RADIANT SYSTEMS

Underfloor heating and cooling systems

MADE IN ITALY

valsir®

QUALITY FOR PLUMBING

Limonaia - Puegnago del Garda (Italy)

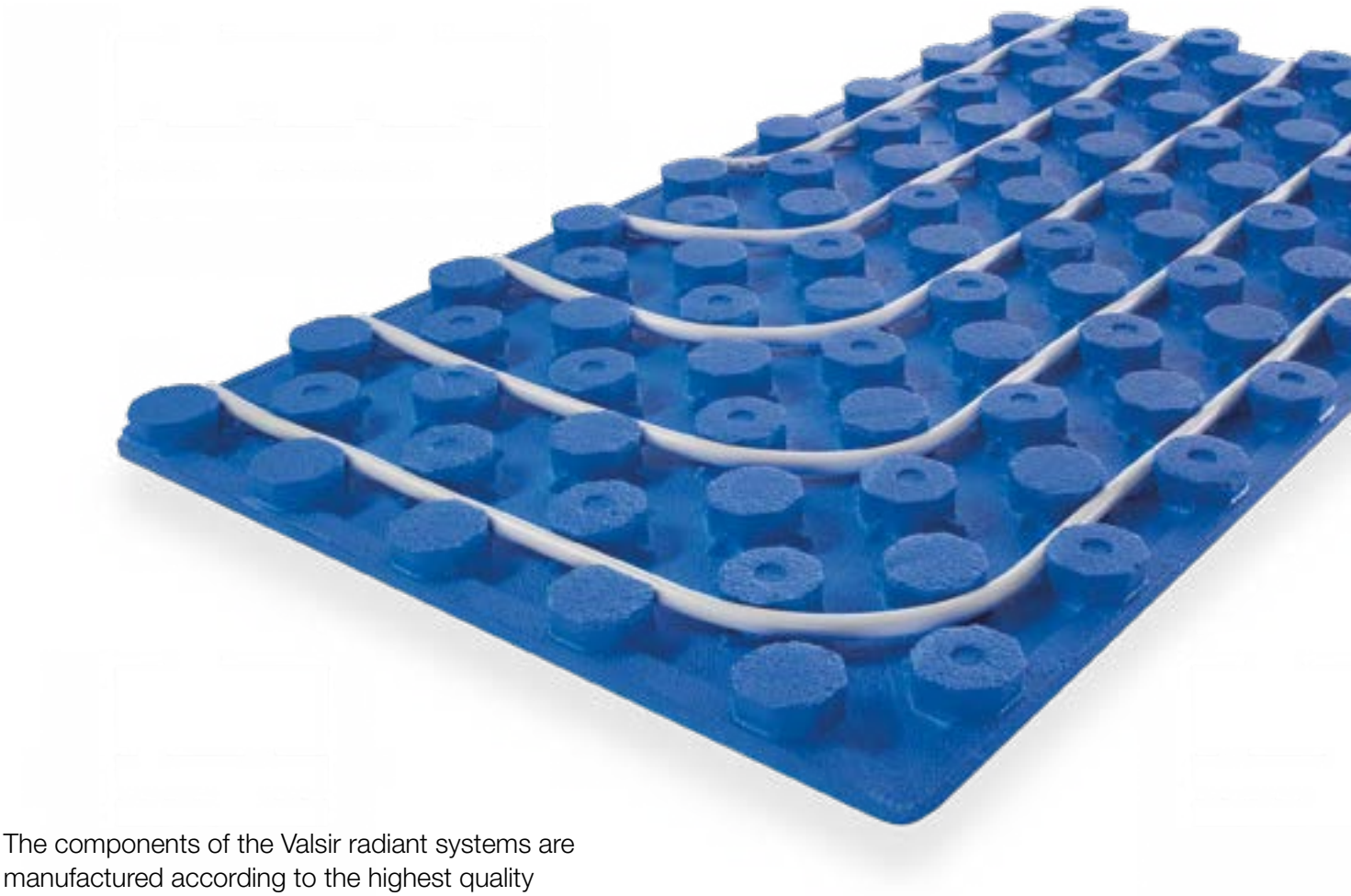
RADIANTSYSTEMS

What is the underfloor heating and cooling system?

The floor radiant heating and cooling system is a mechanical system where the pipes carrying the heated water are laid inside the floor screed.

From Valsir experience, a set of packages are available to cover all possible system requirements inside modern civil and industrial buildings, and to melt snow and ice in outdoor areas.

The use of a low-temperature heated water, combined with reduced temperature stratification in the rooms, guarantees significant energy savings in both heating and cooling compared to traditional systems.



The components of the Valsir radiant systems are manufactured according to the highest quality standards. and in respect for the product and design standards of radiant systems.

MADE IN ITALY

State Archives - Mantua (Italy)

CHARACTERISTICS OF THE RADIANT SYSTEM

The advantages

Floor heating today is without a doubt the most technically valid heating solution for the residential, commercial and industrial sector.

The various system solutions available allow maximum flexibility and adaptability to all types of buildings and construction requirements.

Lower heat loss and higher energy saving compared to a conventional system.

More uniform room temperatures, resulting in greater thermal comfort.

Great **reliability and flexibility** to all types of building and construction requirements.

Elevated heating surface.

No limits of an architectural nature.

