HACHTEL-POWERGLAS® as Insulating Glass

Insulating glass structure

- The pane facing the room consists of toughened safety glass (TSG) and is provided with a special coating without heating wires on the side facing the gap between the panes.
- The outer pane is made of float glass, toughened safety glass or laminated safety glass and is usually provided with a heat insulation coating.
- The spacer is supplied as so-called "warm-edge system" made of plastic available in common sizes from 8 mm to 27 mm thickness: Considerable reduction of heat loss in the border area of the insulating glass pane compared to "normal" insulating glass, because no thermal bridges exist.
- The gas filled into the gap between the panes is argon or krypton as desired by the customer.
- The U_g value in accordance with DIN EN673 is 1.2 W/m²K.
- The cables are lead through at the edge.
- The insulating glass is electrically protected.
- Protection class 2

Tempered Glass HACHTEL-POWERGLAS®

- Temperature difference strength = max. 150 K between centre and edge of the pane
- Bending strength = 120 N/mm²
- Resistance to pressure = 700 N/mm²
- Scratch hardness in accordance with MOHS = 5 – 6
- Max. current load of the special coating = up to 1 W/cm², of the glass surface = 10 kW/m²

Electrical power

The electrical power of HACHTEL POWERGLAS insulating glass can be designed as desired.

Min. 20 W/m²
Max. 800 W/m²

Suitable for permanent temperatures of up to around 70 °C. Higher power can be installed for special applications in which the heating-up time needs to be extremely short.

Combinations

HACHTEL POWERGLAS can be combined with the following types of glass:

- Float glass
- TSG or LSG
- Solar glass

Additionally, HACHTEL POWERGLAS is available with a sun-blind or reflecting foil integrated in the gap between the panes.

Frame types

HACHTEL POWERGLAS can be installed into the following types of frames:

- Wood
- Plastic
- Aluminium
- Structural glazing

Electrical connection and regulation

In addition to series and parallel connection, the electrical power of HACHTEL POWERGLAS is adjusted to the requirements of the building and the user in residential buildings, up to a maximum specific power of 800 W/m². Since power requirements vary (day/night, wind, insolation etc.), a power regulation system is usually used. The following options are available:

- Power regulation based on air temperature measurement
- Power regulation based on glass surface temperature change
- Combination of both

We calculate current and voltage for each pane with a view to the specific power required and the control of each pane and the total heated glass surface.

Power consumption

The power required to operate HACHTEL POWERGLAS depends on the application and is strongly dependent on the size of the windows in relation to the floor space. For special applications, the power requirements can be determined by means of calculations or tests.

Efficiency

The efficiency of HACHTEL POWERGLAS is around 90 %, i.e. around 90 % of the electric energy put in is used to heat the room.

Copyright note

Production of our heated glass panes is protected by a utility patent owned by us.

HACHTEL
LEBEN MIT GLAS

Helmut Hachtel GmbH Isolierglaswerk · Kolpingstr. 3 · 74523 Schwäbisch Hall · Germany
Phone +49/(0)791/95095-0 · Fax +49/(0)791/95095-50 · info@glas-hachtel.de

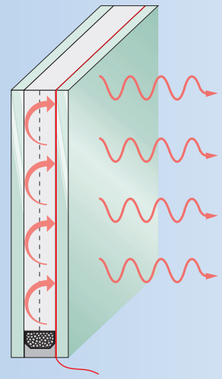
Invisible Glass and Window Heating

HACHTEL POWERGLAS

Heating Glass Solutions®

- Absolutely invisible integration into the window pane
- No condensation or draught
- Evenly distributed radiant heat
- No cold glass surfaces
- For renovation and extensions
- Cost-effective installation
- Optimal room air pollution control
- A maximum of comfort in the room

- The heating is integrated into the glass and absolutely invisible. No space is consumed and no erection space is needed. This gives you freedom to design your interior.
- The whole surface of the pane facing the room is heated and thus an evenly distributed radiant heat is emitted into the room. The result is a pleasant room climate.
- No more cold glass surfaces — just comfort and cosiness.
- Favourable room air hygiene conditions due to low convection and reduced dust formation.
- No cold flows of air or condensation on the panes, therefore also optimal for roof glazing.
- Low-cost installation, easy to install compared to conventional heating systems. Therefore especially suitable for renovation and extensions.
- The warm surfaces of HACHTEL POWERGLAS® heated insulating glass considerably enhance room comfort!



