

**NAOS EUROPE**  
carbon-fiber technologies

# Heat of the Future

[www.naoseurope.eu](http://www.naoseurope.eu)



**excellent reasons**

to choose heating film

**heat**flow



Extremely thin (**0.5mm only**) film technology of a heating system based on long wavelength infrared light emission



**Healthy heat**, biologically optimal for a human organism



Provable **antibacterial effect**



Air **quality** improvement



No **undesirable** electromagnetic radiation



Wide **range** of usage



Significant energy **savings**



Affordable **price**



**Quick installation and dismantling**



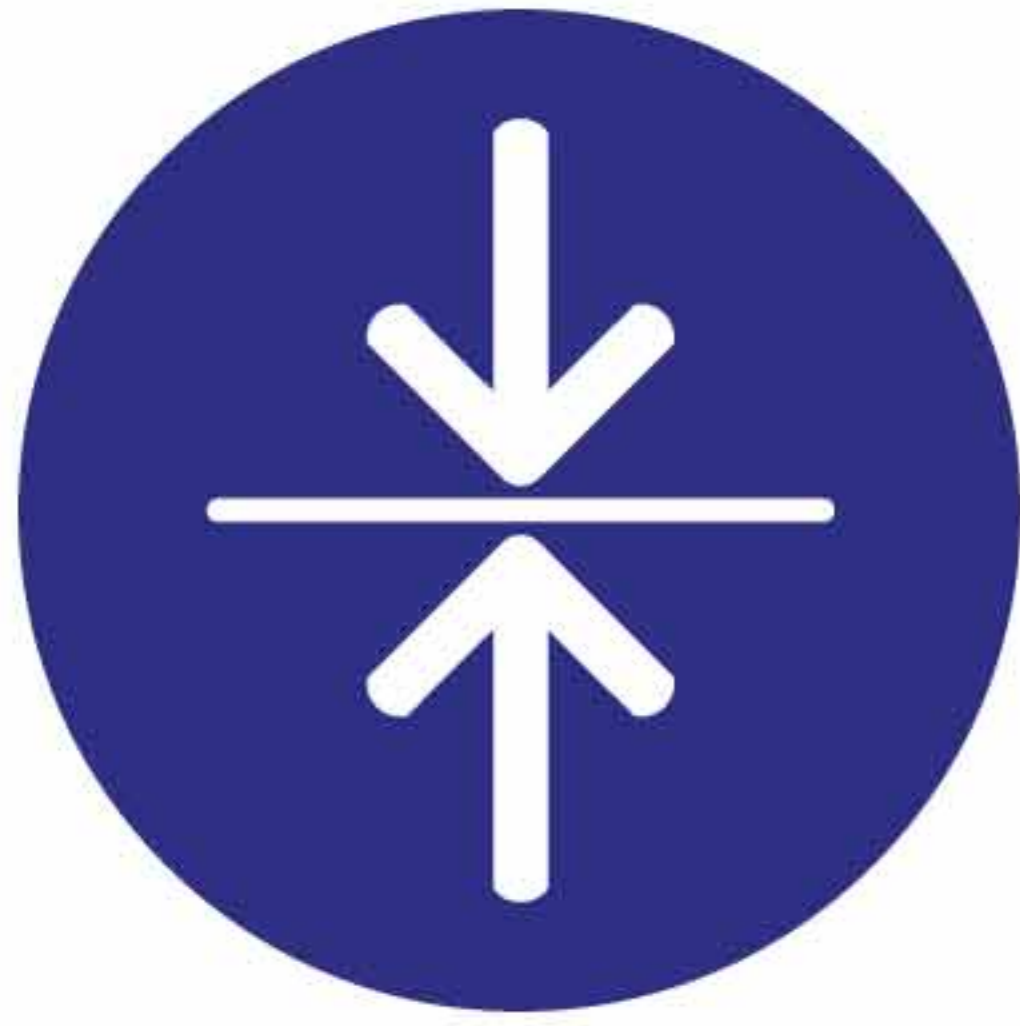
Long **service life**, more than 30 years



**Quick warming-up** of the heating film



**10 years warranty**



## Learn about the unique advantages of only 0.5mm thick **heatflow** heating film

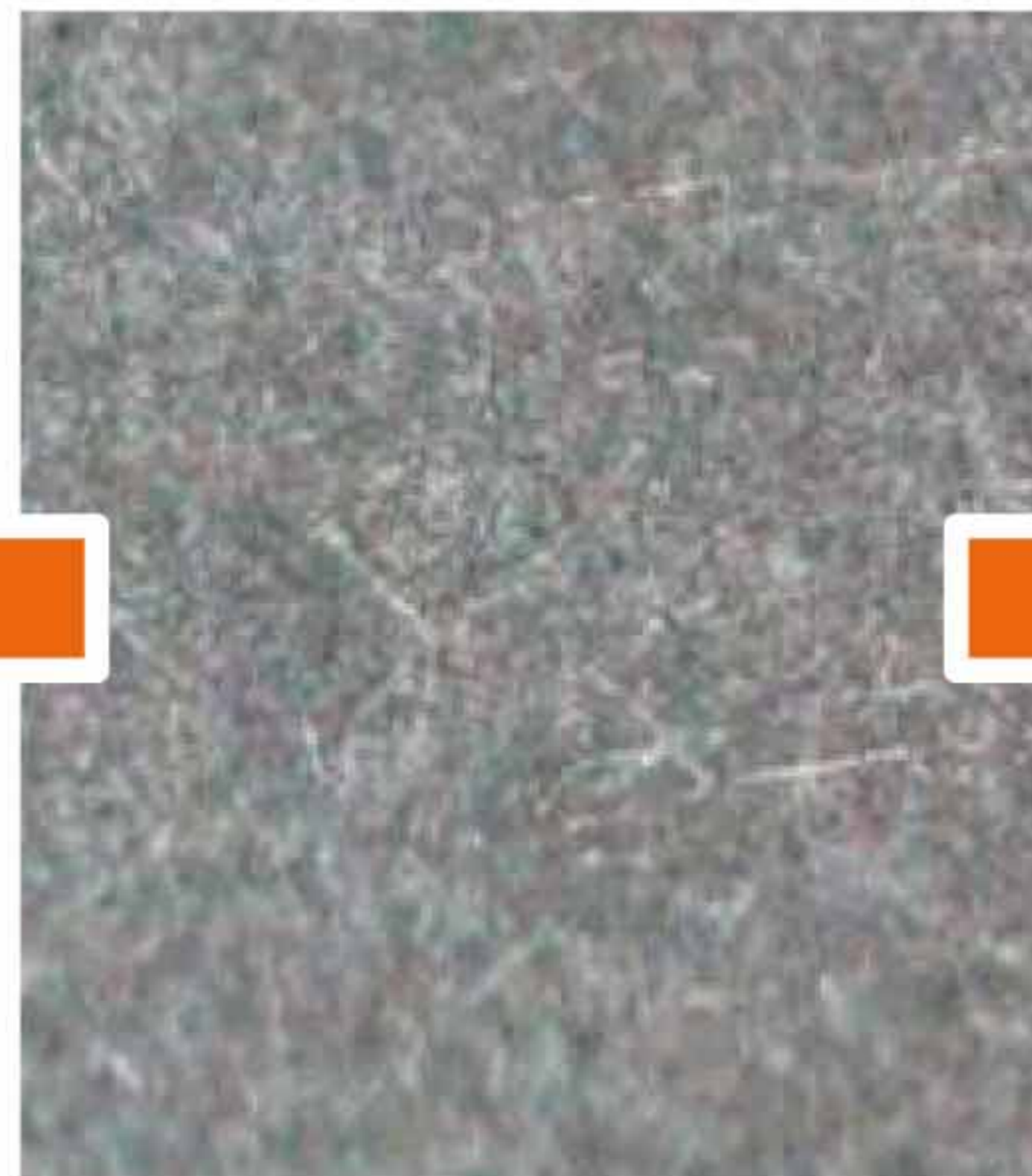
We in **NAOS** have designed a film technology for a new generation heating system. Our secret lies not only in a revolutionary carbon-fiber fabric, but also in the process of coupling the copper plate with the silver element.

