

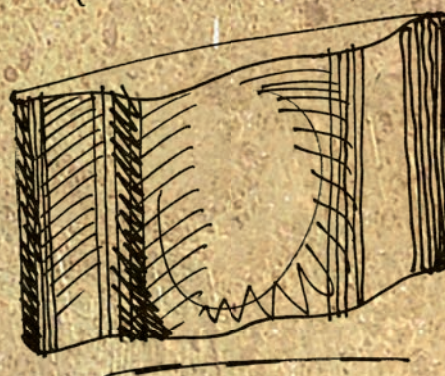
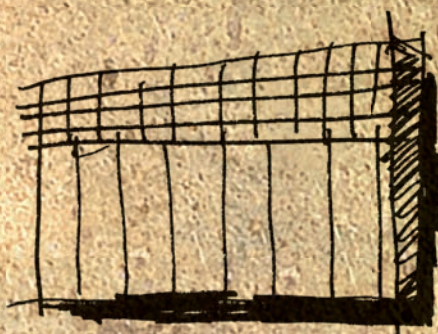


grupporagaini

THE FUTURE WE ARE IN

Technical Information

To designers, retailers and installers are offered the following indications on heating plants, technology result of studies and experiences elaborated from our technical dept.



Installation and maintenance of radiators

Radiators can be used in plants having pipes made of:

- Iron
- Copper
- Plastic

Plants have to be provided of hot water heating, according to EN442, until 120°C with working pressure until 600 K Pascal, 6 Bar (when not otherwise specified).

Radiators' location is studied to find the wished environmental comfort.

In projecting phase the right choice will be evaluated (under window radiators or on external walls) to adapt thermic gradient to the different heights within floor and ceiling and to find the wellness that a heating environment can offer.

Radiators, before installation, must not be kept in very humid places, so that good maintenance of painting can be held.

In case little paint fragments are detached, aluminum oxide would be formed, which would promote detaching of further paint until it completely drops from its support. To clean, use of corrosive products or unfit detergents is not recommended.

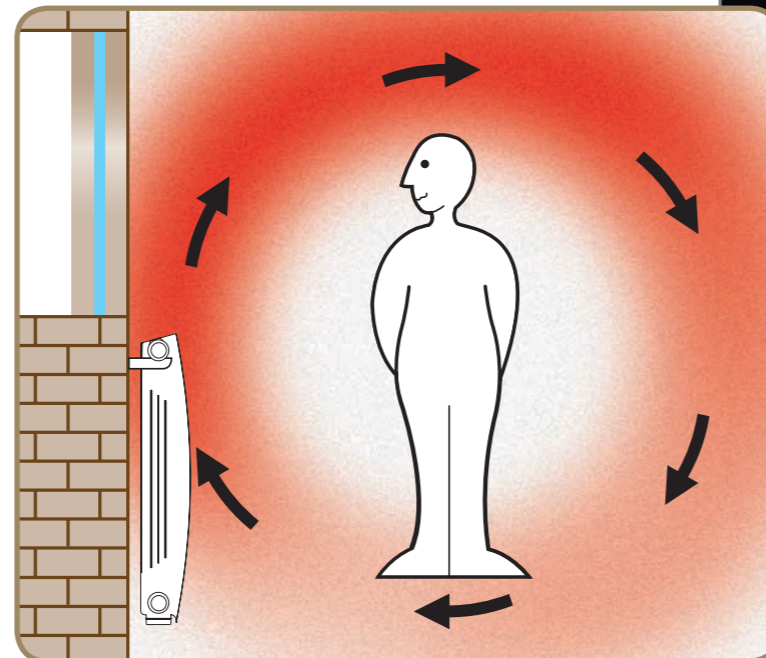
Wellness offered from a heated environment

Correct installation of a radiator, allows to obtain an optimal heat output, but the sensation of wellness of a heated environment

