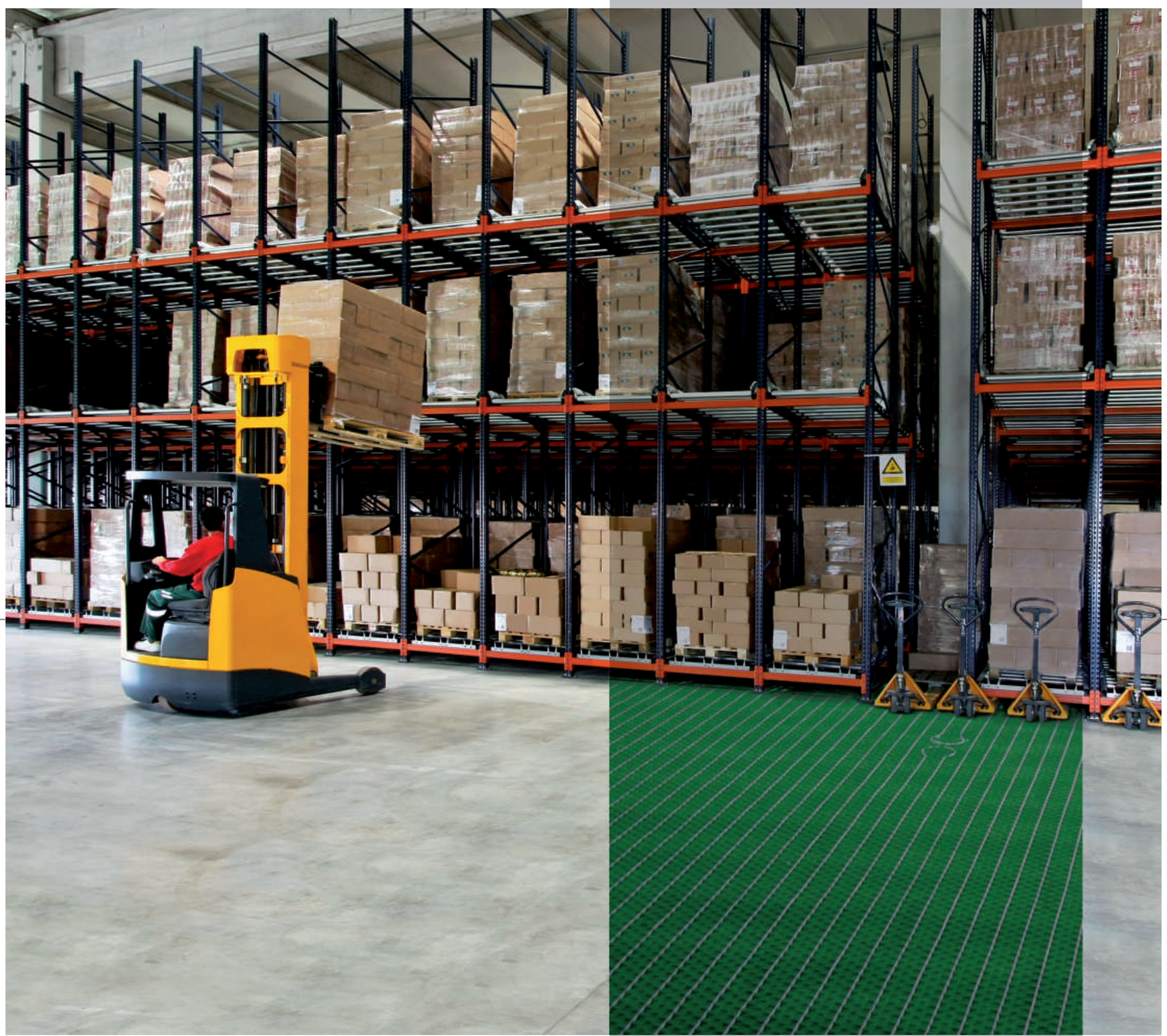
valu-technik



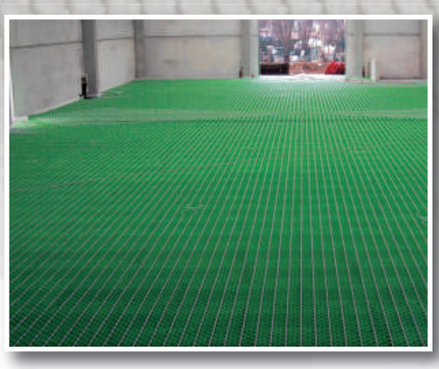
Industrial system and large rooms

UNI EN 1264 Certificate

aquatechnik®

valu-technik

aquatechnik has been working in the industry of manufacturing plastic material pipes to create hydro-thermo-sanitary systems.
For many years to date, it can boast thousands of projects and successes, with a well-established experience that makes it one of the most significant companies in Europe.
Also in the industry of floor-panel heating and cooling systems, **aquatechnik** constantly pursued its goal of manufacturing systems with radiant panels, which can best meet the needs of the customers and of the users by always using high-quality materials that are certified according to the UNI EN 1264 standard.



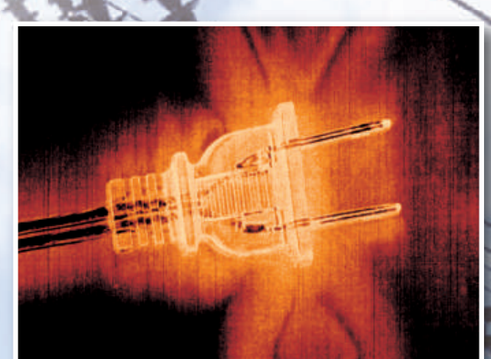
By constantly investing in human resources, today **aquatechnik** can offer a complete service during the pre-sale step, thanks to an effective consulting activity of estimating and designing, as well as during the installation operations, thanks to an effective support at the working site by authorised engineers.