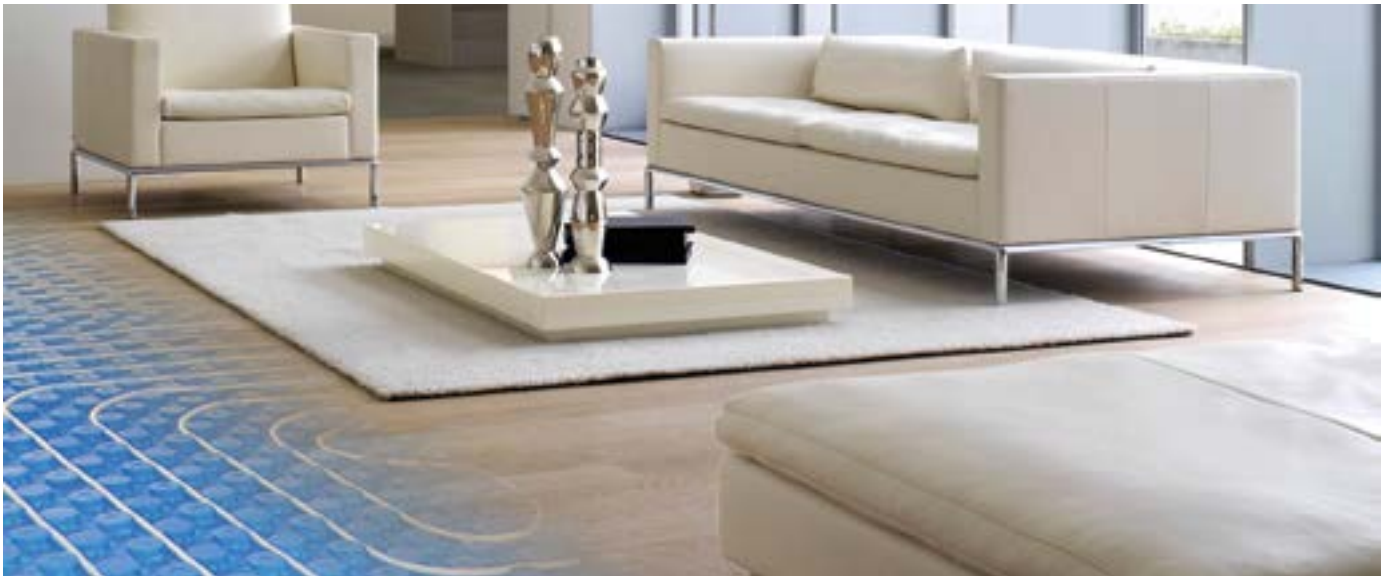
No irritated throats thanks to the **optimum hygienic conditions**.

No dust deposits.

Elimination of mildew on walls and deterioration of wooden floors or window frames.

Lower CO_2 emissions to safeguard the environment and easy **combination with renewable thermal energy production systems**.

Easy to combine with modern heat generation systems.



S. Nicola Church - Vibo Valentia (Italy)

COMFORT AND MAXIMUM PERFORMANCE

The systems

Underfloor radiant systems are heating and cooling solutions combining comfort, healthiness, efficiency and sustainability.

Aesthetical advantages

There are no architectural limits linked to the presence of radiators/fan heaters, hence there is **total freedom in furnishing a room**. Wall mildew is eliminated as is deterioration of wooden floors and window frames.
Underfloor heating systems allow the owner to make use of all available space; it is also valuable in the case of buildings of architectural and artistic importance where it is fundamental that the surroundings do not undergo change.

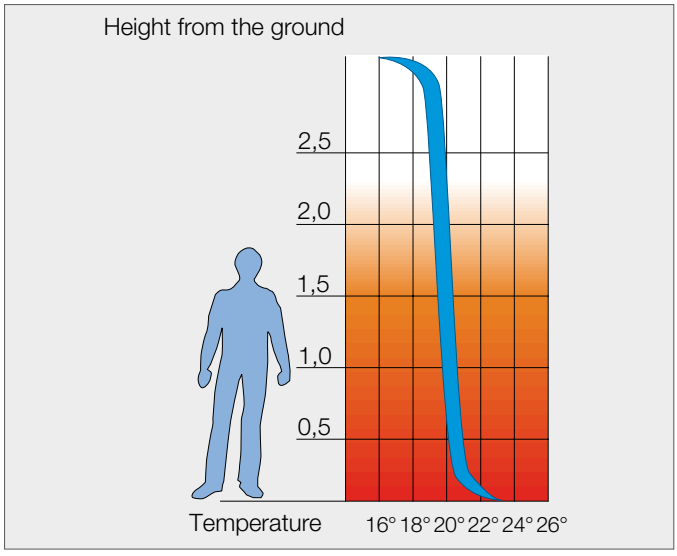
Mildew and condensation problems are eliminated, therefore problems related to the deterioration of plasters, wooden floors and window frames are avoided.

Thermal well-being

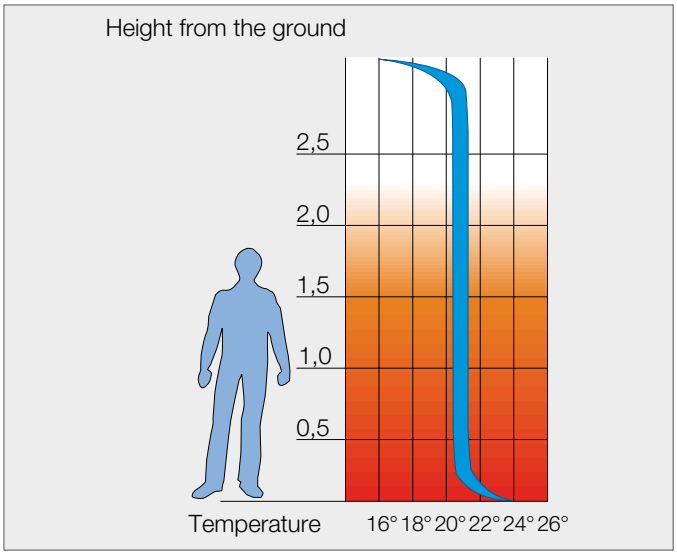
The so-called “thermal well-being”, that is, the sensation of comfort, which is created within a room, is present when the temperature takes on a particular distribution in relation to the height of the room. Such a temperature distribution is defined as the ideal curve of thermal well-being.

To create “thermal well-being” there must be slightly warmer areas near the floor and slightly cooler areas near the ceiling. A temperature distribution curve can be traced for all heating systems.

With floor heating, the particular positioning of the radiant panels and the heat transfer by radiation **generates a temperature stratification, which is the closest to the ideal curve**.



Ideal temperature profile



Temperature profile with floor heating

A MODERN ENVIRONMENTALLY FRIENDLY SYSTEM

Output

The thermal comfort that is generated with floor heating systems **allows much lower heat losses than a traditional heating system**.
Unlike traditional systems, floor heating offers the possibility of recovering heat that is usually wasted due to the stratification effect of the air, which reaches higher temperatures near the ceiling; the higher the ceiling the greater the heat recovery.

With a floor heating system the condition of well-being achieved at an average room temperature, which is generally 1°C below the temperature achieved with traditional systems **and therefore, at equal comfort, energy saving is possible**.

Furthermore, the use of insulating panels to hold the pipe, significantly reduces heat loss and contributes to the increase of system output; traditional heating systems do not require such panels, from a design point of view, and therefore they are never used.