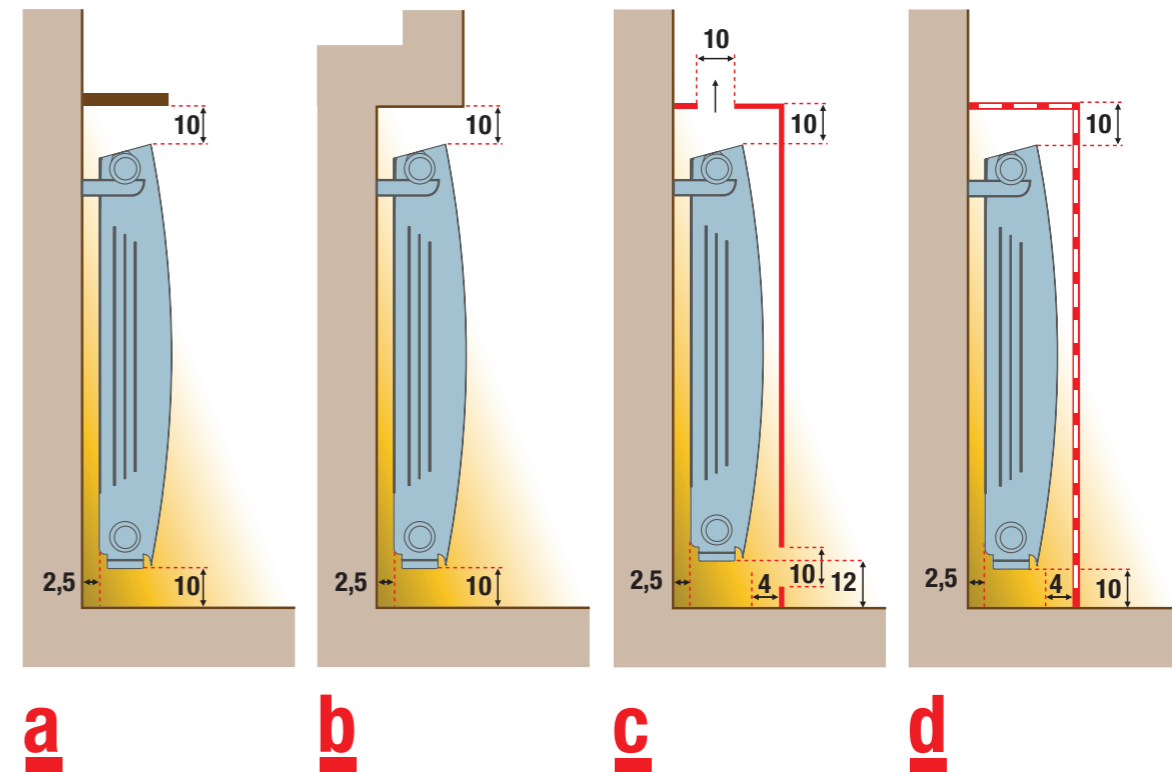
is the result of may factors such as:

- internal air temperature
- heat gradient
- working temperature

With these elements, maximum environmental comfort can be obtained.



Type of installation	Output reduction
a – under shelf installation	4%
b – Built-in a niche	7%
c – covered with plate	5%
d – Below drilled radiator cover in plate	20/30%



a

b

c

d

With “heat gradient” we intend difference of temperature at different heights within floor and ceiling.

To avoid to people the annoyance of cold feet, due to the excessive gap of air temperature between floor and ceiling, this last should be the lowest possible.

To help heat gradient be low, following conditions are necessary:

- To abate negative effects of cold radiation of perimetral walls and windows, radiators should be installed under windows or on walls and must have a rational positioning at horizontal development

- In the plant there must be:

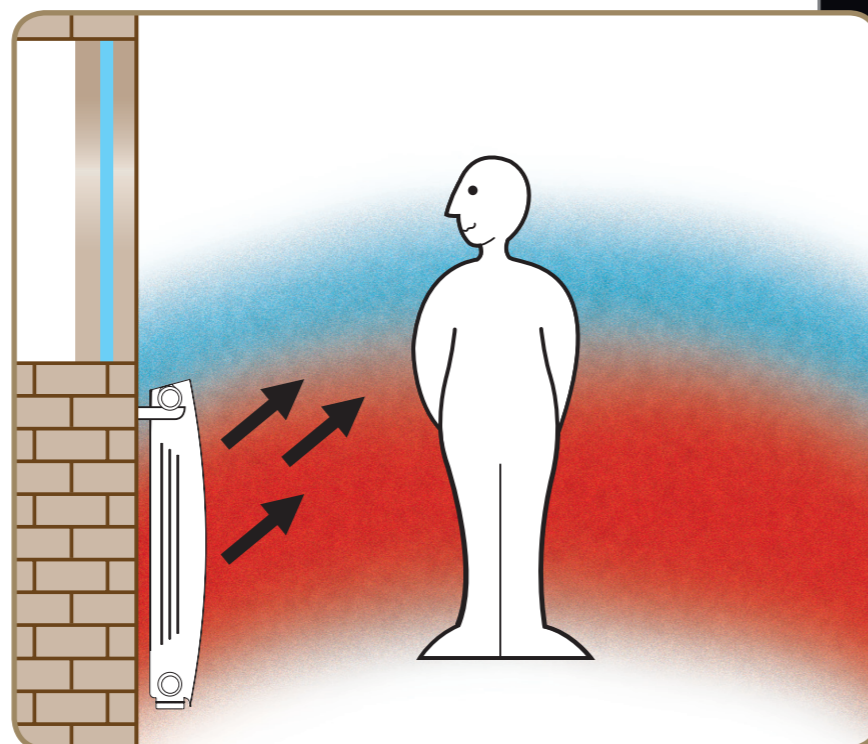
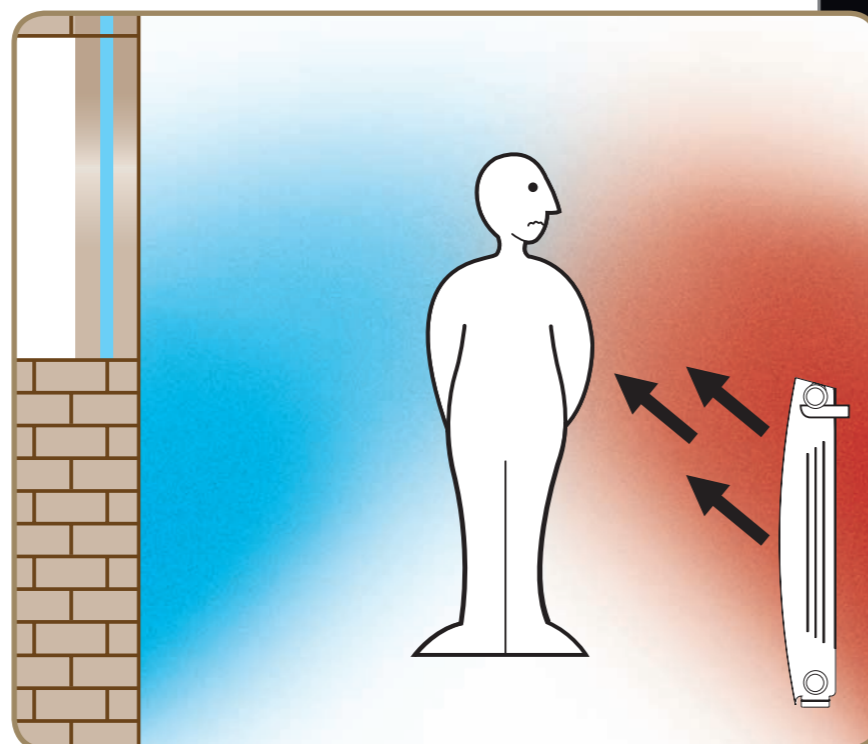
1. low running temperature
2. Δt medium between water in the radiator and environmental air equal or a little lower of 50°

Room should have a restricted height, not over 3 meters, to avoid an excessive stratification of warmed air under ceiling, with an increase of thermic dispersion upwards.

Wellness level for the person is determined from working temperature in a room (media of the temperature of internal air and radiant one of walls and windows) in relationship to heat exchanges happening between this and environmental air, for convection and for irradiation with walls and windows.

Between convection and irradiation exists an interdependence so that the increase of one must correspond a decrease of the other, and vice versa, to have the same wellness level.

Internal air temperature, for environmental comfort, must be higher more windows and walls are cold, so that exchanges within person and all that's around make equal.



