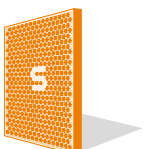


# Schwank Infrared Heaters

## Principle and Functioning



## The sun: the most natural heater of the world

### ■ Infrared heat for maximum comfort

We have derived the principle of our heaters from nature. The heat rays emitted by the sun penetrate the air without heating it and do not transmit their energy – i.e. warmth – until they make contact with a surface. The Schwank infrared heaters utilise the same natural principle to heat buildings whilst saving energy.

The infrared waves are converted to energy at the point where they strike objects, e.g. on our skin but also on machines, stored goods and products. Thus, the warmth is generated directly at the point where it is needed. The thermal energy is absorbed by surfaces which in turn dissipate the energy to the surroundings providing a balanced microclimate.

**40°C**

Radiant temperature



**-6°C**

Air temperature



**17°C**

Ambient temperature



**The sun:** the most natural heating in the world – even at low air temperatures.

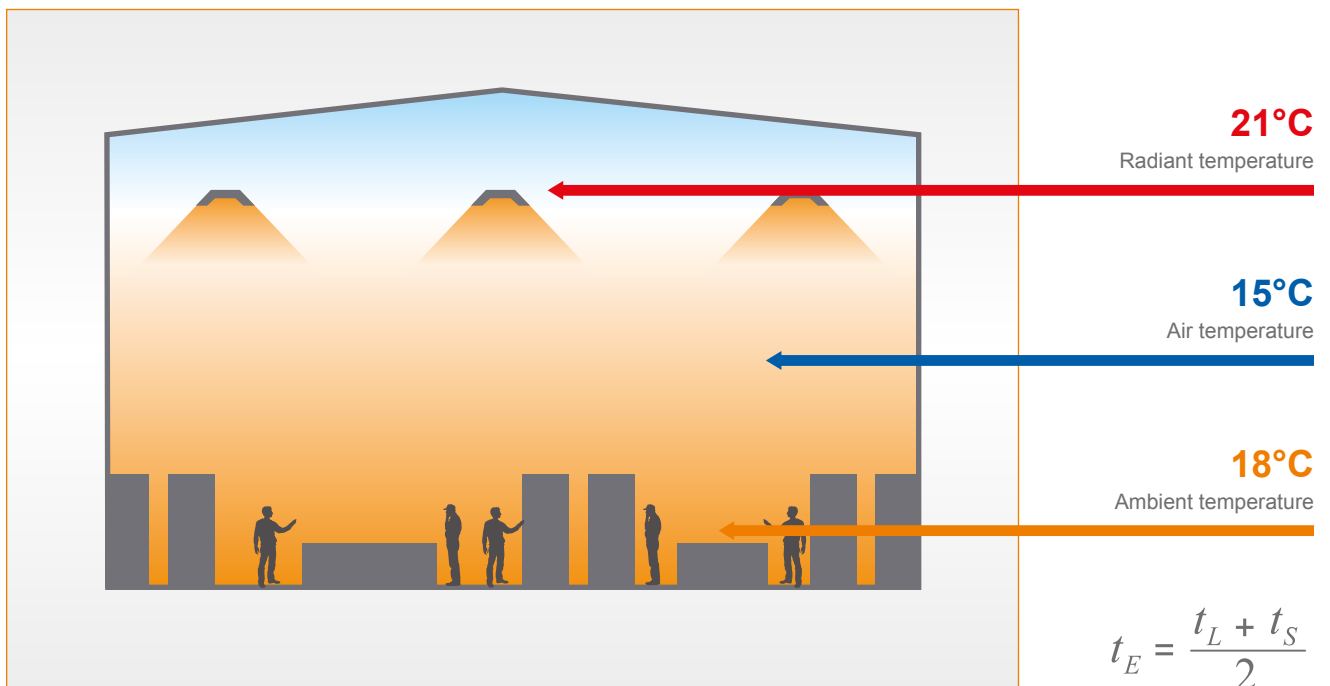


## 8 reasons why you can save energy costs with Schwank infrared heaters

### ■ Infrared radiation – the efficient kind of heating

Schwank utilises this principle to produce heating systems which consume less energy and thus save energy costs: By increasing the radiant heat temperature, the air temperature can be lowered – without compromising comfort.

