

Interior Heating Systems

Innovative, energy efficient and light-weight interior heating systems, setting new standards in passenger comfort

Thermal Comfort Like at Home

Until now, not even first class passengers had access to a high-quality thermal environment. While other aspects of the cabin seem to improve each year, the cabin heating technology has in fact not been improved in decades – until now. Today's state-of-the-art cabin heating systems use hot air, vented through a number of small openings in the cabin. High volumetric airflow is necessary to maintain comfortable cabin temperatures, which sometimes creates unpleasant air drafts and often results in passengers having to use blankets to stay warm. The bottom line is that today's forced- air heating solutions are simply not capable of providing the type of thermal comfort you would expect in a business or first class cabin.

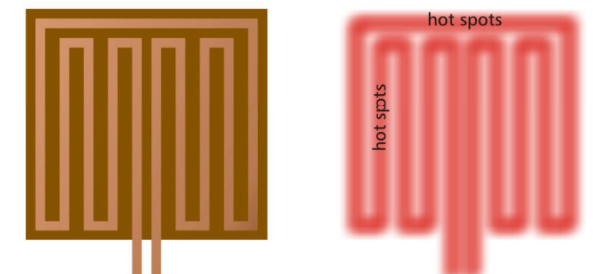
LITEHEAT is a new energy-efficient electrical heating technology for aircraft cabins that creates the same thermal environment and comfort levels that you'd expect to find in your home. Utilizing the unique Villinger electrically heated coating technology, that can be applied on a variety of surfaces in the cabin, it is the first cabin heating system to rely on infrared (IR) radiation rather than convective heating.

LITEHEAT applications may be used to simply avoid unpleasant cold spots or to boost the overall comfort in the aircraft cabin to a whole new level - and this in a simple, light-weight and robust way.

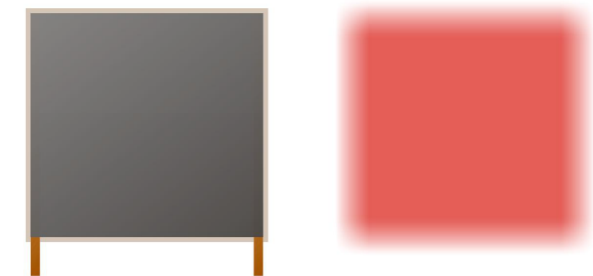


Heating Systems Based on Unique Heatable Coatings & Polymers

- Developed and produced in house, tailored to customer requirements (req. temperature, power source, power density, etc.)
- Self regulating heaters - works against danger of hot spots
- Heating systems with or without ECU
- Higher damage resistance than common state of the art technologies
- High infrared emission (if desired by customer)
- Applicable to various base materials – matches the exact shape of the part
- Coating Thickness < 0,2 mm
- Coating Weight < 150 g/m²
- Temperature limit (active or passive) 200°C
- Withstands power density up to 120.000 W/m² (77 W/in²)
- Variable Voltages 0 - 1000 Volts (AC or DC)