To the contrary, if isolated walls and windows are warmer, to reach an optimal wellness sensation, environmental temperature can be lower, decreasing in this case body heat dispersions for effect of irradiation.

Outputs according to UNI EN442

In the Gruppo Ragaini are evidenced, tested accordingly to new regulation UNI EN 442, which was generated from heat outputs standardizing requirements of the countries members of European Community. According to this rule, radiators' heat output is determined in testing chamber at $\Delta t = 50^\circ\text{C}$ (difference between medium temperature of the battery and comfort environmental temp. set at 20°C).

- In rooms heated by radiators at low temperature there is a reduction of heat gradient, with a resulting improvement of environmental comfort.

- In rooms heated by radiators at low temperature there is a reduction of heat gradient, with a resulting improvement of environmental comfort.

- Low temperature plants reduce to strict necessary convective air motions, that for effect of speed, make bacteria, dust and pollen circulate allowing a higher hygiene or heated environments.

Heat output with qt different from 50°C
Variation of heat output of a radiator with qt different from 50°C is determined in the following way.
Having as reference degree certified nominal output according to UNI EN 442 with $qt = 50^\circ\text{C}$ it makes:
 $Q2 = Q1 (\Delta t2 / \Delta t1)^n$
where $Q1$ = output UNI EN 442 with $\Delta t = 50^\circ\text{C} = \Delta t1$
 $n = c$ specific coefficient of heating body
 $Q2$ = output UNI EN 442 with Δt different than 50°C that is $\Delta t2$

Example:

P_1 = output with $\Delta t = x$
 P_2 = output with $\Delta t = 50^\circ\text{C}$

$$P_1 = P_2 \left(\frac{x}{50} \right)^n$$

Ex: Considering model TOP 50
 $P_2 = 118\text{W}$ $n = 1,324$
If for example we wish to know (P_1) that is output at $\Delta t = 60^\circ\text{C}$ we should calculate:

$$P_1 = P_2 \left(\frac{60}{50} \right)^{1,324}$$

Plant filling water

For the good running and maintenance of the plant, water quality is very important.

PH must be included between 7 and 8 with optimization at 7,3, as experience demonstrates. Use of softened water should be excluded because of great damages that would occur to the whole plant. It's useful to remind that rule UNI EN 8065 contemplates treatment of fulfilling water of the plants, not distinguishing between aluminum, cast iron and steel, to preserve them from corrosive or incrustation processes, which interest boiler, pipes and radiators. Filming aliph polyamines, available under the name of Cillit-HS 23 COMBI, rs within the products to be added to the water in the plants, according to said UNI.

N.B. If circulating water overcomes speed of 2 m/s Cillit-HS 23 does not deposit the protecting film inside plants.. Use of floating valves for automatic gas vent of radiators is recommended, to avoid the stay of corrosives in the plants.

Compatibility within different materials in civil plant

Designers and installers of heating plants were worried about presence of miscellaneous metals in a plant, time passing may cause micro pile with consequent corrosion of related components. This phenomenon, notified also by specific literature, has not found thus feedback from experience of technicians, directly employed in the plants' realization. Micro pile's phenomenon that has not been evidenced from current practice, we consider it's inhibited by the dielectric power of gaskets and tightening materials interposed within radiators, valves and pipes For those who produced plants with said matchings and for those who intend to adopt same planting standard further to this positive experience, the wide examined casuistry can be a valid reason for tranquility.

Gas Formation and noise in heating installations

It may happen that during heating plant running, especially in the first using period, it presents some more or less bothering inconveniences, such as gas formation within its components and some noise in correspondence of heating bodies also when it was created according to best technical and realized in accordance with best practice. Causes of said inconveniences are many and can be solved with interventions when causes are known.

Gas formation

Gas formation within heating installations is originated by three main causes:

1. Air introduced in the plant with filling or restoration water, in which air is present in solution that for effect of heating separates gases dissolved in the boiler. Phenomenon is transitory, in a short time is stops and comes back only in case of emptying plant with partial or total water refill. Emptying installations, except in case of force majeure, is not recommended.