The heating element of **heatflow** heating film is formed by a carbon-fiber fabric composed of a mixture of carbon fiber with carbon paste. Other manufacturers only utilize carbon paste applied on a film using print technology. Thanks to the carbon-fib-

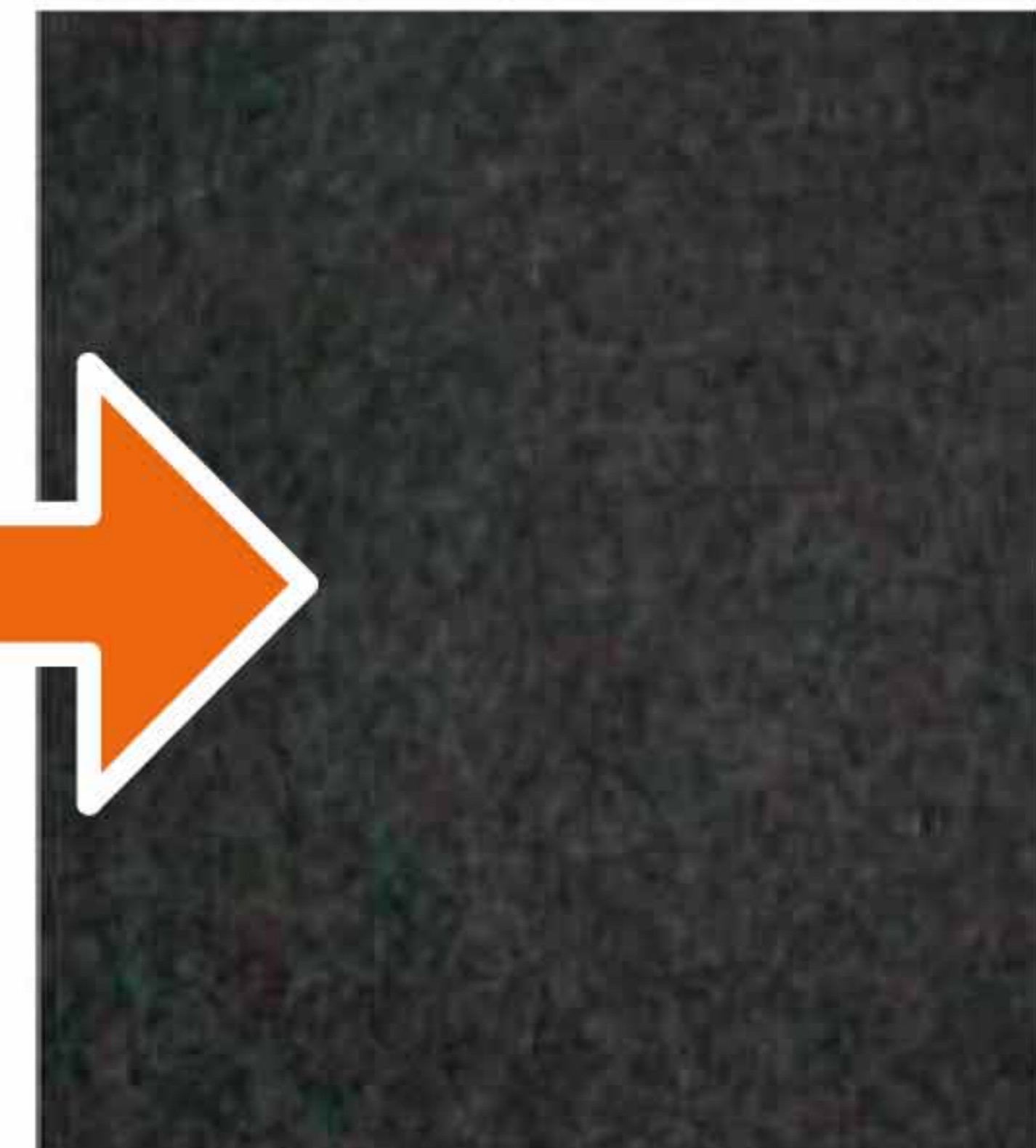
er utilization, the service life of heating film triples (more than 30 years) and also any local surface overheating is precluded. **heatflow** heating film technology is patented and with its attributes and characteristics is fundamentally superior to alternative types of heating.



