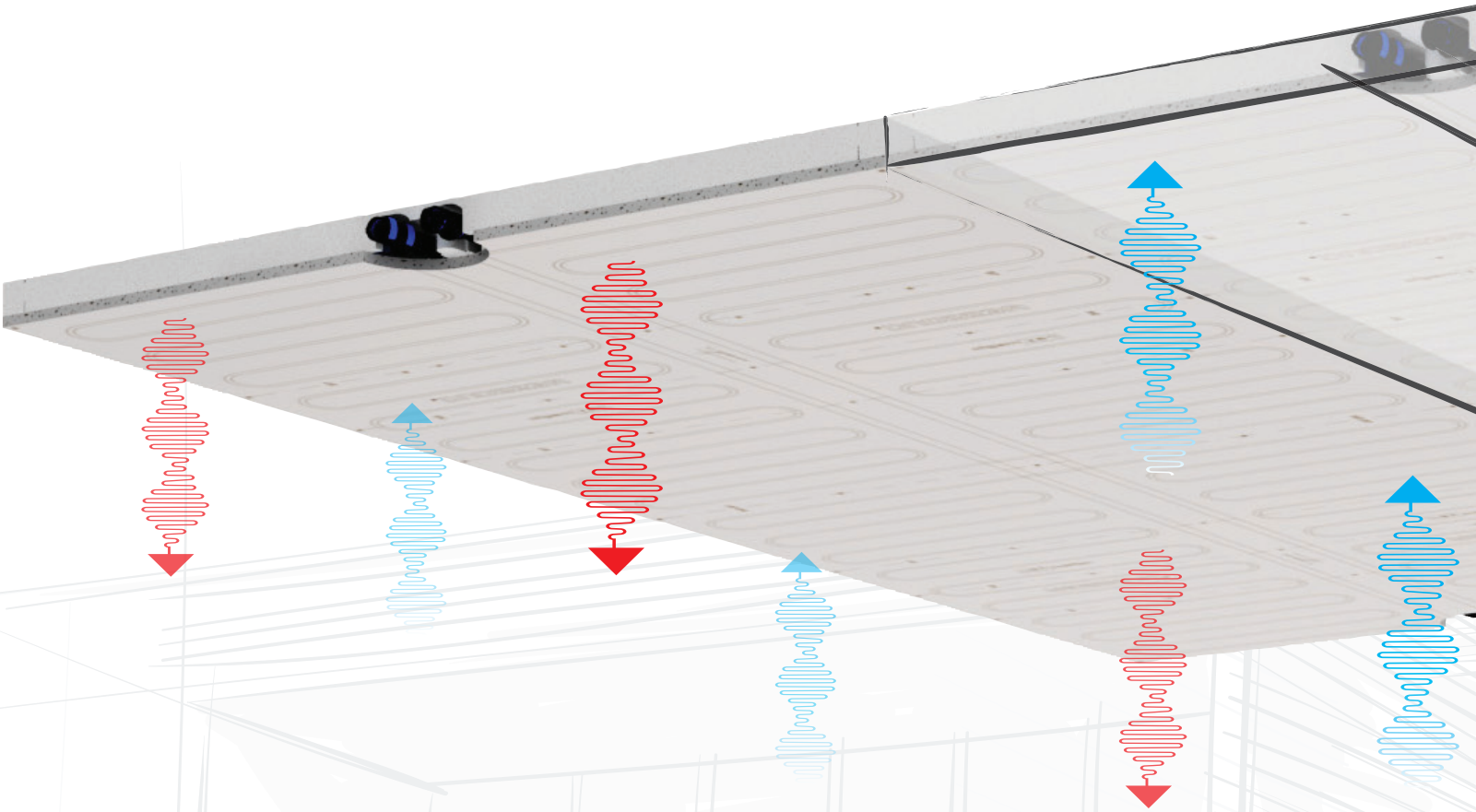
RAY | MAGIC

RADIANT CEILING DRYWALL



patent pending

The radiant panel with backbone

You install it with ease,
it creates the perfect climate

messana®
air | ray conditioning

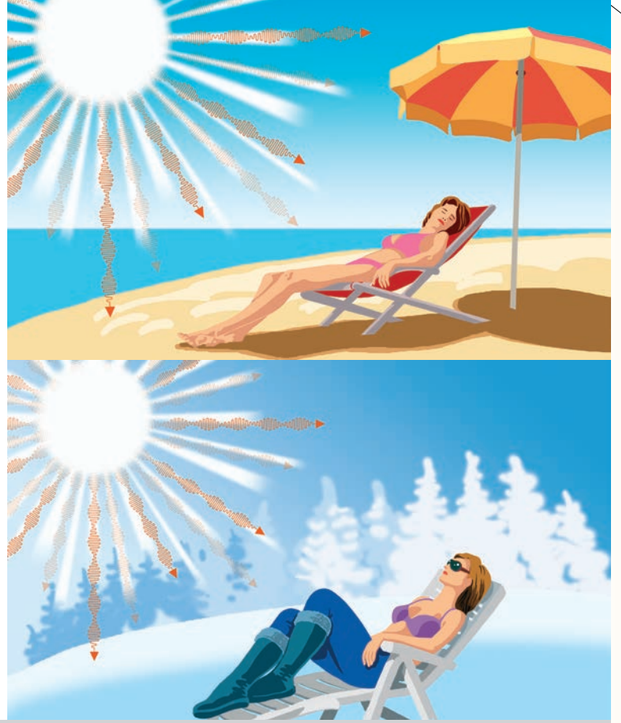
Understanding radiant heat

“Heat goes up and cold goes down” is a common belief about heat. But it’s false. All you need to do is stand in the sun to understand. Why?

The explanation lies in the confusion of terms. While it’s incorrect to say “heat goes up”, it is correct to say, **“hot air rises”**, which clarifies that the concept of heat is a broader concept which does not involve just the movement of air.

What we conventionally refer to as heat is nothing more than the internal energy (vibration) of the most fundamental state of physics. This vibration is expressed in the form of:

- electromagnetic waves (frequency)
- particles of matter (temperature)



Understanding radiant heat

“Heat goes up and cold goes down”
FALSE

“hot air rises”
TRUE

Heat in the form of electromagnetic waves (frequency)

In a rectilinear movement,
generating electromagnetic waves
(radio waves, infrared heat, light, UV, etc.)

Electromagnetic waves are emitted in all directions at 186,000 mile/s

Heat in the form of particles of matter (temperature)

In a circular movement,
generating the corpuscular vibration
of particles (heat of matter)

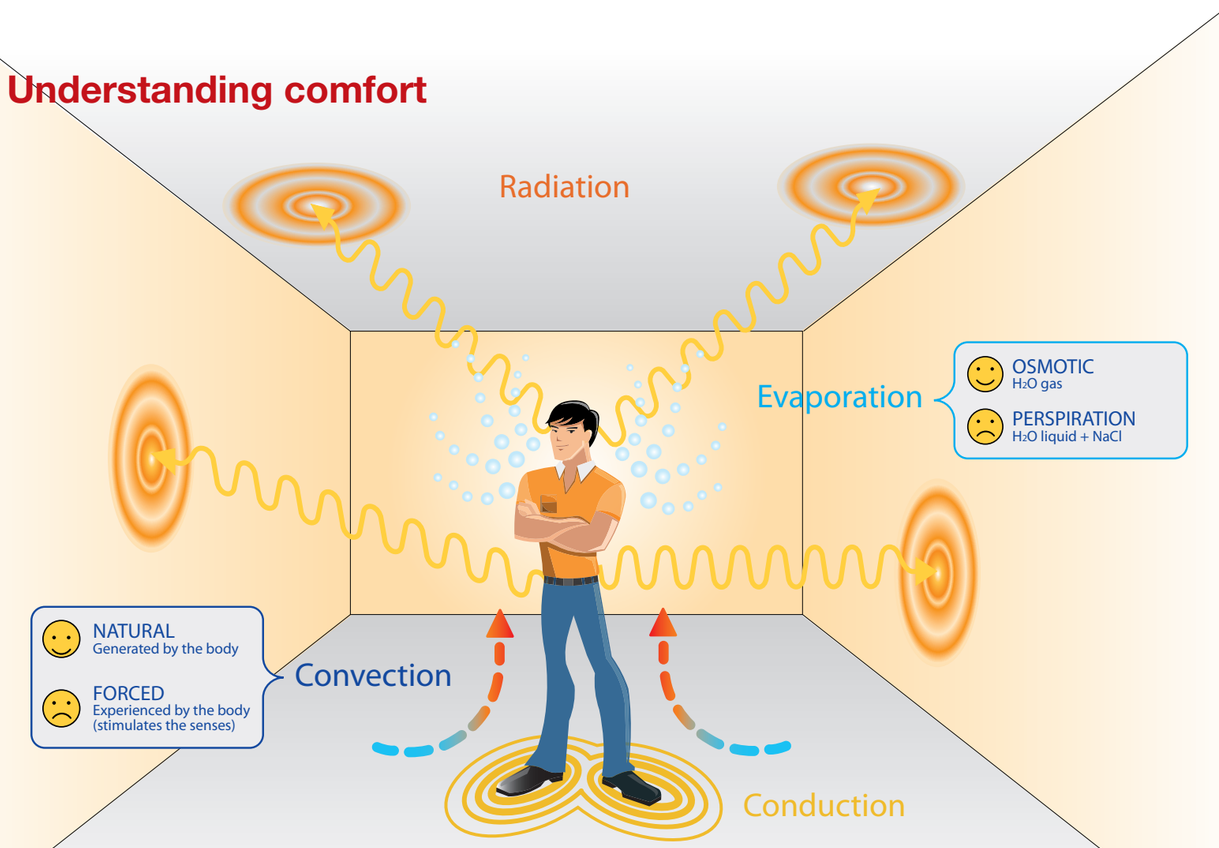
COOLER PARTICLES
vibrate less, taking
up less space
(greater density and weight)

WARMER PARTICLES
vibrate more, taking
up more space
(greater rarefaction and lightness)

This is why air, which is fluid matter, rises if it is hot and falls if it is cold

These types of movement are not directly visible to the naked eye, but we perceive their effect as a sensation of warmth through special receptors all over our skin.
This fundamental vibration gives rise to three substantial and macroscopic methods of heat transmission: RADIATION, CONVECTION and CONDUCTION.

