RÁKOSY GLASS

HEATING GLASS

TECHNICAL GLASSES

2011

RÁKOSY GLASS

HEATING GLASS

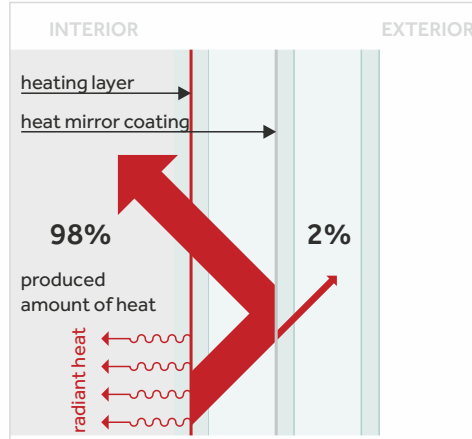
- Heat mirror coating – 98% of the produced energy is used in the interior space
- adjustable temperature
- coating between the indoor laminated glass panes
- it is based on the principle of electric resistance
- maximal surface temperature: 60 °C
- maximal output heat power: 600 - 1200 W/m²

The forming of aesthetic and comfortable living space has resulted in using large, several square meters in surface, glass constructions. Because of these changes in the wall/glass ratio and the building constructions following the high lagging standards of buildings, the loss of heat, even with glass structures produced using state of art coating, is the highest at the windows and the doors.

SIZE LIMITATION
the maximal pane size is 2400 mm x 4500 mm

The heat sensation of the human body is greatly affected not only by the air but by the surrounding surfaces. The surface produced of heatable glass **transmits most of the energy delivered to its surroundings in form of radiant heat.** The inner air temperature of a building can be decreased by 3-4 °C, so a temperature of 18-19 °C gives the same heat sensation of a temperature of 22-24 °C in case of traditional heating methods. **This decreases the energy used for heating significantly.**

One of the most important factor of transforming a house into a pleasant and comfortable home is to find the appropriate heating system. **The heated glass offers a clean, effective and safe solution thereto.** The glass of the Rákosy Glass Heating System (RGHS) is an innovative, ENERGY SAVING heating solution with adjustable temperature and exclusive design.



The surface can function as a window and/or a radiator from a translucent version to versions with unique patterns limited only by the fantasy and taste of the estate owners.

The construction is composed of several layers, with a minimum of two, of hardened glass and the inner heated layer is laminated to keep the construction together even if it breaks. The heating layer is an invisible metal conductor surface applied using nanotechnology and the resistance of it produces heat when conducting electric current. This coating is always inside the laminated glass layer being closest to the interior of the building.

Interior surface temperature	Exterior surface temperature	Required heating power*
18 °C	0 °C	~5-15 W/m²
18 °C	-10 °C	~15-20 W/m²
18 °C	-20 °C	~20-30 W/m²
18 °C	-30 °C	~30-40 W/m²

*for interior surface glass temperature of 18 °C

The advantage of the heatable glass structure:

- low building engineering costs
- aesthetic
- silent
- **in case of new constructions or full renovation** using large-sized glass surfaces **there is no need for elements of traditional heating systems** (furnace, floor radiators, floor convector heaters, lined chimney) – the absence of these items forms a **significant saving** in the investment
- pleasant heat sensation at lower temperature ("comfort theory")
- easy to position because of being translucent
- can be used in sterile environment
- excellent for heating listed buildings and monuments (there is no need for additional heating instruments, so the given seasonal exhibition, or the authenticity of a room is not spoiled by an unfitting heating device)
- variable, in aesthetic aspect (a glass artwork) as well as in architectural aspect (structural glass, thermal glass...).

HEATING GLASS

Considering a 100 m² house as an example, given that the ratio of the heatable glass surfaces and the ground-space is convenient, counting with a residential electricity fee of 40 HUF/kWh, heating cost can be as low as HUF 15,000/month. If the shape or size of the rooms and the surface rate of the fenestrations of the room are not convenient, the Rákosy Glass Kft offers a solution in the form of glass radiators produced in series with the help of industrial art designers, considering individual needs; and these radiators can turn the cooling surfaces of a room into heating surfaces.
As a company with **30 years of experience** specialized for glass manufacturing, with manufacturing and applying heatable glasses we are aiming at, **besides of course satisfying the heating requirements, forming a more pleasant and comfortable interior with our products and with modern architectural and interior design solutions.**

As there is a large variety of sizes in heatable glasses (with a maximum of 2400*4500 mm) the control modes also vary. The room can be controlled by thermostat, by a remote control with unique radio frequency and can even be connected to a smart house controlling system, controlled through the internet even by smartphones.

