



# SUPPLY AIR TEMPERATURE AND HUMIDITY INTERACTION ON THERMAL PERFORMANCE OF INDIRECT EVAPORATIVE AIR COOLING

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## ABSTRACT

In an indirect evaporative air cooling (IEAC) installation air is cooled by means of adiabatic humidification process. By passing over an air/air heat exchanger this air cools the supply or mixed (supply and extracted) air. A clear interaction can be observed between the relative humidity and temperature of the supply air and the thermal comfort realized in the building. To be able to predict the performances of this technique well, a good knowledge of the supply air relative humidity and temperature are thus important. Paper presents the results of measurements carried out in summers of 2008, 2009 and 2010 in a simulated nonresidential building in 3 cities of Latvia: Riga, Liepaja and Gulbene which makes indirect evaporative cooling usable. An evaluation of the indoor summer comfort is made and the interaction between the thermal performance and outdoor air parameters (humidity and temperature) are investigated.

Work actuality is based on the Latvian Cabinet of Ministers regulation No. 534 Regulations Regarding Latvian Building Code LBN 231-03 "Residential and public buildings heating and ventilation" 118th paragraph, "If the air handling equipment for air cooling assess whether the compression cycle cooling techniques can't be replaced by a direct or indirect adiabatic cooling techniques to minimize the impact on the environment." Topic view and updating gives more understandable operating positive and negative aspects, which in turn give engineers new viewpoint to the evaporative cooling as the primary cooling type of application.