Understanding comfort

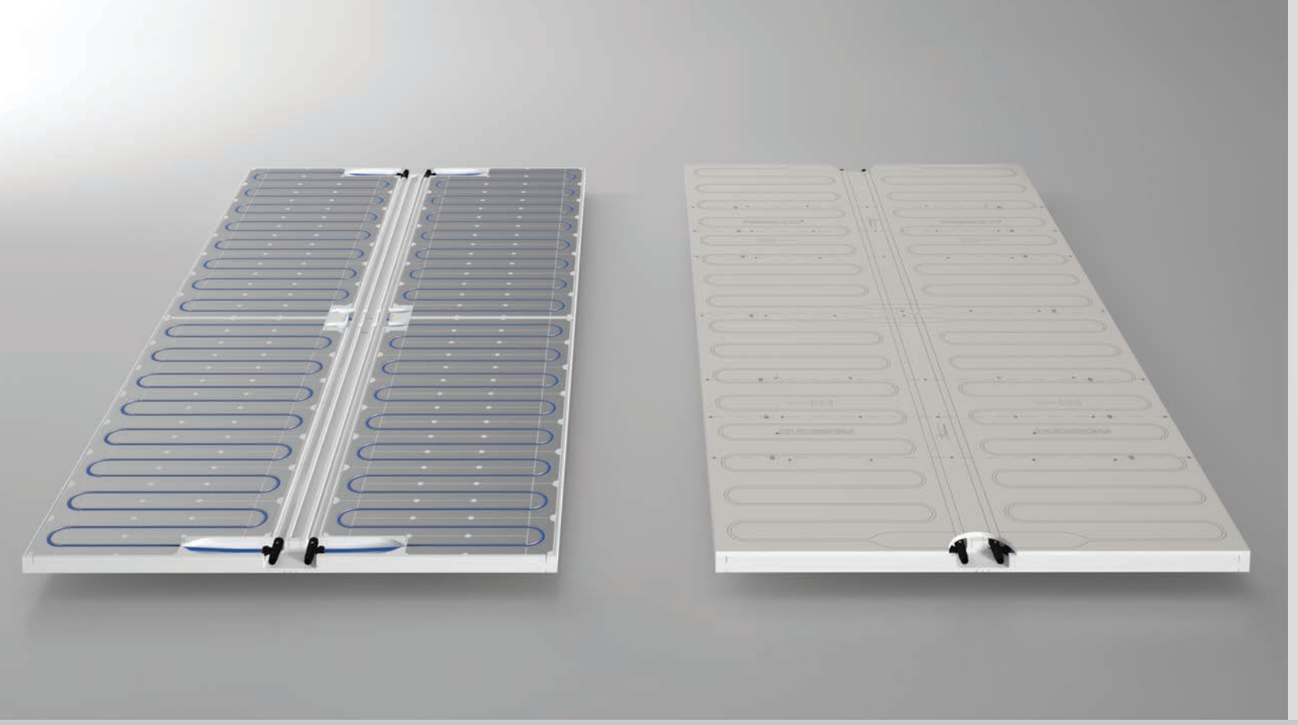


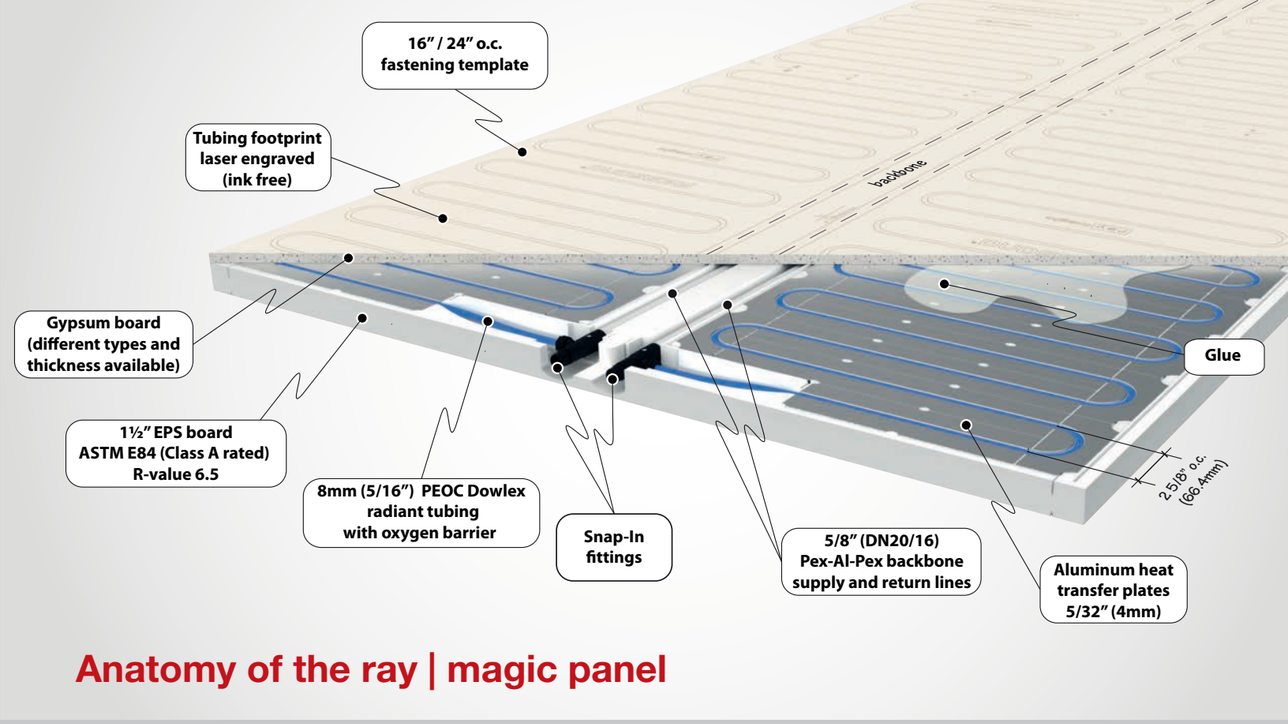
TYPES OF EXCHANGE	IDEAL PROPORTIONS	
	SUMMER	WINTER
RADIATION	45-50%	30-35%
NATURAL CONVECTION	15-20%	20-30%
CONDUCTION	less than 1%	less than 1%
OSMOTIC EVAPORATION	30-35%	40-50%

A comfortable temperature is

- The right balance of the different types of thermal exchange, including evaporation
- Uniform environmental temperature (walls, ceiling, floor and room air)
- In the winter, walls, ceiling and floor should be 2-3 °F warmer than the room air
- In the summer, walls, ceiling and floor should be 2-3 °F cooler than the room air and relative humidity should be 55-60%

