



WE BRING HEAT  
STRAIGHT TO THE POINT

PROCESS HEAT AND  
DRYING TECHNOLOGY

PLANT CONSTRUCTION

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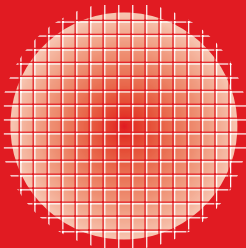
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## GoGaS: Consistently Innovative

GoGaS was founded in 1946 by Heinz Goch in Hamburg as a factory for gas lamps. The business was quick to achieve success. In 1948 the decisively-minded engineer relocated together with all of his employees from Hamburg to his Westphalian home city of Dortmund. At the same time, he began to systematically investigate the opportunities afforded by the transfer of heat using infrared radiation. It didn't take long before he had marketable heating systems for industrial and commercial use.

The experience gained from the industrial use of heat allowed GoGaS to establish their Drying Technology division in 1958. Its tasks include the project design, engineering design and production of process heat and dryer systems for a wide variety of industrial fields.

GoGaS supplies convection dryers, combined radiation/convection dryers and infrared dryers suitable for the task at hand.

Today GoGaS is more active than ever in the research and development of infrared technology. A prime example of this is the development of the RADIMAX short-wave porous burner.



Before



Now

# Our Energy for Your Project

## Efficient solutions for process technology

GoGaS infrared systems are inspired by nature. In a manner comparable with the sun, our heaters emit electromagnetic waves across large distances through the air with no losses. The rays are only converted into heat when they come into contact with physical substances. This makes infrared radiant heaters a perfect fit for heating and drying.

- Drying in the paper and steel industries
- Curing of powder coatings
- Thermal moulding of plastics
- Caramelization of sugar icing on pastries
- Defrosting railcars

As a company with a special affinity to the environment and energy use, we are constantly working on optimizing our systems' energy efficiency. Our success shows that our efforts are not misplaced. Our company's products are among the leading products internationally in terms of energy efficiency and environmental friendliness.



Company founded  
by Heinz Goch

1946

Production of  
catalytic burners  
for industrial use

1952

Founding of Drying  
Technology division

1958

Construction of the  
first air-flotation dryer  
for steel strips

1974

Construction of  
technical centre

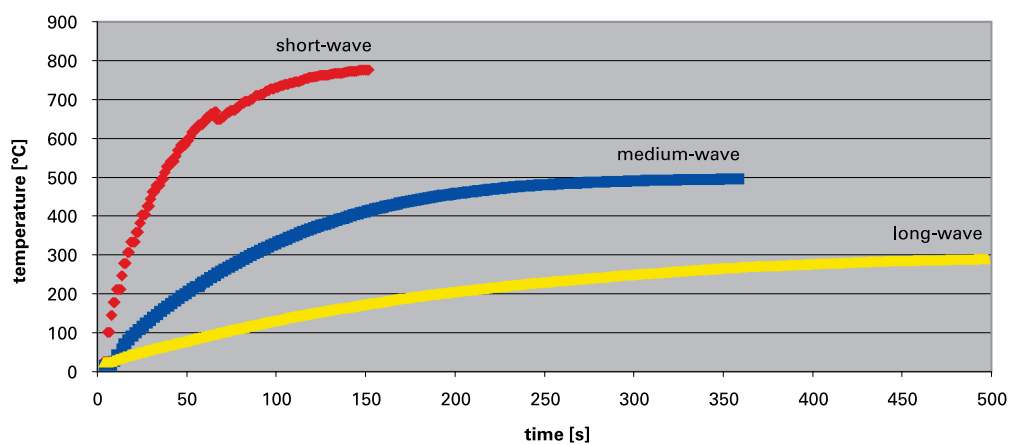
1986

Introduction of  
RADIMAX porous  
burner onto the  
market

2005

## Expertise in Infrared (IR)

With the various burner types – porous burners, metal fibre burners, ceramic burners, low-intensity heaters and catalytic burners – GoGaS covers the entire infrared range used for technical purposes (long-wave, medium-wave and short-wave) and is therefore the only dryer producer in the world to act as a complete supplier for the entire wavelength range. This unique range of products ensures that the drying process is optimally adapted to the customer's needs. In addition, our decades of experience in infrared heating are a benefit to every project. Furthermore, the use of gas as a fuel ensures that operation involves a minimum in energy costs.