Carbon fiber



Carbon paste

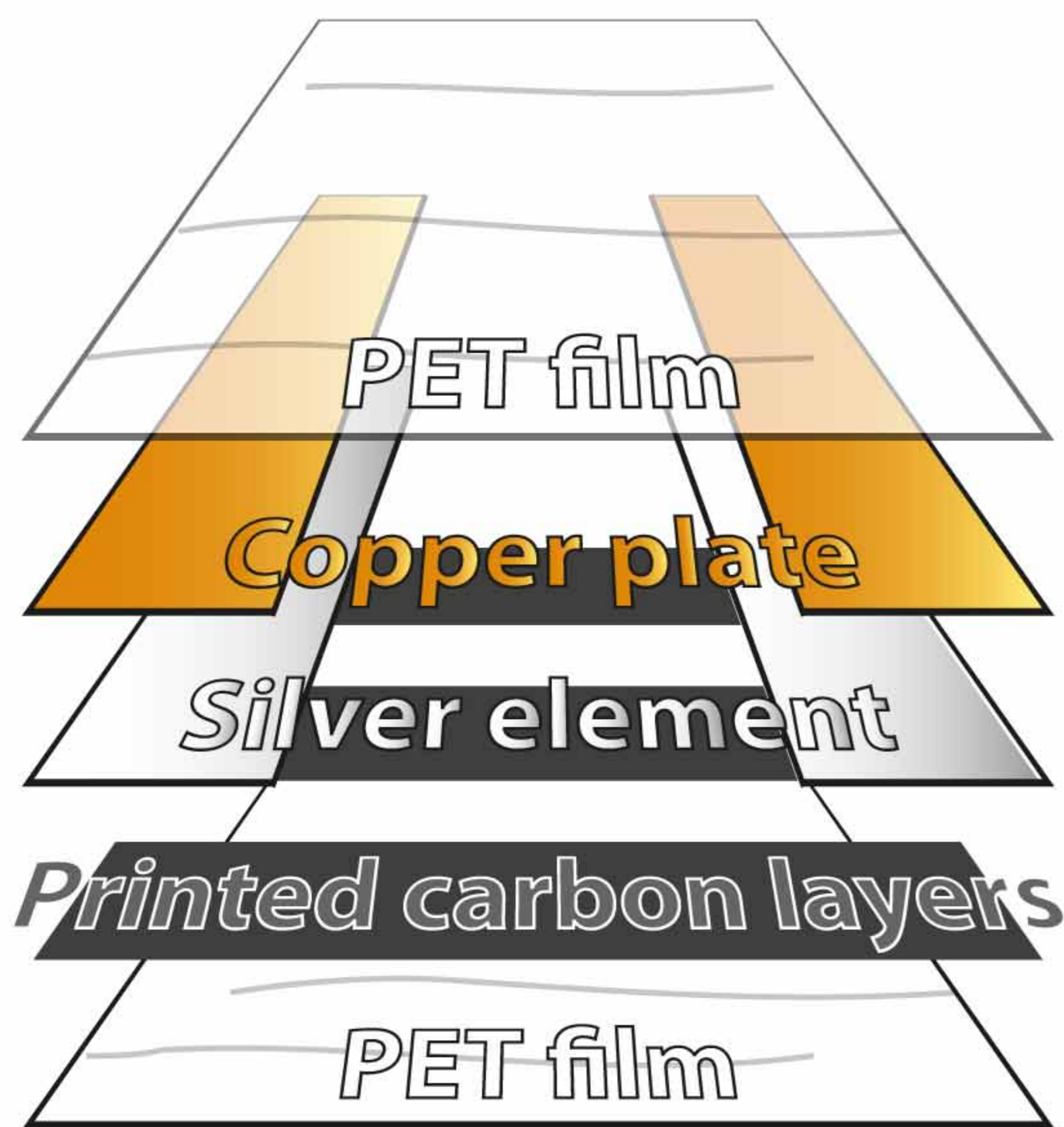


Carbon-fiber fabric

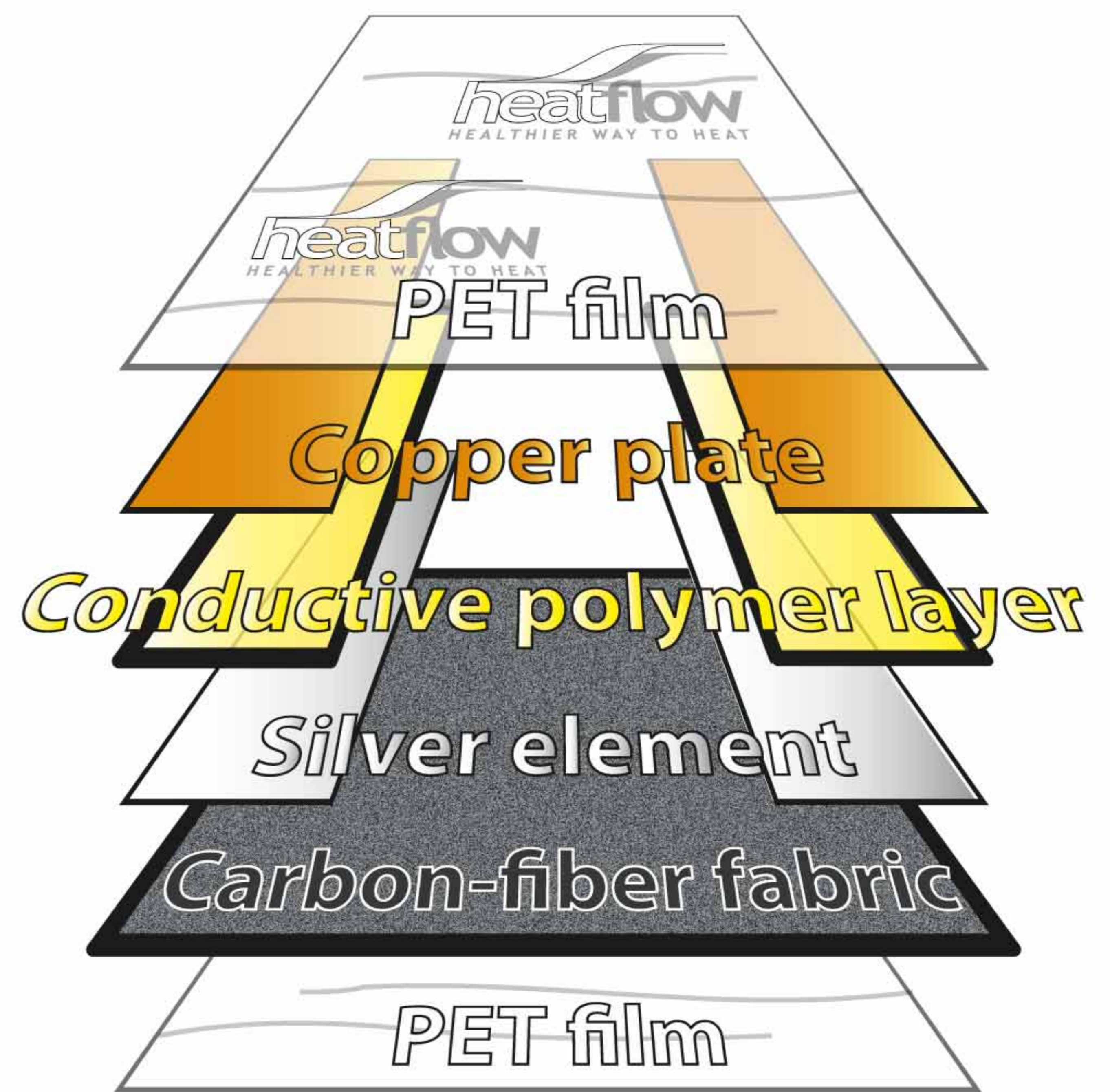
The principal factor determining the quality and safety of an infrared heating film is the process of coupling the copper plate and the silver strip. With other infrared heating film manufacturers' coupling technology, there is no solid contact of the copper plate with the silver powder which can cause undesirable

electric arc formation depending on the operating times. Thanks to a thorough welding process utilizing a **special conductive polymer**, the **heatflow** heating film precludes any electric arc formation. The differences in the process of coupling the copper and silver element are illustrated in the following figure.