Therefore, the customer can take advantage of a safe and reliable service, which is ready to answer any question, to remove possible doubts and to transfer the installation techniques about the **valu-technik** system.
The technical knowledge acquired thanks to the realized systems allowed **aquatechnik** to be so experienced that it can face and solve the most different problems in a professional and competent way, as well as to adjust and test ideal floor-panel systems in industrial sheds, large spaces and places of worship: the **INDUSTRIAL valu-technik SYSTEM**.

HOW TO SELECT THE CORRECT SYSTEM

The selection of the type of heating system to be installed in large premises mainly depends on the comfort level that you want to obtain and on the hygienic-sanitary features deriving from the specific use of the space (e.g. food industries, joiner's workshops, highly-flammable product industries, gyms, places of worship, etc.).

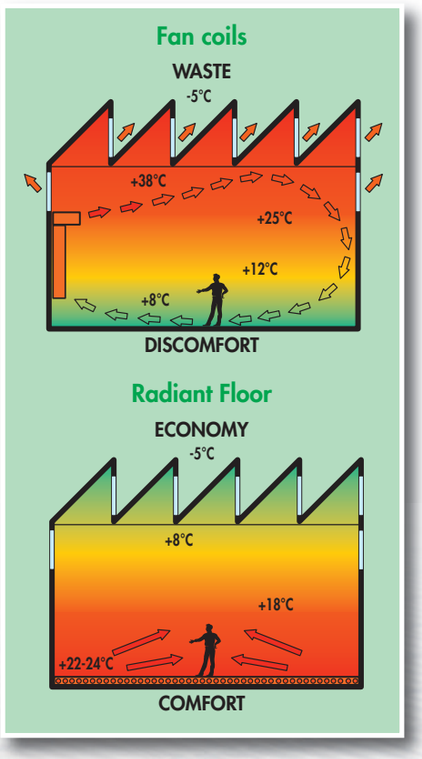
Other decisive factors to select the type of system to be installed in a building that is used for working purposes include economic factors, such as purchase and installation costs, as well as fuel consumption and maintenance costs. ENERGY SAVING and COMFORT have always been **aquatechnik**'s goals.



THE ADVANTAGES OF THE SYSTEM

ENERGY SAVING

If you choose to heat very large spaces by means of a floor-panel system with radiant panels, it will lead to a remarkable reduction in the costs of overhead.
Compared with an air system, you can obtain fuel savings that may reach 50%.
If you use the entire walkable area as a radiator, the industrial **valu-technik** system will allow operating at very low temperatures, and so better exploiting heat generators, low temperature and condensation types.
In addition, the heat transmitted by radiation from the floor concentrates in the areas where the user stays and not next to the roof, where it is useless. Indeed, compared with an air system, which creates stratification phenomena, a heating system with radiant flooring will generate a temperature gradient that is almost linear.
In the upper part of the structure, the air temperature even tends to decrease.
The aforesaid features allow considerably reducing heat losses due to transmission, as the temperature difference between internal and external areas next to dispersing structures and roofs is remarkably lower (see the diagram about the gradient). The great reduction in heat losses allows installing a heat generator whose power is no doubt lower compared with other system types, always obtaining better comfort levels.
The use of lower thermal powers leads to a reduction in the flow-rates that must be supplied to the system, in the diameter of the pipes supplying the manifolds and in the features of the circulating units.
Another important factor for energy saving purposes is the fact that the system, as it works at low temperatures, allows exploiting the heat coming from alternative energies, thus further reducing heating costs and allowing amortising, in a short time, the initial start-up costs that are slightly higher compared with other system types.



COMFORT

The floor-panel heating system has great comfort advantages.
The industrial **valu-technik** system creates an extremely comfortable environment thanks to a homogeneous distribution of heat. Heat is generated in a moderate and uniform way, exchanged to the environment mainly by radiation, so it is perceived by the human body in an extremely natural way.
Heat, which is radiated by the floor, concentrates where the human body really needs it, thus creating a physiologically optimal climate and, in case of industrial sheds, it creates extremely comfortable working conditions. For this reason, an increasing number of customers decides to heat their own premises with the industrial **valu-technik** system.

FIRE AND SAFETY

In case of industrial sheds characterised by manufacturing processe s that include highly-flammable materials, the floor-panel heating system assures maximum safety: indeed, no high-temperature heating device will be installed within the working rooms.

MAINTENANCE

The low-temperature heat-carrying fluid allows a reduced stress to the devices composing the system (heat generators, pipes, fittings, and gaskets).
In addition, as the industrial **valu-technik** heating system is floor-integrated, it will considerably reduce the maintenance costs.

ABSENCE OF AIR CONVECTIVE MOVEMENTS

The absence of convective movements, which is a typical phenomenon in air systems, remarkably reduces the transfer of dust, which is usually caused in case of remarkable temperature differences between heating appliances and air.
In case of a heating system with radiant panels, there is an approximate 5°C temperature difference between the floor and the air within the rooms; the aforesaid difference is not enough to move the dust. In addition, the removal of high-temperature heating appliances offers the advantage of preventing the combustion of atmospheric dust, thus reducing the risk of allergies and assuring healthy environments, as well as excellent hygienic conditions.