Heating curve for a steel plate with different infrared burners

Awarded Dortmund  
Business Prize

2007

Largest railcar  
defrosting instal-  
lation in the world  
commissioned

2009

First plant in  
the world to use  
short-wave gas  
IR burners to dry  
coated steel strips  
commissioned

2011



# All Wavelengths

**Long-wave burners** – Our range of long-wave burners includes our low-intensity heaters. These work with a gas burner that generates a long, smooth flame that is guided through special radiator tubes. The heat transmitted from the flame and from the hot combustion gases on the surface of the tube causes it to heat up and emit long-wave IR radiation. Combustion gases can be transported away with precision without coming into contact with the product or process chamber.

Exclusive to GoGaS: The TRIGOMAX flue gas heat exchanger can be taken to use the residual heat. The hot air can be used for other specified processes. This further increases the energy efficiency.

GoGaS also supplies gas-heated catalytic infrared heaters that use flameless heating technology.


Both heaters provide heat with uniformly low intensity. A large range of materials absorb this long-wave energy consistently well. The risk of overheating is minimised.

**Medium-wave burners** – GoGaS has various gas-operated, medium-wave infrared high-intensity heaters in its range, including the ceramic burner and the metal fibre burner with a knitted or sintered surface. These high-intensity heaters have been specially developed for industrial use and have proven their reliability over the course of millions of service hours. By combining several of these heaters, the customer can achieve a homogeneous radiating field of practically any desired length and width that is adapted optimally to their needs. The heaters can be smoothly adjusted to any level within the control range.

The high radiation efficiency and often the additional use of the hot air cushion between the burner and the material to be dried ensures that energy is used highly efficiently.

**Short-wave burners** – In cooperation with the University of Erlangen, GoGaS has developed a wholly new concept for gas IR burners. The gas is no longer combusted on the surface of the burner as with regular systems, but instead in the core of the porous structure of the burner. With the use of the new combustion principle, we have managed to build a burner with a very high power density.

This short-wave IR burner, which at the time of its market debut in 2005 was a world first, has demonstrated its practicality in many years of industrial use.

	Long-wave
	
<b>Type</b>	<b>DSL low-intensity heater</b>
<b>Wavelength</b>	3.3–5 µm
<b>Max. Burner temperature</b>	600 °C / 1112 °F
<b>Max. thermal surface effect</b>	17 kW/m <sup>2</sup> 5400 BTU/ft <sup>2</sup>
<b>Dimensions mm / Inch</b>	Min. length: 6500 mm / 256"  Max. length: 18000 mm / 709"
	Special lengths on request
<b>Paper drying</b>	–
<b>Textile drying</b>	–
<b>Paint drying</b>	✓
<b>Curing of powder coating</b>	✓
<b>Coil coating</b>	–
<b>Warming and defrosting process</b>	✓