Other manufacturers' films

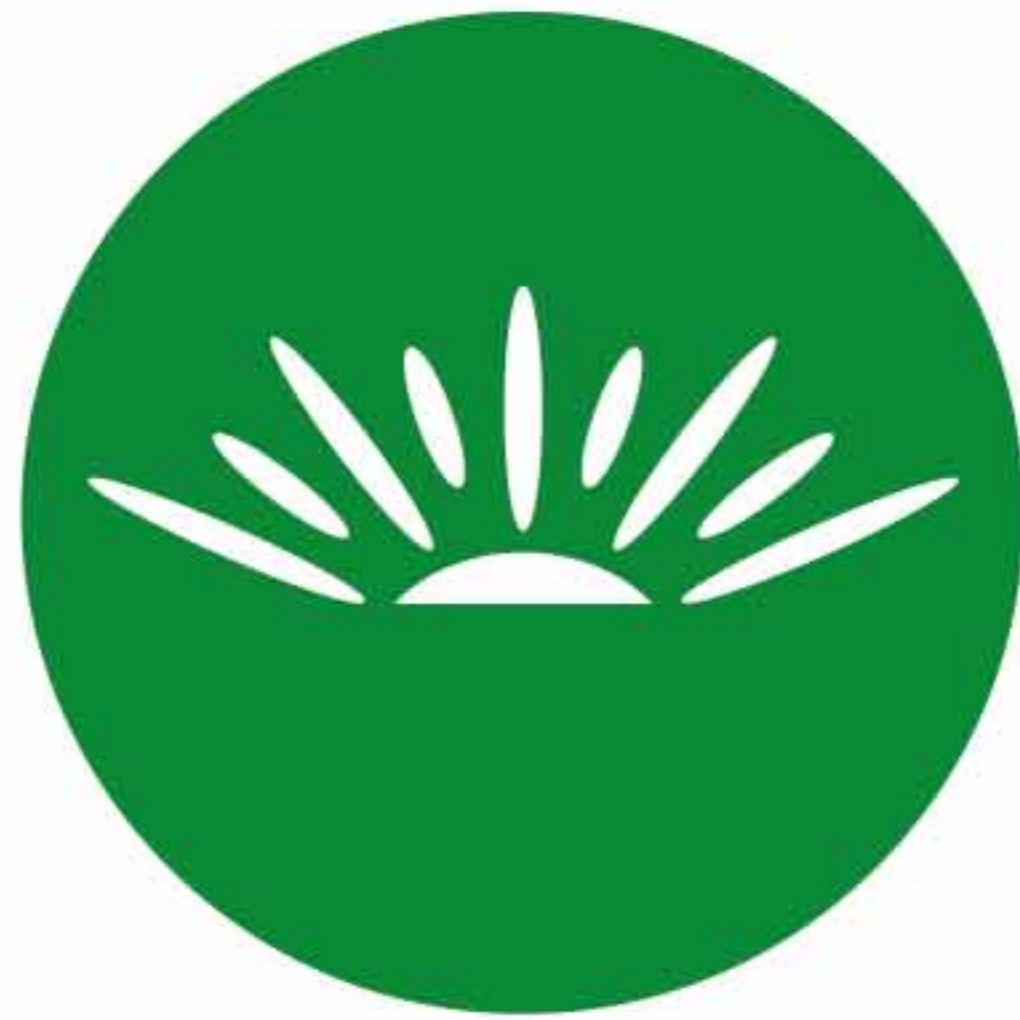


Heating Film  
**heatflow**



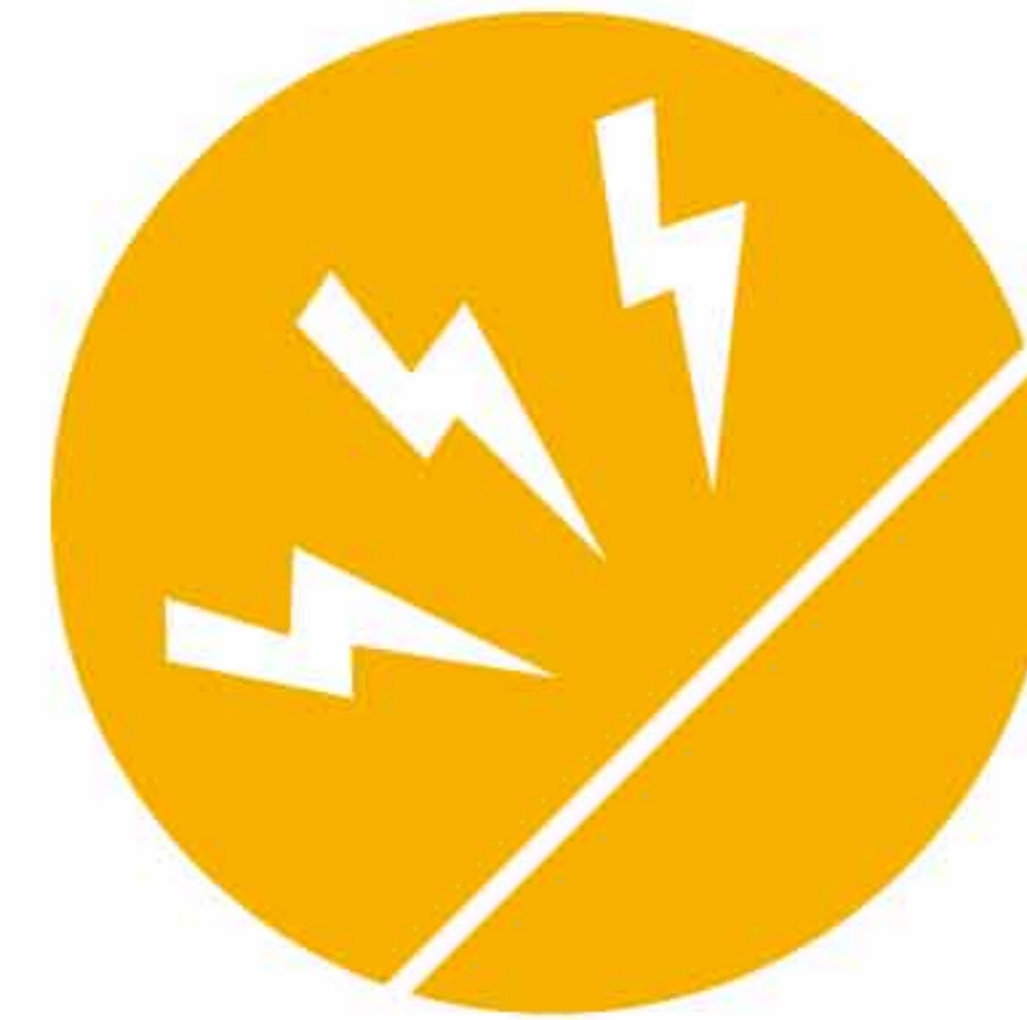
**Revolutionary carbon-fiber fabric ensures 100% heating surface area coverage**

# Indulge yourself with really “**healthy heat**” from **heatflow** heating film



## Heat that is biologically optimal for our organism

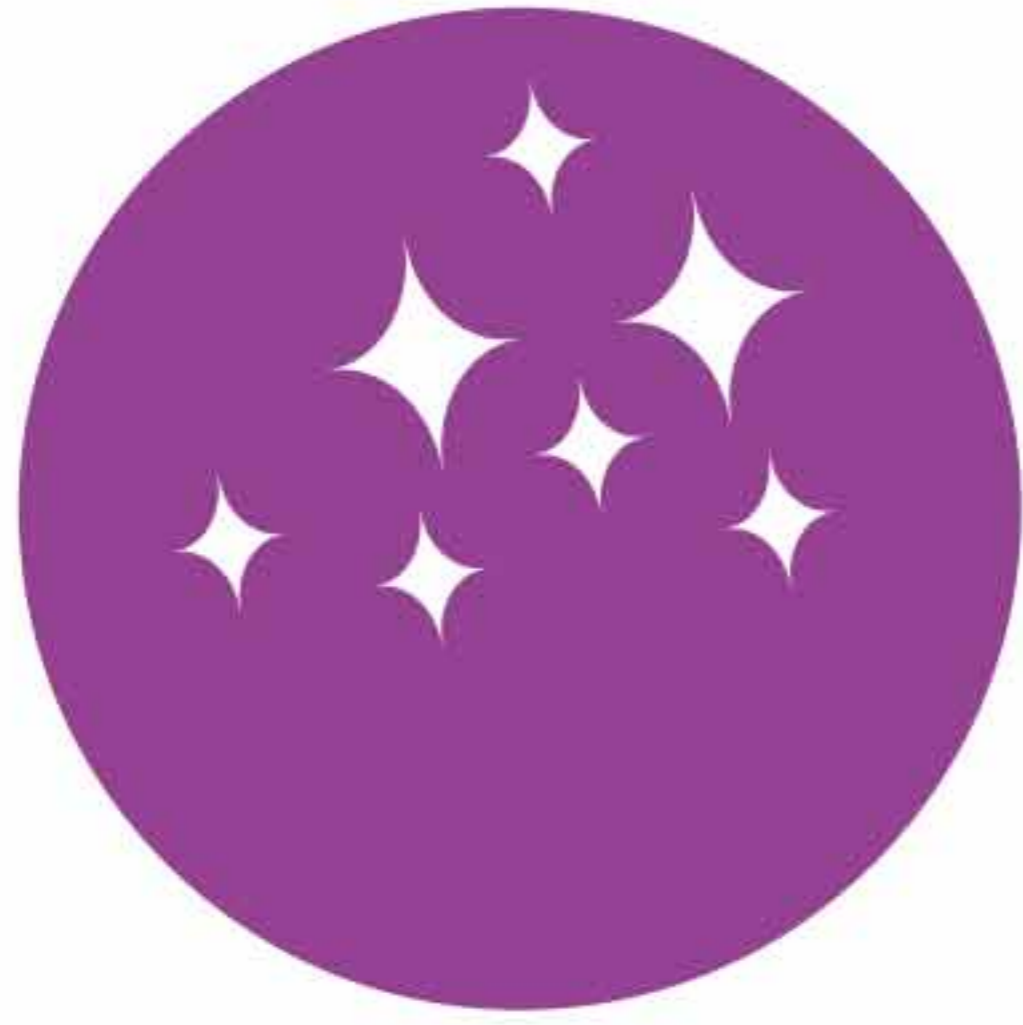
Infrared radiation consists of various wave types. Long wavelength waves are the most valuable for humans. Infrared radiation emitted by **heatflow** heating film is of the same wavelength as the radiation of our organism, thus we accept it as our own. **heatflow** technology is a source of healthy heat, biologically optimal for our organism.



