

The underfloor heating is installed within the base plate, whereby the heating pipes are secured to the lower reinforcement steel mesh depending on the static specifications. System features: Industrial underfloor heating with heating pipes in the base plate without a separate screed layer

Thermal performances of hot water floor panel with different heating pipes: polyethylene coils (PE pipes) and capillary mat (CAP mat ... Results showed that the floor's energy storage capacity is greatly enhanced with the benefit of saving water tank's space. 37677.6 kJ was released by the floor for 16 h while the water circulation is stopped ...

To effectively improve the heat storage performance of concrete radiant floor, a kind of concrete radiant floor with finned water supply pipes (Finned Concrete Radiant Floor) was designed.

Among the various energy-saving technologies, energy storage floor heating systems has attracted widespread attention as an innovative solution. ... a second peak occurs due to both rapid heating of the mortar layer by the hot water pipe and heat storage in PCM. Following this increase in heat, PCM transfers heat back to the mortar layer again ...

Radiant floor heating is one of the most energy-efficient ways to heat your home. In fact, they are considered at least 20 to 25% more energy-efficient than forced-air heating systems. ... uses water that is heated by a boiler and then circulated through plastic pipes. The heat from the water warms the floor and radiates throughout the room ...

Liu et al. [168] presented a pipe solar energy storage floor with PCMs as shown in Fig. 17 (b). They found that both thermal conductivity and heating enthalpy of the composite PCMs affect the ...

Compared to the floor without PCM, the energy released by the floor with PCM in peak period will be increased by 41.1% and 37.9% during heating and cooling when the heat of fusion of PCM is 150 kJ ...

The energy storage device and pipes are filled with water. Fig. 1. Schematic of the space heating system coupled with underground storage and radiant floor heating system. Full size image. ... The mesh density of the target heating space, the radiant floor heating pipes, and the heat storage tank were increased to obtain high-accuracy solutions.

A linked heat pipe phase change heat storage system with an oscillating heat pipe utilizing water as the thermal fluid was also proposed by Qu et al. [15, 16], and its dynamic performance was tested and assessed. The findings show that the oscillating heat pipe can effectively support the system's thermal energy storage process, particularly ...

The heat storage tank's hot water is directed by the circulation pump into the phase change energy storage floor's water pipe, where it is trapped as phase change latent heat in the PCM. ... Fig. 10 displays the experimental platform for a direct-expansion SAHP coupled with a phase-change energy storage floor heating system built by Liu et al ...

To improve the utilization rate of energy, the consumption of fossil energy must be reduced. In this study, a low-temperature radiant floor made of concrete is taken as the research object, and a two-dimensional low-temperature hot water radiant heating system with different concrete filling layers is numerically simulated using a computational fluid dynamics ...

For PCM utilization in building component, energy storage structure is expected to improve the ability to extract heat from heat source and dissipate heat to the room at the same time. This paper presents a ring-shaped energy storage structure with combination of an outer casing pipe and an inner coil pipe in heating terminal. To better understand thermal ...

3.1 Why use heat pipes in energy storage systems. ... The modules are installed in a floor-standing unit that is suitable for installation in both new and existing buildings. Seven modules were used in each unit, giving a latent cooling capacity of 4.4 kWh, e.g. 500 W of cooling for 8 h. The unit also houses the fan.

It utilizes circulating hot water through pipes beneath the floor to heat the floor surface. ... The proposed PCM energy storage floor heating system in this paper consists of several structural layers, arranged from top to bottom: a wood floor layer, a concrete layer, heat storage layers embedded with capillary tubes, and a heat insulation ...

By using phase change materials (PCMs) in building envelopes, the indoor temperature can be regulated through the storage and release of thermal energy, which reduces energy ...

Numerical analysis of latent heat thermal energy storage using miniature heat pipes: A potential thermal enhancement for CSP plant development. Author links open overlay panel Abdulmajed Khalifa a b, Lippong Tan a, ... Experimental study of under-floor electric heating system with shape-stabilized PCM plates. *Energy Build.*, 37 (2005), pp. 215-220.

1) sensible heat (e.g., chilled water/fluid or hot water storage), 2) latent heat (e.g., ice storage), and 3) thermo-chemical energy. 5. For CHP, the most common types of TES are sensible heat and latent heat. The following sections are focused on Cool TES, which utilizes chilled water and ice storage. Several companies have commer-

Being dependent statistics, building energy consumption has accounted for 2/5 of the world's total energy consumption. The combination of phase change energy storage materials with floor radiant cooling and heating system has become one of the main technical means of energy-saving buildings.