Only **messana air | ray conditioning** can offer these conditions



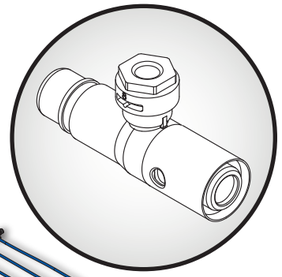


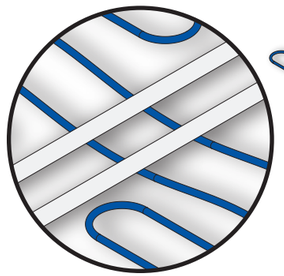
Anatomy of the ray | magic panel

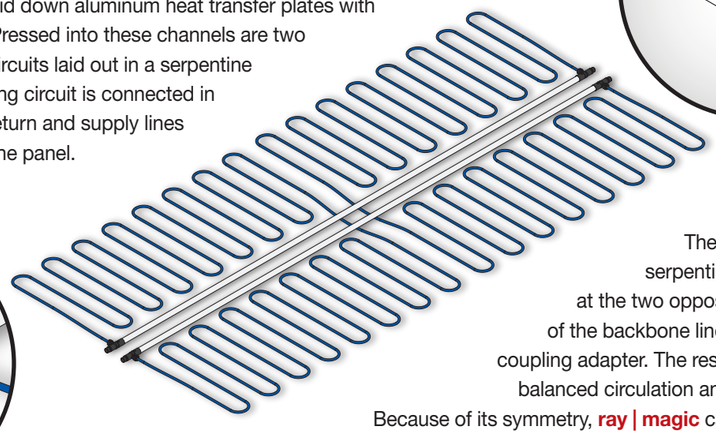
RAY | MAGIC the radiant drywall

ray | magic, the radiant drywall

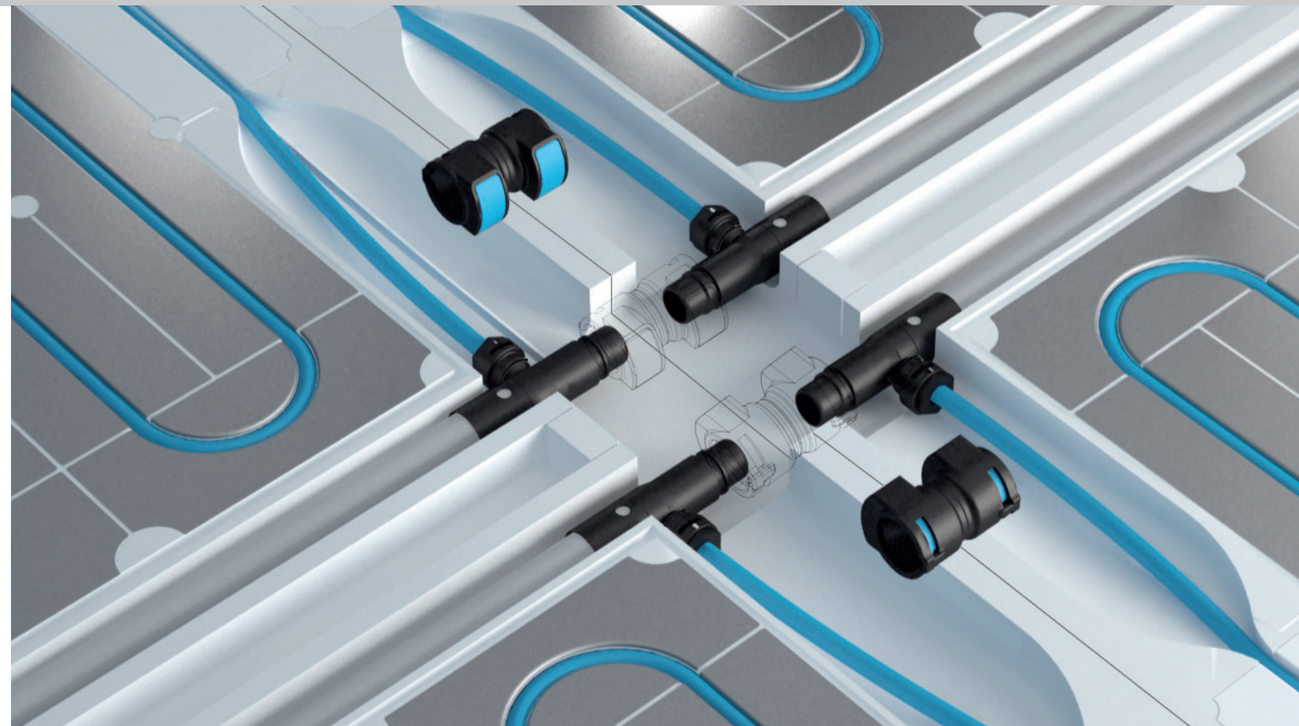
ray | magic is a prefabricated sandwich panel assembly consisting of a 1½” thick EPS board and a gypsum panel glued together. In between the two, over the pre-formed EPS board are laid down aluminum heat transfer plates with specially shaped channels. Pressed into these channels are two symmetrical radiant tubing circuits laid out in a serpentine pattern (61ft long). Each tubing circuit is connected in parallel to 5/8” Pex-Al-Pex return and supply lines that run along the length of the panel.







The connections of the serpentine tubing are made at the two opposite terminal fittings of the backbone lines with a three-way coupling adapter. The result is a system with balanced circulation and easy air removal. Because of its symmetry, **ray | magic** can be connected at either end and in series, simplifying the installation process.



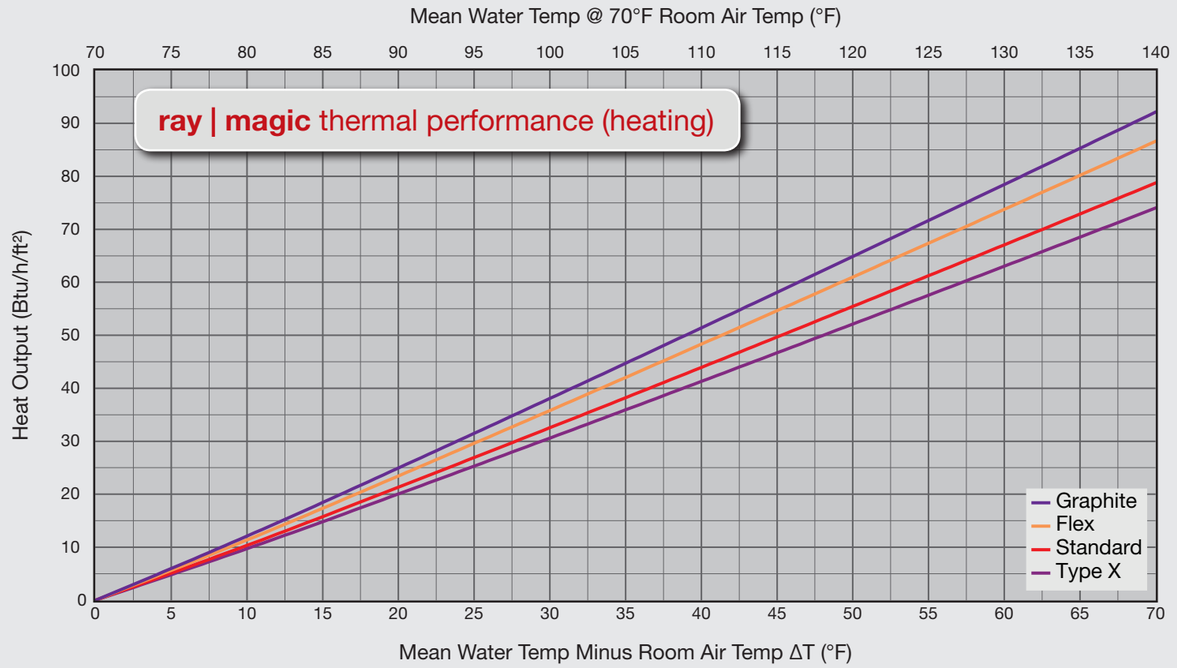
ray | magic technical specifications and thermal performances

ray | magic panel		STANDARD	GRAPHITE	TYPE X	FLEX
Dimension (WxL)		4’ x 8’			
Thickness		2”	1 7/8”	2 1/8”	1 3/4”
Weight (dry)		2.63 lbs/ft²	2.22 lbs/ft²	3.20 lbs/ft²	1.58 lbs/ft²
Water content		0.49 gal (including backbone lines)			
Radiant tubing		PEOC Dowlex			
Diameter		8.5 mm (5/16”) o.d. - 5.5 mm (7/16”) i.d.			
Spacing		2 5/8”			
Length		61 ft x circuit (two circuits per panel with 0.12 gal of water each)			
Heat output †+	typical	32.5 Btu/h/ft²	38.1 Btu/h/ft²	30.6 Btu/h/ft²	35.8 Btu/h/ft²
	max	78.7 Btu/h/ft²	92.1 Btu/h/ft²	74.0 Btu/h/ft²	86.6 Btu/h/ft²
Cooling output ‡+	typical	24.7 Btu/h/ft²	28.9 Btu/h/ft²	23.2 Btu/h/ft²	27.2 Btu/h/ft²
	max	38.4 Btu/h/ft²	44.9 Btu/h/ft²	36.1 Btu/h/ft²	42.2 Btu/h/ft²
Effective radiant surface		~ 90%			
Maximum operating temperature		140 °F			
Surface flame (ASTM E84)		Class A			
Flame spread index		0			
Smoke developed index		5			

† Typical 100°F (max 140°F) mean water temperature @ 70°F room air temperature. Tested in accordance with EN 14037

‡ Typical 56°F (max 46°F) mean water temperature @ 76°F room air temperature. Tested in accordance with EN 14240

+ Data certified by third-party laboratory. Thermal performances of Graphite, Type X and Flex panels are estimated