The possibilities of temperature controlling:

1. Simple temperature controlling unit

2. Joint controlling unit

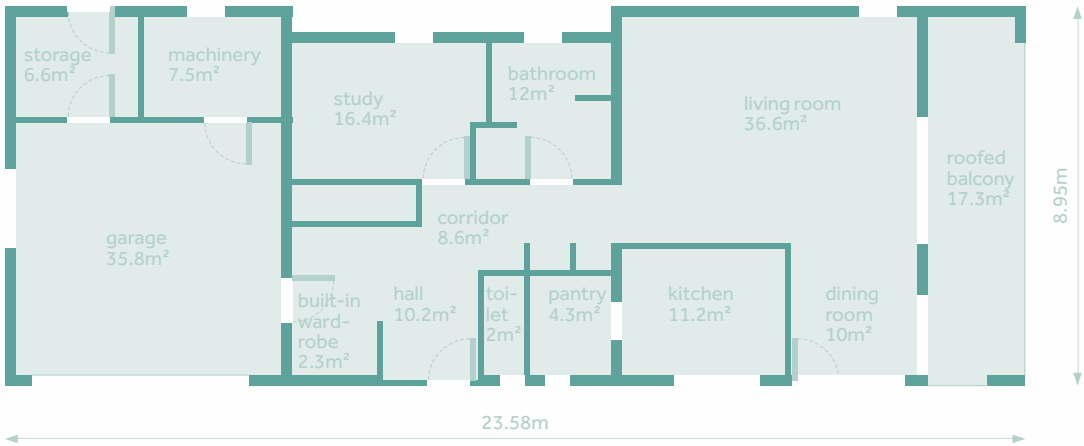
Capable of controlling and adjusting the temperature of up to 16 glasses; the size of it depends on the number of the heated glasses, but with a maximum of 600 x 800 x 250 mm

3. A controlling unit coordinated with a smart building controlling unit

The main unit is the same as in the previous case, completed with the central unit of the building control system

EXAMPLE 1

A family house in Százhalombatta



wall structure:
25 cm ceramic wall blocks with 10 cm lagging

glass surface:
53,1 m²

heated ground-space of the building:
220 m²

glass structure:
three-layered thermal glass, heatable design

window casement:
plastic

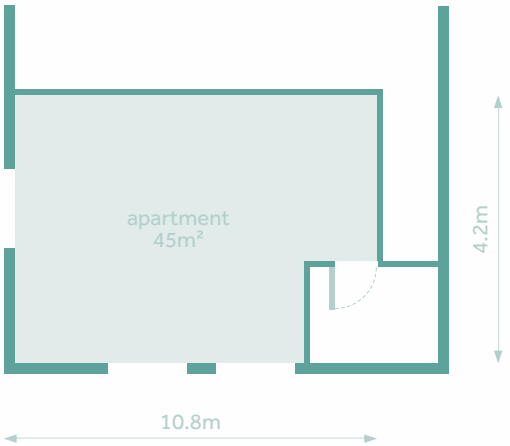
HEATING GLASS										
price of glass structure		price of window casement		price of central h. system		FULL PRICE			power	current
material	labour	material	labour	material	labour	material	labour	TOTAL COST		
13 919 €	2 529 €	9 629 €	1 925 €	-	-	23 549 €	4 455 €	28 004 €	33,1 kW	145,2 A

CENTRAL HEATING										
price of glass structure		price of window casement		price of central h. system		FULL PRICE			power	current
material	labour	material	labour	material	labour	material	labour	TOTAL COST		
2 407€	481 €	9 629 €	1 925 €	17 514 €	3 643 €	29 551 €	6 051 €	35 603 €	24 kW	-

RÁKOSY GLASS

EXAMPLE 2

The heating of a joint-space apartment with glass radiator



function:
apartment

location:
1st floor

ground-space:
45 m²

clear height:
3,3 m (~150 m³)