MORE FREE SPACES

Another important aspect to be taken into consideration is the recovery of equipment rooms that are used for traditional heating appliances (ex. fan heaters, radiant heating solutions, etc.).
Indeed, the system is completely built-in in the floor, so there are more free spaces that can be used.

EXPLOITATION OF ALTERNATIVE ENERGIES

The large floor-panel heating exchange surface allows operating with a very low temperature heat-carrying fluid. So, the system can recover and best use the heat that comes from production processes, heat pumps, solar energy, spring water, etc. additionally reducing heating costs that, in the best cases, can even be zeroed.

THE INDUSTRIAL valu-technik SYSTEM

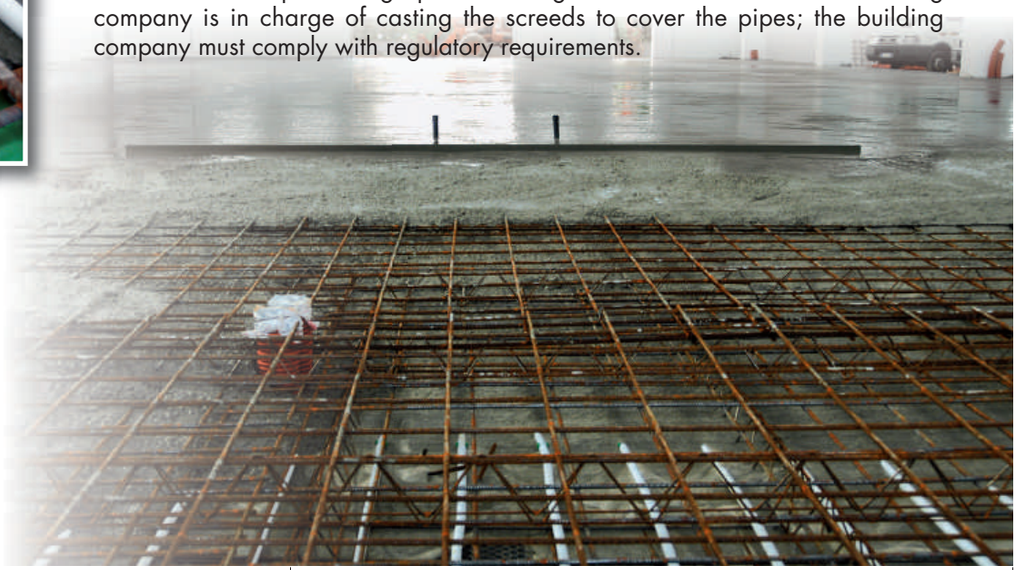
The industrial **valu-technik** system provides for two installation methods: the first method includes metal bars where you fasten the plastic-material clips hooking the pipe and the pipe support, which can be installed with multiples 5 cm passes. Thanks to a handy joint, the metal bars firmly connect one to the other, thus assuring the system modular structure. A nylon sheet with vapour barrier function is put onto the supporting concrete slab.
The second installation method provides for the installation of insulating sheets – plain or preformed – where the pipes are fastened with 5cm or 7.5cm centre distances.

Other completion materials and accessories are as follows:

- the perimeter insulating baseboard, which has to be fastened in all vertical structures to compensate for screed expansions;
- **valurapid** manifolds equipped with drain units and shut-off valves;
- built-in inspection panels to house the manifolds;
- the thermo-fluidifying additive to be added to the mixture to cast the radiant screed.

THE STRUCTURE OF THE SCREED

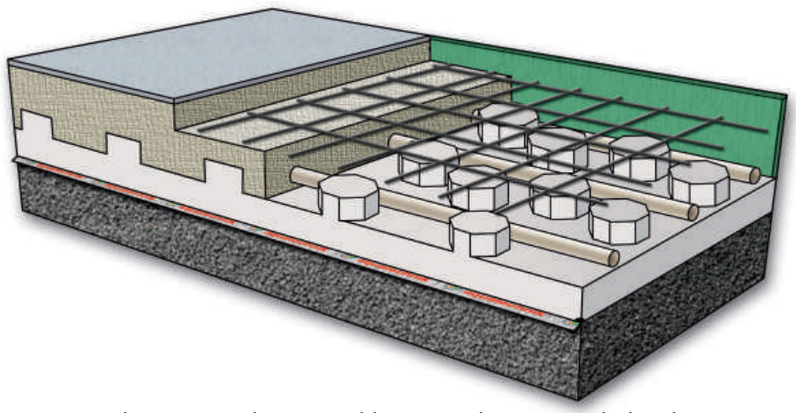
The industrial **valu-technik** system does not require particular precautions concerning the structure of the screed. Indeed, the structural designer will assess the stresses and the loads concerning the involved floor and will have to establish only the layer and the type of insulation in the floor foundation, the primary and secondary reinforcements with possible supporting framework to be buried into the screed, as well as the relevant thickness, so that it can effectively support static and dynamic loads.
In case of buildings intended for industrial purposes, it is obviously and absolutely important to know the intended use of the building in order to effectively design the floor-panel radiant system.
aquatechnik offers the most adequate solutions for all needs and for every flowrate that concerns the flooring of the shed. Indeed, the company has been installing systems in sheds for years where the floor is constantly stressed by forklift trucks, heavy vehicles, self-propelled machinery, machinery for heavyweight structural works and metal processing operations in general. Remember that the building company is in charge of casting the screeds to cover the pipes; the building company must comply with regulatory requirements.