Sustainability

This is a modern low-environmental impact system compared to a traditional heating system. Low-temperature radiant systems are also fully compatible with green solutions, where the heat generator is combined with systems for producing energy from renewable sources, such as solar heating or photovoltaic solutions.

Energy saving

A modern system with **reduced environmental impact** as compared with traditional heating systems.

Radiant panel systems allow an average energy saving of 25% depending on the climatic conditions of the surroundings.

This important energy saving can be attributed to the fact that the large surface area of the floor is heated with a low temperature heating fluid.
It is therefore convenient to use heat sources whose performance increases as the temperature required decreases, such as heat pumps, condensation boilers, solar panels, heat recovery systems, zone heating systems.

Hygienic conditions

Floor heating systems do not favour the formation of damp areas on the floor and therefore, conditions are not generated that would favour the formation of dust mites or bacteria or of mildew on the walls.
Moreover, **floor heating operates at low temperatures and does not alter the relative humidity of the air**, maintaining the best conditions for personal health.

THE IDEAL PIPE FOR RADIANT SYSTEMS

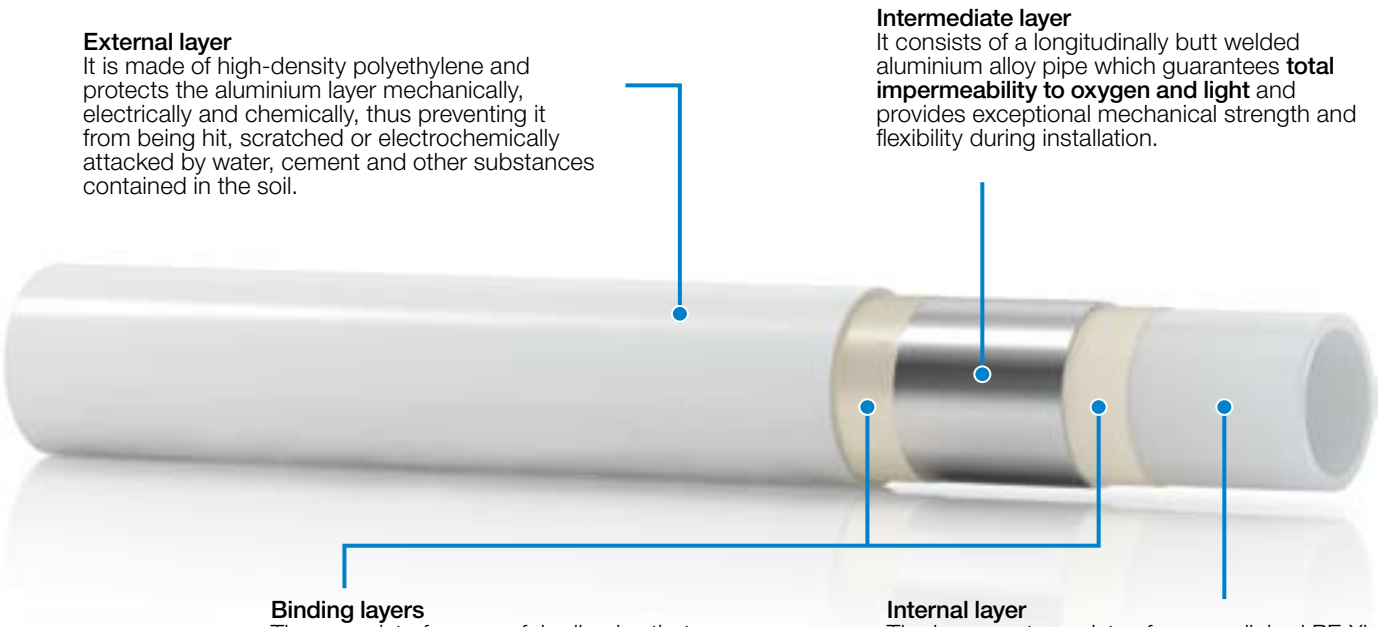
Heat performance

The Mixal® multi-layer pipe is the heart of the underfloor heating and cooling system.
The aluminium layer, its thickness and its special position ensure excellent thermal conductive qualities, which improve the efficiency of the system and make installation easier.

With Mixal® pipes it is possible to carry out floor heating systems with higher heat outputs.

In fact the greater conductance generates higher temperatures on the pipe surface as compared with all-plastic pipes (PE-X and PERT) and this advantage is reflected, for example in the possibility of obtaining relatively low supply temperatures.

The greater performance of Mixal® pipes compared with all-plastic pipes **means greater system output** at equal flow conditions.
An example: the 16x2 Mixal® pipe has the same thermal output as the 17x2 PE-X pipe.



Mechanical behaviour

The mechanical characteristics of the Mixal® pipes make them ideal for use in floor heating systems. The bending radius corresponds to 2.5 times the pipe diameter and the circular section at the bend remains constant.

The pipe, once bent, remains in the desired position like a metal pipe; hence **the use of anchor clips is not required** as with all-plastic pipes.

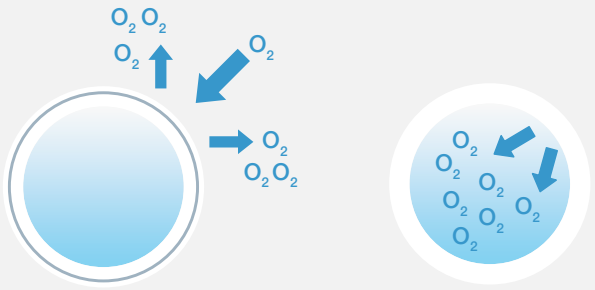
Barrier against oxygen and UV rays

The inner layer in aluminium acts as a perfect barrier against the passage of gaseous molecules thus avoiding the danger of corrosion due to oxygen infiltration and damage caused by exposure to UV rays.

The table shows a comparison of the oxygen transmission coefficients (Oxygen Transmission Rate) of aluminium, of EVOH (the material used as an oxygen barrier in all-plastic pipes) and of crosslinked polyethylene (PE-X).

Many PE-X pipes sold today are manufactured with the oxygen barrier on the outside of the pipe.
This layer is hence notably exposed, not only to superficial damages, but also to the negative effect of humidity, which drastically increases the porosity of the pipe.

Material	Oxygen transmission coefficient OTR at 25°C and 0% UR
Alluminio	0
Barriera EVOX	0.21
PE-X	12,000



Pexal®/Mixal®

Plastic pipe

DEHUMIDIFICATION: PERFECT INTEGRATION WITH THE HRV SYSTEM

Cooling and dehumidification

Underfloor radiant cooling works on the sensible part of the energy contained in the air, but not on the latent heat consisting of the vapour contained in the air in the form of humidity.

