

## System technology

### System review

Basic idea of the aquatherm black system is the comfort of an occupied area: thermally well-balanced zones are created.

Hence, the principle of the aquatherm black system technology is not warming and circulating the air, but heat radiation of the tempered

surfaces to deliver directly to the space to the benefit of the occupant. Convenient warmth is provided, as the heating surfaces are relatively large and therefore heating surface temperature can be kept low.

This is one advantage compared to small, hot surfaces, such as radiators.

The systems, due to the low flow temperature (25-35°C), are well suited in conjunction with other temperature heating. Various heating source thereby arise, including the possibilities of the use of fuel efficient technology and alternative energy, like solar, geothermal and recovered heat.

Besides, the thermal advantages is the added benefit of reduced air movement. The result is reduced dust movement and a stabilized air humidity.

In summary wall heating saves 25-30% of energy costs and contributes to a healthy environment. Of course the aquatherm black system for wall and ceiling can be combined with each other.

The wall heating can be installed on mortar walls, pre-fabricated and concrete walls. The floor (subsurface) must be dry and a level for taking the plaster or the dry construction elements.

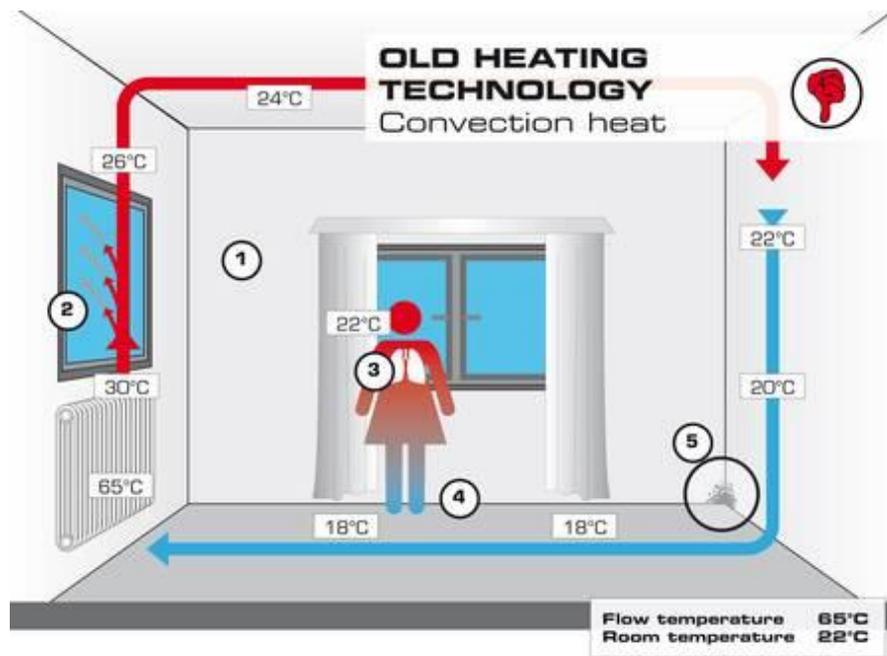
The tolerance of the heights and inclination of the carrying subsurface must correspond to the German DIN 18202.

The insulation at the outer wall of modern houses is made by customers.

### Comfort

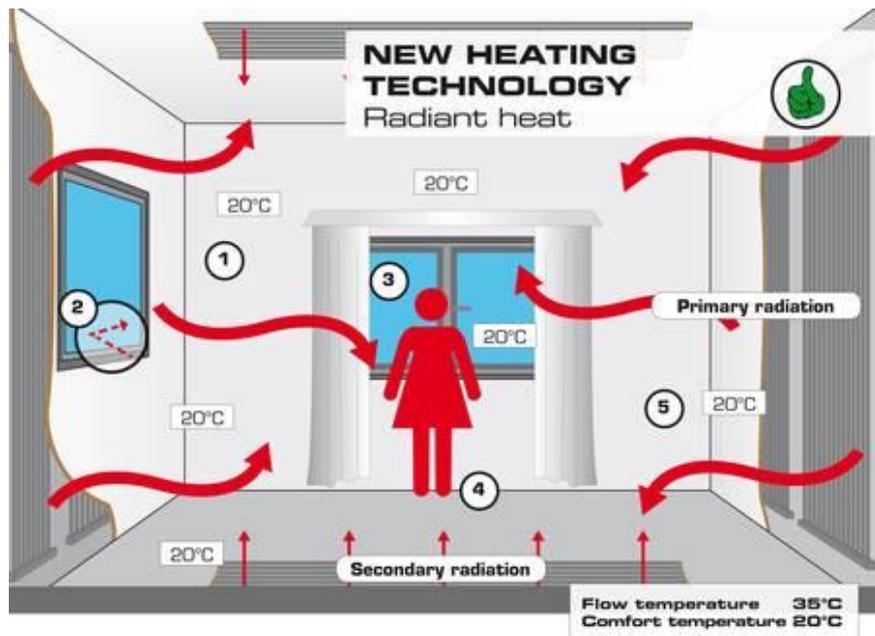
Moderate temperatures (20-35° C) with large heating surfaces generates a steady radiation for the user.

Direct heat radiation on the human body delivers a comfortable warm feeling. The room air temperature can be reduced in opposite to conventional heating technologies (radiators/convectors) (17-18°C) and still provide thermal comfort for the occupant.



### The convection heating with the old radiator

1. Energy loss 1:  
A high air temperature of at least 22°C is required to heat a room with air. Air is a bad heat carrier; therefore the energy costs are high.
2. Energy loss 2:  
Air heats the window. But the highest energy loss results from weak point of the insulation in the house - the window. Very high-quality windows are necessary. When airing the most energy-rich air escapes through the window.
3. Health at risk:  
The air movement (warm air rises) kills the sense of well-being, too, since asthmatic and allergic persons have a primary problem with raising dust. This dust mixes with our breathing air and can lead to enormous burdens of the organism. An increase of the room temperature requires a reduction of the air humidity. Mucous membranes will dry out. The natural filtration system (nose) will be affected.
4. Discomfort:  
Feet remain cold, as warm air rises up and is mainly in the upper area of a room. By that a feeling of discomfort is developed. The heating is adjusted to a higher level. The above effects will be increased.
5. Formation of mould:  
Cold air strokes the wall, water condenses and creates the culture medium for the formation of mould.



### The radiant heating with the new climasystem

1. Energy saving 1:

Comparable to the sun, the radiant heating first of all heats the solid and liquid materials in a room. Walls, ceilings and floors are constantly heated and the room temperature only in the second step. However, a high air temperature is not required for radiant heatings. An air temperature of 20°C is completely sufficient and provides a comfortable sense of well-being.

2. Energy saving 2 :

There are no losses through the window. Heat radiation is reflected by glass and given back to the room.

3. Energy saving 3:

The room temperature is low. Thus you will not have any big energy losses, even when airing. The low air temperature creates a natural and pleasant climate.

4. Comfort

In case of radiant heat, there are no differences in temperature of the room air, like with convection heatings. The head remains cool and the feet warm.

5. Dry walls:

Since the walls are directly heated, there is no condensation and consequently no formation of mould.

**Rule of thumb:**

Reduction of room temperature by 1°C= 6 % energy saving

Surface to be occupied= 60–100 % of the building area, depending on the building structure