



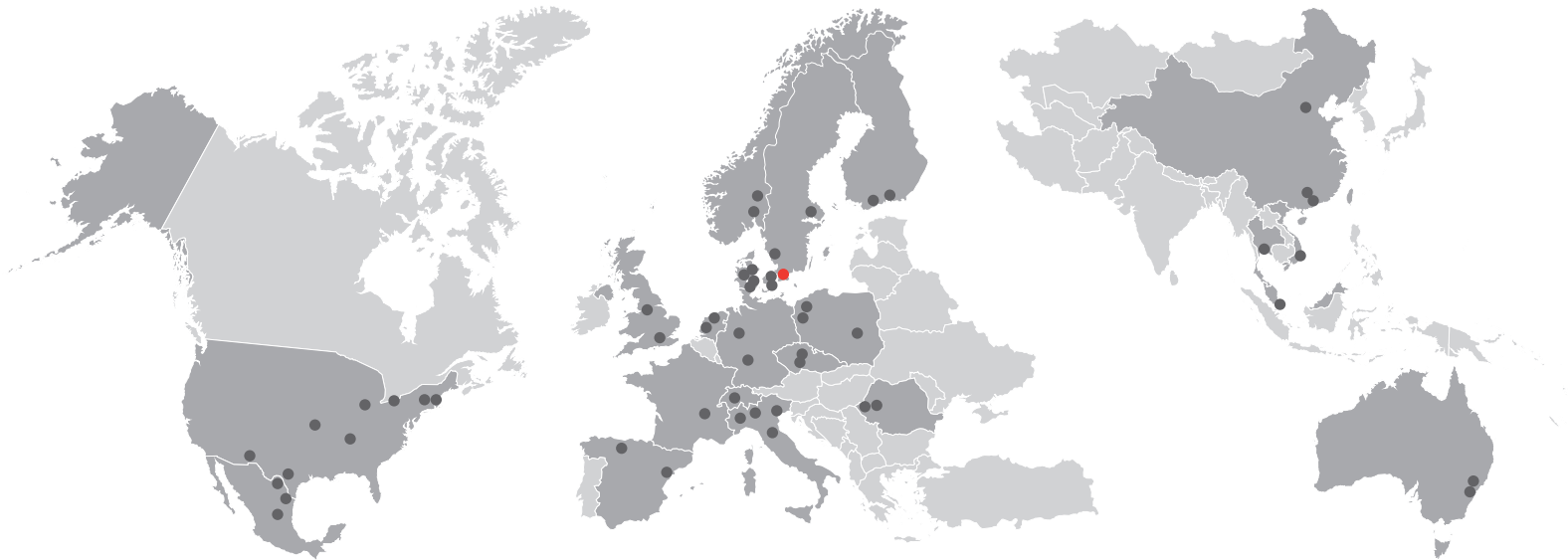
BACKER

**TRANSPORTATION & AUTOMOTIVE SOLUTIONS**

SAFETY · ENERGY EFFICIENCY · COMFORT

# BACKER

EVERYDAY · EVERYWHERE



NORTH AMERICA

EUROPE

ASIA/OCEANIA

## BACKER GROUP

Backer develops, produces and sells customized solutions and components for electric heating, measurement and control. The original technology was stainless steel tubular elements. However, the constant growth of the Group, both organically and through acquisitions, has enabled the integration of several new technologies. Today the Group offers a far wider product range, with a vast number of technologies for several industry sectors and a large variety of applications.

- 7000 employees and 40 production units on 4 continents
- 70 years of accumulated competence and experience in the industry
- International organization with local presence
- Many specialized R&D departments to bring new innovative solutions to the market
- Customized solutions fulfilling special requirements
- Strong focus on components and systems for sustainable energy solutions
- Volume and industry production in different parts of the world

## TECHNOLOGIES



Tubular Heating Elements



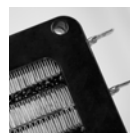
Printed Elements



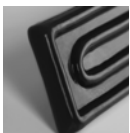
Supported wire Elements



Measurement & Control



PTC Elements



IR & Halogen Elements



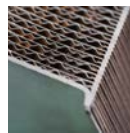
Heating Cables



Suspended Wire Elements



Heat Pump Technology



Special

## INDUSTRY SECTORS



Industrial/Projects



Energy/Environment



Advanced technology



Commercial equipment



Home appliance



Transportation



HVAC

# BACKER TRANSPORTATION & AUTOMOTIVE SOLUTIONS

SAFETY · ENERGY EFFICIENCY · COMFORT

Backer Transportation & Automotive Solutions wants to make it easy for customers and partners to get high quality solutions for a wide spectrum of heating related Transportation & Automotive applications. The solutions cover both heating components and safety products, complete intelligent systems, new energy solutions, and temperature control devices. Backer Transportation & Automotive Solutions is your single point of contact and inspiration in the heating related Transportation & Automotive Industry.

