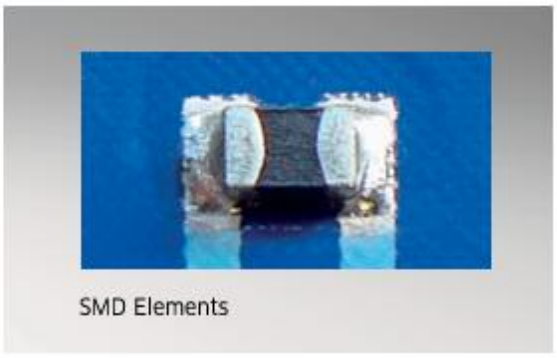
Connector terminal board

## SENSORS AND FUSES



Soldered FASTON connectors

Printed paths with PTC effect



SMD Elements

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