	Medium-wave			Short-wave
				
<b>Catalytic burner</b>	<b>Ceramic burner</b>	<b>Metal fibre burner</b> Knitted surface	<b>Metal fibre burner</b> Sintered surface	<b>Porous burner</b> <b>RADIMAX</b>
3.3–5 µm	2.4 µm	2.2 µm	2.2 µm	1.7 µm
600 °C / 1112 °F	950 °C / 1742 °F	1050 °C / 1922 °F	1050 °C / 1922 °F	1450 °C / 2642 °F
30 kW/m <sup>2</sup> 9500 BTU/ft <sup>2</sup>	120 kW/m <sup>2</sup> 38000 BTU/ft <sup>2</sup>	200 kW/m <sup>2</sup> 63400 BTU/ft <sup>2</sup>	250 kW/m <sup>2</sup> 79200 BTU/ft <sup>2</sup>	1000 kW/m <sup>2</sup> 317000 BTU/ft <sup>2</sup>
600 mm x 600 mm / 23.6 x 23.6"	140 mm x 375 mm / 5.5 x 14.75"	140 mm x 375 mm / 5.5 x 14.75"	150 mm x 200 mm / 5.9 x 7.9"	150 mm x 200 mm / 5.9 x 7.9"
450 mm x 1200 mm / 17.7 x 47.2"	100 mm x 270 mm / 4.0 x 10.6"	100 mm x 270 mm / 4.0 x 10.6"		
450 mm x 1.500 mm / 17.7 x 59.0"	100 mm x 400 mm / 4.0 x 15.75"	100 mm x 400 mm / 4.0 x 15.75"		
	100 mm x 535 mm / 4.0 x 21.0"	100 mm x 535 mm / 4.0 x 21.0"		
	100 mm x 800 mm / 4.0 x 31.5"	100 mm x 800 mm / 4.0 x 31.5"		
		300 mm x 400 mm / 11.8 x 15.75"		
Special sizes on request		Special sizes on request		
–	–	✓	✓	✓
–	✓	✓	✓	–
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	–	✓	✓	✓
✓	✓	✓	✓	✓



# Coil Coating

GoGaS supplies infrared systems for drying one or both sides of coated steel strips. Either medium-wave burners or RADIMAX short-wave burners are used for this.

In paint drying, we differentiate primarily between two processes:

- 1) Evacuating the solvent and cooling the product accordingly with the coldness from the solvent vapour. The paint film is dry, but it lacks a resilient surface.
- 2) Temperature is applied to induce curing of the paint. Depending on the paint formula, the manufacturer will specify a PMT (peak metal temperature) that needs to be reached for the curing process to take place.

With our gas infrared burners, the PMT can often be reached without having to heat the entire steel strip. Due to the high amount of heat transferred through the infrared radiation process, short dryer lengths are possible.

By switching off individual burners around the edges, each row of burners can be adapted to the various steel strip widths. This enables considerable energy savings to be achieved. Switching from a heated width of 1800 mm to a heated width of 750 mm, for example, will save around 58 % in gas consumption. Of course, it is also possible to control the output of each burner row on the basis of each material's thickness and throughput speed.

To protect the rows of burners, for example from materials falling down, any dryer hoods not in service can be closed off using protective covers that can be moved by means of a motor or can be rotated out of the way using special devices.

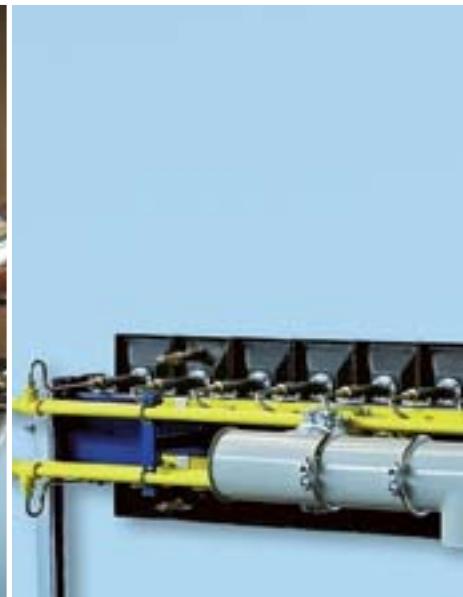
The products we deliver also include special solutions such as steam-heated systems used for pre-heating steel strips prior to pickling.