Reducing the air temperature by 1 K [°C] will thus save 7% energy. The more this value is lowered the more energy is saved.

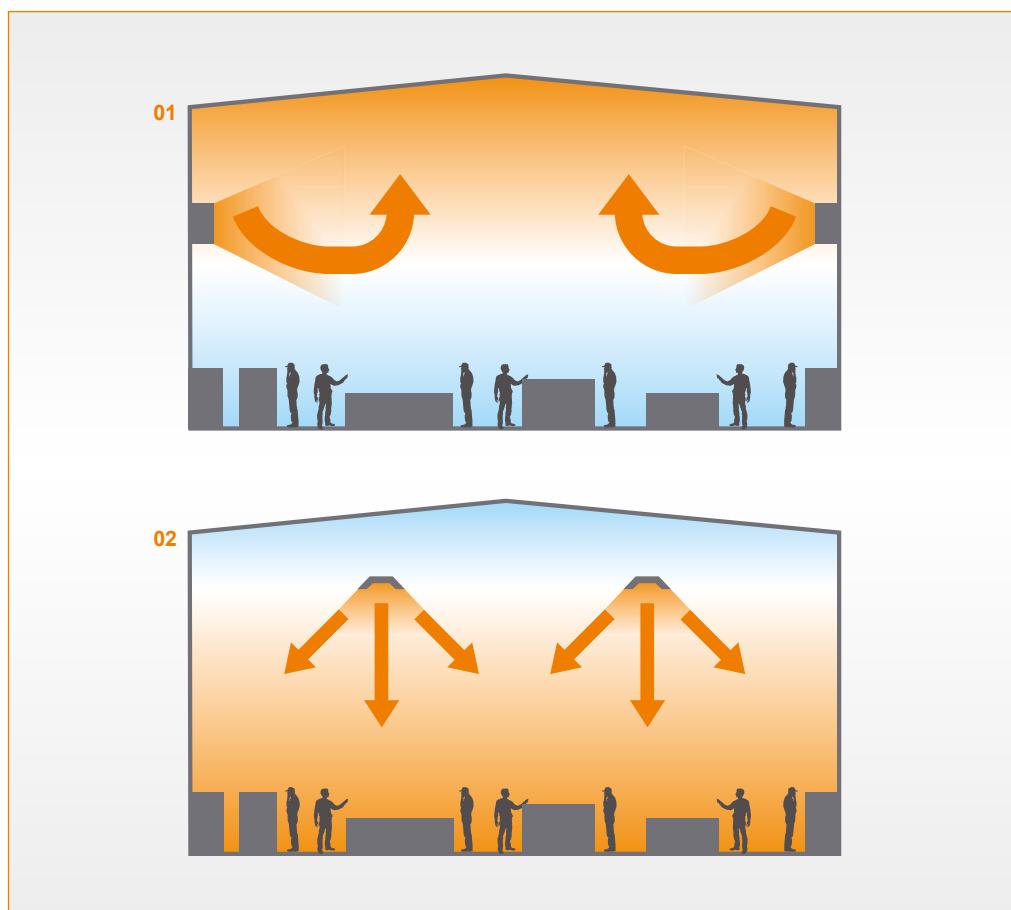


## Infrared heaters = Warmth at occupancy level

### ■ Avoiding hot air stratification below the ceiling

Hot air rises – a so-called thermal lift takes place. This means the higher the air rises, the more the temperature will increase. Infrared heaters by Schwank, however, heat the surfaces.

Thus, the thermal lift within buildings is avoided. Expensive and unnecessary hot air stratification beneath the building's ceiling is reduced. This advantage will have a 1:1 effect in regard to the energy costs.