## We will not expose you to any undesirable electromagnetic radiation

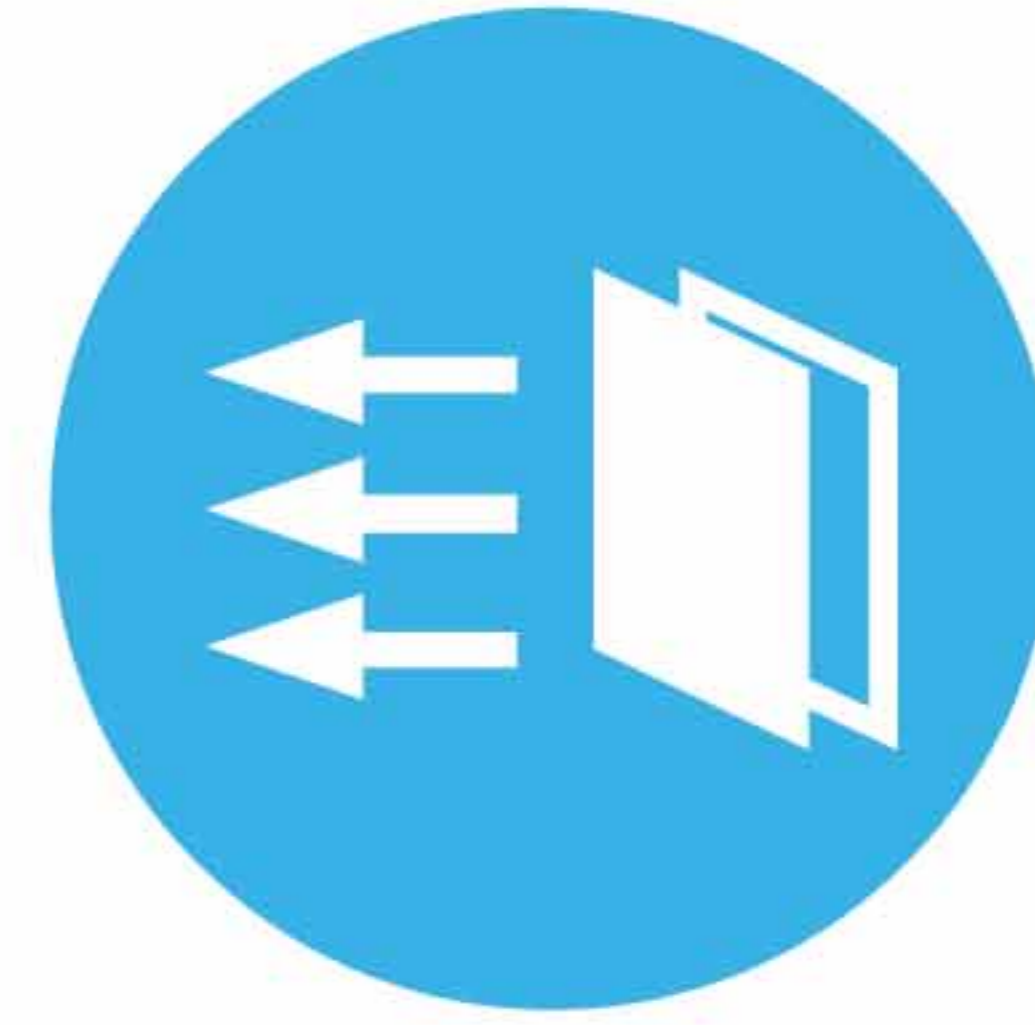
**heatflow** heating film does not emit any undesirable electromagnetic radiation! The current electrical heating systems adversely affect our health. The reason for this is that electromagnetic waves and electromagnetic field induce deceleration of blood circulation. The EMS test carried out by the Swiss company SGS has shown that **heatflow** heating film does not emit any undesirable electromagnetic radiation.

**Healthy heat without undesirable electromagnetic radiation**



## Provable antibacterial effect

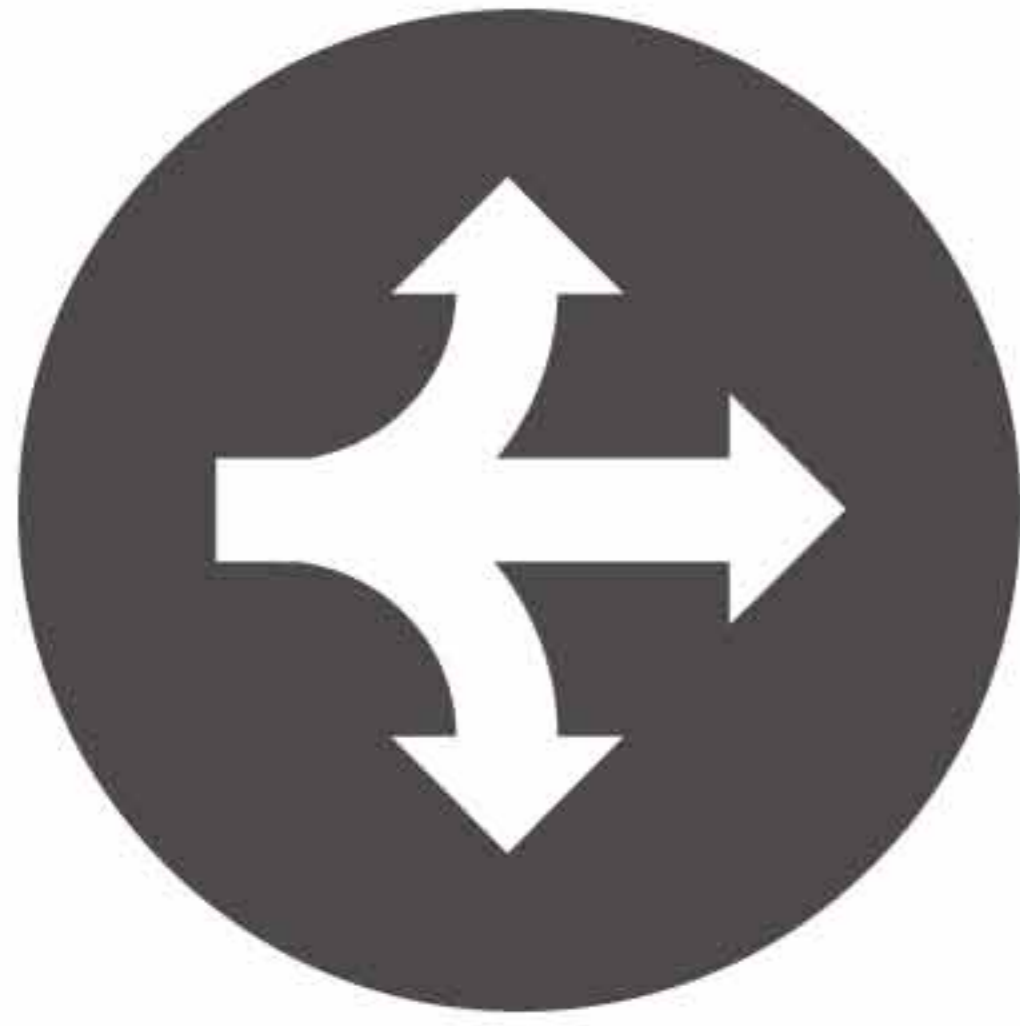
**heatflow** heating film exhibits an antibacterial effect as a result of saturation of the air with anions. According to the results of the test carried out by Korea Far Infrared Association, **the efficiency of antibacterial effect has been rated to 72.6 %.**



## We improve air quality in your rooms

Based on the results of an experiment performed every 30 minutes, it has been found that **heatflow** heating film improves air quality by 81 % within 2 hours. Moreover, an exceptional effect on our organism is created in the heated room while the room humidity is preserved because the air is not dried up.





## Discover the various options of **heatflow** heating film utilization

**heatflow** heating film is suitable as a basic heating or, if necessary, also as a supplemental heating in all building types. **heatflow** will ensure a comfortable heating and the necessary heat of a highest standard not only in

your home, house, or living room, but also in hotels, restaurants, cafe bars, shopping and business centers, kindergartens, hospitals, cottages, sport centers, agriculture structures and in all places where heat is required.

**Shopping center**



**Greenhouse**



**Restaurant**





**heatflow** technology does not place any restrictions in choosing the floor finish. It is used with any type, no matter whether it is

- **parquet,**
- **laminated,**
- **tiled floor,**
- **ceramic tiles,**
- **floor carpet.**

**Kitchen** – ceramic tiles



**Bathroom** – ceramic tiles/wall covering



In addition, **heatflow** heating films may be installed not only on the floor but also on ceiling or walls, which proves the versatility of this product.

**Living room** – carpet/parquet



**Children's room** – laminate floor



# Do not overlook also these advantages of **heatflow** technology



## Significant energy savings

Room heating with **heatflow** infrared heating film is economically more favorable than any other alternative types of heating.

In comparison with an electrical heating of traditional types and utilizing for example a zone thermostat, **cost savings of up to 40 %** can be achieved.