Infrared steel dryer prior to delivery



Infrared steel dryer in operation



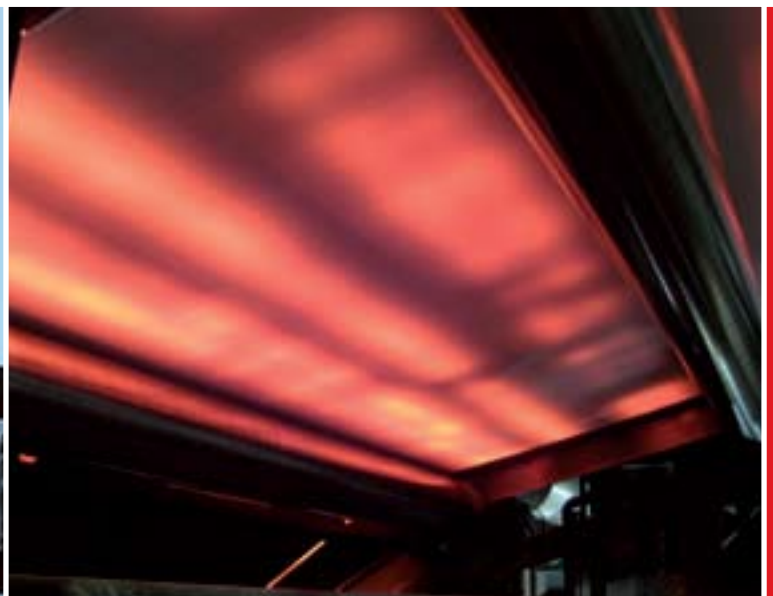
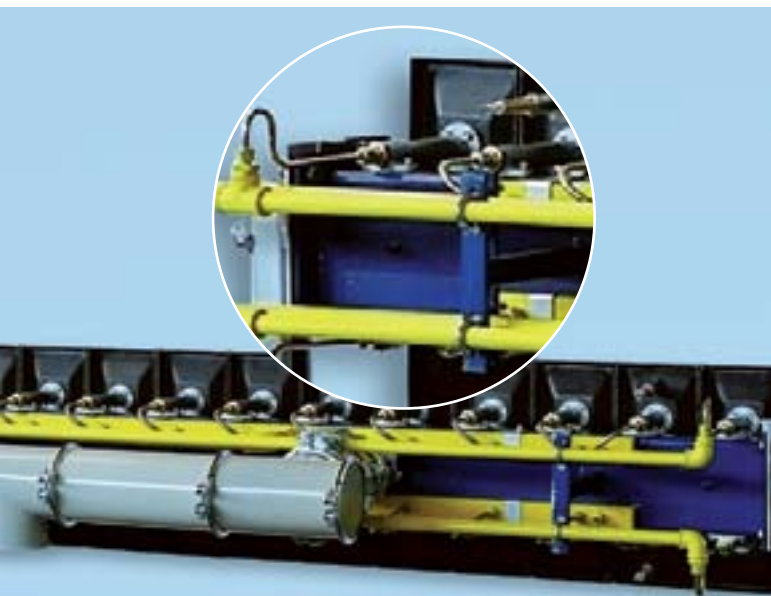
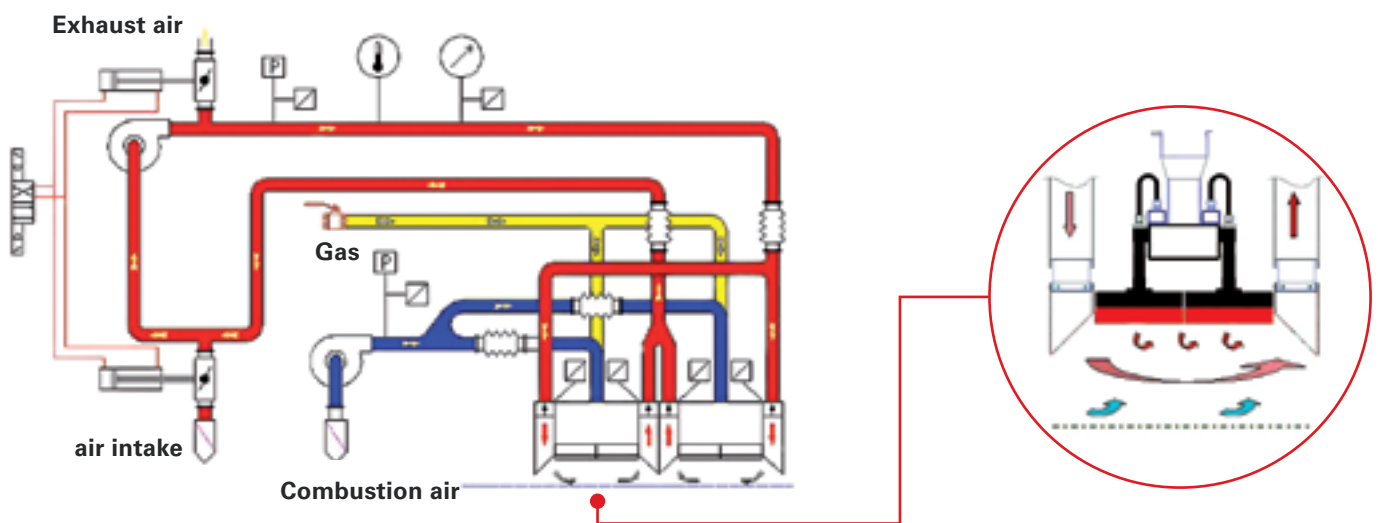
IR twin row prior to installation