#### Comparison:

**01** Convective system = heat under the roof

**02** Infrared heating system = heat in the working area

04

Energy savings potential of up to **18%**

**18%**

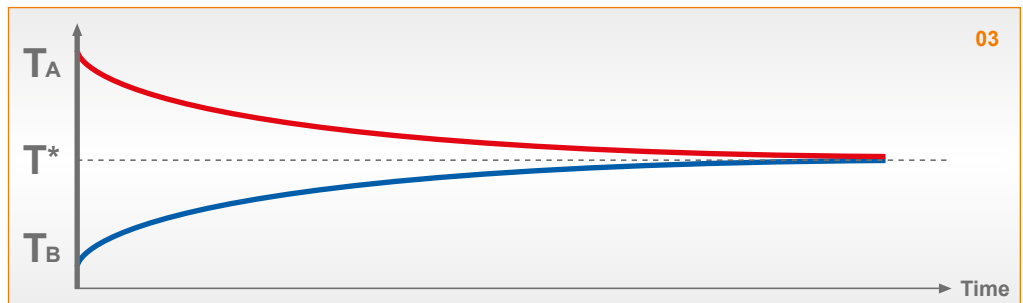
# Heating buildings without any losses

## ■ Reduction of transmission losses

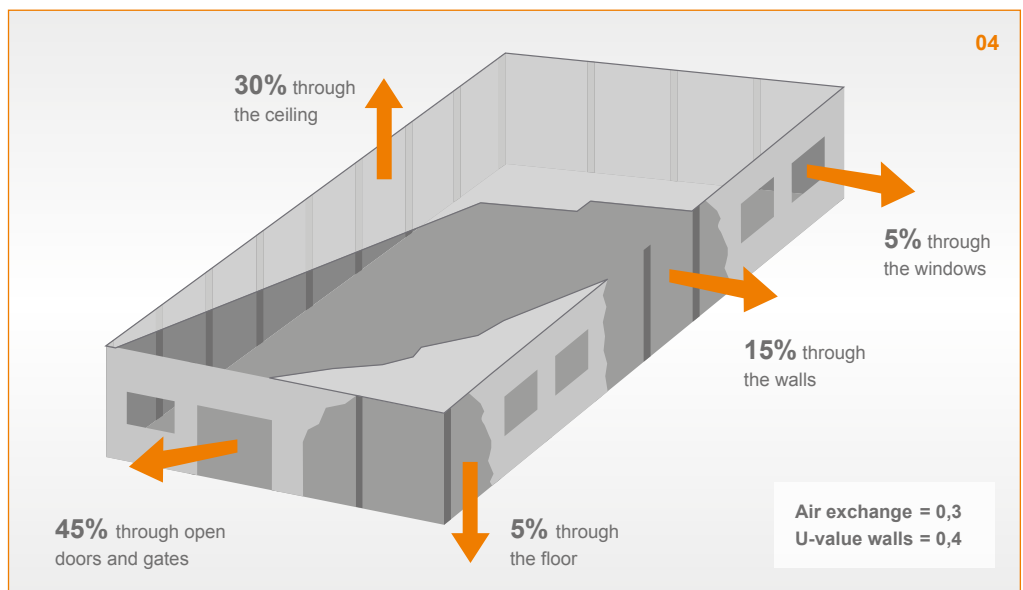
The higher the temperature difference between two media, the more they strive to compensate for this temperature difference – this effect is called transmission. The same is true for outside temperatures [ $T_B$ ] and room temperatures [ $T_A$ ].

Precisely directed infrared radiation does not heat the building walls more than necessary; it reduces the difference between inside and outside temperatures and thus minimises transmission losses.