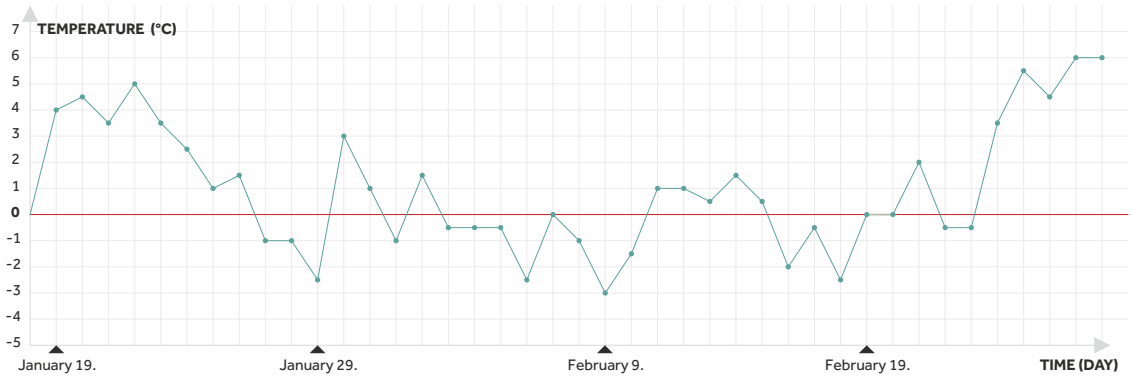
location:
corner of a building

wall structure:
Porotherm bricks

roof framing:
sandwich panel

HEATER:
GLASS RADIATOR (1,5 m²)

RÁKOSY GLASS



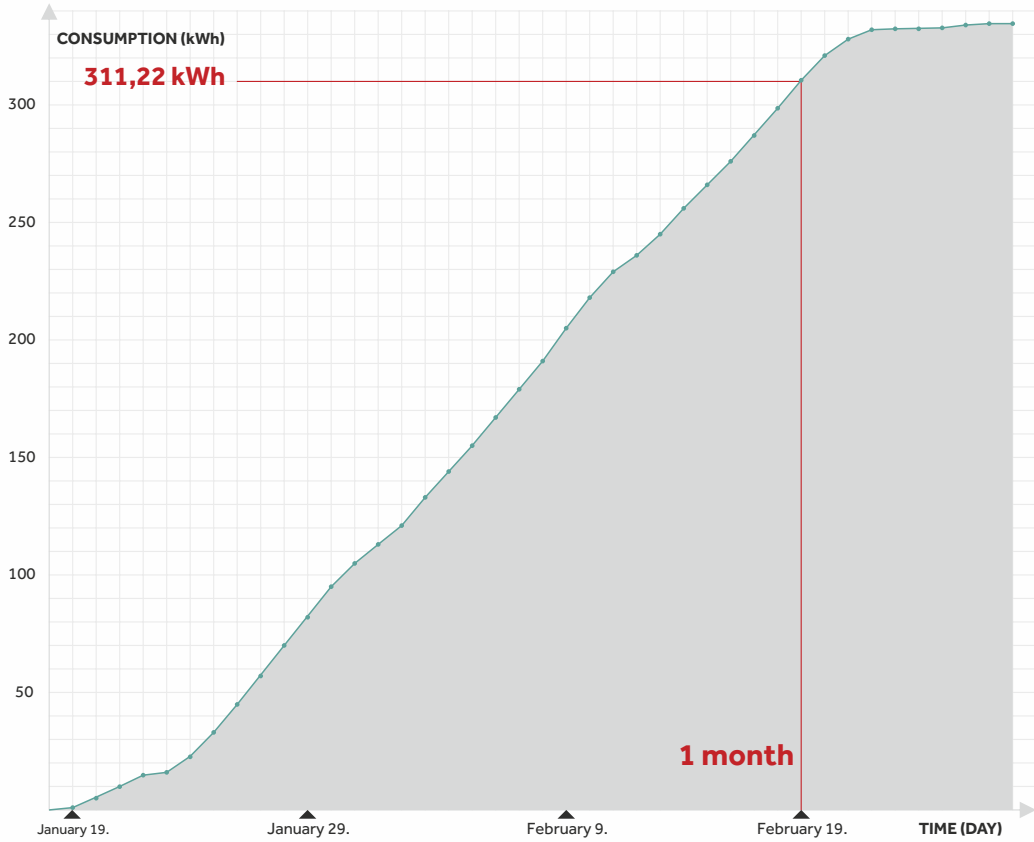
period of monitoring:
1 month

consumption measured during the period of monitoring:
311,22 kWh

Residential electricity fee in kWh (gross)
(average price, January 28, 2015.)
Monthly heating cost (gross):

ELMŰ • ÉMÁSZ
36.55
36 €

e·on
39.14
38.5 €



RÁKOSY GLASS

SHOW ROOM and
PROCESSING PLANT

HUNGARY - 1103 Budapest, Noszlopy u. 3-5.
Tel.: **+36 1 261 0445, 261 0579**
Fax: **+36 1 431 0468, 221 3192**
www.rakosyuveg.hu