## PRODUCT DEVELOPMENT



## PERFORMANCE TESTING

- Temperature and measurement
- Interior testing
- Thermal imaging
- Cooling room -25°C
- Noise testing
- Humidity chamber
- Life cycle testing
- Wind tunnel tests
- Resistor power testing
- Long term corrosion tests
- Electrical tests up to 24kV AC
- External resources for other types of tests such as shock and vibration and intermittent pulses.

## MASTERING THE DESIGN

- Pro/ Engineer 3d-CAD
- X-ray equipment
- PDM-link/ Product data management etc.
- FLO EFD
  - Thermal/ flow simulations PTC MECHANICA
  - Thermal and stress analysis

## QUALITY

We strive to deliver the highest quality products combined with a flexible way of working. This permeates the whole process from sales, product development, manufacturing, customer service and logistics. Backer delivers products that meet all relevant standards and tests, certifying products according to customer specifications. We also have possibilities to carry out tests in modern labs, constantly improving our product performance and energy efficiency.

## DID YOU KNOW?

The majority of all companies in the Backer Group are ISO certified and all of the companies will be by 2020.

ISO 9001 · ISO 14001



### Innovations for the future

A partnership with Backer gives you a dedicated team of designers, project engineers and technical experts in the fields of electric heating, measurement and control, ready to provide you with the optimal solutions for your needs.

# TRANSPORTATION

## AIR OR WATER COOLED RESISTORS



**Air cooled resistor**



**Water cooled resistors**



### **Application Service**

We offer our support by using computer simulation software and thermal models to predict the temperature of the various parts of the resistor. As a result, securing the correct choice of the right component without oversizing, at the same time as speeding up the design. The thermal model depends on the size and weight of the resistor, wire size, length and filling material.



# HEATING SYSTEMS



### HVAC

Heating and air-conditioning systems for public transportation



### Compartment heaters

- Aluminium elements
- Complete heating units with/ without fan



### Glycol pre-heaters

Flange heater mounted in pressure vessel, terminal box with built-in thermostat  
20-45°C and temperature limiter. Available for water or oil; for various wattage and voltage and in different sizes, according to customer requirements.



### Aluminium light weight heating elements

Large surface area which gives low working temperature.



### Central heat exchanger

Compact heat exchanger with sealed outlets of double insulated cartridge heaters for connection to the terminal line on trolley buses. Nominal power 29-40kW. Nominal voltage 400-900 VDC.



### Thick film heat exchanger

- Low weight & compact design
- Quick temperature rise
- Robust design
- Possible high operation temperature (up to 350°C)



### Under floor heating

For wooden and laminate floors. Complete installation kit for under floor heating, incl. cables, temperature control unit and heating foil for 230V.

## HEATING COMPONENTS & SAFETY SYSTEMS

Several types of heaters are crucial components of modern day cars. The heaters ensure everything from the thermal comfort for the driver and all passengers to optimal performance of all safety functions, e.g. clear sight.



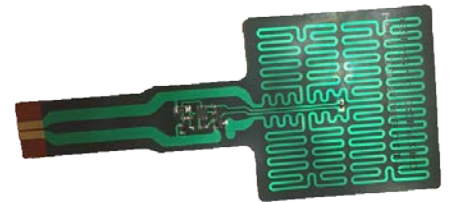
### Engine heaters

- Engine preheaters
- Tubular elements
- Engine crankcase heaters
- Cast-in elements



### Seat heaters

- Flexible foil elements



### Heat Plate

- Dry surface heater
- Larger area
- Laminated to Aluminum plate to improve heat transfer



### Windscreen wiper heaters

A number of flexible foils assembled directly in the wiper and in the stand-by position for efficiency against icing and freezing of the wiper which makes it a safety application.



### Rear view mirror heaters

- Flexible foil elements



### Lens heaters

Flexible foils installed for preventing ice and condensation on night cameras and spotlights.

DID YOU KNOW THAT BACKER IS THE NUMBER ONE SUPPLIER OF REAR VIEW MIRROR HEATERS IN THE WORLD?

YOUR COMFORT AND SAFETY  
IS OUR DRIVING FORCE...