## Paper Drying

IR burners are generally used to dry coated web in paper machines. GoGaS uses metal fibre burners, porous burners or a combination of both burner types for this application depending on the required capacity and the space available. Both burners evenly dry coated web with maximum efficiency and stand out with their robust construction. Due to the considerably higher specific capacity of the porous burner, it is easy to increase drying capacity even when space is limited.

Flow diagram



Infrared paper dryer

# Textile Drying

In the textile industry, dyeing is one of the most complex refinement processes. The demands placed upon dyeing technology are considerable because the quality of the dyeing is very recognizable to the eye.

GoGaS infrared pre-dryers have perfectly proven their value in many systems used to improve quality after the dyeing process. Dye particles are fixed onto the surface of the textile as a result of the contactless pre-drying process. Gas infrared burners are usually used as a heating source, but in rarer cases, electric infrared burners are also installed.

GoGaS metal fibre burners are particularly well suited to textile pre-drying. They are highly resilient to mechanical damage, vibration and water sprays. They are also recommended in light of their ability to heat up and cool down extremely quickly. This ensures absolute safety in all operating states. Should the machine or line stop, the rapid cooling of the gas infrared burner is supported by an air intake/exhaust system for immediate cooling.

The pre-dryers can be fitted with two, four or six burner rows in a modular fashion. The dryer capacity can be adjusted by shutting down individual rows of burners in a ratio 1:3. The burner capacity can also be smoothly adjusted to any value between 50 % and 100 % within the burner's control range.

Also, by switching off individual burners around the edges, each row of burners can be adapted to the various product widths. Not only does this optimize the quality of the dyeing, but it also allows for considerable savings in energy.



Gas infrared pre-dryer for dyed textile webs



A look inside a gas infrared pre-dryer without a web



A look inside a pre-dryer with a web

## Paint Drying

In paint drying, the products supplied include circulating air dryers and infrared dryers for wet and powder coatings. In addition to conventional circulating air dryers, GoGaS has particular expertise in the manufacture of infrared dryers.

Whether you are drying organic solvent-based or water-based paints, whether melting and curing of powder coatings, GoGaS infrared dryers are always on the right wavelength.

GoGaS is the only dryer manufacturer in the world able to offer long-wave, medium-wave and short-wave gas-powered infrared burners. This unique range of products ensures that the drying process is optimally adapted to the customer's needs.

## Construction Materials

GoGaS supplies complete lines and components for drying and surface-coating of construction materials such as plasterboard, cement-bonded particle board, fibre cement board and roof tiles, both flat and corrugated.