2. Presence of organic materials in the installation (e.g. working residues or hemp for hydraulic use) that because of decomposition develop methane, which remains in the superior part of heating bodies. This phenomenon is transitory and stops as decomposing material is exhausted.

3. Plant filling water aggressiveness origins a more persisting gas development. We know that water during its path from atmosphere to sea, absorbs in different measure carbon dioxide from air and mineral substances from stones and soils, without forgetting about many poisons added from man. Chemical and electrochemical (corrosive) processes having high gas c development, amongst which hydrogen that occupies first place, are due to the use of a very aggressive water in the plant which reacts with metallic components of it. This phenomenon can last whole seasons damaging installation whether rule UNI – CTI 8065 – which contemplates treatment of water filling plants is not followed.

Gas miscellaneous venting from radiators results to be qualitatively composed by:

- Carbon dioxide CO₂
- Nitrogen N₂
- Hydrogen H₂
- Methane CH₄
- Oxygen O₂

Main inconveniences caused by gas presence in heating installations can be so resumed with:

- Noise in heating fluid circulation
- reduction or stop in water circulation within heating bodies
- Insufficient room heating because of compromised radiators' heat output
- Corrosion of installation's components

Remedies and proposed interventions

To eliminate reasons causing origin of gas formation and resulting inconveniences some interventions are proposed as soon as causes are known.

- To remove residues taking part in the gas formation, it's important to provide an accurate installation washing by making water circulating and, after some hours, discharged from the plant.

-Afterwards, a new charge should be made with drinkable water having a PH within 6, 5 and 8 and hardness within 12-14° Fr (do not use softened water).

When filling is complete, in order to help separation of air in solution, water circulating temperature should reach several times 85°-90°C

- Venting radiators and mounting columns with the help of manual valves air remaining can be eliminated.

Only if water quality corresponds to the one indicated in present notes, manual air vent is valid and in this case gas formation in the installation results limited and transitory.

- Phenomenon of gas formation can assume big proportions is water filling the plant has different values than recommended ones concerning hardness and PH, because of water aggressiveness, establishing corrosive processes damaging the installation. This phenomenon requires precise interventions.

We propose as remedies the following simple interventions, that experience confirmed as valid, considering impossible the solution of taking care of each installation with a laboratory specialized in water treatment, for practical and economic reasons.

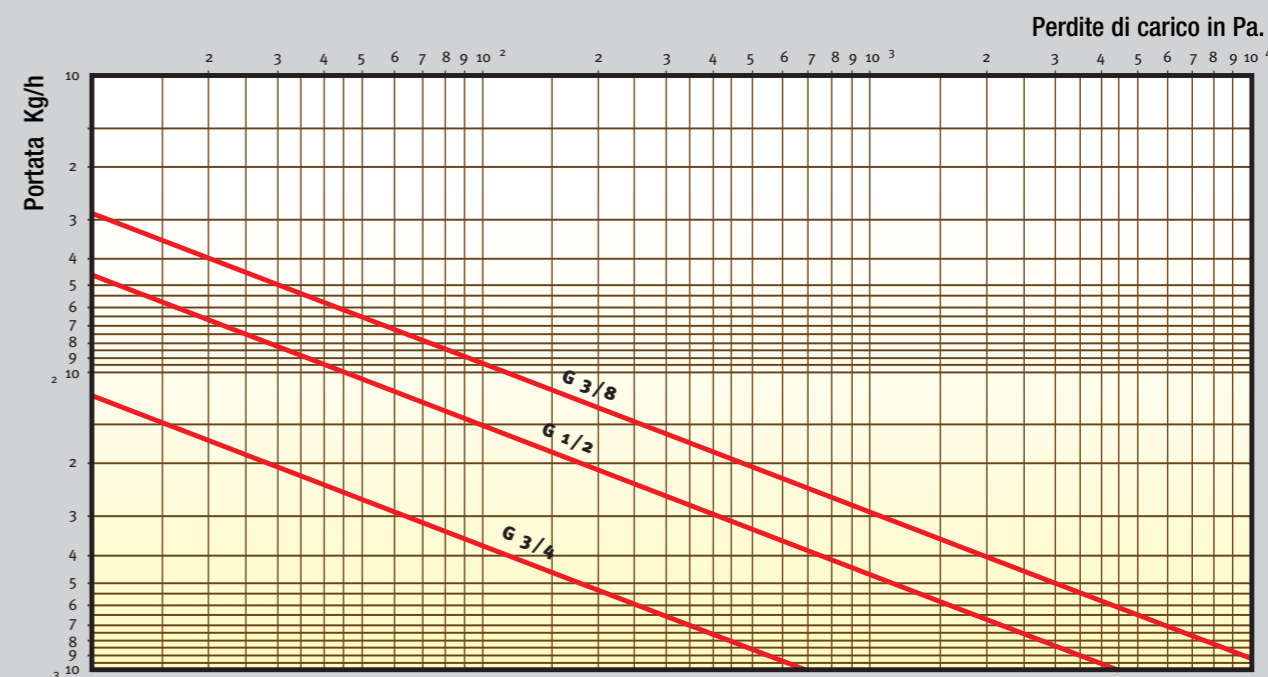
1. Supply radiators and mounting columns with automatic air vents of the floating type for gas venting.

