IN THE FRAMEWORK OF THE PROGRAM OF ENERGY SAVING
INDUSTRIAL COMPANY "TEPLOFON" IMPLEMENTS THE PROJECT

ENERGY EFFICIENT SYSTEMS
INFRARED ELECTRIC HEATING

SUPPORTED BY:
Scientific-industrial company "Teplofon" specializes on development and production of instruments and systems of infra-red heating of buildings from 1997. Currently the company holds 22 patents for methods and devices used for fabrication of the infrared heaters.

The equipment is being developed with the participation of the Russian Fund of Technological development and the SKOLKOVO Foundation.

The company's products are regularly included in the list of "100 best goods of Russia" and are sold in more than 50 regions of Russia and abroad (Mongolia, Kazakhstan, Kyrgyzstan, Serbia, Bulgaria).

Infrared heaters are supplied to various municipal facilities (schools, kindergartens, etc.), objects Krasnoyarsk railway, military and private objects (NPO Geliymash", Krasnoyarsk hydroelectric power station and others).
The Infrared heaters “Teplofon Glassar”

THE PURPOSE
The heaters are used to heat residential, public, administrative offices as well as the apartment, shops and enterprises.

THE FEATURES
The electric power of the heaters is from 400 to 600 Watts. The heating element is energy efficient infrared heating panel based on carbon tempered glass. It may be produced in two colors: black or white. The device thickness is only 4,2 mm.

THE DIFFERENCES
The innovative design and black colors allow to use the heaters in modern appartament with individual style. This device has ultra-thin body and is certificated to work without supervision.

<table>
<thead>
<tr>
<th>The technical characteristics:</th>
<th>Model</th>
<th>Power, watt</th>
<th>Voltage, V</th>
<th>Temperature, °C</th>
<th>Protection class</th>
<th>Weight, kg</th>
<th>Size, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Teplofon Glassar 0,4</td>
<td>400</td>
<td>220</td>
<td>95</td>
<td>I1 (IP54)</td>
<td>5,5</td>
<td>700-450-42</td>
</tr>
<tr>
<td></td>
<td>Teplofon Glassar 0,6</td>
<td>600</td>
<td>220</td>
<td>95</td>
<td>I1 (IP54)</td>
<td>6,9</td>
<td>900-450-42</td>
</tr>
</tbody>
</table>
The combined infrared heaters “Binar”

THE PURPOSE
The heaters are designed for heating of residential, public, administrative, household premises, as well for heating of inhabited areas.

THE FEATURES
They are produced with a capacity of 1000 and 1500 watts. In the design of the device there are:
- A modern X-shaped grating element that allows you to warm up quickly the room to the required temperature;
- An energy efficient infrared panel on the basis of high-strength glass for supporting comfortable temperature.

THE DIFFERENCES
The heater control is carried out using a smart thermostat, which is able to maintain specified temperature in the premises during a weekly cycle with minimum power consumption.

The technical characteristics:

<table>
<thead>
<tr>
<th>Model</th>
<th>Power, watt</th>
<th>Voltage, V</th>
<th>Temperature, C</th>
<th>Protection class</th>
<th>Weight, kg</th>
<th>Size, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teplofon Binar 1.0</td>
<td>1000</td>
<td>220</td>
<td>90</td>
<td>1 (IP24)</td>
<td>9,0</td>
<td>700-435-105</td>
</tr>
<tr>
<td>Teplofon Binar 1.5</td>
<td>1500</td>
<td>220</td>
<td>90</td>
<td>1 (IP24)</td>
<td>11,6</td>
<td>900-435-105</td>
</tr>
<tr>
<td>Teplofon Binar 1.0 flo</td>
<td>1000</td>
<td>220</td>
<td>90</td>
<td>1 (IP24)</td>
<td>9,4</td>
<td>700-435-240</td>
</tr>
<tr>
<td>Teplofon Binar 1.5 flo</td>
<td>1500</td>
<td>220</td>
<td>90</td>
<td>1 (IP24)</td>
<td>12,0</td>
<td>900-435-240</td>
</tr>
</tbody>
</table>
Benefits of infrared heating systems

Infrared heating system allow to considerably reduce the consumption of energy by:

- Rational distribution of air temperature on altitude areas, allowing you to warm up the floor space without overheating the air at the level of the head.

Thereby significantly reduce heat losses are inevitable if the ventilation of the premises;

- Reduction of temperature of air on 2-4 °C necessary for comfortable stay of the person in the room is achieved through higher temperatures walling wall and floor)than in the convective heating;

- Heat storage in the objects and walls. Heated objects in turn give warmth to the room;

- Due to the possibility local point of heating required areas of the premises (particularly efficient for industrial and administrative premises with high ceilings);

These advantages allow to reduce energy consumption by 30-40%.

Heating of the room, through infrared heat waves:
- Maintain the necessary moisture and freshness in the room;
- Minimizes convective air flow (draughts), raising dust and causing discomfort that cause colds;
- Has a favorable effect on the human body, supports its thermal balance, creates a special feeling of comfort.

These properties allow you to create indoor microclimate and favorable conditions for living and human life.
The comparative calculation of efficiency of various heating systems

<table>
<thead>
<tr>
<th>Type of heater</th>
<th>Infra-red</th>
<th>Convection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tип прибора</strong></td>
<td>«Worm wall»</td>
<td>Heater &quot;Teplofon&quot;</td>
</tr>
<tr>
<td>Installed power</td>
<td>15.7 kW</td>
<td>17.1 kW</td>
</tr>
<tr>
<td>Room temperature</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Consumption El. energy kWh / month.</td>
<td>Without thermostat</td>
<td>With thermostat</td>
</tr>
<tr>
<td></td>
<td>4 439</td>
<td>2 663</td>
</tr>
<tr>
<td>Consumption El. energy kWh / year</td>
<td>34 053</td>
<td>20 432</td>
</tr>
<tr>
<td>Consumption of coal t / month.**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Consumption of coal t / year.**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>The cost of mounting with equipment and capital costs, Euro (approx)</td>
<td>3481,22</td>
<td>3510.65</td>
</tr>
</tbody>
</table>

Region - Krasnoyarsk, \( t_{\text{min}} = -48 \text{ C}, t_{\text{ave}} = -8.8 \text{ C} \)

House of 200m², two floors, the walls are brick 500mm + insulation 100mm + ventilated facade

Heat losses premises depending on the type of heating (panel-0.9; IR-1.0; convective-1.1):
- When infrared panel heating: 14.5 kW
- With infrared heating with heaters: 16.1 kW
- In the convective heating: 17.7 kW
Contact information

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