03 Alignment of two media of different temperatures



04 Share / Proportion of transmission losses through the walls, the ceiling and other ways using the example of a modern industrial building



30%

Energy savings potential of up to 30%

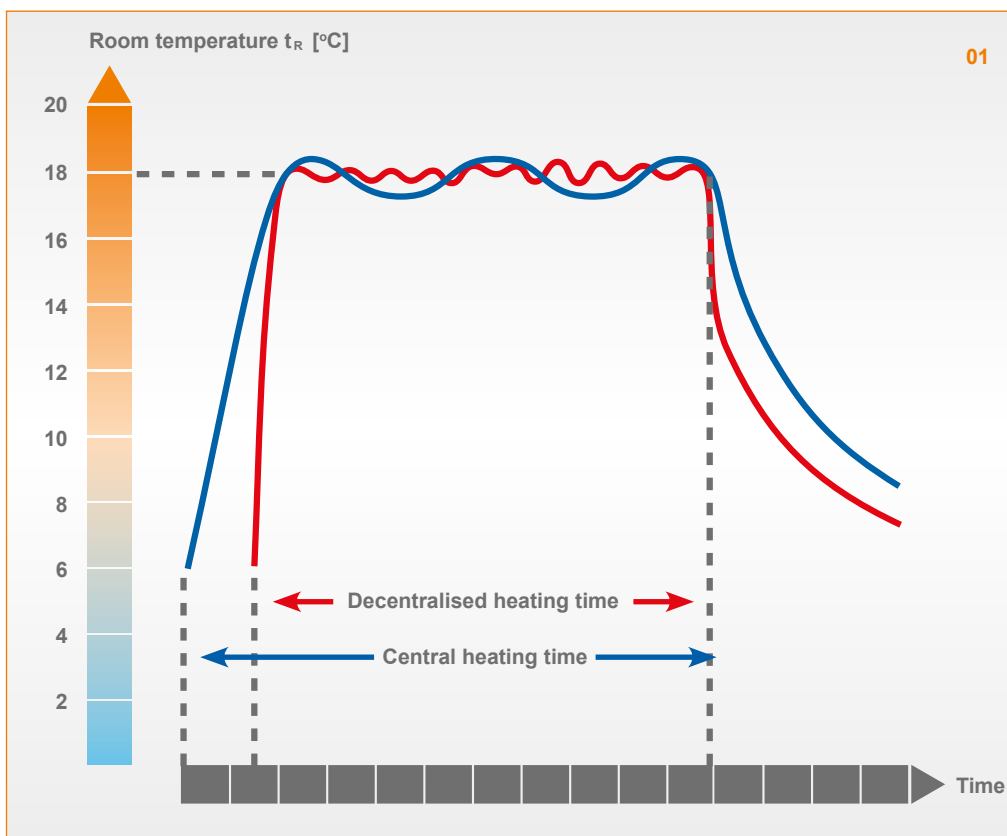
# Additional transfer media prevent heat from being transferred efficiently

## ■ Short reaction and heat-up times

As opposed to central heating systems using heat transfer media [e.g. water], Schwank infrared heaters directly generate heat.

When switching on the heater, the warmth can be felt immediately. The heating system does not waste any time with heating up and distributing the heat.

Fully modulating control systems of the infrared heater ensure a direct sensation of constant heat. Compared to central heating systems using water as a heat transfer medium, Schwank infrared heaters have short heat-up times. Thus, the operating times of the heating system can be reduced to the absolute minimum.