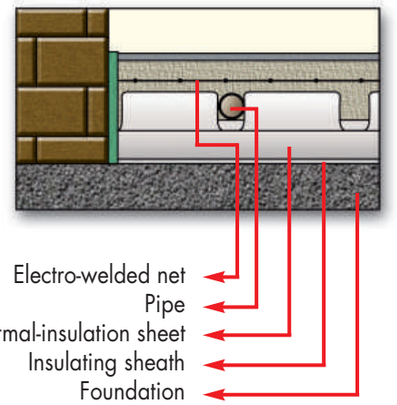
valu-technik SYSTEM WITH SHAPED INSULATING PANEL

This version provides for the installation, onto the supporting nylon waterproofed concrete slab, of insulating sheets with a density equalling 30 kg/m³ with shaped surface in order to house the pipes with multiple 7.5cm centre distances. The system circuits are created with PE-X/Al/PE-X, PE-X/Al/PE-HD or PE-RT pipes.

EXAMPLE OF INDUSTRIAL valu-technik SYSTEM WITH SHAPED THERMAL-INSULATION SHEETS



STRATIGRAPHY

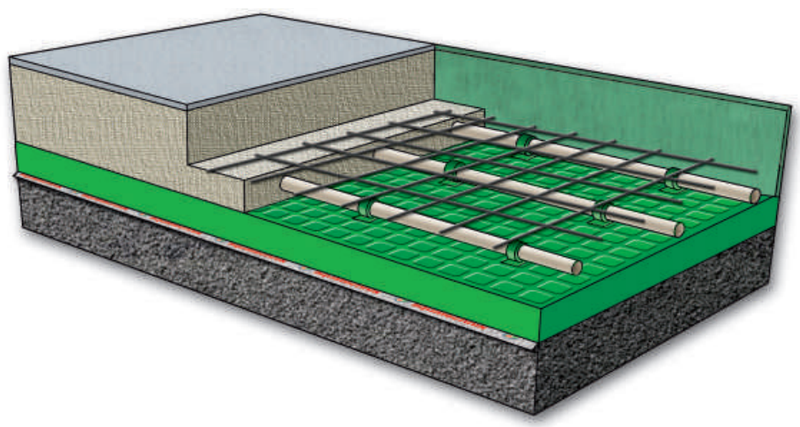


The same application can be created by using sheets provided with protective layer, 5cm pass, green- and black-coloured.

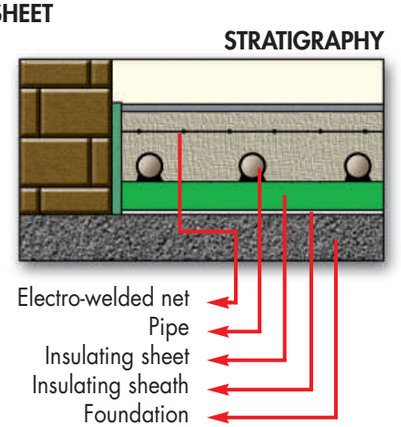
valu-technik SYSTEM WITH PLAIN INSULATING PANEL

This version provides for the installation, onto the supporting nylon waterproofed concrete slab, of plain insulating sheets with a density equalling 30 kg/m³. The system circuits are created by using PE-X/Al/PE-X, PE-X/Al/PE-HD or PE-RT pipes.

EXAMPLE OF INDUSTRIAL valu-technik SYSTEM WITH PLAIN THERMAL-INSULATION SHEET



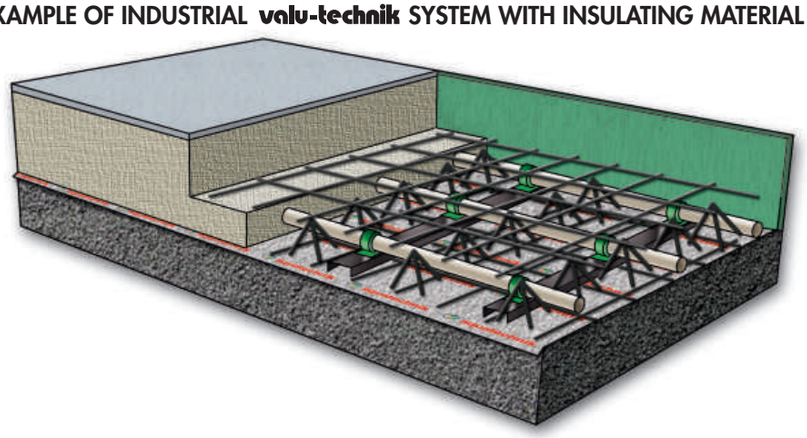
STRATIGRAPHY



valu-technik SYSTEM WITH INSULATING MATERIAL, BARS AND CLIPS

This version provides for the installation, onto the supporting nylon waterproofed concrete slab, of modular metal bars with multiple 5cm passes and fastening clips. The system circuits are created by using PE-X/Al/PE-X, PE-X/Al/PE-HD or PE-RT pipes, and then covered with a metal net.

EXAMPLE OF INDUSTRIAL valu-technik SYSTEM WITH INSULATING MATERIAL



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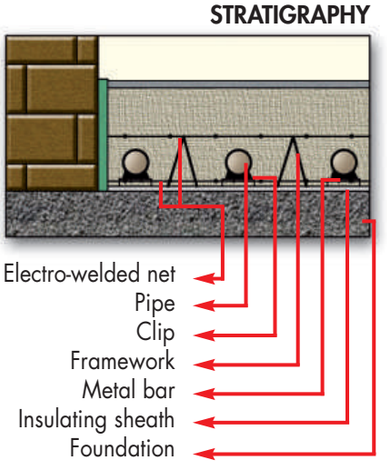


COMPONENTS

MULTILAYER PIPE

multi-calor pipe made with PE-X/Al/PE-X in compliance with the UNI EN1264 standard, class 1

Excellent behaviour in case of thermodynamic stresses, good resistance to electrolytic and chemical agents, very reduced friction values with fluid flowing, removal of corrosion phenomena.