# NEW ENERGY SYSTEMS

## PROLONGS AND ENSURES PERFORMANCE

Modern energy solutions require just the right temperature to perform optimally. Extreme weather naturally imposes additional stress. However, whether it's warming up batteries or Ad-Blue, our heaters make sure that new energy solutions work optimally and have a long life time. At the same time making sure no unnecessary energy is lost or unnecessary money is spent!



### Backer HV PTC heating system intended for battery package for electric vehicles.

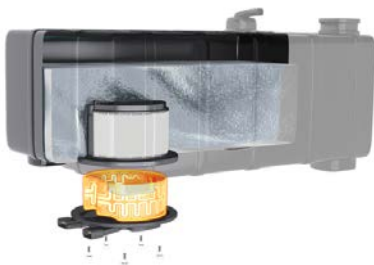
High DC voltage double insulated PTC element. Connection box and air duct in plastic. PCB board with implemented Backer software for CAN-bus control with open loop control of power. HV - and LVDC cables integrated. Customized to fit actual vehicle. Compatible with vehicle' A/C system.

- High-voltage PTC heating systems for electric cars
- PTC elements
- Flow through heaters



### Battery heaters

- Ensures ultimate performance of Li-Ion batteries even during extreme cold
- Prolongs the lifetime of the battery



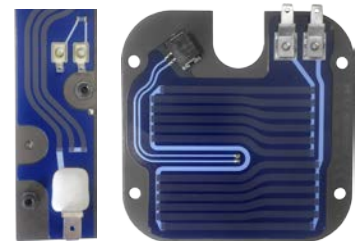
### Ad Blue UREA heater

- AdBlue®
- Dry surface heater
- SEMI DRY Surface heater
- Submerged Surface heater
- Submerged Free Floating
- Insulated dry surface heater



### Battery heaters

- Internal
- Heat plate
- Wrap around
- Inbuilt housing PTC
- Thru flow
- Prismatic Cell and Pouch Batteries



### Thick film elements

For defrosting of urea in exhaust systems



JOIN OUR PATH FOR A  
MORE SUSTAINABLE FUTURE!

# MEASUREMENT & TEMPERATURE CONTROL

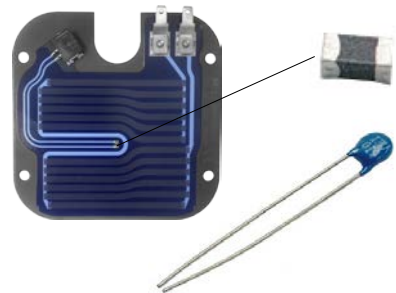
## ELECTRONIC CONTROL SYSTEMS

Accurate temperature sensing and temperature control are vital when considering any heating application. We can provide a wide range of various solutions for measurement and control. Everything from a simple standalone controller, to a large fully customized complex system.



### PT100 / PT1000

The majority of today's automotive and industrial systems depend on an accurate and reliable supply of information. Our Pt100 and Pt1000 sensors, give an excellent performance in a highly rugged design.



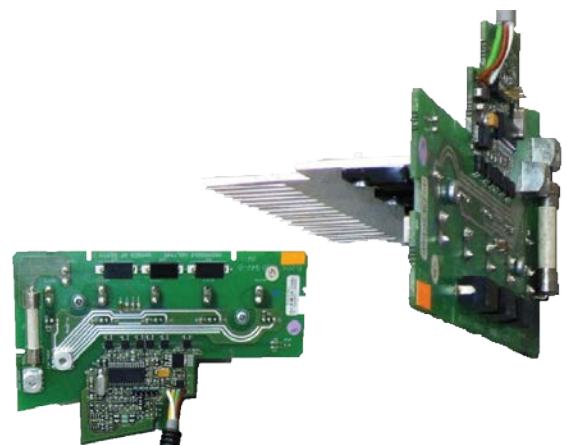
### NTC SENSORS

Negative temperature coefficient (NTC). Decreases in electrical resistance when their temperature is raised. Negative temperature coefficient (NTC) thermistor is a two terminal solid state electronic component with predictable change in resistance corresponding to changes in absolute body temperature.



### RELAY / TRIAC / IGBT

The power output control can be executed through mechanical or non mechanical components. Relays, Triacs and IGBT's are examples of devices that we can provide. Specified and approved for automotive AC or DC applications.



### CONTROL

The integrated power electronics solutions give a compact functional package for easy fitting to any application in the HV area.

TAKE CONTROL OVER  
PRECISION, EFFICIENCY  
AND ENERGY CONSUMPTION!





BACKER

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