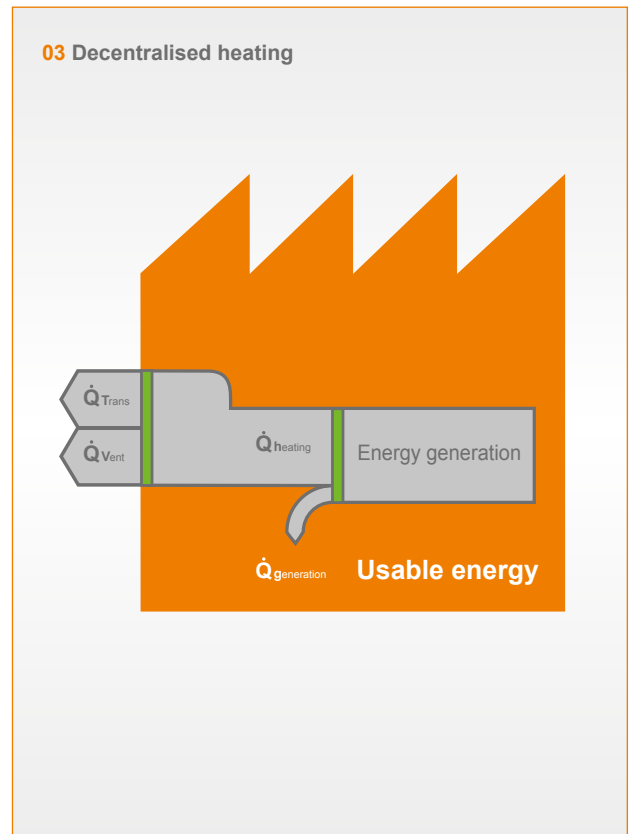
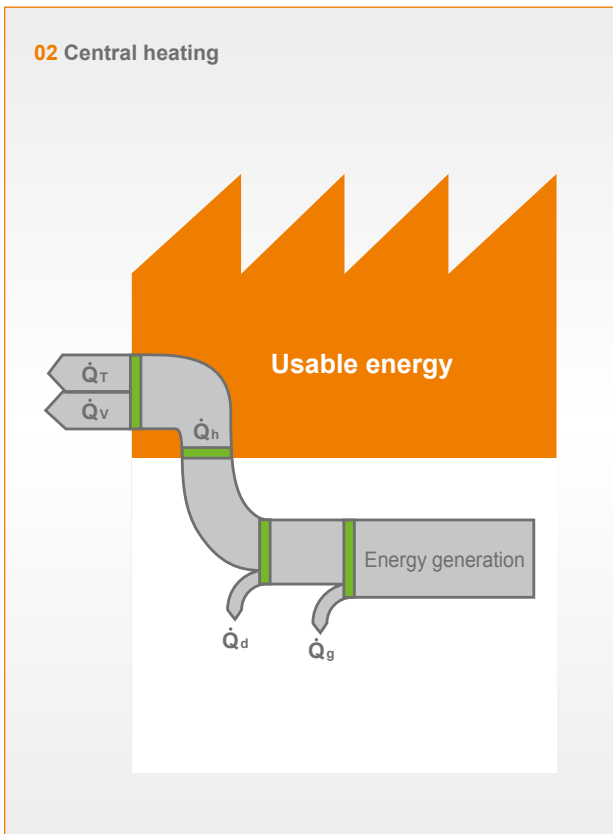
01 Comparison chart of central and decentralised heating time

# Direct radiant heat without any losses

## ■ No distribution losses

With central heating systems, long heat-up times are accompanied by distribution and transmission losses [02]. Mainly, such energy and heat losses are caused by long transfer distances and additional transfer stations.

Locally installed infrared heaters made by Schwank directly convert primary energy [such as natural gas, LPG, biogas] to radiant heat [03]. This avoids unnecessary transformations and transfer distances and the energy can be utilised for its actual purpose.