Depending on the air water content and the relative humidity of the air, it may be necessary to dehumidify rooms to prevent condensation on the floor.

This function can be performed by V-DRYAIR EVO isothermal dehumidifiers, which are available for both wall and ceiling installation.
These machines, equipped with cooling unit, refrigeration circuit and air filters, suck in and dehumidify the air, which is then released into the room at a neutral temperature, ensuring maximum levels of living comfort.

Air quality affects the state of the environment, human health and consequently the well-being of the people.

Today, energy efficiency regulations have led to more and more buildings being insulated, thus reducing energy consumption, but preventing natural air flow.

Hence, the need for a controlled mechanical ventilation system that, by providing constant and controlled air exchange, monitors and dilutes indoor pollutants such as humidity, CO_2, Radon, VOCs (volatile organic compounds) and formaldehyde.

VALSIR DEHUMIDIFICATION MACHINES

Valsir offers several machines that not only provide outside-inside air exchange, but also dehumidification.

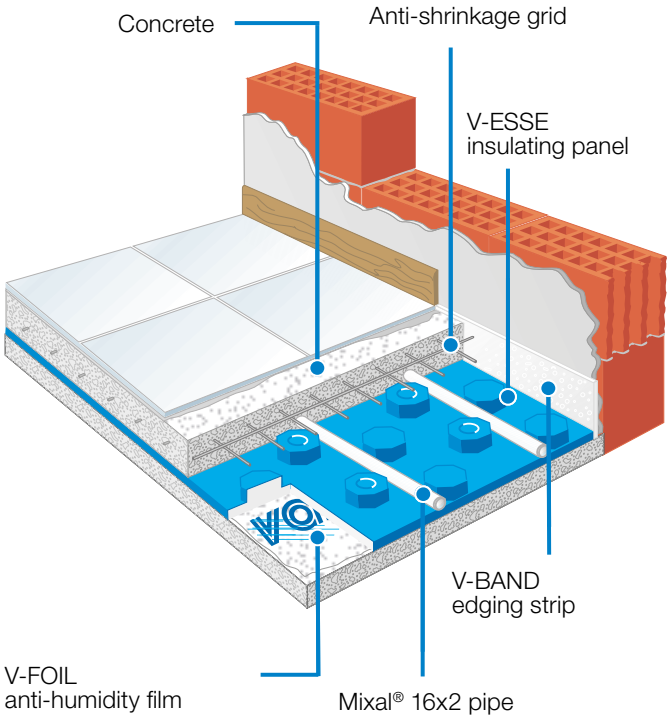
		Installation	Air flow rate in dehumidification mode	Room surface (h = 2.70 m)	HRV management	Water supply
V-DRYAIR EVO V Class-A		Vertical	260 m³/h	100 m²	-	15-20°C
V-DRYAIR EVO H Class-A		Horizontal	260 m³/h 520 m³/h	100 m² 200 m²	-	15-20°C
IDRONICA Class-A		Horizontal and vertical	260 m³/h 520 m³/h	100 m² 200 m²	●	7-10°C
ISOTERMA Class-A		Horizontal and vertical	260 m³/h 520 m³/h	100 m² 200 m²	●	15-20°C
MAXIMA Class-A		Horizontal and vertical	260 m³/h 520 m³/h	100 m² 200 m²	●	15-20°C

V-ESSE SYSTEM

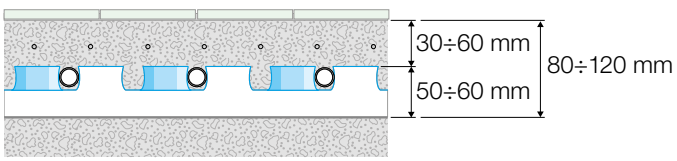
The heating and cooling system designed specifically for residential buildings and offices where the laying height is at least 90 mm.

By using the V-Acoustic multi-layer soundproof floor covering over screed of 100 kg/m^2, the noise performance will improve by 28 dB.

Noise reduction to impact sounds.
(UNI EN 12354-2 - App. C2)
ΔL_w > 28 dB



Panel characteristics	Measurement unit	V-ESSE
Resistance	-	Class 150
Surface type	-	Pre-formed
Panel working dimensions	mmxmm	1350x750
Minimum pipe spacing	mm	75
Insulation thickness	mm	20 - 30
Total thickness	mm	50 - 60
Density	kg/m^3	30
Compressive strength	kPa	150
Flexural strength	kPa	250
Fire resistance	-	Euroclass E
Thermal conductivity	W/mK	0.034
Thermal resistivity	m^{2}K/W	0.59 - 0.88



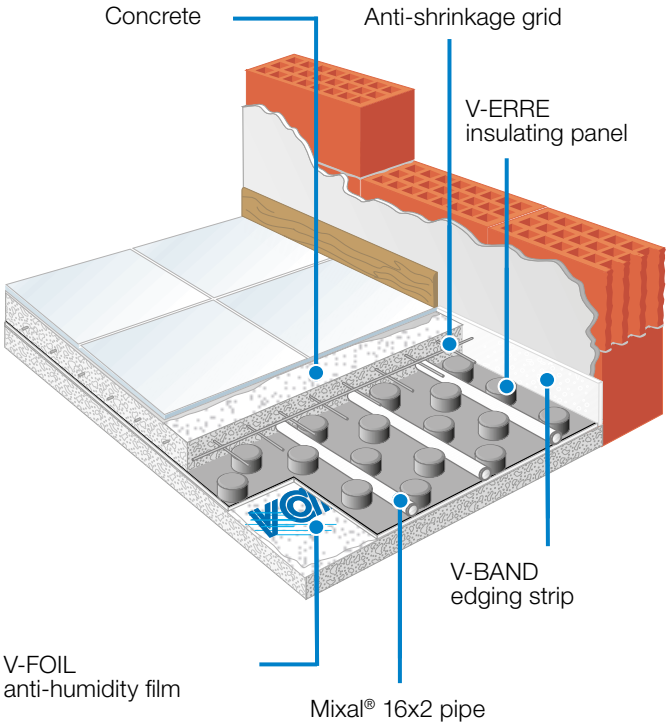
V-ERRE SYSTEM

Heating and cooling system based on embossed panel, designed specifically to adapt to buildings with limited laying space without giving up the advantages of a radiant floor system. In case of traditional screeds, laying space is only 72 mm and can be further reduced by using self-levelling screeds certified for such applications.