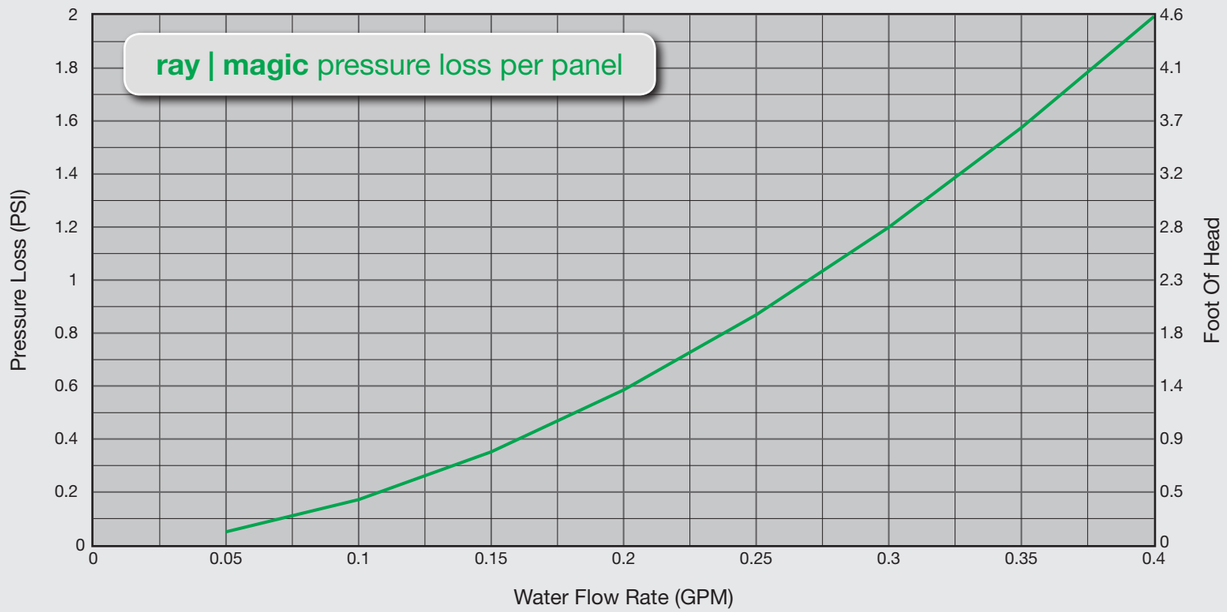


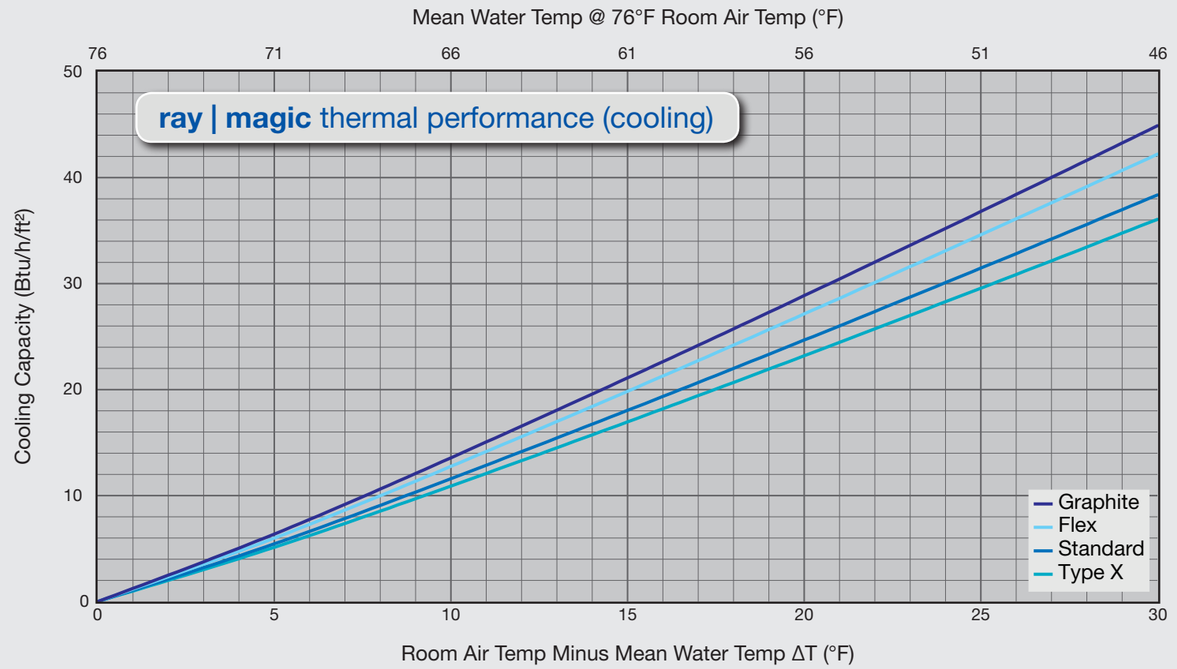
Effective **radiant surface** 90%

radiant tubing spacing **2 5/8”**

Up to **92 Btu/h/ft²** heating

Up to **44 Btu/h/ft²** cooling





Increased R-value and better sound insulation

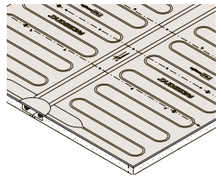
The EPS insulation prevents bac loss and the panel does not require additional insulation, however added insulation between the ceiling joists increases the overall system performance.
1½“ EPS board, added to the interior side of the framing, allows for better control of interior environment: maximized insulation (R-value 6.5) and minimized sound transmission. With a STC sound rating of 40, **ray | magic** panel itself provides more sound insulation than a 4” exterior wall which provides only a 34 STC sound rating (wood framing with fiberglass batt insulation).
When installed, **ray | magic** panels can be sealed together using polyurethane spray along the expanded polystyrene edges to create an airtight seal. This helps to maintain a low leakage envelope and high indoor air quality.
EPS is also resistant to insects, including termites, is stable and retains its physical proprieties over time. EPS is 100% recyclable.

ray | magic EPS board is Class A fire rated (ASTM E84).

Different drywall boards to meet different needs

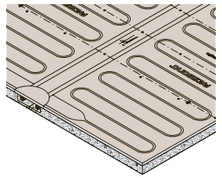
ray | magic panel can be manufactured with a variety of gypsum board coverings. This way, each wall or ceiling not only radiates heat, but best meets your aesthetic, thermal and insulation needs. Available in different thicknesses: 1/4”, 3/8”, 1/2” and 5/8”.

ray | magic is available in a large range of drywall finishes and thicknesses to best satisfy different architectural requirements.



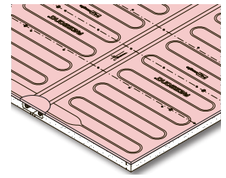
TYPE C - STANDARD

1/2” fire-resistance gypsum board with the addition of fiberglass strands and uneunexfoliated vermiculite to provide increased fire resistance



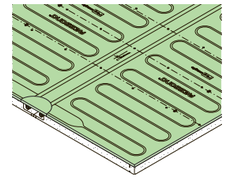
GRAPHITE

3/8” graphite gypsum board with the addition of graphite to increased thermal efficiency (17% higher compared to standard)



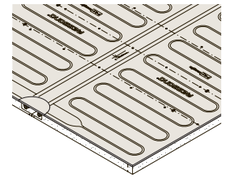
TYPE X

5/8” TYPE C gypsum board to provide increased fire resistance



MOLD RESISTANT

1/2” mold resistant gypsum board with silicone additive. For rooms and environments that have an above normal exposure to humidity and dampness



FLEX

1/4” gypsum board. For curved wall and ceiling and any other lightweight applications. Increased thermal efficiency (15% higher compared to standard)

Increased **R-value** and better sound **insulation**

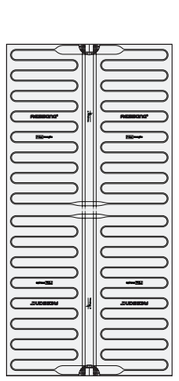
One panel, **four different sizes**

Different **drywall** boards to meet different needs

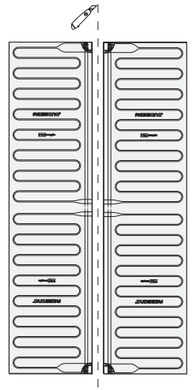
the best **acoustic performance**

One panel, four different sizes

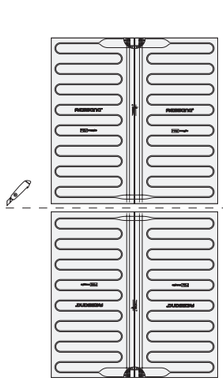
ray | magic panel can be cut in half, lengthwise and widthwise, into sub-panels to better cover smaller areas and fulfill almost any building requirement. Cutting the panel is as simple as cutting drywall.



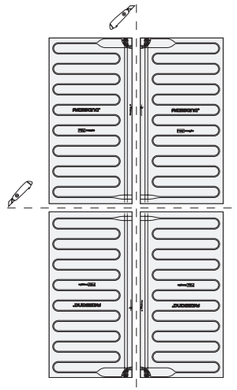
full panel (4x8 ft)



1/2 panel lengthwise cut (2x8 ft)



1/2 panel widthwise cut (4x4 ft)



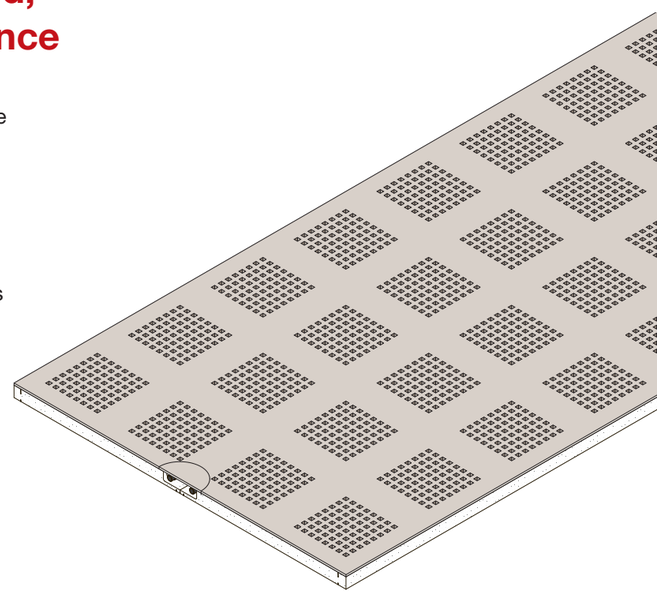
1/4 panel (2x4 ft)

