

# **Description of moisture thermal patterns in concrete by infrared thermography**

## **Abstract**

The aim of this paper is to collect graphical information with thermal images, on how moistures can appear in building materials like concrete, and to develop a method that provides its detection with infrared thermography. This research has been realized due to the fact that moistures are one of the greatest building pathologies, besides standards and documentation for the use of this technology in specific applications, like moisture detection, are insufficient. Real specimens of concrete have been built specially for that purpose, causing moistures in them. Then infrared images (thermograms) of their evolution have been taken, and they have been analysed with FLIR Tools+ and FLIR ThermaCAM Researcher software. The results of the experiments have revealed important information to define the thermal patterns looked for. In this way, the graphic characteristics of a typical qualitative (without measurement temperatures) thermal pattern in a wet material are described, as well as the qualitative thermal pattern of the capillarity rise which a part of the material suffered. In addition, the humidity levels have been checked with a thermo hygrometer to confirm the different areas that thermography shows in the previous thermal patterns. This research will be useful for professionals who have the suitable equipment for moisture detection and treatment because once the visible moisture marks have been produced, they endure regardless the material is damp or not.

**Keywords:** Infrared thermography, inspection method, graphic analysis, moisture.