## Affordable price

**heatflow** carbon infrared technology has many unique advantages. Affordable purchase price and low installation costs are further outstanding benefits. Thus, we offer a **state-of-the-art heating system which is, in addition, affordable to everyone.**



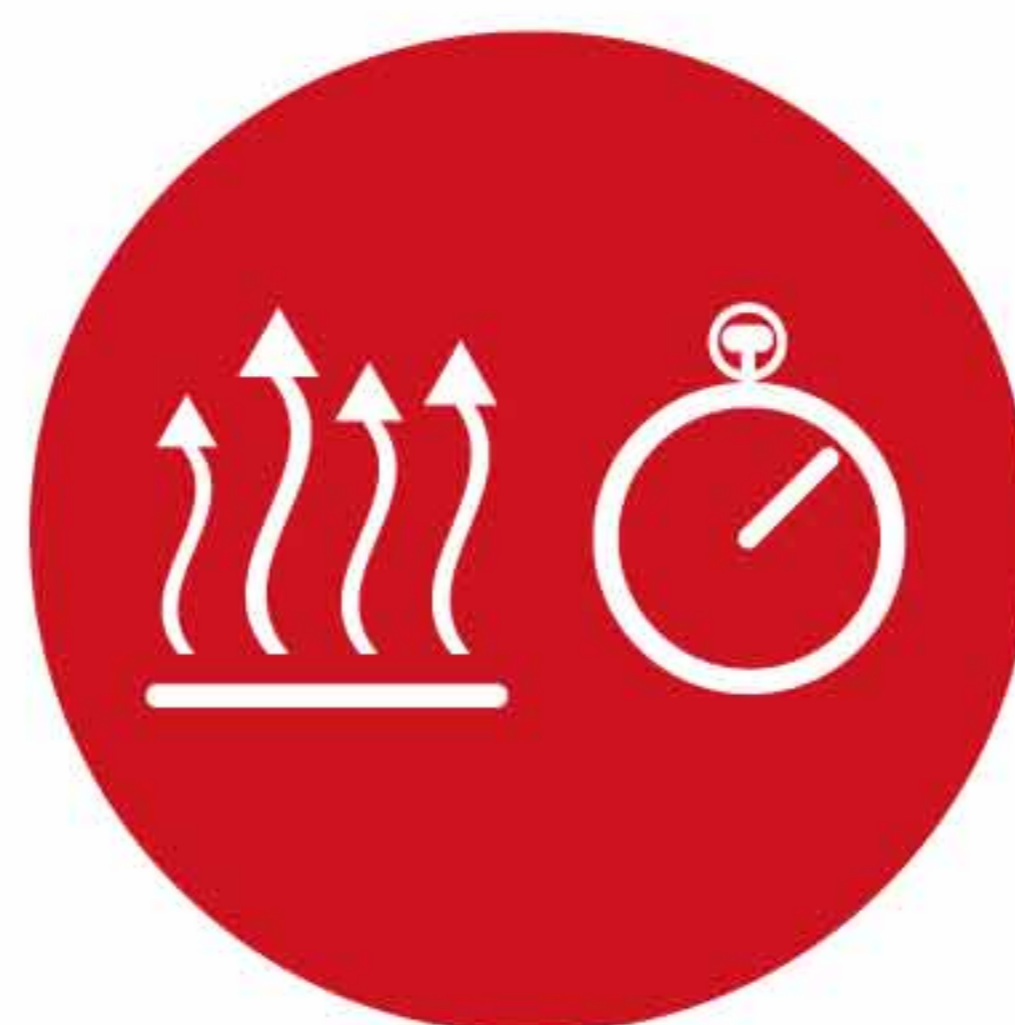
## Quick installation and dismantling

**heatflow** technology is also very popular because of simple and quick installation of the whole system. The installation itself **is not restricted by various construction limitations.** Installation is carried out onto any dry surface regardless of the shape or size of the heating area. Furthermore, **heatflow** heating film may even be re-used.



### Service life of more than 30 years

The unique technological patent of **heatflow** carbon infrared heating film developed by **NAOS Co. Ltd.** has prolonged the lifetime of the film to more than 30 years. We are one of the few on the EU market to offer a **reliable heating system with service life several times longer** than that of other alternative heating types.



### Quick warming-up of the heating film


**Only 5 minutes** is enough to reach the maximal required temperature of **heatflow** heating film. Unlike in water heating system, no water preheating is necessary.



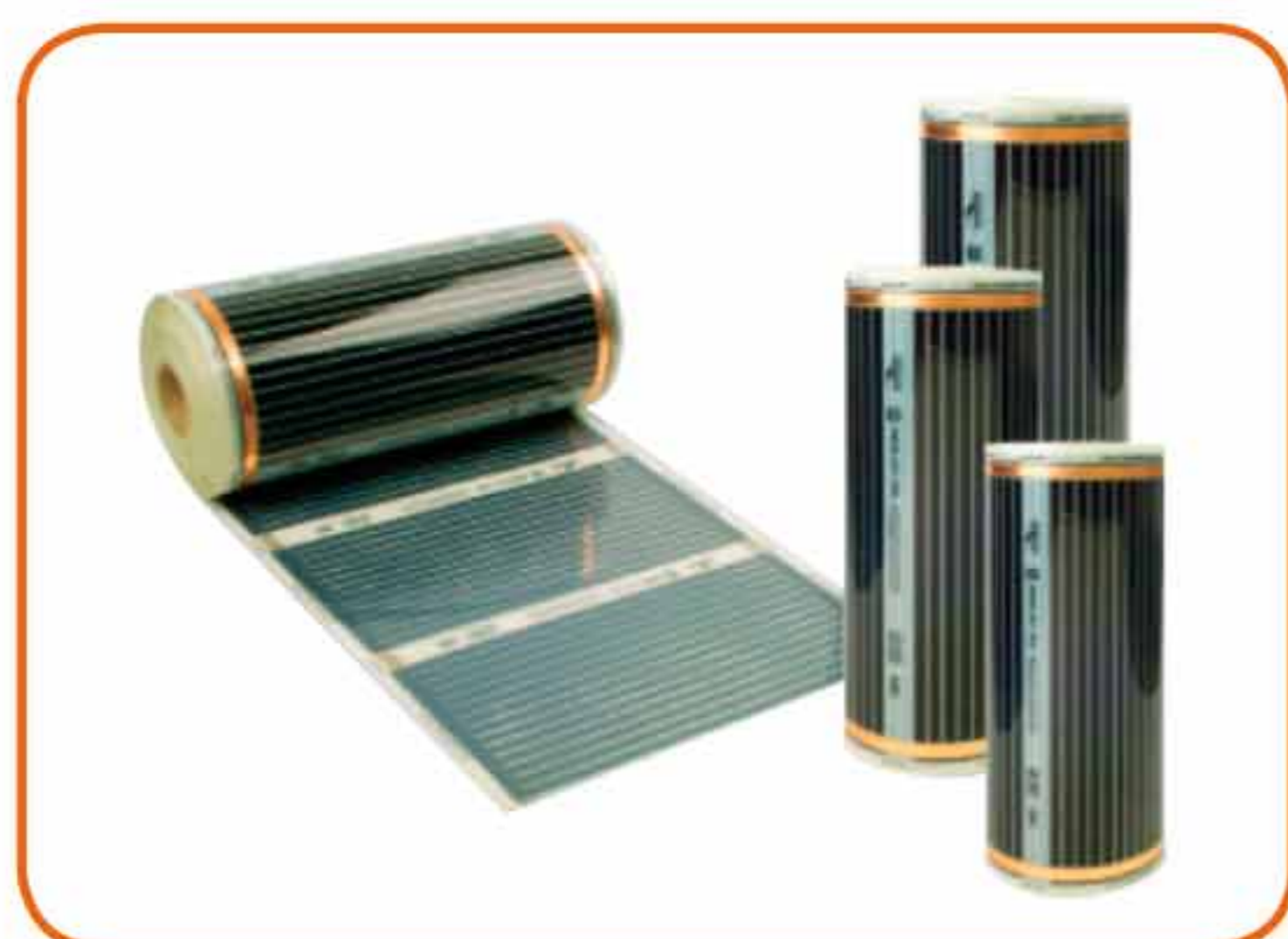
### 10 years reliability warranty

The 15 years warranty only applies to **heatflow** carbon infrared heating technology. The manufacturer and the supplier disclaim any liability for damages caused by non-professional handling, or by non-professional modifications of heating film structure.