Coils available in 16mm and 20 mm Ø.

multi-eco pipe made with PE-X/Al/PE-HD, class 1.

Excellent behaviour in case of thermodynamic stresses, good resistance to electrolytic and chemical agents, very reduced friction values with fluid flowing, removal of corrosion phenomena.

Coils available in 16mm and 20 mm Ø.

polipert pipe made with PE-RT with EVOH anti-oxygen barrier, classes 4 and 5.

Excellent behaviour in case of thermodynamic stresses, good resistance to electrolytic and chemical agents, very reduced friction values with fluid flowing, removal of corrosion phenomena.

Coils available in 16mm and 20 mm Ø.

THERMAL-INSULATION SHEETS

EPS 200 insulating panels whose function is to contain heat loss and acoustic dispersions. They formed the base where the heating circuits will be installed. In addition, they are provided with joints on side edges for perfect coupling one to the other, as well as to prevent possible heat bridges to the supporting concrete slab.

They are available in shaped, plain and thermoformed versions.

Various heights according to the thermo-technical design.

They are manufactured in compliance with the UNI EN 1264 standard.

THERMAL-INSULATION BASEBOARD

It is made with closed-cell expanded polyethylene. It is used to absorb expansions and for the heat/sound insulation of the screed to the vertical structures (ex. walls, columns, steps, etc.).

It is fastened to the wall by using specific adhesive straps. The perimeter baseboard is provided with a polyethylene sheet sealed on one side, which has to be put onto the insulating panels to prevent thermal bridges.

CURVE TEMPLATE

Plastic template for 16-18-20mm Ø pipes, suitable to keep a suitable bending radius for **polipert** *pipes.*

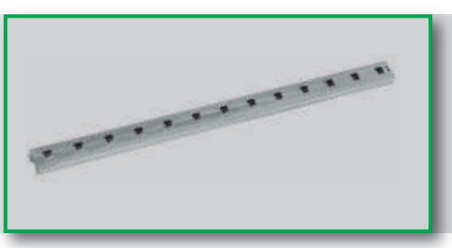
INSULATING SHEETH

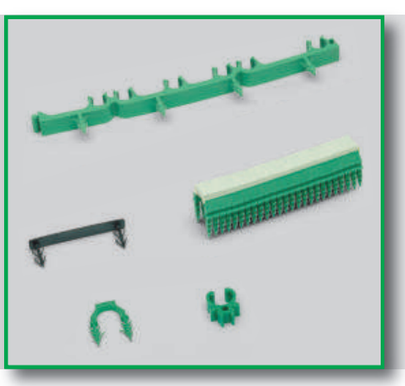
Insulating sheet made with synthetic material for vapour barrier to be installed between the concrete slab and the installed insulating material or the metal bars.

METAL BAR

Modular metal bar for industrial systems.

It is used to fasten the pipes. In the upper part, it is provided with snap-on seats to hold the clips that will fasten the pipe, thus allowing the construction of heating circuits.





FASTENING CLIPS

They are made with plastic material and are used as fasteners to fix the pipes to the insulating panels.

They are available in the following versions: rail type, manual fastening, in series for fastening device, to be fastened onto metal bar, and bridge type.

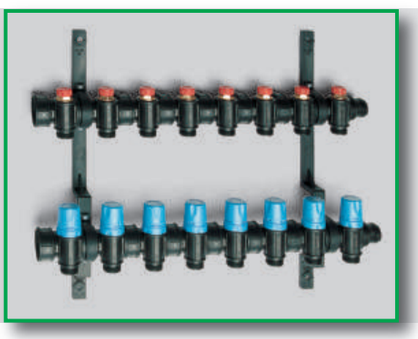
VHF THERMAL ADDITIVE

Super-fluidifying agent based on second-generation polycarboxylate ethers, conceived to cast cement mixtures.

It reduces water exudation and improves the mechanical resistance and thermal conductivity features.

SYNTHETIC FIBRES

Polypropylene fibres agglomerated in flakes, characterised by high specific surface, expressly conceived to prevent the plastic shrinkage of concrete that causes cracks, in particular during the period of middle ageing



PRE-ASSEMBLED VALURAPID MANIFOLD

Ø 32mm pre-assembled modular manifold made with polyamide with 16 and 20 ***safety*** *outputs and Eurocone outputs. It was designed and manufactured to be used in heating/cooling systems with radiant panels. It is available in different versions:*

- Ø 32mm manifold-16 and 20 **safety** outputs and Eurocone outputs, complete with manual control valves, micrometric holders, fastening brackets, 4 to 12 couplings;
- Ø 32mm manifold-16 and 20 **safety** outputs and Eurocone outputs, complete with manual control valves, flow-meters with closing, fastening brackets, 4 to 12 couplings.

VALURAPID MANIFOLD

Ø 40mm polyamide modular manifold with 20mm output. It was designed and manufactured to be used in heating/cooling systems with radiant panels. Each individual module can be quickly and simply assembled with a number of outputs to the circuits provided for in the thermotechnical project.

It is compatible with flow-meter, micrometric holder and needle auger.

½" cock coupling.