Sound absorption gypsumboard, for the best acoustic performance

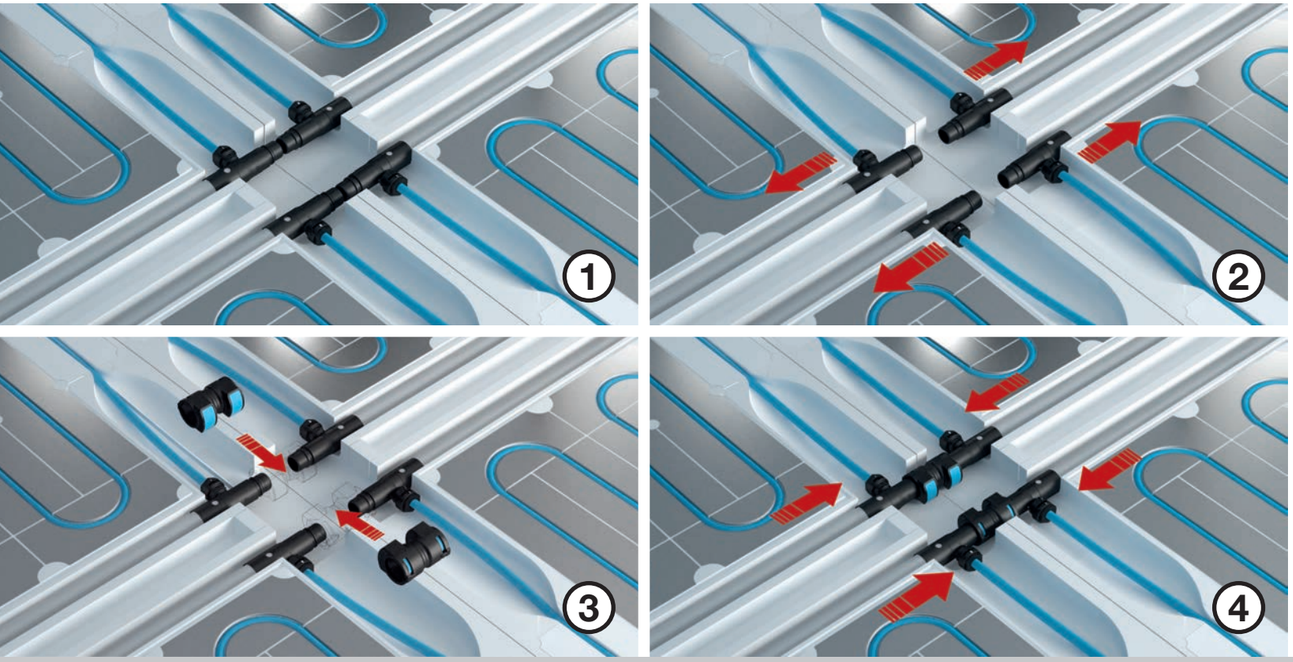
Not only heat, not only the perfect climate, but now, you are introduced with a radiant-drywall ceiling systems with high sound absorption features.
For special commercial requirements **ray | magic** can be ordered with sound absorption drywall finishing:
a 1/2” perforated plasterboard that have numerous punched-through holes over its surface (4 different patterns available). When a sound wave strikes the surface of the ceiling the energy of sound waves will be highly absorbed improving the acoustics of the room.

To increase sound absorption performance, can also be installed on walls.

ray | magic Noise Reduction Coefficient = 0.15



Four easy steps to connect two panels with the coupling | magic



STEP 1
Install two **ray | magic** panels together aligning their return and supply line fittings

STEP 2
Slide out the return and supply lines to allow the positioning of the snap-in coupling

STEP 3
Insert the snap-in coupling between the two fittings

STEP 4
On both fittings snap in the coupling until it clicks

Innovative joining technology

The **messana air | ray conditioning** connection system is based on a quick connect joining technology to make the plumbing of the radiant system simple, fast and cost effective.
We developed a complete pipeline system based on two different fitting technologies:

- snap-in (detachable joint, with push-button disconnect)
- fit-in (permanent joint)

messana air | ray conditioning fittings, insulated 5/8" Pex-Al-Pex pipes (for the connection of the panels to the manifold) and the engineered plastic manifolds are all you need for the plumbing job. Pex-Al-Pex cutter and chamfering tool are the only tools required.

Innovative **joining** technology

Snap-in

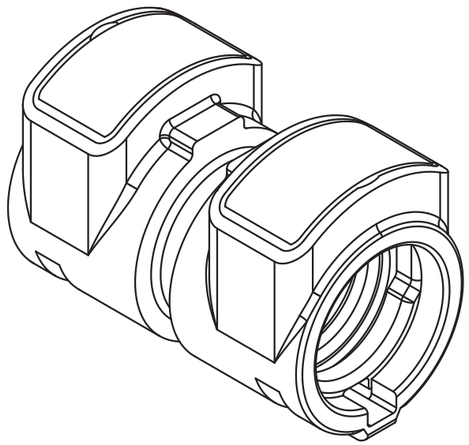
Easy to **do-it-yourself**

100% leakproof

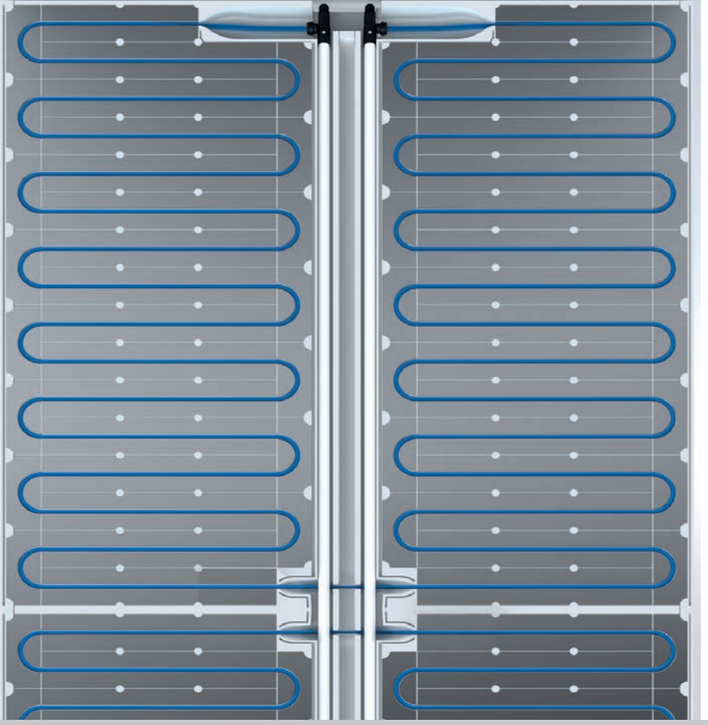
A revolutionary connection system

ray | magic features a revolutionary connection system (patent pending), that makes the installation of the radiant ceiling quick and simple.
The return and supply pipes are terminated, on both sides of the panel, with a snap-in fitting and are free to slide in and out approximately one inch. This allows the snap-in adaptor to be insert and eases the connection between two panels.

Without any significant loss of efficiency, up to **10 panels** (320ft^2 of radiant surface, typically more then 500ft^2 of ceiling) can easily be connected in series to a branch circuit connected to the main supply and return lines.



- **Pre-insulated engineered plastic manifolds**
- **A complete range of fittings to make your plumbing job easier**
- **Pre-insulated Pex-Al-Pex pipes**
- **100% leakproof installations, every time**
- **Dual o-ring sealing to provide a durable, high performance coupling**
- **No tools are required**
- **Easy to do-it-yourself**



ray | magic, the radiant panel with backbone

Yes, **ray | magic** actually has a backbone, the secret behind its magic and its strength (patent pending).

Embedded 5/8” Pex-Al-Pex supply and return backbone lines run along its length and terminates at each end with a snap-in fitting. **ray | magic** panels can be connected together without any additional pipes, in a simple snap with the exclusive snap-in connection technology.

Snap! and the job is done.

control | magic, the brain of the system

Peace of mind is also important when it comes to comfort and **control | magic** electronic control unit goes one step beyond in this regard as well, because it is Ethernet, because it is powerful, because it is attractive and because it is based on the most sophisticated and highly tested control logic of air-ray conditioning.

control | magic is powered by a high performance processor to run complex comfort algorithm and is equipped with two Ethernet controllers (one for a private local network where all the other modules of the **air | ray conditioning** system are connected and one for a local LAN/internet to allow remote access).

control | magic offers simple and convenient zoning of space as well as simple effective occupant control.

The panel, the control board, the sensor and the air treatment units

Snap! and the job is done

sense | magic, the thermostat and humidistat combo

sense | magic is an advanced thermostat and humidistat device equipped with two class A (±0.25° F) PT100 sensors to constantly monitor both temperature and humidity of the room.

- Fully programmable
- LCD display with touchscreen interaction
- Communicates to **control | magic** via TCP/IP protocol

sense | magic comes with Axolute BTicino wall plate in a very attractive design, with many different colors and materials to choose from.

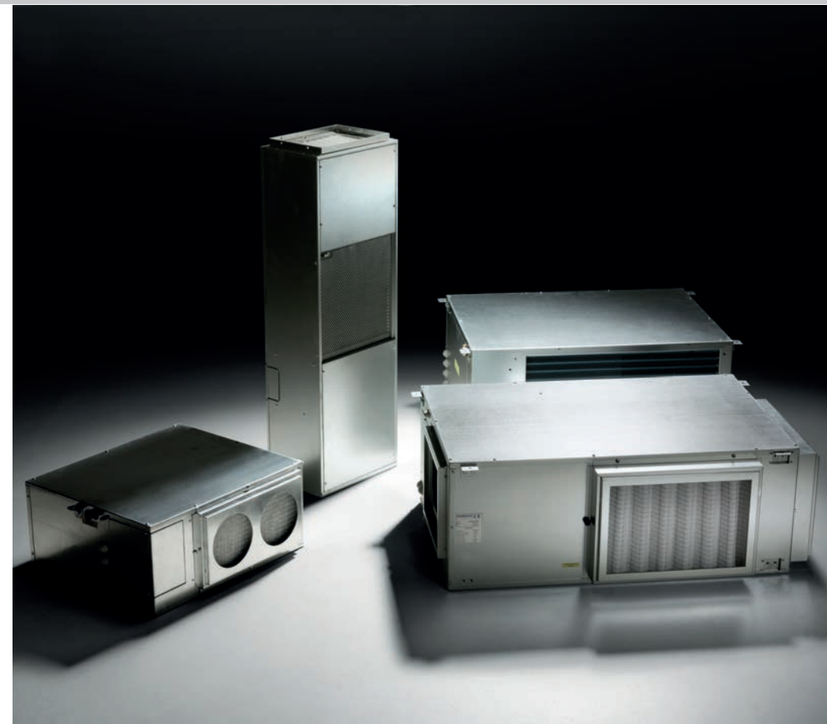
The best system for a perfect climate

air | magic, the air treatment units*

air | magic is a line of air treatment units specifically designed for ray conditioning.
High indoor air quality is the right level of humidity, cleanliness and neutral temperature without unpleasant drafts of air.

