

## Heating of a luxury resort in the Indian Himalayas using water-based clay wall-heating panels

The Taj group of hotels is a large Indian hotel chain with over 100 hotels across the world. The newest hotel is being built in the Indian Himalayas at an altitude of about 2500 m above sea level. It has nearly 100 rooms and has been developed as a destination spa and conferencing resort. The location is at a small town called Theog about 30 km from an Indian hill station called Shimla.

The project is located on a steeply sloping land of nearly 20,000 m<sup>2</sup> and is oriented in a north-south direction. It is on a mountain ridge commanding stunning views and adjoins a Cedrus Deodar reserve forest. The total built-up area of the project is about 12,000 m<sup>2</sup>. The resort includes a bar, coffee shop and speciality restaurant along with a 300m<sup>2</sup>-large banquet hall, meeting rooms and a spa.

It targets the luxury segment, and Indian tourists in particular. There are five categories of guest rooms ranging from deluxe rooms of about 32 m<sup>2</sup> each to

triplex suites of nearly 100 m<sup>2</sup> each. The Indian firm Pradeep Sachdeva Design Associates designed the architecture and interiors of the guest rooms.

The high-end interior spaces are centrally heated but the guest rooms are heated using WEM clay wall-heating panels. These ready-made panels are about 25 mm thick and comprise of 16 mm diameter composite metal and synthetic pipes. These have an output of about 85 W/m<sup>2</sup> at a water temperature of 35° C.

These panels were chosen after exhaustive comparative studies and cost benefit analyses of conventional air-based VRV systems, electric underfloor systems and WEM clay panels. The WEM wall-heating panels were found to be most appropriate for use in the project.

The average temperatures at the hotel location range from 26°C in summer to lows of -5°C in winter. There is also considerable snow in winter, often up to 1 m.





The panels are heated via water pipes embedded in the clay wall-heating panels. The water is heated using a combination of solar thermal panels on the roof and heat pumps. The heat pumps are reversible so that it is possible to cool the spaces in summer when temperatures become very hot.

The clay panels are fitted to the walls of the guest room, vestibule and bathroom and finished with a topcoat of WEM fine clay plaster. The rooms have been insulated along the walls and the ceiling, and double-glazed windows with a U-value of 2.0 have been installed.

Initial trials of the clay panels were done in a mock-up room to test the efficiency and train the Indian contractors in their handling and installation. Feedback from users has been very good: the heating system is silent and the radiant heat provides a pleasant feeling of warmth.

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