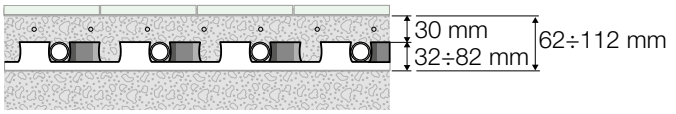
In fact, coupling a rigid moulded sheet with a moulded polystyrene slab allows reducing spaces considerably.

By using the V-Acoustic multi-layer soundproof floor covering over screed of 100 kg/m^2, the noise performance will improve by 28 dB.

Noise reduction to impact sounds.
(UNI EN 12354-2 - App. C2)
ΔL_w > 28 dB



Panel characteristics	Measurement unit	V-ERRE
Resistance	-	Class 200 - 150
Surface type	-	Pre-formed
Panel working dimensions	mmxmm	1200x800
Minimum pipe spacing	mm	50
Insulation thickness	mm	10 - 20 - 30 - 40 - 50 - 60
Total thickness	mm	32 - 42 - 52 - 62 - 72 - 82
Density	kg/m^3	30 - 25
Compressive strength	kPa	200 - 150
Flexural strength	kPa	250 - 200
Fire resistance	-	Euroclass E
Thermal conductivity	W/mK	0.033
Thermal resistivity	m^{2}K/W	0.30 - 0.61 - 0.91 - 1.21 - 1.52 - 1.82



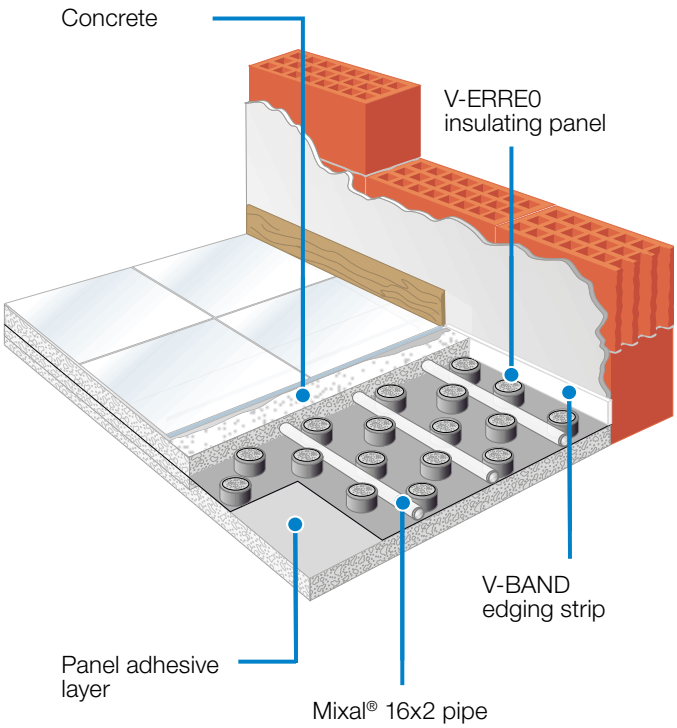
V-ERRE0 SYSTEM

Heating and cooling system with high-resistance polystyrene preformed panel with excellent mechanical properties - ideal for renovation - providing a total thickness of 22 mm, where a 16 or 17 mm pipe can be laid.

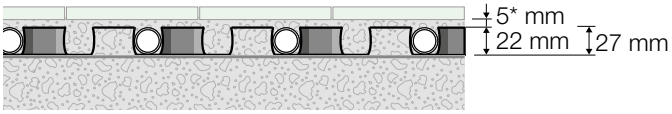
The V-ERRE0 panel is the perfect solution for low thermal inertia systems.

The V-ERRE0 panel is manufactured in accordance with **UNI EN ISO 13163** and marked in accordance with **European CE Directives**.

In the case of installation with V-FOIL or non-grounded elements, using an additional bonding primer is recommended.



Panel characteristics	Measurement unit	V-ERRE0
Resistance	-	Class 250
Surface type	-	Preformed and perforated
Panel working dimensions	mmxmm	1200x800
Minimum pipe spacing	mm	50
Panel strength	mm	22
Density	kg/m^3	30
Compressive strength	kPa	200
Flexural strength	kPa	250
Fire resistance	-	Euroclass E



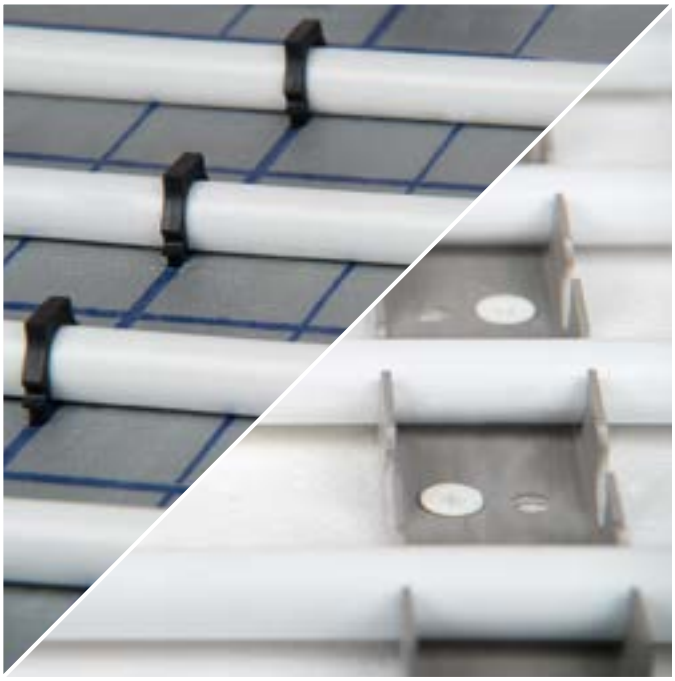
* in accordance with the minimum thickness values required by the manufacturer of the self-levelling compound