8%

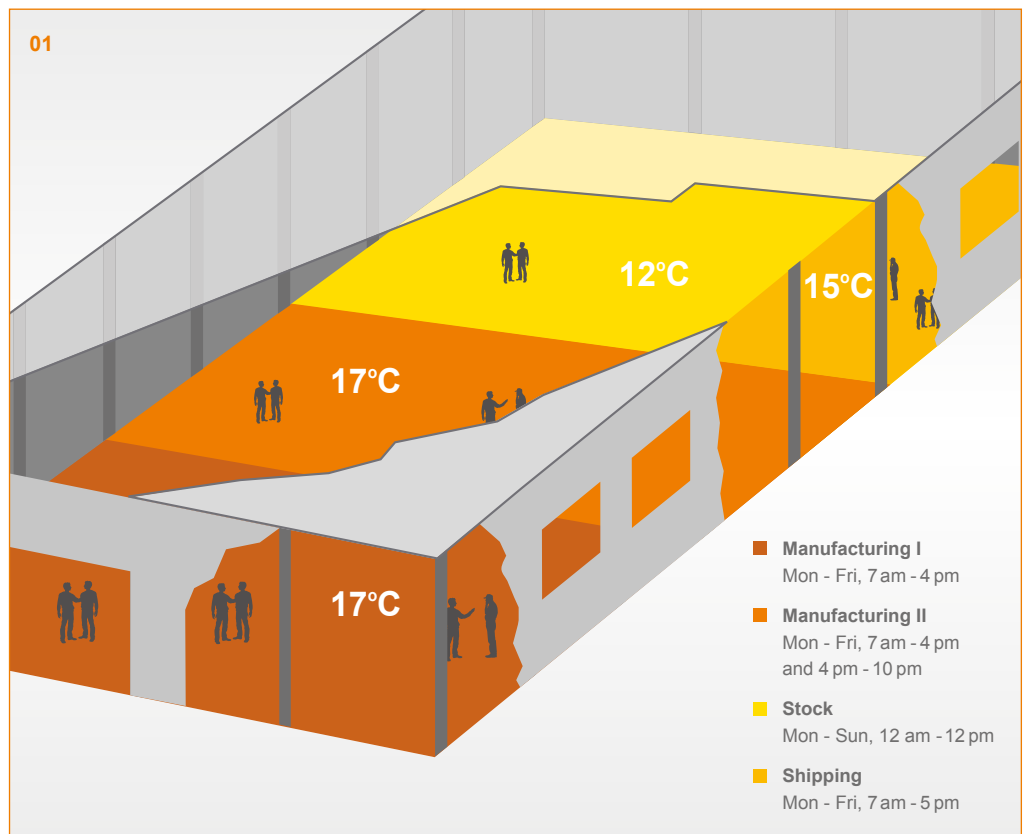
Energy savings potential of up to **8%**

# Individual heating zones

## Heat only at the time and in the zone needed

Schwank infrared heaters can heat both the entire building and individual work places in an energy-saving manner. Just like light, the heating can be separately turned on and off in different areas. In such independent heating zones, the temperatures can be controlled individually.

Such an on-demand heating systems can be controlled according to actual use and to the shift and working times. An intelligent heating control adapted to these needs reduces the operating times of the entire heating system and directly saves energy costs. After all, everyone knows that a heater being off is the most economical heater.



01 Partial heating of independent heating zones inside one industrial building

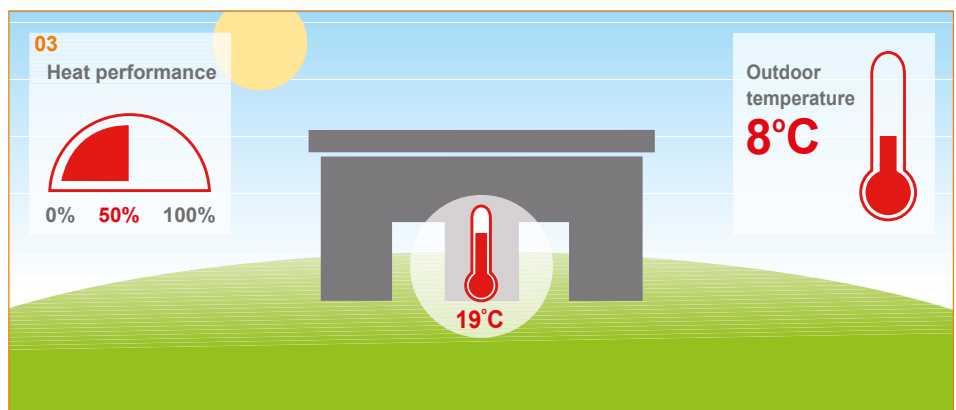
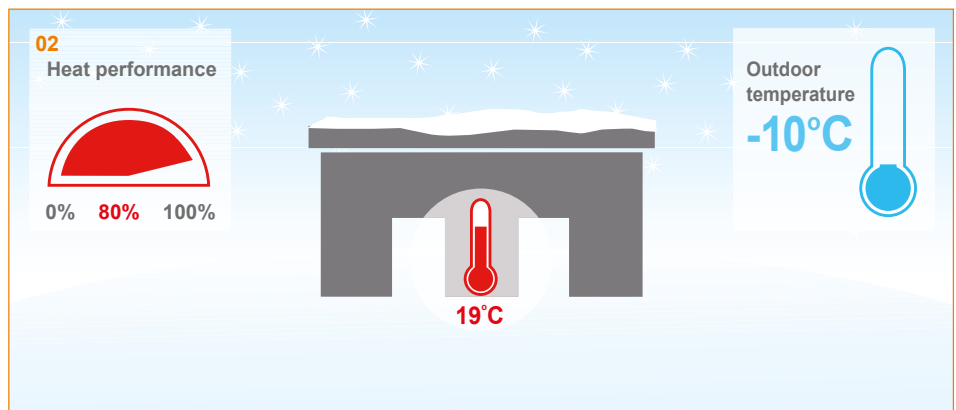