The research of phase change energy storage radiant floor mainly focuses on structural layer design and phase change material selection. Feng [16] adopted Deca-Durabolin as a phase change material and established a two-dimensional phase change energy storage radiant floor heat transfer model considering its phase change interval, and verified the ...

Zhou, G.; He, J. Thermal performance of a radiant floor heating system with different heat storage materials and heating pipes. *Appl. Energy* 2015, 138, 648-660. [Google Scholar] Huang, K.; Feng, G.; Zhang, J. Experimental and numerical study on phase change material floor in solar water heating system with a new design. *Sol. Energy* 2014, 105 ...

It utilizes circulating hot water through pipes beneath the floor to heat the floor surface. Floor heating is widely adopted in indoor heating systems due to its comfort and cost-effectiveness [3-5]. ... The findings demonstrate that the cascade PCM energy storage floor heating system avoids overheating and saves >19 % of energy consumption ...

Researchers have proved the effect of foam metal in improving the thermal conductivity and temperature uniformity of PCM through heat transfer experiments [21, 22], visualization experiments [23], theoretical calculations [24] and numerical simulations [25, 26]. Sathyamurthy et al. [27] used paraffin as an energy storage medium in recycled soda cans ...

Ceramic tile is the most common and effective floor covering for radiant floor heating, because it conducts heat well and adds thermal storage. Common floor coverings like vinyl and linoleum sheet goods, carpeting, or wood can also be used, but any covering that insulates the floor from the room will decrease the efficiency of the system.

This study found the most suitable PCM melting temperature for the proposed PCM-based radiant floor heating system ranged from approximately 35 °C to 45 °C for a floor ...

The heat preservation performance of the combined energy storage pipeline was evaluated by numerical simulation. This paper analyses the heat transfer performance of complex energy storage pipes, and considers the influence of natural convection and variable temperature zone on insulation performance. On this basis, the structure design of ...

Zhang et al. [16] defined a parameter - energy storage ratio to describe the ability of floor to transfer and utilize the night thermal storage and their numerical results on water based heating showed that the SSPCM floor has larger energy storage ratio than the concrete floor by 16-21% and could maintain more stable heat flux for a long ...

The exact 2-D transient solution of a slab with an embedded array of parallel circular pipes for heating/cooling is developed. The boundary and initial conditions are: constant temperature at the pipe surface, upper slab

surface subjected to convection heat transfer, thermal insulation at the slab bottom, and constant initial temperature. The analytical solution of the ...

Application of phase change material (PCM) floor in a solar water heating system can greatly enhance the floor's energy storage capacity, and thus space for water tank is ...

Thermal performance of a radiant floor heating system with different heat storage materials and heating pipes Appl Energy, 138 (2015), pp. 648 - 660, 10.1016/j.apenergy.2014.10.058 View PDF View article View in Scopus Google Scholar

Hydronic radiant floor heating systems use a network of pipes to circulate hot water beneath your floor. A boiler or water heater warms the water, and a pump siphons it through loops of 1/2-inch polyethylene tubing installed under the flooring.

Thermal energy storage technology can effectively promote the clean heating policy in northern China. Therefore, phase-change heat storage heating technology has been widely studied, both theoretically and experimentally, but there is still a lack of engineering application research. According to the characteristics of heating load in northern rural areas, a ...

From Fig. 4, it is clear that from 9 am there was a significant increase in heat transfer rate from the evacuated tube to heat pipe because of the commencement of heat transfer between the heat pipe condenser section and a thermal energy storage medium. During Run 1, the therminol oil attains 100 °C at 11.40 pm, the temperature further ...

1. Introduction. Thermal energy storage techniques have become a promising way to minimize the peak-valley difference of energy consumption. Latent thermal energy storage (LTES) is a major aspect of thermal energy storage due to its high thermal storage density, and it can maintain a constant temperature in the process of heat release [1]. Therefore, phase ...

In this study, a double pipe PCM floor heating system with three independent heating modules was proposed for clean energy heating in rural China. A 26-day experimental study was conducted to study the operation effect of the system under four different strategies. ... Experimental research on fixed phase change energy storage floor radiant ...

Semantic Scholar extracted view of "The numerical simulation of radiant floor cooling and heating system with double phase change energy storage and the thermal performance" by Ying Xu et al. ... Thermal performance of a radiant floor heating system with different heat storage materials and heating pipes. Guobing Zhou Jing He. Engineering ...

Zhou and He [24] carried out experiments to investigate the performance of a low-temperature hydronic radiant floor with two types of heating pipes (conventional poly-ethylene coils and capillary mat), supplied by



Energy storage floor heating pipe

water temperature constant at 40 °C, and embedded in a sensible or latent thermal mass for heat storage, using sand and PCM with a ...

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