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Thermal-hydraulic characterization of the natural circulation of air between two vertical cylinders enclosed in a rectangular cavity LUIS ALFREDO PAYAN-RODRIGUEZ, CARLOS IVAN RIVERA-SOLORIO, SALVADOR VILLARREAL-GARCIA, ALEJADRO JAVIER GARCIA-CUELLAR, RAMON RAMIREZ-TIJERINA, Tecnologico de Monterrey, Campus Monterrey, Department of Mechanical Engineering, and Research Chair in Solar Energy and Thermal-fluid Sciences — This work presents the results of an experimental analysis focused on the characterization of the natural circulation of air in the vicinity of two vertical cylinders. A three dimensional cavity encloses each cylinder, where one of them is a heat source and the other is a heat sink. A wall with two holes of variable diameter delimits and connects the two enclosures in order to restrict the air flow exchanged between them. The distance between the center lines of the cylinders was varied with the purpose of measuring the effect of the surrounding walls on the natural circulation. All configurations were tested for different heat generation rates. A Particle Image Velocimeter was used to obtain the flow patterns and a set of thermocouples was installed to measure the temperature field. The experimental results are analyzed and discussed.

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