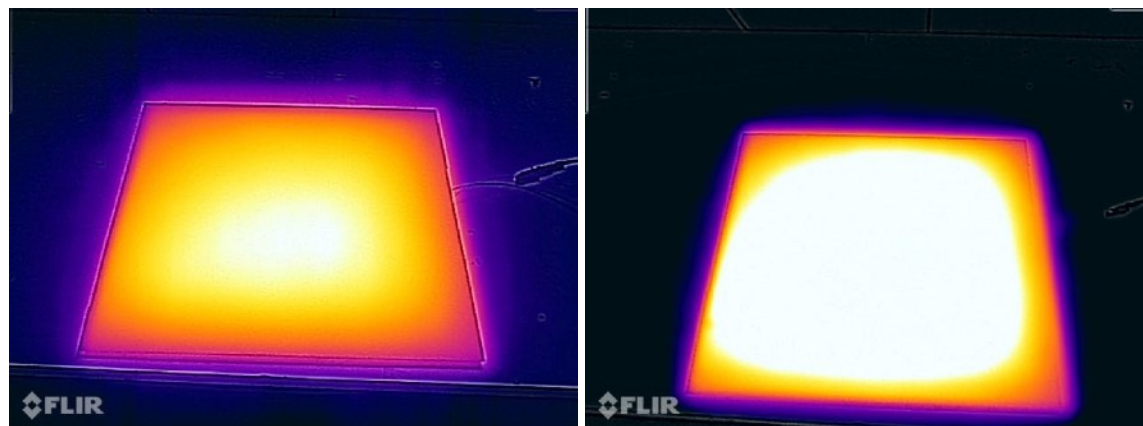


Conventional heaters

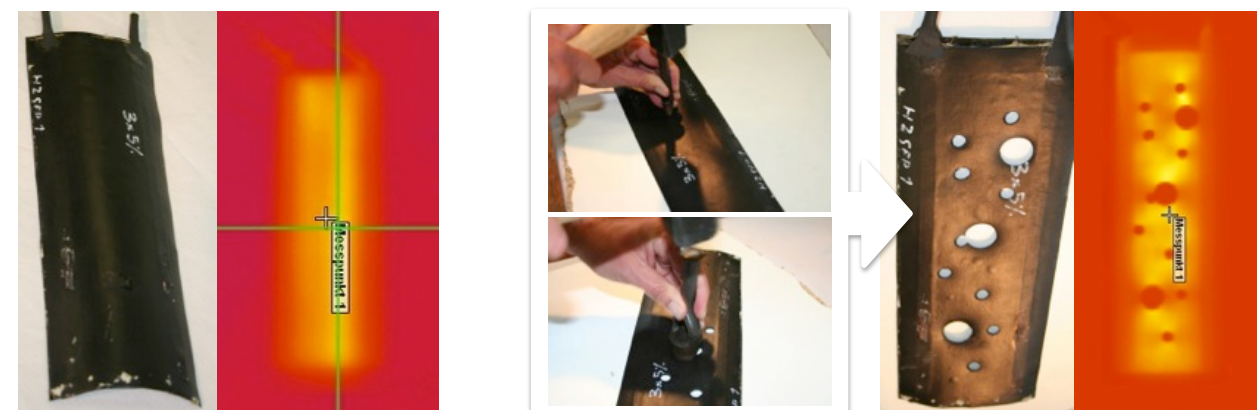


LITEHEAT heaters

LITEHEAT Full Face Heaters



Ultra-high damage resistance



Do-160 Tests

LITEHEAT has been thoroughly tested according to Do-160 Standards and has successfully passed all tests.

Tested according to Do-160 Standards:

Non-toxic | Flame Retardant | Vibration Resistant | Humidity Resistant | Strong Adhesion | No EMI | e.g.

tests performed by:



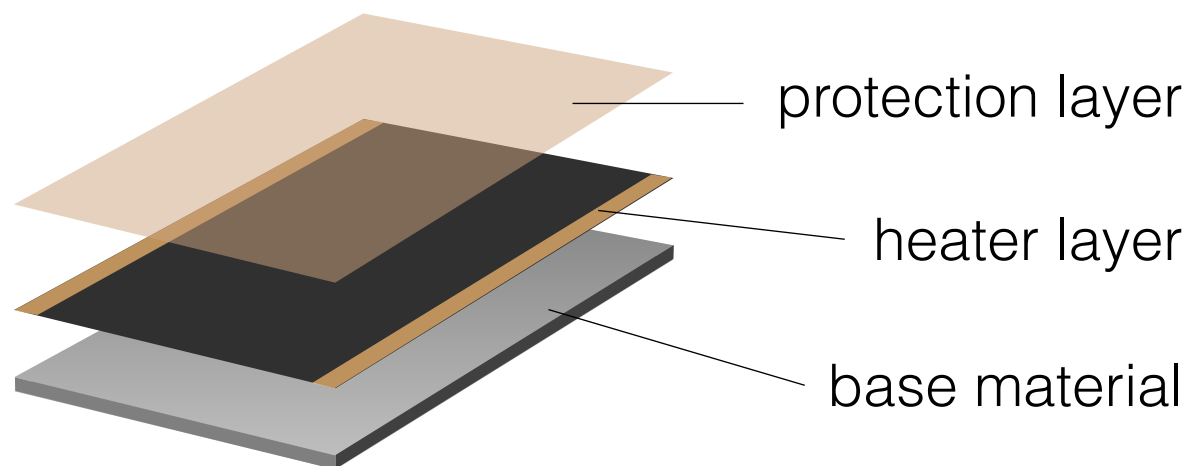
Lufthansa Technik



Heater Design

In order to guarantee the simplest heater design and system interface, different application methods for the heater layer may be used – depending on customer requirements and application needs:

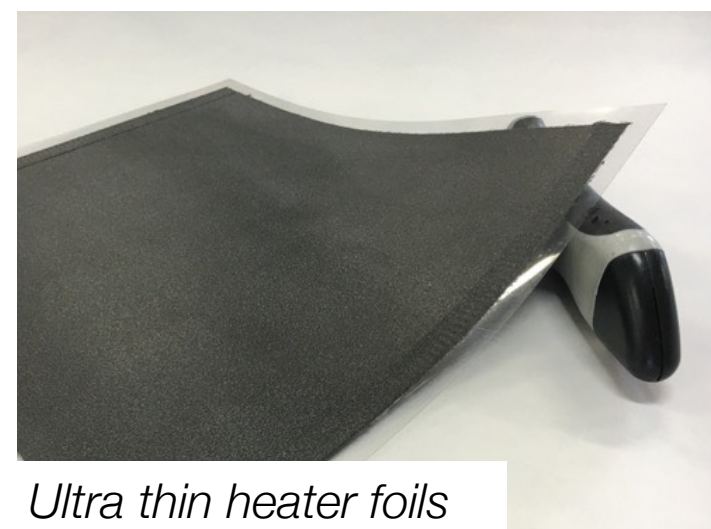
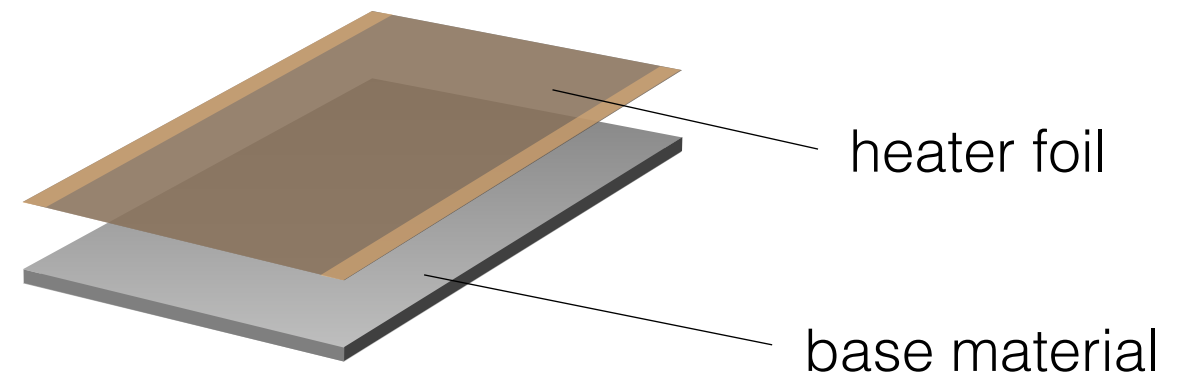
Heater Layer Applied Directly on Part



Heater layer
thickness:
<0,2mm

*Heater directly applied on
backside of cabin part*

Heater Layer Applied As Heater Foil



Heater foil
thickness:
<0,2mm

Ultra thin heater foils

Example: Improving Passenger Comfort in Airplanes

LITEHEAT systems can be covered with any kind of finishing materials, to be chosen by the customer. Once covered with any kind of soft-, or hard finishing material, LiteHeat heaters become completely imperceptible. Put simply, the application of LITEHEAT converts various parts and surface areas in the cabin, such as sidewall panels, ceilings, floors, doors, instrument panels and more, into large-scale infrared radiators, without changing their shape or appearance in any way.