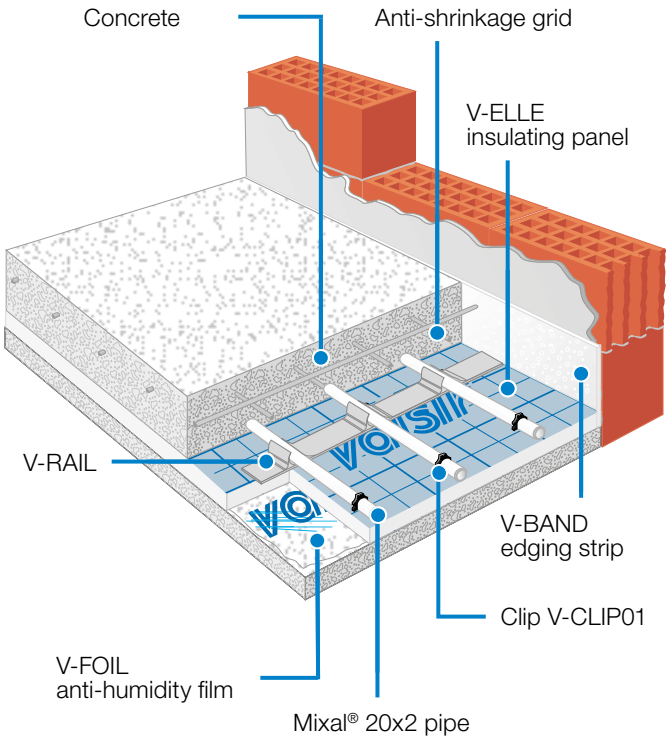
V-ELLE AND V-RAIL SYSTEMS

Heating and cooling systems with a smooth panel for industrial, commercial or open-space environments where high resistance to heavy loads such as vehicles or industrial machinery is required.
System installation is rapid thanks to the smooth panel, which is fastened to the Valsir multi-layer pipe by means of hooked clips or special V-RAIL fixing bars made of plastic material and equipped with double-sided adhesive.

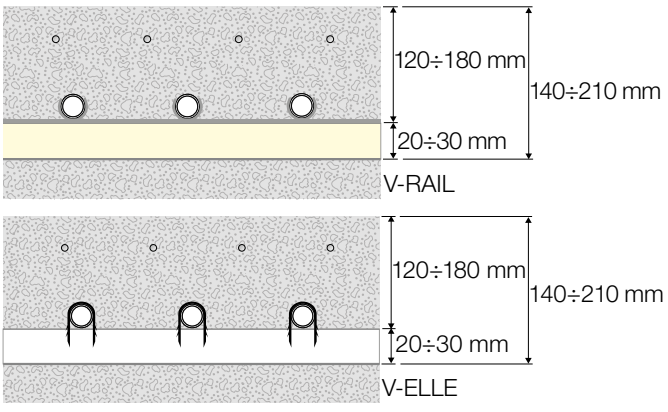
This solution is also widely used to melt ice and/or snow in outdoor areas such as yards, ramps, heliports, car parks, but also football or rugby fields (where the insulation layer is removed).

Moulded panel is not required to install the V-RAIL system.





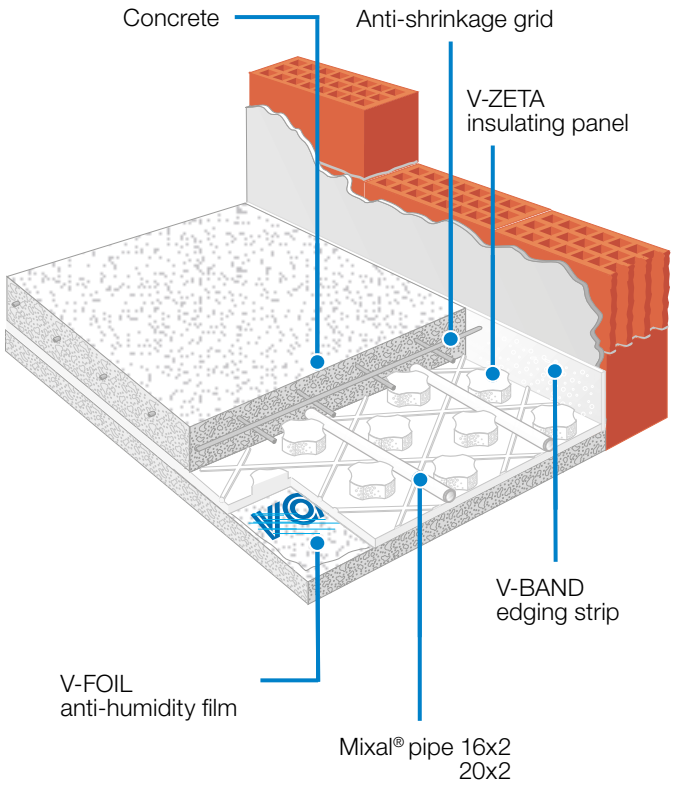
Panel characteristics	Measurement unit	V-ELLE e V-RAIL
Resistance	-	Class 200 - 250
Surface type	-	Smooth
Panel working dimensions	mmxmm	1000x12 - 1000x18
Total thickness	mm	20 - 30
Density	kg/m^3	30 - 40
Compressive strength	kPa	200 - 250
Flexural strength	kPa	250 - 350
Fire resistance	-	Euroclass E
Thermal conductivity	W/mK	0.033
Thermal resistivity	m^{2}K/W	0.61 - 0.91



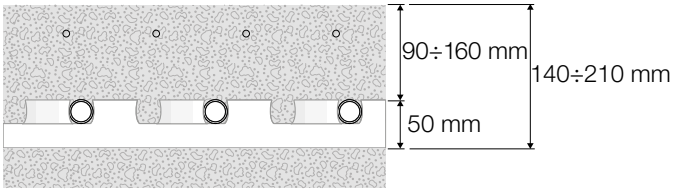
V-ZETA SYSTEM

The ideal system employed for the creation of floor heating systems in industrial buildings without renouncing the ease of installation of the Valsir multi-layer pipe on socketed panels.

It is an economically valid solution that is also suitable in residential buildings and offices.



Panel characteristics	Measurement unit	V-ZETA
Resistance	-	Class 200
Surface type	-	Pre-formed
Panel working dimensions	mmxmm	1200x750
Minimum pipe spacing	mm	75
Insulation thickness	mm	20
Total thickness	mm	50
Density	kg/m^3	30
Compressive strength	kPa	200
Flexural strength	kPa	250
Fire resistance	-	Euroclass E
Thermal conductivity	W/mK	0.035
Thermal resistivity	m^{2}K/W	0.57



THE IMPORTANCE OF SETTING

Hydraulic adjustment

The regulation of the heating system is a very important aspect to ensure the best living comfort. When using a radiant system for underfloor heating or cooling, correct adjustment of the system is even more important. In fact, every system needs to be “balanced” both from the point of view of the flow rates and the temperatures involved.
Valsir’s offer also includes all the necessary elements to realise and manage the central heating unit, upstream of the radiant system. After the hydraulic separator, the installation sequence provides for the manifold - using a compact connection kit - and then the modules to deliver water at the correct temperature and flow rate.