2. To avoid corrosion and consequent gas development please add to plant water filming aliph polyamines, type Cillit – HS 23 COMBI or other specific products for aluminum heating bodies. In commerce.

3. To help venting of eventual gases from the automatic air vent and safety valve please avoid to completely close the radiators' interception valves. This would prevent over-pressures and possible breakage of radiators.

Noise

When heating installation presents noise in correspondence of heating bodies, radiators are wrongly called into question. It was demonstrated that radiators themselves are not cause of the inconvenient, but simply they are vehicle of propagation of noises depending from other reasons. As indicated in the following casuistry, running abnormalities or non-compensated heating dilatations concur to determine installation's noise.



- Water filling radiator at exceeding speed makes a rustle similar to an open tab one.
- Presence of air in the top part of the radiator, due to the partial filling of the superior cavity of the sections, makes a typical noise of flowing water.

If the radiator flow connection is down as used in mono tube plants or modul with Univer valve, inconvenient is not happening.

- Phenomenons of installation's echo and especially in the radiators are caused by circulation pump of a heat fluid that sometimes operates over scheduled values.

- Supporting brackets non perfectly in axis with supporting points of the radiator are cause of noises similar to metallic strokes, audible during heating and cooling phases.

- Wall work not perfectly done, that is without providing a certain scrolling freedom of the pipes, that are subject to heat dilatation, causing blockage of pipes in the cement.

Consequent noises are transmitted from pipes to heating bodies with a typical TICK-TICK, that is repeated at every relevant thermic variation.

Copper pipes protected with isolating sheath are saved from this inconvenient, also because of the higher malleability of this material respect to iron.

Remedies and proposed interventions

- Acting on regulation lock shield to balance water input to project values, rustle due to incoming water speed and turbulence is eliminated. If noises persists, because of excessive prevailing of the pump, problem can be solved inserting a Ø 18mm probe, directly connected to radiator's input valve so that the water can be guided to the section opposite to the input one.

-Noises due to air presence in the radiator are eliminated by supplying heating body with an efficient automatic air vent.

Echo phenomenons due to circulation pump disappears by adapting load, prevalence and rpm to

typical characteristics of the installation.

In some cases it's fundamental to extinguish phenomenon

to put anti-vibrating joints between pump and pipes.

- Brackets can be covered by gum sheath to avoid noises due to thermic dilation of radiators hanging on supporting brackets.

- Preventive measures should be used to avoid noises of pipes subjects to dilatation under tracks, by using isolating sheaths in which pipes can move freely.



grupporagaini

*Wishing that these
suggestions may
be useful to for a proper
use and installation
of our radiators,
we are engaged in a continuous
technical deepening
for the satisfaction
of our customers.*

Gruppo Ragaini SPA



grupporagaini

Gruppo Ragaini S.p.A.

S.S. 77 Val di Chienti, 14 - 60025 Loreto (AN) - Tel. +39 071 7500740 - Fax +39 071 978814 - info@grupporagaini.com - www.grupporagaini.com