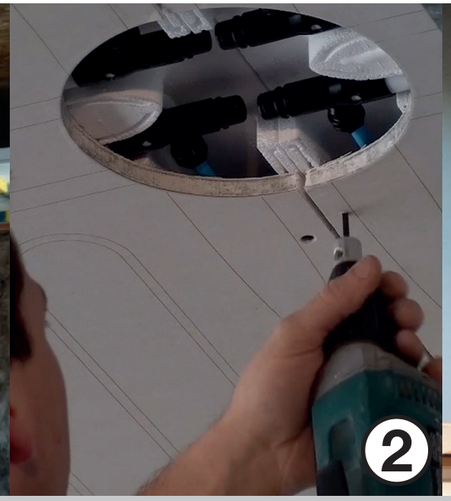
The aesthetic and acoustic impact is extremely low, while offering energy savings that are unimaginable with a traditional air system.

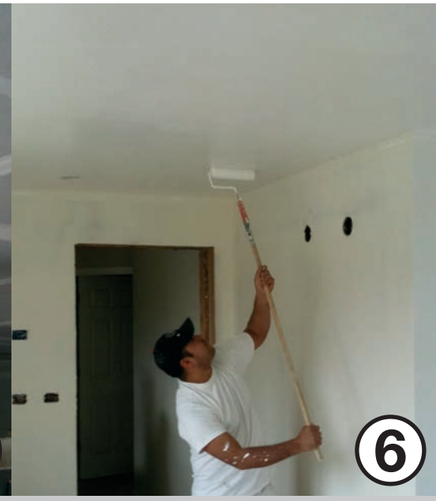
*At the moment air | magic is only available with CE marking. Visit www.messana.it for other lines of products we offer to European market.



Extremely easy to install, as simple as hanging drywall

RAY | MAGIC





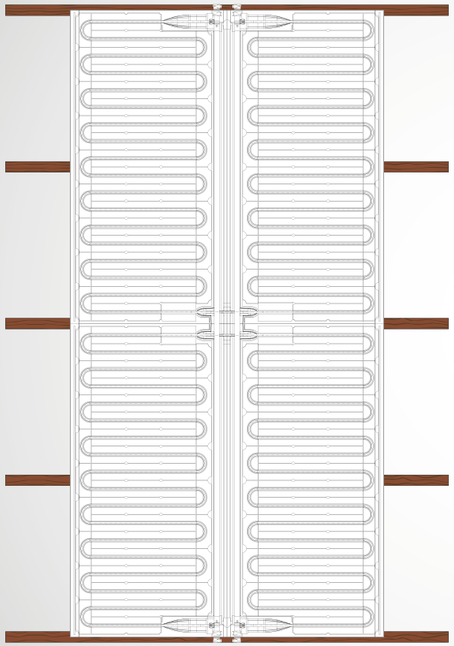
Extremely **easy** to install as simple as hanging **drywall**

reducing labor costs

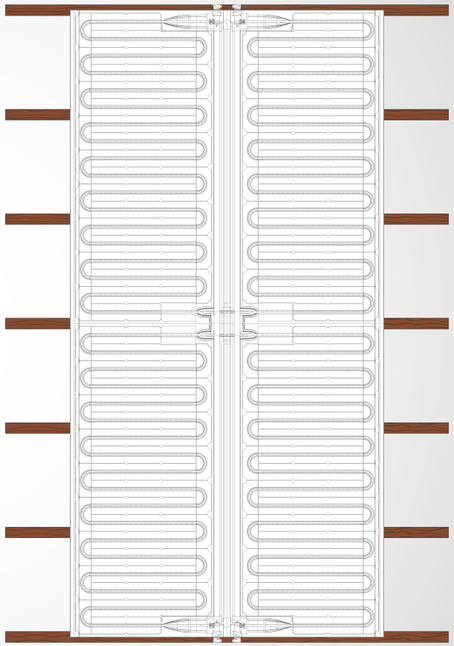
ray | magic is extremely easy to install, as simple as hanging drywall.
It is installed directly to the framing in much the same way as traditional drywall, in 6 easy steps.

1. **Lifting and positioning** the panel
2. **Hanging** the panel to the ceiling joists (if needed can be cut in sub-modules with a drywall knife) using drywall fastening screws. With the piping footprint and the fastening template laser engraved on the drywall face, you will never hit a pipe!
3. **Connecting** panels together using the snap-in coupling. To favor this operation the drywall layer has a semi-circle opening in the fitting area
4. **Fastening** the semi-circle cut out (that is provided with the panel), to cover the fitting area and be ready for taping
5. **Taping and mudding** like standard drywall
6. **Painting**. Paint as standard drywall

24” o.c. framing



16” o.c. framing



ray | magic can be installed on ceilings and walls, on a 16” and 24” o.c. framing with drywall screws.

Because of its high efficiency, usually only 50-70% of the ceiling surface needs to be covered. For the remaining area 4x8 ft blank panels (EPS and drywall sandwich panel) are available to match the thickness of the **ray | magic** panel and provide a complete sound proofing system.

Blank panels can also be installed to accommodate recessed lights. Pendant lights can be installed drilling a hole for the electric cord directly through the **ray | magic** panel.

The **messana ray | magic** panel system is an effective way of **reducing labour costs** compared to both forced air and radiant floor systems.
Its installation is simple and straight: the job is done in no time at all and it is completely safe.

YESTERDAY

Traditional job site

Obviously a radiant floor panel system needs to be installed before the flooring. Because the Pex tubing is typically laid down right after the installation of the panels, it is very possible to incur in tubing damage. The newly installed radiant floor has to hold up many other building processes and **extra care** in the construction site is required.
Some radiant panel manufacturers suggest temporarily covering the floor with mesonite panels or thin plywood, to protect it from spillage, debris and heavy foot traffic throughout construction.

- Radiant floor requires more complex panel layout
- Radiant tubing needs to be laid down
- Radiant floor has to hold up during different construction phases
- Tubing gets damaged during construction
- Temporary cover of the radiant floor during construction is recommended
- In the construction phases, radiant floor installation occurs at the wrong time, interfering with other critical work and delaying the schedule

Working in a building site with floors covered by pipes that limit movement and delay work is not cost effective.

TODAY

RAY|**MAGIC** job site

ray | magic radiant systems are typically installed on the ceiling directly to the framing (and walls, if needed), leaving the floor of the job site completely free of pipes. This way, pipes are at reduced risk from damage throughout the construction.
ray | magic dry installation technology speeds up and improves the over-all installation of the radiant surface and combine heating and ceiling drywall in one.

- Easy to plan and design
- Fast and simple installation
- Radiant tubing is integrated in the panel
- Floor free of pipes, clean job site
- **ray | magic** is the drywall!
- Each panel can be cut in smaller modules of different sizes to cover all kinds of building needs
- One source for the complete air-ray conditioning system

This is an obvious advantage for cost and time savings, and the job site is clean and tidy.

RAY | MAGIC

A traditional environment

This is how we are used to seeing a living room: areas, furniture, windows and.. radiators.
And the air conditioning unit. And another unit. These are elements that distort our view, take up precious space and do not come close to providing a silent, uniform climate.
They are also the perfect places for dust to accumulate. They compromise the harmony of the space, which could be larger and used differently.

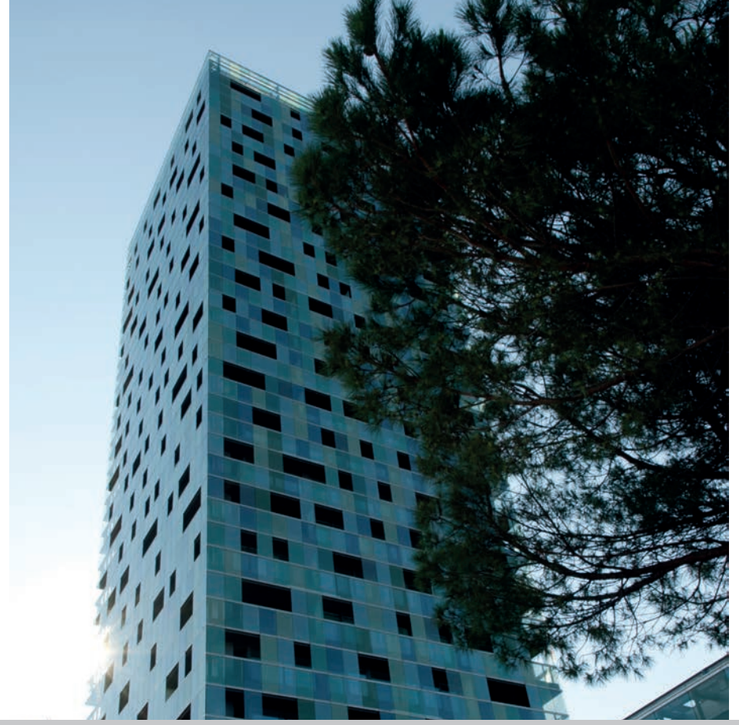
More freedom with messana air | ray conditioning

And here is the same room with **messana air | ray conditioning**. There are no radiators and no air conditioning units, just a small, elegant sensor attached to the wall. The radiation from the **ray | magic** ceiling keeps the formation of dust to a minimum and frees space for more movement and for the room to potentially be used differently. The climate is genuinely uniform throughout the room and the air is healthier.