Cabin heating system layout example

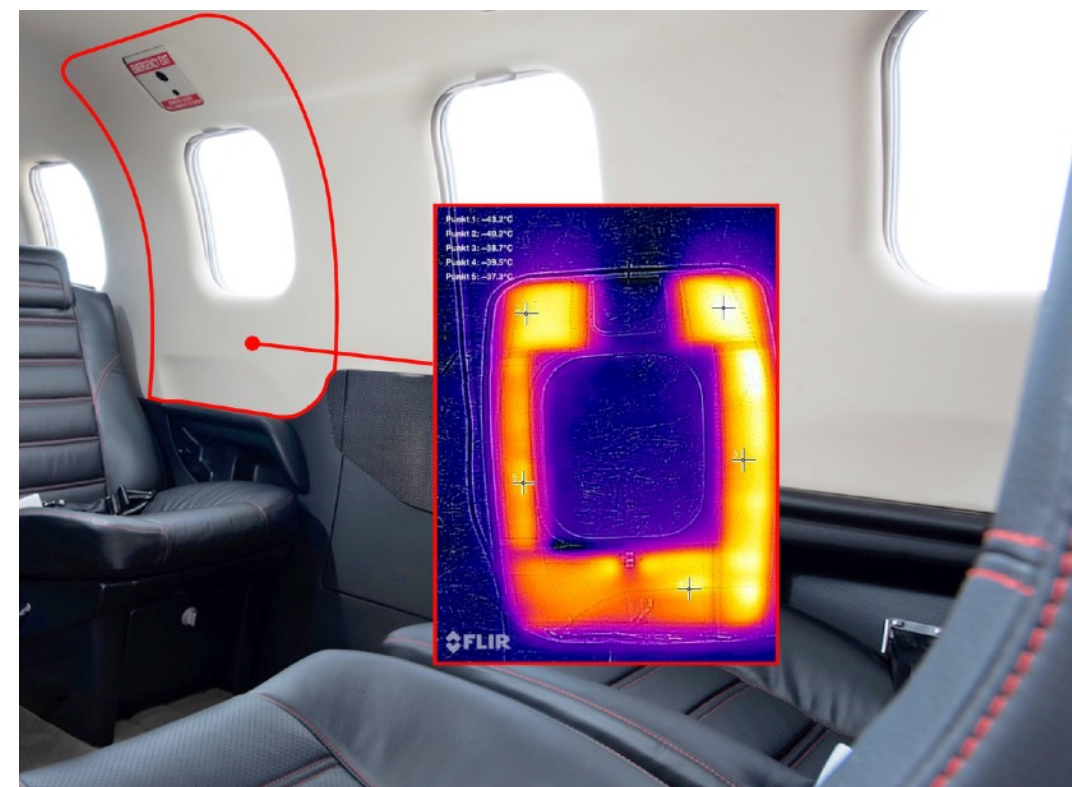
1. Overview of the surfaces to be heated

- Rear cabin and cargo door panels



➤ The surfaces selected take into account both 6 seats and 4 seats accommodations of the cabin

Cold spot avoidance (on emergency door)



Improving Passenger Comfort in Helicopters



LITEHEAT system- first operational test



1:1 scale EC-135 Mock-up @ RTA climatic wind tunnel

A light- weight, highly damage- tolerant cabin heating system for helicopter cabins was developed together with the OEM, with highly improved comfort and lower energy consumption compared to a conventional system based on engine bleed air. Utilizing our own heater layers, the system is mainly based on the implementation of heated wall-, ceiling- and floor panels, which operate on the principle of infrared radiation heat.

Improving Passenger Comfort in Helicopters

Cold Soak Tests

Conditions:

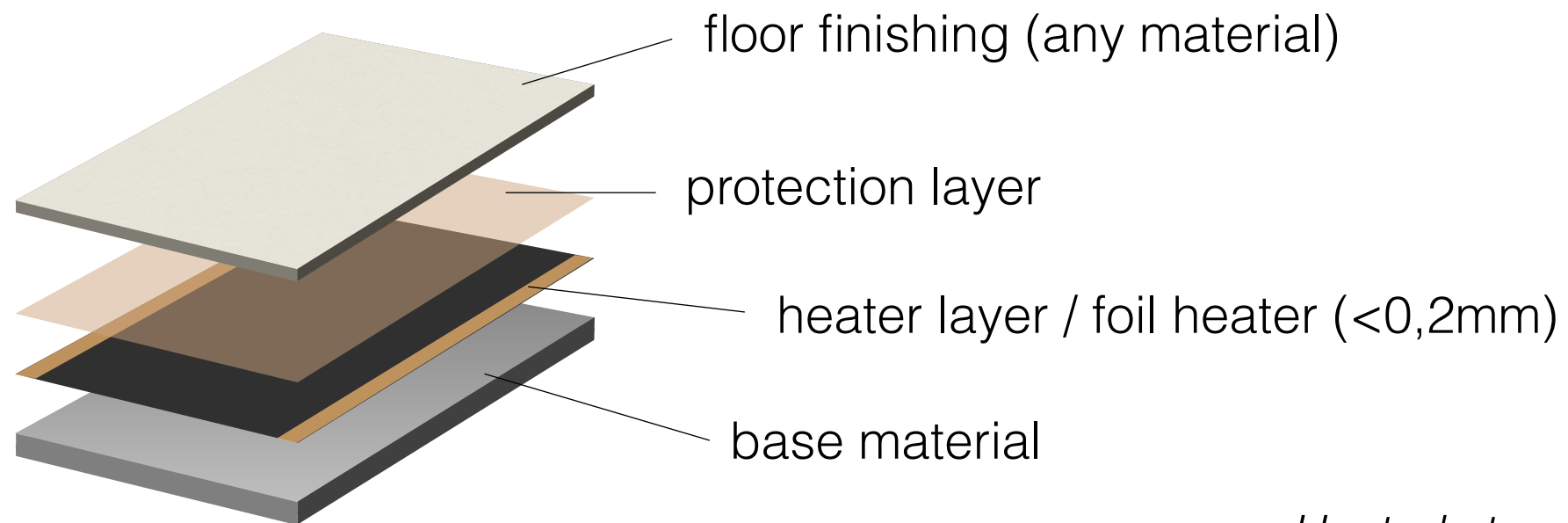
- Temp.: -30°C
- Wind: 100km/h
- Situation: (over night) cold soaked
- Comfort measuring equipment position: right passenger back seat
- Starting Power: 4,7kW for 15min