Room adjustment

From the user’s perspective, adjusting the system involves setting two simple parameters: temperature and humidity.
In addition to the traditional chronothermostats and humidistats, Valsir’s range includes the new Wi-Clima Evo. A single object that provides the functions of winter and summer chronothermostat, humidistat and HRV system control if required.
The device meets the need of residents in the latest generation buildings to easily control various parameters, at the same time preventing them from changing the system operating parameters.
Wi-Clima Evo makes it possible to operate the heating or dehumidification system through electrical wiring, and/or radio frequency controls.
The Wi-Clima app, downloadable from the Valsir store, is ideal for users wishing to control the system remotely by connecting their smartphone directly to the Wi-Clima Evo thermostat.

THE COMPONENTS

The Valsir range is simple but complete, and provides a quality solution for any type of installation.

All components are available for the professional realisation of a radiant system. In addition to multi-layer pipes, PE-X (Thermoline®) pipes can be used. Both metal and plastic manifolds are available. Together with the panels, all the components for pipe fixing are supplied. The additive to be added to the screed, the impact sound or anti-humidity foils, and other components for a smooth, safe and high performing installation are also available.

The manifold is used to connect and control each radiant circuit independently. Valsir manifolds are equipped with flow meters on the delivery of each circuit with adjustment memory lock, return lockshield, system vent and drain valve.
They are available in PA-M and steel, and are supplied pre-assembled and ready for installation. The first type is modular and suitable for installation when radiant cooling is required. The second type, which can also be used for high temperature systems, allows installation in a compact space.

Several accessories can be combined with the distribution manifold: shut-off valves, fixed and variable point mixing kits, thermoelectric heads for system adjustment.

PA-M modular manifold.

Pre-assembled steel distribution manifold.

Shut-off valves.

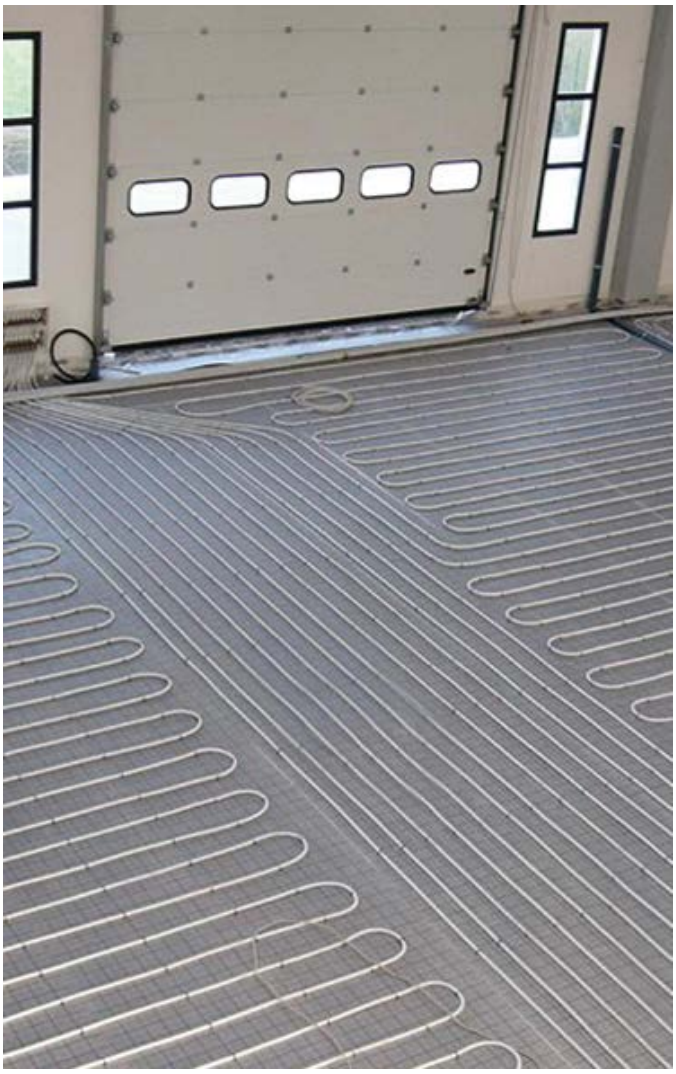
Head and control unit.

Sport centre Seriate - Bergamo (Italy)

REFERENCES

Tesla showroom - Prague Kunratice (Czech Republic)

Hotel Unter Den Linden - Stockerau (Austria)



Warehouse - Sondrio (Italy)

Josefina Restaurant - Stockholm (Sweden)

Building Praterstraße 70 - Vienna (Austria)

CUSTOMER SERVICE

Technical support

Valsir provides complete support during design and on site, thanks to a high-level technical department that consists of a team of engineers with international experience that are capable of providing solutions to all installation needs.

Valsir Academy

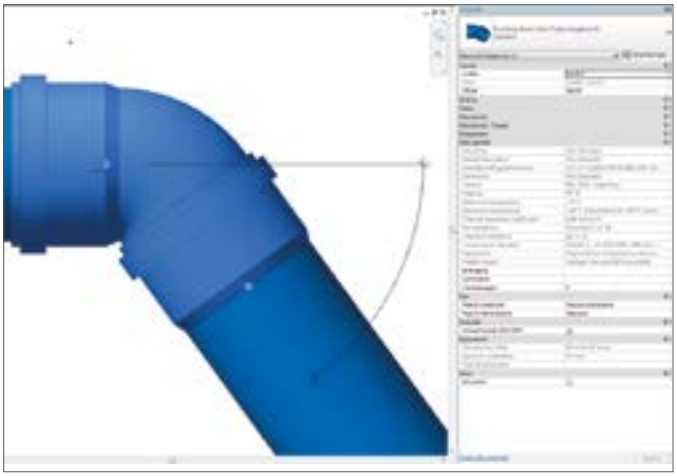
Valsir has an important training facility - **Valsir Academy** - dedicated to clients, distributors, plumbers and planners that provides perfectly equipped courses, both theoretical and practical on the use and the design of plumbing and heating systems. Courses are provided both inside the training facility and on customers' premises.