Great added value for new construction

ray | magic is the ideal solution for a wide variety of construction sectors, including residential, commercial, public, healthcare and education.
ray | magic system is energy efficient, helping to meet building regulations and increasing occupant comfort, which can help to improve productivity. Sound absorption panels can be used in order to meet specific acoustic requirements. Ceiling panels increase the amount of usable floor space and operate without significant air movement, contributing to less dust, pollutants and allergens suspended in the air, creating a healthier working environment.

messana air | ray conditioning system will save money every month. Lower energy costs and greater occupant comfort add resale value to the building.



Thermography

This picture, taken with an infrared camera, shows the series of seven **ray | magic** panels supplied at one end and capped off at the opposite end.

The image shows the **even distribution of heat** over the entire length of the circuit.

Great added value for **new construction**

even distribution of heat

Ideal for **retrofit**

Architectural and interior design solutions with utmost **freedom**

Ideal for retrofit

Extremely easy installation, incredible versatility and minimal invasiveness make the messana **ray | magic** system the perfect solution for remodeling.

It is very inexpensive and simple to lower a ceiling by 1½" to accommodate the radiant ceiling panel, by removing the old drywall and replace it with **ray | magic** panels. On the other hand, it is very difficult to raise a floor without having to alter doors, moldings or baseboards.

ray | magic panel is also light, perfect for installation in lofts that can only support limited added weight.

Architectural and interior design solutions with utmost freedom

A radiant ceiling is the solution that best meets architectural and interior design requirements.
It does not interfere with furniture and, given the versatility that the messana **ray | magic** system offers architects, it allows for endless possibilities of installation.

Without floor registers, radiators or baseboard heaters, there is only space for creativity.

RAY | MAGIC

More power, more space

Because of the high efficiency of the **ray | magic** gypsum panels not all of the ceiling needs to be covered and more useful space is available for recessed lighting, speakers, sprinklers, decorative beams and skylights.

Radiant heat is **silent and invisible**. You can not see thermal radiation (infrared), you can feel it, but you can not hear it: it is pure, uniform, widespread heat that is invisible, silent, clean for your home, as it does not move dust.
Radiant heat allows substantial energy savings, is clean for the environment, and allows best usage of renewable energy.

All the comfort that an intelligent home can offer

With the **messana air | ray conditioning** system, your wellbeing is a touch of a button away. This is the comfort that an intelligent home can offer. Using the **control | magic** unit, you can set the ideal temperature and create the right climate for your home, including the humidity level. And the system automatically turns on and off… It is as simple and convenient as can be. Even by remote control from your mobile! **Nothing could be easier…**

Silent and invisible

More **power** and more **savings**

The **perfect climate**, right away

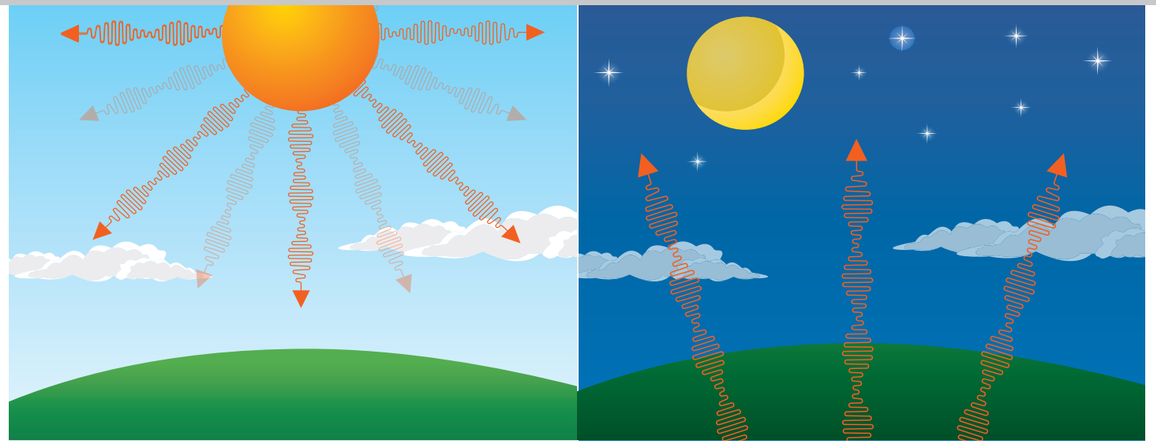
Nothing could be **easier...**

Consistent **wellbeing**

The perfect climate, right away

From the ceiling the heat radiates immediately, much faster than a radiant floor system, since it does not have to pass through the flooring, rugs, cabinets and furnishings such as beds, sofas and furniture, but instead expands instantly throughout the space, without barriers.
The responsiveness of **ray | magic** radiant ceilings panels makes them excellent for modern controls, placing energy where it is needed when it is needed, and achieving superior comfort and efficiency.

With the **messana air | ray conditioning** system, the climate in your home is always ideal. Every room, every space, has the perfect temperature, evenly and in balance with your body.



Consistent wellbeing

Our skin (approximately 20 ft² for an average adult) has millions of receptors to detect temperature. Uniform thermal sensation is the first requirement for a system that must offer comfortable conditions. A radiant ceiling panel system is the solution that best meets this requirement, because it imitates exactly the way the earth is heated by day (solar radiation) and cooled at night (re-radiation towards the cool sky), with the difference that in a closed space, the radiant surface temperature is very close to the comfort temperature of the room, enhancing the feeling of a uniform, natural temperature.

“ray conditioning” the new era of climate control

The mission of **messana air | ray conditioning** is to make a technological contribution to favor the development of a new era in the HVAC industry promoting a new concept of thermal comfort based on ray conditioning.

In the air conditioning era, our concept of comfort has been distorted to perceive well-being as “the pleasant” feeling of cold air or warm air, typical sensation of traditional forced air systems. In the new ray conditioning era, comfort is a perfect balance of heat exchange between our body and the surrounding environment.
Indoor climate control is based upon active radiant surfaces and the thermal exchange is carried mainly by radiation: infrared radiation from the radiant panels (radiant heating) toward your body and heat radiation from your body toward the radiant ceiling panels (radiant cooling).

Ray conditioning is a hybrid radiant heating and cooling technology:

- Radiant cooling: the radiant ceiling drywall acts as a heat exchanger between the room and the cold water running through the panels. The ceiling absorbs heat from heat sources in a room and exchanges it with the chilled water circulating in the panels. The chilled water is then delivered to a chiller and re-cooled.
- Radiant heating: the warm surface of the radiant panels provide heat to the room

Traditional air conditioning is no competition to ray conditioning. Aesthetic appeal, acoustic insulation, comfort level and energy efficiency, are among its huge advantages.

Saving up to 50%
“ray conditioning”
is the **green** solution to forced air

Green your home with messana®
air | ray conditioning
Potentially up to **17 LEED® points**

“ray conditioning” is the green solution to forced air

Choosing to live in a green home means choosing a lifestyle and a technology that combine well-being and energy saving at the highest levels. Only efficient technologies can be healthy, comfortable and also ecologically sound.

With the **messana air | ray conditioning** system, it is even easier to save energy and it is more cost effective too, up to 50%.
Installation cost with an experienced contractor is generally 20-30% less than installing a conventional forced air system. Also operation and maintenance expenses are significantly reduced since there are no moving parts and filters.

Spaces may be zoned by the use of **control | magic**.

Green your home with messana air | ray conditioning

Messana Air-Ray Conditioning LLC is proud to be a member of the U.S. Green Building Council and help home builders achieve points toward LEED® for Homes Certification.
Up to 17 LEED® points in the sections of Energy and Atmosphere (EA) and Indoor Environmental Quality (EQ) can be earned with **messana air | ray conditioning** system.

We produce an environmentally friendly product to offer an efficient alternative to traditional heating and cooling systems (air conditioning) which are among the largest consumers of energy in North America.

Whenever possible, we encourage our clients to integrate **ray | magic** panel system with solar and geothermal technologies.

The materials that **ray | magic** panels are made from (gypsum and EPS) are 100% recyclable.

LEED® is intended to improve performance in matters such as energy efficiency, CO_2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.

ray | magic is green under any aspect

RAY | MAGIC

	Heating Efficiency	Cooling Efficiency	Indoor Air Quality	Heating Operation Cost	Cooling Operation Cost	Design Flexibility	Noise Level	Installation Cost	Maintenance Cost	Retrofit Suitability	Layout Semplicity	Comfort
ray | magic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Radiant Floor	✓	✗	–	✓	–	✗	✓	–	✓	✗	✗	–
Forced Air	✗	–	✗	✗	✗	–	✗	✓	✗	–	✗	✗
Hydronic Radiators	–	n/a	✗	–	n/a	✗	✓	–	✓	–	✓	✗
Electric Radiant Ceiling	✗	n/a	✓	✗	n/a	✓	✓	–	✓	✓	✓	✓
Electric Radiant Floor	✗	n/a	✓	✗	n/a	✗	✓	–	✓	✗	–	–

ray | magic ceiling panels are remarkably advantageous compared to other heating and cooling systems, setting them apart as superior to any other climate control system.

NO noise, NO ducts, NO draft, NO dust

Radiant ceiling is **better** than radiant floor, the facts speak for themselves!

