1 Placing the vapor barrier

A vapor barrier is a thin plastic foil, typically made out of PE (Poly Ethylene). It is placed on the sub grade.

The vapor barrier **prevents moisture coming up** from the ground.

When radiant heating is installed with the staple method, a barrier with a grid mark pattern is recommended, as it makes the installation of the piping much easier.

When the piping is tied to the rebar, the barrier can be neutral.

2 Insulation

Radiant heating installations still require **insulation**. The insulation is placed on top of the vapor barrier. Typically, 1.5" or 2" thickness is used to reach a value of around R10.

Most common materials are **EPS** or **XPS**.

Different pressure classifications will be used depending on the application.

A high-quality insulation has great strength and stiffness, which **prevents the staples from coming loose**.

In cold climates, it is also recommended to **place this insulation vertically** around the perimeter.

3 Installing the piping

Piping is the most important component of radiant heating. Remember that the piping will be encased in concrete, making it very hard to repair once pin hole leaks start to appear.

PEX-AL-PEX is an excellent choice for radiant heating. It is a multilayer pipe, made of cross-linked PE on the inside and outside, with an inner layer of aluminum.

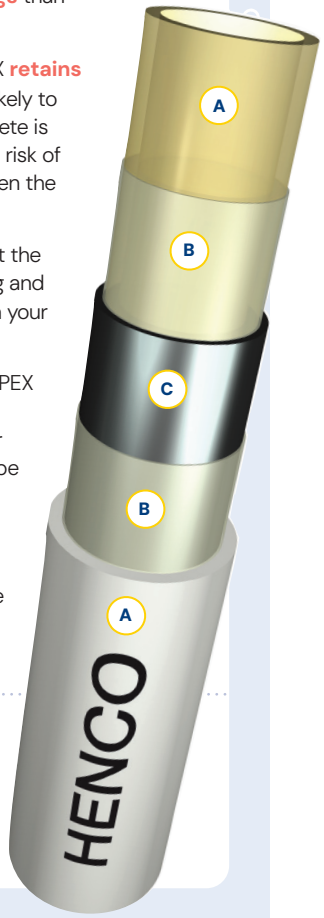
This gives PEX-AL-PEX **higher pressure temperature ratings** than single layer PEX.

Because PEX-AL-PEX **retains its shape**, it is less likely to float when the concrete is poured, reducing the risk of getting damaged when the saw cuts are made.

Your dealer will select the correct pipie spacing and layout, depending on your specific project.

Typically, ½" PEX-AL-PEX piping is being used. For larger surfaces or snow melt, 5/8" can be applied.

A loop will always run from the supply manifold, through the building and back to the return manifold.



A **Crosslinked Polyethyleen**
Physical crosslinking C (Xc)

B **Adhesive layer**

C **Aluminium (AL)**
Butt welded

4 Staples or rebar tying

There are **3 common ways** to attach the piping.

Method 1

A **staple gun** can be used, which pins the piping into the insulation using **plastic staples**.

The staples hold the piping in place when the concrete is poured.

In general, 1 staple is used per foot of piping. Where the piping turns around, some extra staples are used.

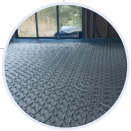
Method 2

An alternative method is to **tie the piping to the rebar**. This can be done using a **braid hook** or a **rebar tying machine**.

Zip ties are not recommended as they might cause abrasion in the outer layer of the pipe.

Method 3

Some insulation panels are pre-shaped to hold PEX-AL-PEX piping. Simply walk the piping into place. A staple might be required on the turns.



5 Radiant heating manifold

Radiant heating manifolds allow the distribution of the fluid through the different loops. They ensure every loop receives the right amount of flow, which leads to a comfortable consistent heat throughout the building.

A typical plumbing manifold does not allow the flow regulation per loop, leading to inconsistent heating. As such, plumbing manifolds should not be used in radiant heating installations.

6 Pressure test and filling of the system

When all the loops are installed and connected to the manifold, the system can be **pressure tested**.

This guarantees there are **no leaks** in the system, before the concrete is being poured.

Typical test pressures with air are around **60 to 80 PSI**.

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+ 10 million ft²
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11 million
fittings/year

450 million
feet/year

± 300
staff

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Radiant heating in concrete slabs

By placing piping in concrete slabs, a room can be heated in a very evenly and energy efficient way.

Radiant heating is the most comfortable way of heating, being more hygienic and safer than more traditional ways of heating.

It is a very versatile way of heating, and can be applied in garages, post frame buildings, basements, shops, warehouses, barndominiums...