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Performance evaluation of dual phase change material gypsum board for the reduction of temperature swings in a building prototype in composite climate

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Abstract: In the present work, thermal performance of a conventional gypsum board is compared with the dual phase change material gypsum board. This gypsum board prepared by placing phase change material in small cells in the form of poly-bags. These poly-bags sandwiched in two layers of the gypsum. The gypsum board used for present investigation has two layers of phase change material with different melting points. This gypsum board is intended to be used as false ceiling and hence can easily be used with existing building. We also present a mathematical model which is a mix of numerical and analytical approach. The mathematical model used in the present study validated using the experimental data. Results of the given model are in good agreement with the experimental data. The validated numerical model used for optimization of melting points of two layers. Effect of the positioning of two phase change material layer is also analyzed. Optimization of parameters evaluated using the absolute mean deviation of room temperature from comfort temperature. Experimental work has been carried out using two identical prototypes made up of laminated ply having gypsum boards attached to

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