Results:

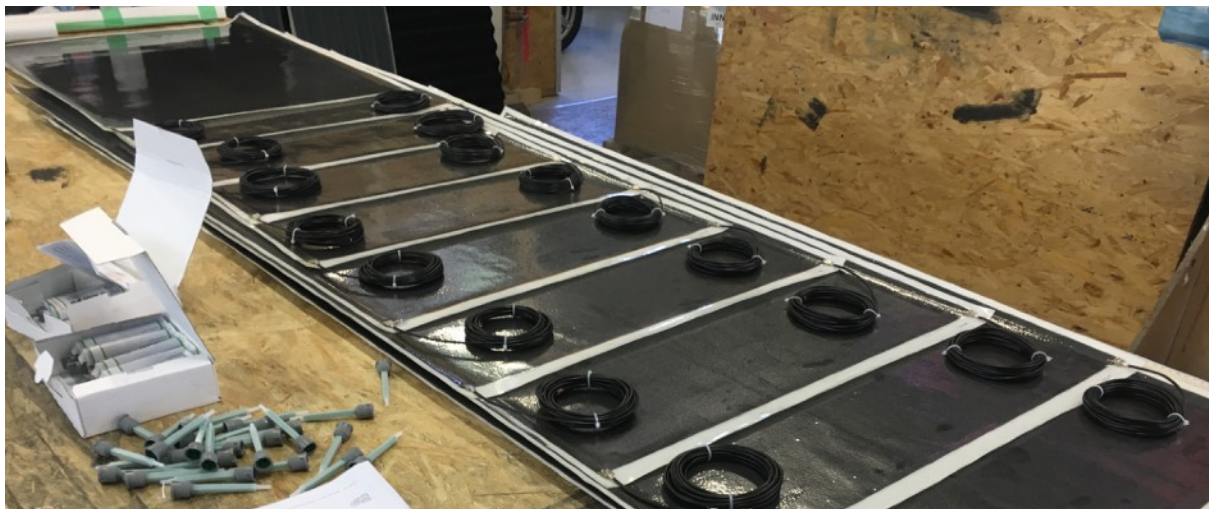
- Cabin: Optimal comfort after 15 minutes heating
- Cockpit: Optimal comfort after 20 minutes heating
- Total Power Consumption: 1,1 kWh



Other Products: Heated Floor Panels



Manufacture of floor heaters



Heated stone floor

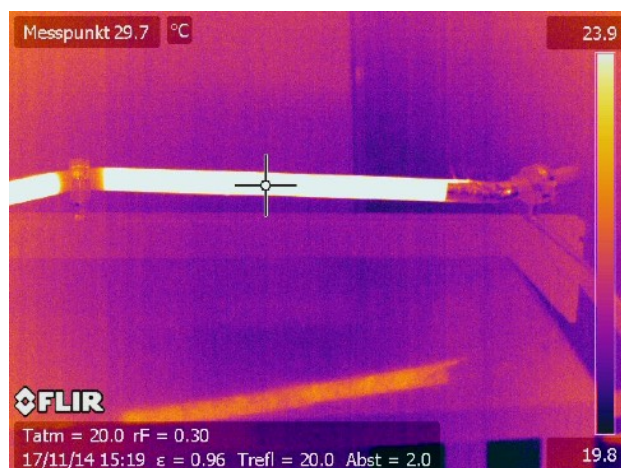




Other Applications

- Heated seats (heaters in arm rests, back rest etc...)
- Heated pipes, drains etc... (de-icing systems for drainage systems that are prone to freeze)
- and much more ...

Heated water pipes



Contact



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