These boards or tiles are transported, heated, coated, dried and then cooled to stacking temperature in special cooling zones.



Gas IR curing zone for powder coating



Coating system for corrugated boards



# Radiating Fields

Radiating fields are achieved by lining up burners horizontally or vertically. Any dimensions depending on the type of burner selected, are possible. Radiating fields are suitable in any situation that requires the transfer of large amounts of heat to a small surface.

With its broad range of long-wave, medium-wave and short-wave infrared radiant burners, GoGaS is able to offer the best burner for the best solution. It is also sometimes beneficial to combine different burners. These burners are also ideally suited to making use of energy from exhaust gases for an additional transfer of heat by means of convection. This means radiating fields are very cost effective to run in small spaces.

## Examples of use:

- Caramelization of sugar icing on biscuits
- Browning meat
- Testing flame-resistant clothing
- Heating foils
- Heating asphalt or bitumen
- Drying coatings, for example on glass panels, the rear side of carpets, rugs or insulation wool



Heating tunnel with GoGaS metal fibre burners



Radiating field

## Railcar Defrosting Installations

Hard coal, lignite, ores, FGD gypsum or limestone gravel – all types of frozen bulk materials can easily be thawed out under winter temperatures with GoGaS railcar defrosting installations.

GoGaS presents a variety of system types that are technologically mature and have proven their value under severe practical conditions, not only because they are cost effective to run, the process ensures that the railcars are handled with care. In addition, the costs are far below those that are incurred when production needs to be halted!

### Ideal methods for defrosting railcars:

- GoGaS railcar defrosting installations with gas infrared heaters used as lateral heaters, optionally with low-intensity or high-intensity heaters and special burners for heating below
- GoGaS railcar defrosting installations with electric infrared heaters used as lateral heaters, and special burners for heating below
- GoGaS railcar defrosting installations with hot air heating



Railcar defrosting installation, cabinet doors open, operation in winter



Railcar defrosting installation, cabinet doors closed, idle in summer

# The Heating Specialists

When making decisions on investment, the demand for cost-effective and energy-efficient space heating solutions continues to rise. With the following products we can meet modern demands on convenience, cost efficiency and energy efficiency:

- High-intensity heaters
- Low-intensity heaters
- Hot air technology
- Solar air collector
- Intelligent control technology

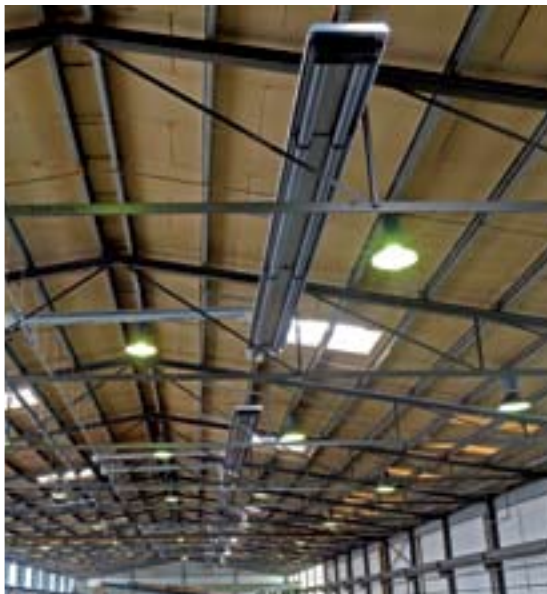
This extensive range of products makes GoGaS extraordinarily flexible and enables them to find the best solution for a wide variety of requirements.