# Advantages of **heatflow** infrared heating film

Water heating	Cable systems		HEATFLOW	Advantages of our technology
Requirement for a cement layer	Requirement for a cement layer	Process of laying	Process of laying	Cost-effective installation
10 cm or more	More than 2 cm	Foundation layer thickness	No foundation layer thickening	Corresponds to the room height
Additional space for heating source installation required	Lowers the room height when using cement covering	Increase of utility area	No additional space required	Keeps the original room characteristics
Floors and walls	Floors and walls	Layout options	No limitation	Installation suitable for various architectural projects
High, depends on boiler modification	High, from 150 W/m <sup>2</sup>	Energy consumption	Low, 10 to 270 W/m <sup>2</sup> according to the circuit type (series, parallel)	Energy efficiency
No operation when damaged	No operation when damaged	Operational capability	Operational even when damaged	Stability even when parts of the system are damaged
Limited to 10 years	Up to 15 years	Service life	Long, more than 30 years	Long service life
After drying up the foundation layer, 14 – 20 days	After drying up the foundation layer 14 – 20 days	Operation	Immediately after installation	Quick installation and commissioning
Slow, requires preheating: 30 – 60 minutes	Slow, 15 – 20 minutes	System warming up speed	Quick, 5 minutes!	Quick warming up - feeling of heat and comfort
No	No	Room ionization, saturation of air with oxygen ions	Yes, air ionization takes place during heating process	Increases immunity, improves heart function, decreases stress and nerve strain
No	No	Antibacterial effect	Yes, 72.6 % effect	Kills bacteria and fungi, makes living space healthier
No	No	Removal of unpleasant odors	Yes, 81.0 % effect	Healthy microclimate
Local heating effect	Impact of adverse effect	Impact on human organism	Healthy heat source	Beneficial effect on whole organism

# Advantages of full-area technology of **heatflow** heating film manufacture to lamella technology



Lamellated Carbon powder	<b>Heating element structure</b>	Full-area Carbon-fiber fabric
Carbon paste applied using print technology	<b>Heating element manufacture technology</b>	Pressure process in high temperature
Mechanical compression (there is a risk of electric arc during use)	<b>Safety of coupling the copper plate to the silver powder</b>	Using a special conductive polymer (welding method)
10 years	<b>Service life</b>	More than 30 years
Stripes	<b>Heating surface</b>	Continuous area
90 %	<b>Efficiency coefficient</b>	98 %
Slower by 17.8 %	<b>Warming up speed</b>	Depending on coverage used, <b>heatflow</b> heating film achieves the required temperature the most quickly
As a result of applying the carbon powder using printing technology, unevenness of the printed layer arises, which can cause local overheated zones formation	<b>Evenness</b>	Carbon-fiber fabric evenly distributes the heat across the whole surface
Every 25 cm only (at designated places on the film only)	<b>Shape adjustment by cutting</b>	Possibility of cutting at any site (transverse section)

## Nomenclature and consumption of **heatflow** infrared heating film

Heating film type	Dimensions	Wattage	Heating temperature	Energy consumption
HFS 1010	1 m x 75 m	220 – 270 W/m <sup>2</sup>	45 °C	10 to 240 W/m <sup>2</sup> according to the circuit type (series, parallel)
HFS 0510	0,5 m x 100 m	220 – 240 W/m <sup>2</sup>	45 °C	



# NAOS EUROPE

carbon-fiber technologies

NAOS EUROPE, s.r.o. is the official representative of Korean company NAOS Co. Ltd., leader in manufacture of carbon-fiber infrared heating film of full-area type. NAOS EUROPE, s.r.o. is the **only and exclusive supplier** of this type of heating film within the European Union and European countries. The heating film technology is patented and, on the basis of its attributes and characteristics, it is fundamentally superior to alternative types of heating.

It is the first time in the history of infrared film heating technology that NAOS Co. Ltd. managed to solve problems like uneven heat distribution across the area, operational safety, and to achieve high energy savings.



[www.naoseurope.eu](http://www.naoseurope.eu)

# Production quality is confirmed by international and European certificates **ISO 9001, EMC, CE**

## LVD Compliance Certificate



**SGS**  
Date issued August 14, 2007  
CERTIFICATE No.: STE-07-1043 S C LV

**CERTIFICATE OF LVD COMPLIANCE**

Product submitted: Heating film that using Carbon Filament  
Model Heat Flow HFS1010  
Rated Input: 220-240 V~, 50/60 Hz, 160 W / 1 m at 220 V, 186 W / 1m at 230-240V

Applicant (Manufacturer): NAOS CO., LTD.  
8-5C8 Digital empire, #980-3, Youngtong-Dong, Youngtong-Gu, Suwon-City, Kyunggi-Do, Korea

Testing Laboratory: SGS Testing Korea Co., Ltd.  
Test Report Number(s): STE-07-1043 S R LV  
Specification Requested: EN 60335-1:2002 + A11:2004 + A1:2004

**Conclusion**  
Based on a review of the test report, this apparatus meets the requirements of the above standards and hence fulfills the requirements of Directive 2006/95/EC.

This certificate is only valid for the equipment submitted and configuration described, in conjunction with the test data detailed above. It does not permit the use of the SGS PRODUCT CERTIFICATION MARK.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives.

**CE**

Wondok Kim  
Manager

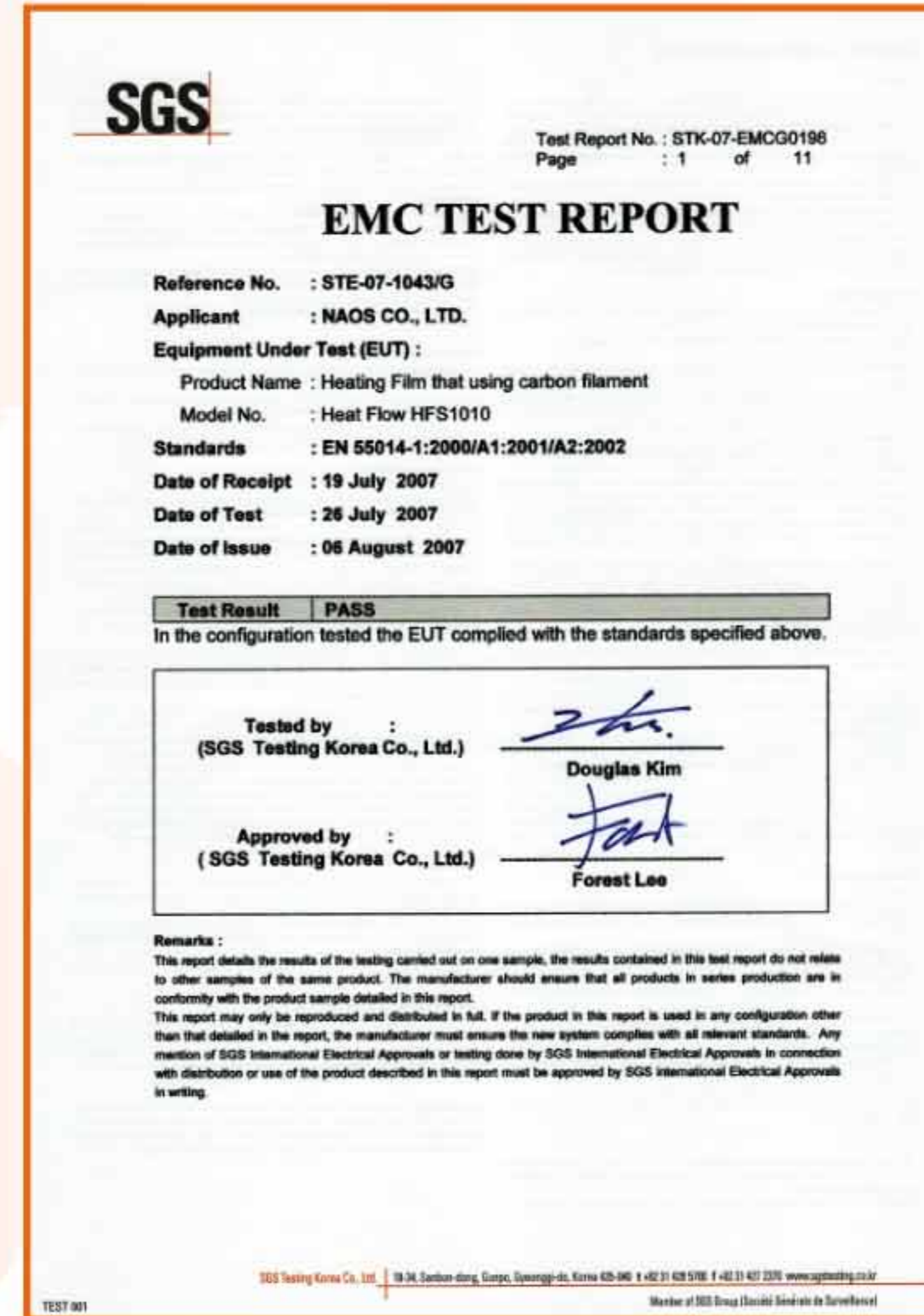
Eric Lee  
General Manager

Copyright of this certificate is owned by SGS Testing Korea and may not be reproduced other than in full and with the prior approval of the General Manager of SGS Testing Korea.