FLOW-METER

It was designed and manufactured to be installed in the delivery circuit of ***valurapid*** *manifolds. It allows measuring the water flow-rate of each individual circuit (loop), to perform adjustments and to balance the system.*

0.5 ÷ 5 l/min

valu-technik

MICROMETRIC HOLDER

It was designed and manufactured to be installed in the delivery circuit of valurapid manifolds. It allows balancing the system by adjusting every individual circuit (loop).

It allows increasing the circulating water flow (opening holder) or reducing it (closing holder) to adjust the return temperature, as per project instructions.

In addition, it is equipped with a position memory system, which allows temporarily closing one or more loops without compromising the system balance.

NEEDLE AUGER

*It was designed and manufactured to be installed in the return circuit of **valurapid** manifolds.*

Its function is to open/close the individual circuits, thus allowing pressurised water in the manifolds to flow into the loop (open needle auger) or locking the relevant flow (closed needle auger).

The auger can be controlled by means of electrical heads or by manual handwheels.

HANDWHEEL

It was designed and manufactured to be installed in the needle auger.

It allows opening/closing the valves in manual way.

ELECTRICAL HEAD

*It is installed in the individual circuits of **valurapid** manifolds; with the help of specific electronic controls, it allows managing each individual area/loop. It allows managing central systems that include a single manifold, such as systems provided with independent areas, controlled by the relevant thermostats.*

Power: 230V - 50~60Hz; opening time: about 3 min; ON/OFF version or provided with limit-stop micro-switch.

DRAIN UNIT

Available with the following features:

- 32mm and 40mm Ø body, **safety** system, complete with automatic air valve for system de-aeration, hose connection with filler to load/unload the system.

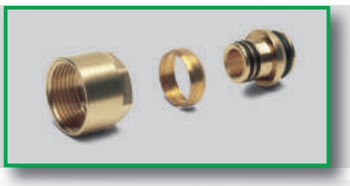
INSPECTION BOX

Built-in cabinet made with galvanised metal plate to house the manifolds. It is equipped with a white-painted metal door, with magnetic fastening, key lock, false holes for side inputs, and guides for the manifold brackets.

The thickness equals 11 cm and can be adjusted up to maximum 14 cm. The different model are charachterized by a different width.

SUPPORTING FEET

Universal supports for **aquatechnik** *inspection boxes made with galvanised metal plate; they can be adjusted from 220mm to 330mm.*



EUROCONE FITTING

Press-fitting suitable for thermoplastic materials, equipped with hose connection with O-ring and split conical-head couplings; it is used to connect the pipes to the manifolds with Eurocone output.

SERVOMOTOR

Servomotor 230V~50Hz for zone valve. Opening time: 45sec/90°.

M/F THREADED JOINT

*M/F threaded joint made with brass to pass from **safety** system to a inch thread.*
To be installed in delivery and return lines for 32mm and 40mm Ø valurapid manifolds.

F/F THREADED JOINT

*F/F F threaded joint made with brass to pass from **safety** system to a inch thread.*
To be installed in delivery and return lines for 32mm Ø valurapid manifolds.

ZONE VALVE

Angle zone valve, two-way, Ø 1" F and pipe union 1¼"F , total flowing, without servomotor.

ZONE VALVE

Straight zone valve, two-way, Ø 1" M/F and 1¼"M/F with pipe union, without head.

SHUT-OFF BALL VALVE

Ball valve, 1¼" Ø M/F, with total flowing, with butterfly handle equipped with pipe union and gasket for the connection to the manifold. It is installed in delivery and return manifolds for the relevant shut-off operation.

REDUCTION

*Reduction for the drain unit to be installed in **valurapid** 32 and 40 Ø modular manifold bodies.*

NOTE: for further information, see the technical specifications about the products in the web site: www.aquatechnik.it

PRACTICAL RECOMMENDATIONS

TESTING OF THE SYSTEM

1) It is extremely important to test the system before casting the screed and leave it under pressure during the relevant formation.
2) Test the system at a recommended pressure of 10 bar, and restore the pressure from time to time until it has stabilised.
3) During testing operations, it is advisable to perform some pressure charging and descharging cycles in the system before stabilising the pressure at the pre-established value. The aforesaid cycles allow identifying possible weaknesses in the pipes and in gasket seals between manifold couplings, etc.
4) In case of freezing hazard, use the specific antifreeze solutions after checking their compatibility with the pipes, or completely drain the system, in case of water testing, after casting the screed.
5) If there is no freezing hazard and you want to prepare the system to be switched ON, fill it by means of the specific charging/descharging units that are installed in the manifolds, as it is described in the following chapter.
6) The absence of leakages and the testing pressure must be specified in a testing report.

SWITCHING ON AND BALANCING OF THE SYSTEM

1) Load the system by using the specific charging/descharging units installed in the manifolds. Fill loop by loop, and drain the air from a rubber pipe that is connected to the charging/descharging unit and use manual and automatic drain valves. The operation must be carried out by starting to fill, with all valves and holders being closed, except for the ones for a loop. After draining the first loop, act in the same way for the other loops and close valve and holders of the completed loops. The aforesaid procedure assures a correct tharging of the system and, as a consequence, a better output also preventing the malfunction of the circulating unit.
2) While filling the system it is important to drain all the air that is present. System charging and venting operations are carried out as follows:

   - close all holders and all valves in delivery and return manifolds.
   - close the shut-off valves installed in the supply lines of delivery and return manifolds.
   - connect a transparent rubber pipe to the draining cock of the return manifold (on the top).
   - fill the water through the delivery manifold (low) by means of a pipe connected with the charging/descharging cock or through the Ø 1" opening of the shut-off valve.
   - open the valve and the holder in the first circuit loading the water until fully removing the air; check the continuous exit of water by using the transparent rubber draining pipe previously connected with the return manifold.
   - close both the valve and the holder in the previously loaded circuit.
   - repeat the last two operations for all circuits.
3) Before switching ON the system, check that the perimeter insulating strip was cut flush with the final floor, assuring that the screed freely operates (expands) against the vertical structures.
4) Wait at least three screed-drying weeks before activating the system.
5) Switch ON the system with an initial delivery temperature of 25°C to be kept for 3 days. After that, increase it until reaching the maximum design temperature (see the drawing), which has to be kept for at least 4 days.
6) The system start-up process must be documented.
7) In case of quick drying, self-levelling or synthetic casting screeds, activate the system after a period that complies with the specifications established by the supplier of the screed.
8) While starting up the system, adjust the boiler thermostat at 50°C. The aforesaid precaution prevents water from circulating at a too high temperature within the panel system in case of adjustment malfunctions.
9) Calibrate the circuits of the system by adjusting manifold holders and position the relevant opening according to design tables (see the drawing).
10) As far as the boiler is concerned, you have always to provide for a safety probe to be installed in the delivery side of the panel system, which is independent from the control unit, and directly connected with the heat generator that will switch it OFF in case of overtemperatures.

DESIGN ACTIVITY

1) To prevent physiological discomfort conditions, the surface temperature of the floor must be lower than the values established by the reference standards (UNI/CEN 130 and UNI EN 1264-2), max. 29°C in residential living areas, max. 35°C in marginal areas with the limit of 1 m depth from external walls.
   The 35°C max. temperature can also be reached in the so-called transit and/or passage areas (ex. access

areas and corridors) and in toilets.

2) To prevent useless heat accumulations and to reduce the already remarkable thermal inertia of this type of systems, during the design step, keep the value of the power supplied by the panel lower than the value provided for in reference standards (UNI/CEN 130 and UNI EN 1264), that is, max. 100 W/m^2.
3) It is preferable to use modulating-type thermoregulations, that is, capable of adapting the system to the external climatic conditions. Indeed, differently from thermostatic thermoregulations, which are also called fixed-point because they always maintain the same water temperature within the system, the thermoregulations with climatic regulator assure the reduction of useless heat accumulations in the screed with the subsequent reduction of the thermal inertia in the same system. In addition, selecting modulating thermoregulation assures considerable energy saving when managing the system.