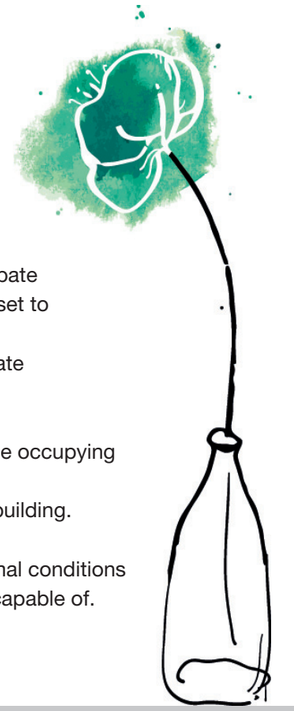
ray | magic RADIANT COOLING (ray conditioning)	FORCED AIR SYSTEM (air conditioning)
With a small pump energy is efficiently distributed throughout any room. Water is a better cooling transport agent then air and it takes much less energy to move water then air	Air requires a much larger volume to transport the same amount of cool then water. A powerful fan blower is needed to move air, which means wasted energy
With 1½" thick EPS panel, back losses are negligible	Inevitable heat loss from ducts and air leaks reduce the efficiency
Can be combined with a wide variety of energy efficient sources, like air to water heat pump and geothermal heat pumps	Forced air chillers operate at lower temperatures, resulting in less efficiency and increased energy cost
Silent and invisible while functioning	Noisy and architecturally intrusive
Does not move dust because it functions mainly by radiation. Ideal for environments that require maximum hygiene and for people who suffer from allergies and respiratory problems	Can favorite the growth and spread of microorganisms, move dust and can be unhealthy for our respiratory system. Not recommended for children and the elderly
The entire surface is cooled with radiant air and creates the ideal climate for our physiology. Hydronic cooling is gentle, draft free and odorless	Annoying drafts of cold air create uncomfortable areas
Maintenance free. Just routine periodic checks of the system will guaranty enduring performance and operation	Filters need to be periodically changed. Ducts may require cleaning, fan motors to be oiled and belts to be replaced
Flexible with any type of structures can easily be integrated into any architectural design	Large ducts and registers are intrusive and difficult to hide
Zoning can be simply implemented with zone valves. State-of-the art climate control system is also available (control magic)	To zone a forced-air system, expensive controls and dumpers are needed

ray | magic RADIANT CEILING	RADIANT FLOOR
It does not move dust because the heat source is from above and it is mainly radiant, however, thanks to the re-radiation, the floor is warm	It spreads dust when heating because the source is on the floor where dust deposits and on average 30-40% of the heat is delivered by convection
It has a fast response time: the ceiling temperature has a response delay of about 1 minutes per °F	It is slow: the floor temperature has a 10-20 minute response delay per °F
When cooling, it can reach up to 50 Btu/h/ft^2 , condensation free if controlled by control magic and air magic	When cooling, it does not exceed 10-20 Btu/h/ft^2
If damaged, it is very easy to repair, just like repairing drywall	If damaged, significant work in the floor is necessary
Perfect for renovations and it is applied to a completely dry surface	Very invasive to install. Raising a floor is much more complicated and expensive
Because it is located in the ceiling, there is no need to drop pipe connections down the walls. All the pipes are up and out of the way.	Pipes run in the floor and during construction there are risks of damage, to the point that many manufacturers suggest temporary protecting the radiant floor
It runs on low temperature but it can be pushed up to 140°F when required by critical climate conditions	Typically, it runs on a higher water temperature but it is limited to a floor maximum temperature of 87.5°F
Easy to evaluate the exact heat output since the drywall resistiveness is known and there are no obstructions for the radiant heat	Heat output is difficult to estimate before flooring is chosen, and furniture layout is decided
Can easily operate at surface temperatures up to 130°F without discomfort for the occupants	Surface temperature needs to be lower then 87.5°F otherwise occupants complain of hot sweaty feet and can damage the flooring.
Without a doubt, it costs far less than radiant floor	System design and tubing layout are more complicated and labor intense

radiant architecture

by MESSANA

Ideal climate and well-being with the “radiant-architecture”



“radiant architecture” is a **new modern concept of climate control** based on creating the appropriate **balance between man and his architectural environment**.

Ceiling, floor and walls of every room can create the ideal climate, allowing the occupants to dissipate their metabolic heat in the most natural way. How? Temperatures of the surrounding surfaces are set to the right value.
With **radiant architecture** surfaces play an active role and become the main objective of the climate control project, instead of the traditional forced air system.

Large amounts of thermal energy can be exchanged without any discomfort, simply putting anyone occupying the area in a state of **“radiating wellness”**.
This means energy efficiency, more savings, respect for the environment and added value to any building.

radiant architecture, where the active radiant surfaces become capable of creating optimal thermal conditions for comfort and well-being that air conditioning and systems based on thermal convection, are incapable of.

The architecture that puts people at the center of everything.

“radiating **wellness**”

balance between man and his architectural environment

new **modern** concept of climate control

The new alternative: “radiant architecture”

We were born to radiate, and for that to happen we need the surfaces surrounding us to be at their ideal temperature.

The majority of buildings constructed before the petroleum era and the invention of air conditioning, were characterized by substantial thermal masses that were able to grant comfort even without climate control devices.
As new construction technology led to buildings being lighter weight, it became necessary to cool them down. Air conditioning was the technological answer to the problem. However, cold air doesn’t have the capability to effectively lower the temperature of surfaces. Air is rarefied matter and to transport energy it must be moved. This action disturbs the comfort level of the occupants.

“ray conditioning” is the solution, in fact radiation is the most fundamental form for the transmission of energy, it moves instantaneously and in all directions. This way large quantities of thermal energy can be exchanged without creating discomfort.
radiant architecture explains how to create **active radiant surfaces** that in addition to being construction elements, also have the capability to actively influence the process of thermal exchange between the human body and its surrounding environment, acquiring esthetic value, enhancing comfort levels, respecting our natural environment and saving energy.
Architects aware of these advantages can utilize **radiant architecture** to add value to any building. **radiant architecture** is an ecologically friendly climate control product that also enhances daily living by increasing our comfort level.

messana air | ray conditioning, technology for wellbeing

OECP (Optimized Energy & Comfort Performance) is the acronym for the logic that the **messana** system expresses and manages to ensure levels of comfort and energy savings never before achieved with known technologies. Technology is the expression of creativity and human intelligence to improve living conditions.
As technology advances, it becomes increasingly ecological and sustainable. Air conditioning is an important step in the creation of thermal comfort that improves living and working conditions indoors, but, by not respecting the physiological nature of the human body, it has always emphasized its own limits through various discomforts and disturbances, architectural invasiveness and high energy consumption.

Try **messana air | ray conditioning**: you will discover the perfect balance between your own wellbeing and that of the environment in which you live.

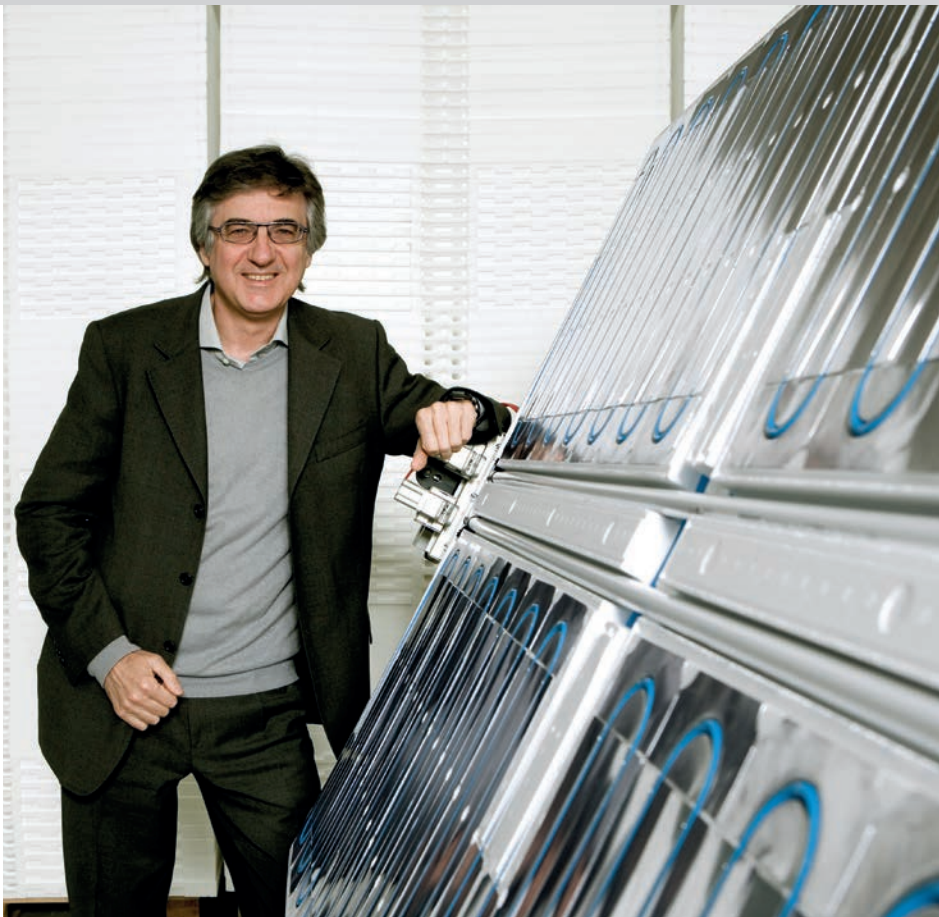
messana air | ray conditioning,
technology for **wellbeing**

ROBERTO MESSANA

Founder and president of Messana Air-Ray Conditioning LLC, is recognized as the father of modern radiant air conditioning: **ray conditioning**.

With his book “Understanding Comfort”, the result of over twenty years of research and experiments, he has established the scientific basis for the relationship between the physiology of the human body and its energy processes with the constructed environment to achieve thermal comfort.

Having built thousands of systems, MESSANA has gained unique expertise, the best guarantee for its customers and a fundamental element in the **air | ray conditioning** technological development.



MESSANA®
air | ray conditioning

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