VALSIR IS BIM-READY

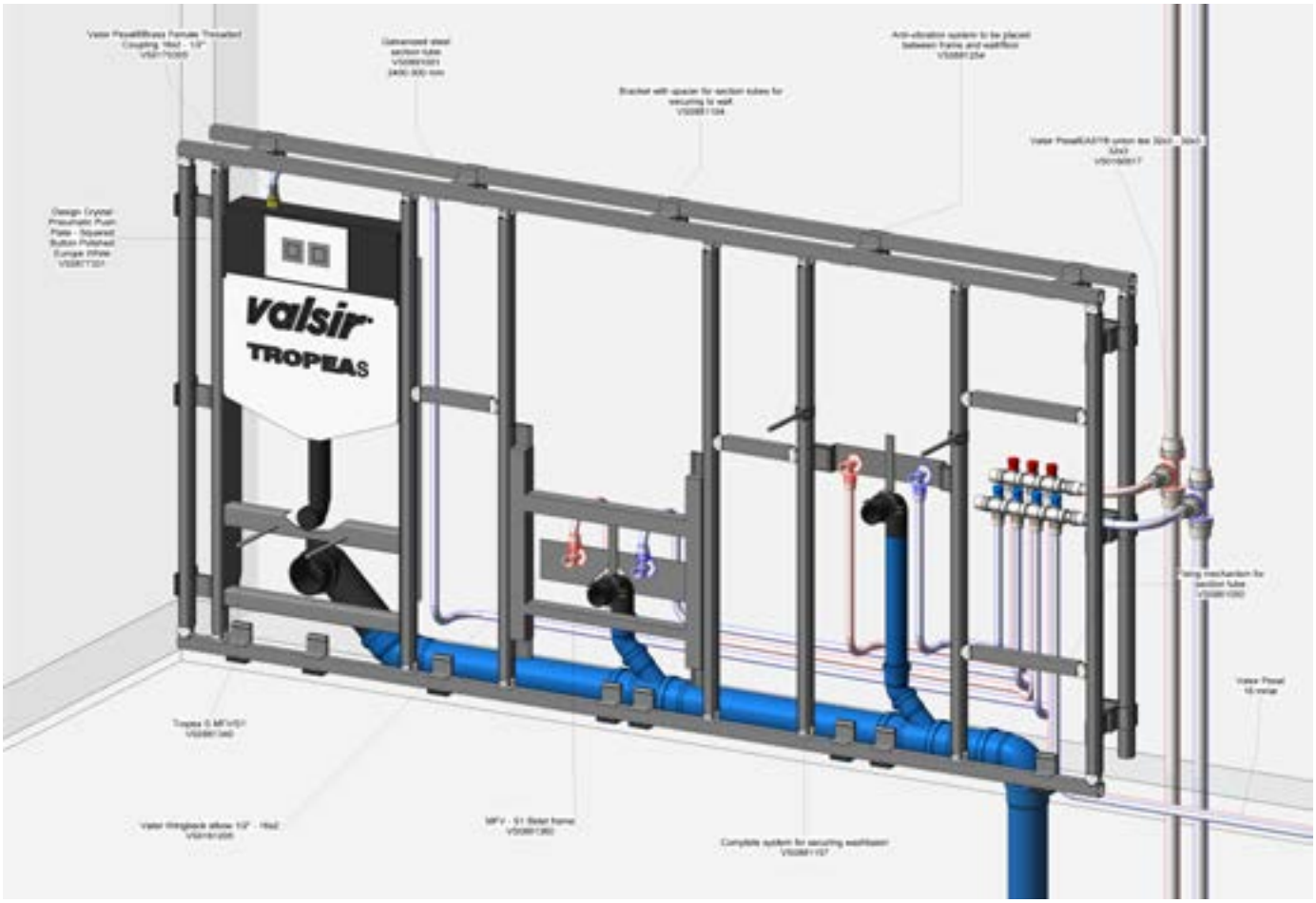
Valsir has adopted the BIM philosophy, the modelling process that allows to improve planning, design, construction and management of buildings, aligning with the industry transition to digital building modelling.

A “BIM-oriented” design offers outstanding competitive advantages: more efficiency and productivity, less errors, less downtime, less costs, greater interoperability, maximum information sharing, more timely and consistent project control.

Valsir captures the essence of this system with a set of Revit models and applications designed for quick and easy use.



www.valsir.it/u/revit



QUALITY AND ENVIRONMENT

Quality

The constant commitment of Valsir in the production of quality products is attested by over **200 product approvals** obtained throughout the world by the most stringent certification bodies (data updated to 01/07/2022), by a Management System of the Quality (QMS) certified in compliance with the **UNI EN ISO 9001:2015** standard and the Energy Management System (SGE) certified according to the international standard **UNI EN ISO 50001:2018**.
Valsir S.p.A. has further demonstrated its commitment to the environment by obtaining certification **ISO 14001:2015** on the Vestone production site.
Since 2019 an innovative and modern plant has also been built that, integrated with the already installed photovoltaic park, will be able to produce over 30% of the electricity needed for all Valsir plants. This is a Trigenerator powered by methane gas capable of producing electricity, steam and cooling energy.

Sustainability

Efficient processes and reliable products are no longer the only parameters used to perform an assessment of the quality of a company's conduct: the capacity of the company and its management to design and implement production process that are sustainable from an environmental point of view is of equal importance.

Valsir has started a project of Corporate Social Responsibility and has published its 3th Sustainability Report that gathers facts and figures relating to the daily commitment of Valsir in terms of social, economic and environmental responsibility.

Download
valsir.it/u/sostenibilita-en

WASTE SYSTEMS

SUPPLY SYSTEMS

GAS SYSTEMS

FLUSHING SYSTEMS

BATHROOM SYSTEMS

TRAPS

RADIANT SYSTEMS

DRAINAGE SYSTEMS

HRV SYSTEM

ACADEMY

SEWER SYSTEMS

WATER TREATMENT

GROUP SILMAR

valsir®

QUALITY FOR PLUMBING

L02-579/2 – Luglio 2022

VALSIR S.p.A. - Società a Socio Unico
Località Merlaro, 2
25078 Vestone (BS) - Italy
Tel. +39 0365 877.011
Fax +39 0365 81.268
e-mail: valsir@valsir.it

www.valsir.it