# Intelligent temperature control

## ■ Just the heating output needed

Virtually every heating system is oversized. In general, heating systems are designed for the lowest outside temperature to be assumed in the course of a year, although only a few days a year they are operated at full output. This is why Schwank infrared heaters are offered with **fully modulating control**.

This ensures the output of the heating system and the actual heat requirement of a building can be perfectly matched. That's what we call intelligent: The level of comfort will be improved and further energy savings of up to 14% can be achieved.



02 Heat performance of industrial heaters in winter

03 Heat performance of industrial heaters in spring or autumn

# 14%

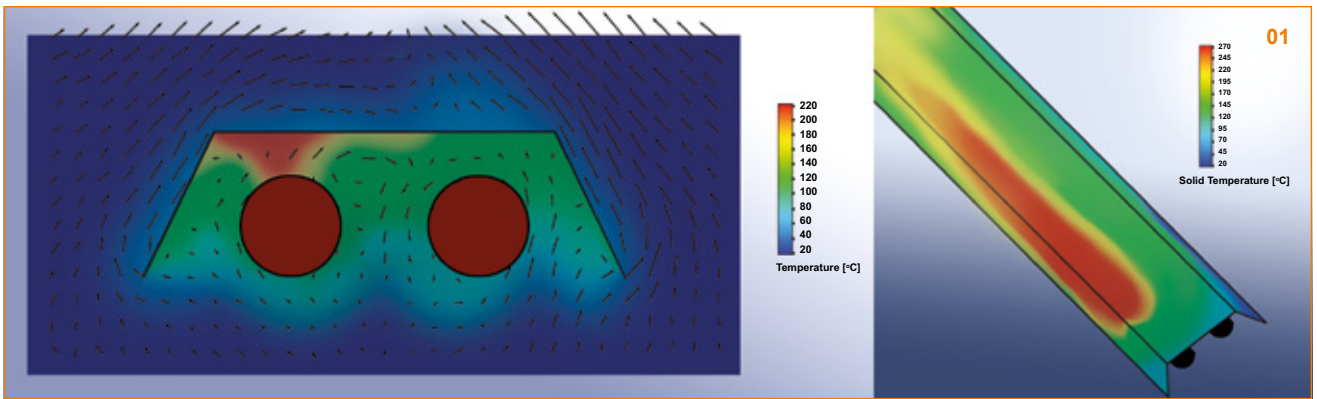
Energy savings potential of up to 14%

# Reduction of unused heat

## ■ Only heat serving its purpose is of value

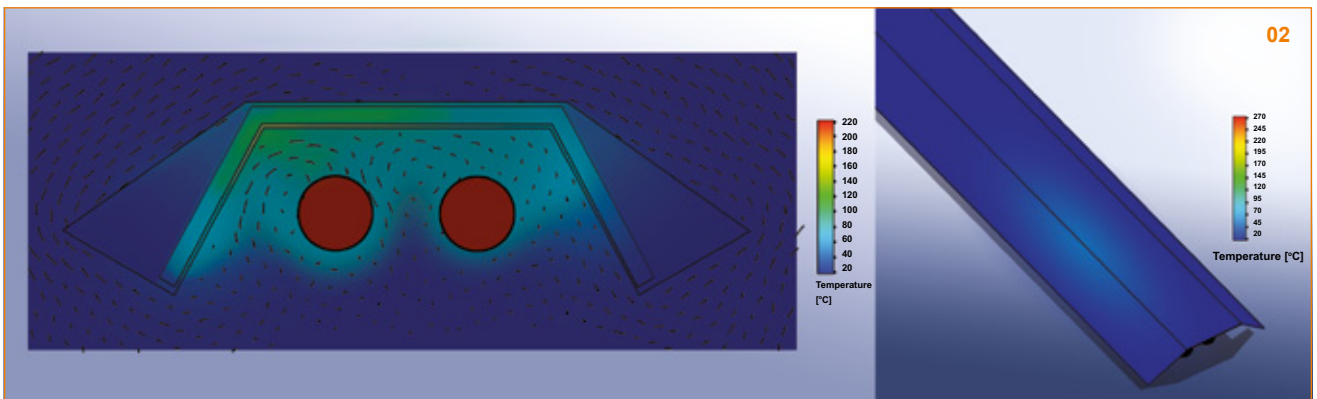
Insulating heat transfer media to avoid heat losses is regarded as state of the art. This also applies to infrared heaters as only the infrared rays that reach

the occupancy level heat the area effectively. This means insulation will pay off twice: more comfortable heat while consuming less energy.



**01 Non-insulated reflectors**

Temperature and flow distribution of a standard tube heater



**02 Insulated reflectors**

Temperature and flow distribution of superTube®





# Tailor-Made Solutions for Industrial Buildings, Outdoor Applications and Sport Arenas

## ■ System Comparison

Which heating system is the best? A heating system that suits all applications simply does not exist. Our programme therefore contains a well-balanced and extensive product portfolio in order to propose the best solution, tailor-made for your heating needs.