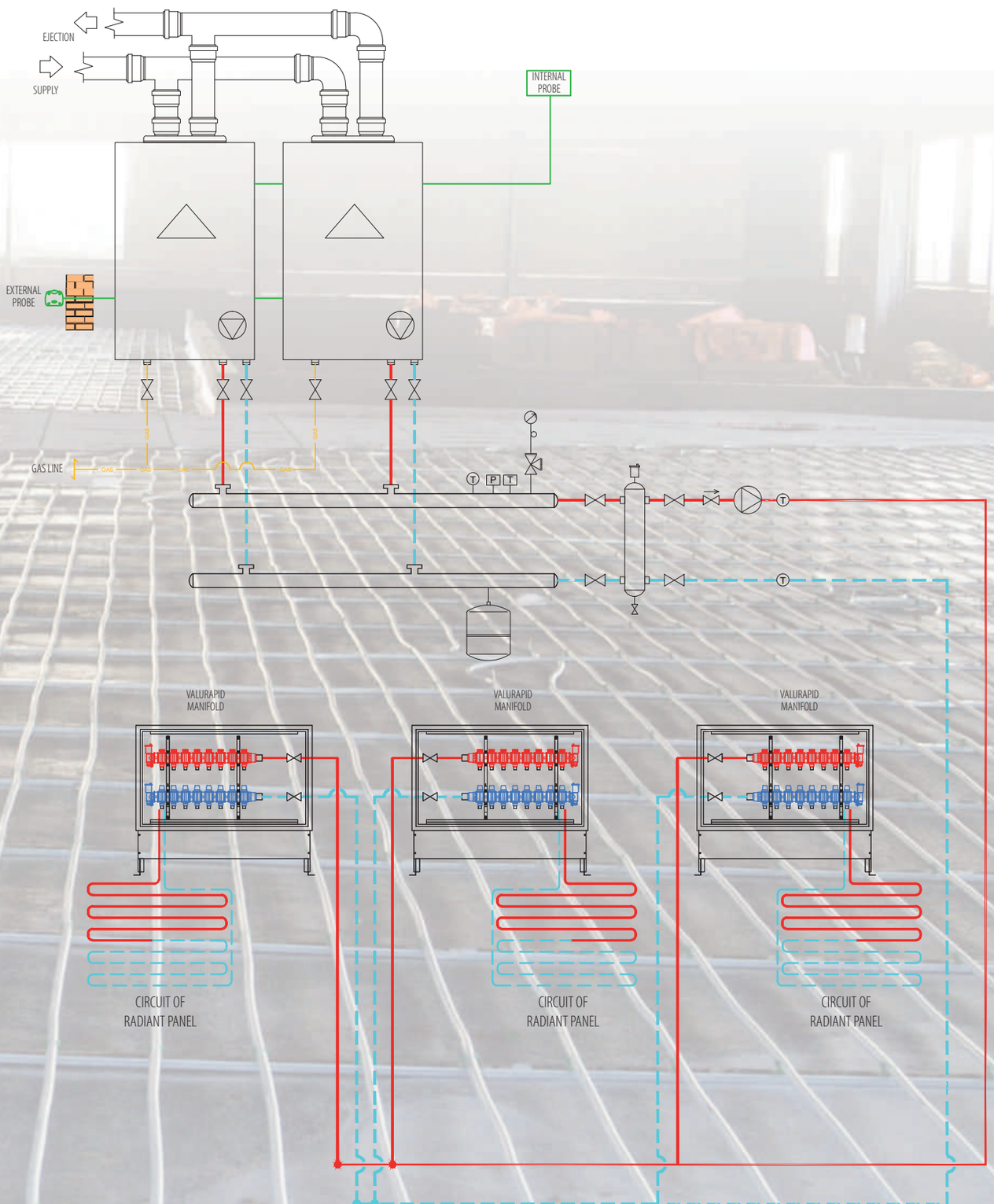
SYSTEM MANAGEMENT

1) During the operating period, do not switch OFF the system and reduce system operation slowdowns as much as possible; in that case, do not exceed maximum 2 or 3 degrees of difference (ΔT) between comfort and attenuation temperatures.
2) It is advisable to manage the system with modulating thermoregulations.

EXAMPLES OF GRAPHIC DIAGRAMS

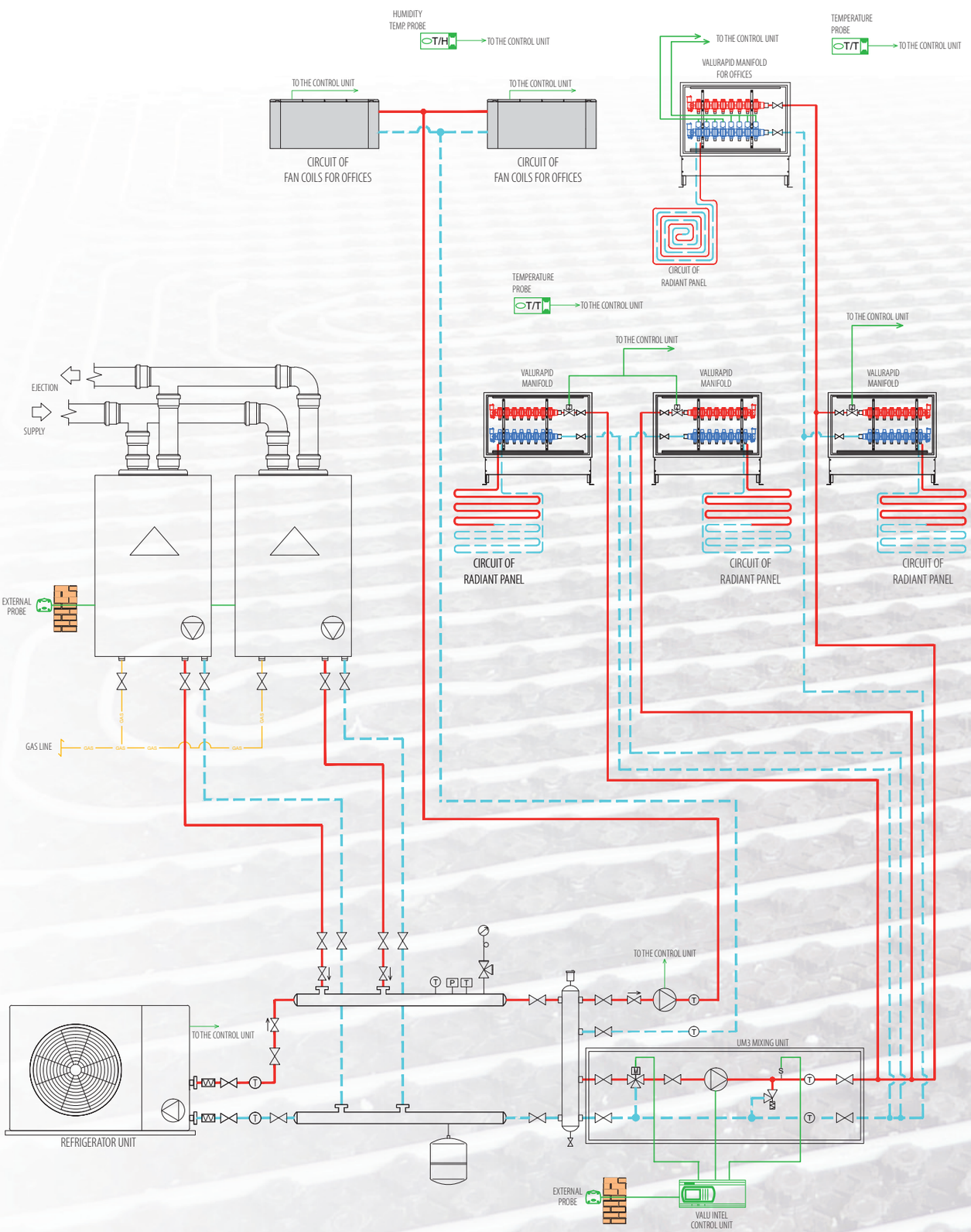
HEATING SYSTEM

STANDARD DIAGRAM FOR INDUSTRIAL BUILDING WITH CASCADE LOW-TEMPERATURE BOILERS, INTERNAL AND EXTERNAL PROBES



HEATING – COOLING SYSTEM

STANDARD DIAGRAM FOR INDUSTRIAL BUILDING WITH CASCADE HIGH- AND LOW-TEMPERATURE BOILERS, AS WELL AS MIXER THREE-WAY VALVE



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Magicgraph - Giugno 2013 - vers.00

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