Fields of use include:

- Industrial and commercial spaces
- Warehouses
- Logistics centres
- Sporting facilities (tennis halls, fitness studios etc.)
- Sports stands (football stadia, multifunctional arenas)
- Outdoor spaces (gastronomy, private patios)
- Churches



VARIOMAX patio heater



Condensing low-intensity system

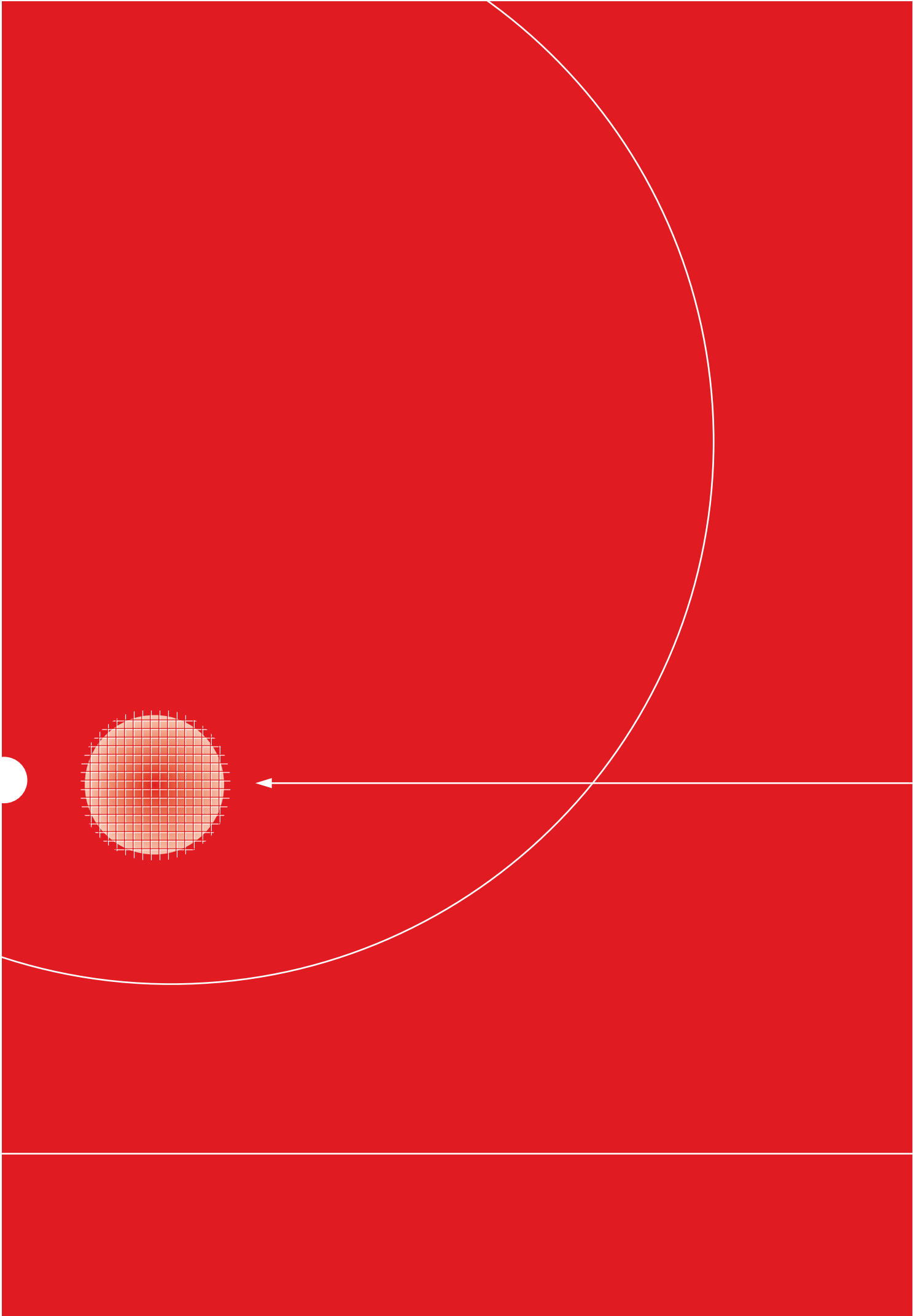


Stand heating with high-intensity gas infrared heaters



Heating of logistics halls with low-intensity heaters







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