Based on this large product assortment we are able to provide a neutral system comparison. Our vast appliance assortment and system solutions guarantee an optimum and customised result to best accommodate your individual needs.

## A neutral assessment of the different systems of industrial heating

System / Features	Unit Heaters		Radiant Heaters			
	direct	Indirect	Gas-infrared heating		Radiant ceiling panels	Underfloor heating
			Luminous heaters	Tube heaters		
Equipment Efficiency	Good	Low	Very Good	Very Good	Low	Low
Auxiliary Energy	Significant	Significant	Minimal	Low	Available	Available
Noises	Yes	Yes	No	Low	No	No
Air movement	Yes	Yes	No	No	No	No
Air Renewal	Possible	Possible	Not possible	Not possible	Not possible	Not possible
Heating-up Time	Short	Lengthy	Very Short	Short	Lengthy	Very Lengthy
Partial Heating	Limited Possibility	Limited Possibility	Possible	Possible	Possible	Possible
Heating Areas with Flammable Goods	Limited Possibility	Possible	Limited Possibility	Limited Possibility	Possible	Possible

Source: Federal Association of German Energy and Water Economics, 2010

# Innovative. Experienced. Competent.

## ■ Experience for more safety

For more than 70 years, the name Schwank has stood for high-quality and cost-efficient building heating systems. As the market leader for gas-fired infrared heaters, Schwank has comprehensive experience in using cost-efficient heating systems. More than 150,000 satisfied customers and over 2 million appliances produced speak for themselves [for reference, see [www.schwank.co.uk](http://www.schwank.co.uk)].

As a German manufacturer, we aspire to a high standard of excellence in delivering products and service of the highest quality. Each single Schwank product excels by adopting economic procedures with minimum CO<sub>2</sub> emission.



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