Member of SGS Group (Société Générale de Surveillance) F890501

SGSPAPER 0640036

## EMC Compliance Certificate



**SGS**  
Test Report No.: STK-07-EMCG0196  
Page: 1 of 11

**EMC TEST REPORT**

Reference No.: STE-07-1043G  
Applicant: NAOS CO., LTD.  
Equipment Under Test (EUT):  
Product Name: Heating Film that using carbon filament  
Model No.: Heat Flow HFS1010  
Standards: EN 55014-1:2000/A1:2001/A2:2002  
Date of Receipt: 19 July 2007  
Date of Test: 26 July 2007  
Date of Issue: 06 August 2007

**Test Result: PASS**  
In the configuration tested the EUT complied with the standards specified above.

Tested by: Douglas Kim  
(SGS Testing Korea Co., Ltd.)

Approved by: Forest Lee  
(SGS Testing Korea Co., Ltd.)

**Remarks:**  
This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

SGS Testing Korea Co., Ltd. 19-24, Seobon-dong, Guro, Gyeonggi-do, Korea 426-066 t +82(0) 626 5106 f +82(0) 627 2205 www.sgstesting.co.kr

## ISO 9001 Certificate



**ICR**  
International Certification Registrar Ltd.

**Certificate of Registration**

This is to certify that:  
**NAOS CO., LTD.**  
Rm. 908 B-Dong Digital Empire, #980-3 Youngtong-dong, Youngtong-gu, Suwon-si, Gyeonggi-do, Korea

Has been assessed by International Certification Registrar Ltd., in respect of their Quality Management Systems and found to comply with

**ISO 9001:2008**

Approval is hereby granted for registration providing the rules and conditions relating to certification are observed at all times.

Certification Scope  
Design, Development, Manufacturing and Servicing of Carbon Filament Forming Heater(Multi-Function, Picture Frame Type)

Certificate Issue Date: 18<sup>th</sup> May 2010  
Expiration Date: 17<sup>th</sup> May 2013  
Certificate No.: Q343510

The Seal of ICR Limited was here to affixed in the presence of:

President

IAF ANAB

International Certification Registrar Ltd.

## EMC Compliance Certificate



**TÜV SÜD**  
Product Service

**Attestation of Conformity**  
No. N8 11 05 76663 001

Holder of Certificate: NAOS Company Limited  
923-4, Gumncheon-il, Hyangnam-eup, Hwasung-si, Gyeonggi-do 445-622, REPUBLIC OF KOREA

Product: Heating element (Carbon Heating Film)

This Attestation of Conformity is issued on a voluntary basis according to the Low Voltage Directive 2006/95/EC relating to electrical equipment designed for use within certain voltage limits. It confirms that the listed equipment complies with the principal protection requirements of the directive. It refers only to the particular sample submitted for testing and certification. See also notes overleaf.

Test report no.: CPSA0109621

Date: 2011-05-16 (James Jeon)

CE After preparation of the necessary technical documentation as well as the EC conformity declaration the required CE marking can be affixed on the product. Other relevant directives have to be observed.

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TÜV SÜD Product Service GmbH · Zertifikatsstelle · Riederstraße 85 · 80339 München · Germany

heatflow  
HEALTHIER WAY TO HEAT

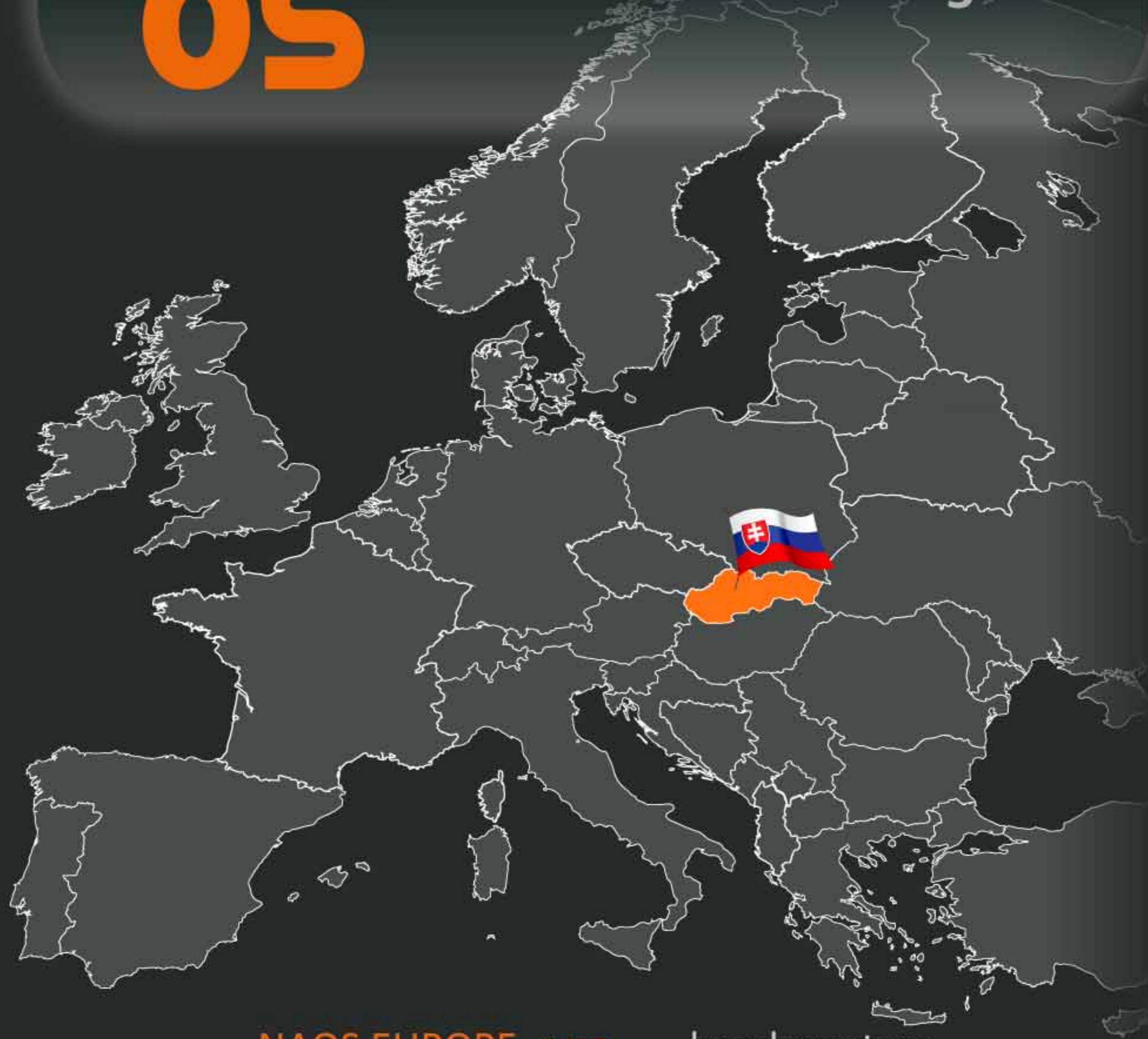
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Priemyselná 4, 040 01 Košice, Slovak republic

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[info@naoseurope.eu](mailto:info@naoseurope.eu)

Your distributor:

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