Advantages of HACHTEL-POWERGLAS® Heated Insulating Glass

Multitude of Possible Applications of HACHTEL-POWERGLAS®

Appearance

HACHTEL POWERGLAS is absolutely invisible in the window pane. If the window surface is sufficiently large, there's no need for additional heating and disturbing radiators.

Cosiness

The warm surfaces of HACHTEL POWERGLAS create comfortable inside temperatures. The heat is radiated into the room and provides a pleasant climate. The advantage of radiant heat is that the air inside the room needs not be heated first to obtain the desired effect. As a consequence, it's getting warm shortly after the heating is turned on.

Cost effectiveness

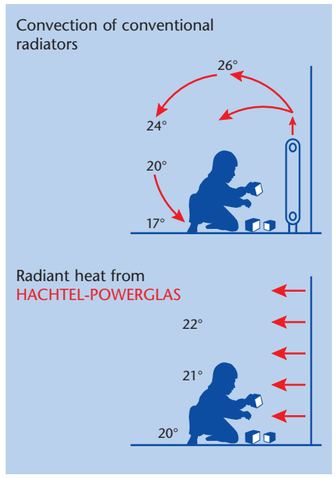
HACHTEL POWERGLAS contributes to saving energy, because the perceived cosiness depends on the operative temperature, the mean value of the air temperature and the average surface temperature of the surfaces enclosing the room. An increase of the mean surface temperature of the window surfaces in the room allows the room temperature to be reduced by 2 °C on average. This means a reduction in power consumption by around 12 % and, because the air temperature is lower, less heat is lost when the air in the room is renewed. The room air quality is perceived as being more pleasant. HACHTEL POWERGLAS is a low-temperature heating system. Large glass surfaces in the room are used for heating and thus the temperature of the heating medium is just slightly higher than the room air temperature.

Safety

The heated room-side pane of the HACHTEL POWERGLAS insulating glass is made of high-quality toughened safety glass (TSG), while normal insulating glass panes in windows usually consist of float glass.

Health

Headaches and hardened muscles in the back and neck as a consequence of cold convection near windows are avoided. Still and thus dust-free air is a prerequisite to an ideal room climate that preserves your health. Therefore, HACHTEL POWERGLAS is the optimal heating system also for allergic persons and asthmatics. In conventional heating systems, large surfaced radiators generate hot air which rises up, while cold air is flowing up from the ground. This convection creates an unhealthy draught which constantly whirls up dust and allergens. Moreover, convection heating withdraws oxygen and humidity from the air, and dry, low-oxygen air full of dust and germs means higher susceptibility to respiratory diseases.



Ideal for

- Old and new buildings
- Office buildings
- Public houses and hotels
- Swimming-pools and indoor pools
- Hospitals and old people's homes
- Glass extensions and conservatories
- Roof extensions
- Buildings in which conventional heating systems cannot be installed
- Canteen kitchens
- Inspection glasses on machines and installations
- In special designs as laminated glass in overhead areas, for vehicle and ship glazing, glazing of freezing chambers and refrigerating sets and other applications aiming at reducing condensation/icing

Cost saving

- No chimney-sweep
- No maintenance
- No tank cleaning
- No stocking
- No emissions
- No wear
- Single-room control, thus no regulation loss as, for instance, in the case of a central control system of a heating boiler
- Most easy billing, pay for the electricity consumed
- Most energy suppliers already offer very favourable rates for heating current which are invoiced via direct connections and separate measurements.

Easy installation

- Only the connection line coming out of the edge of the insulating glass pane needs to be lead through to the outside via the window frame and connected to a power source. Apart from that, the windows are installed in the same way as conventional insulating glass panes.
- Can be retrofitted at any time.
- No external connection costs