

# **Thresholds of thermal and mechanical comfort based on wind tunnel experiments. Application to Portugal**

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The perception of the atmospheric environment, including the meteorological variables, influences the comfort of people and the usage of outdoor spaces. A set of experiments in a wind-tunnel were performed in order to assess the effects of the changes in wind speed in the levels of thermal and mechanical comfort of people. The potential influence of personal characteristics in the perception of comfort was also analysed. Participants were positioned inside the wind-tunnel while performing the same activity and wearing similar levels of clothing, being subjected to increasing wind speeds. Questionnaires were filled in by the participants after each acclimatization phase, stating their level of comfort. The thermal resistance related to increasing wind speed and the movement ability with higher wind speeds (up to 18.3 m/s) were also assessed. Results show that up to 4.5 m/s people feel generally comfortable; women have lower levels of comfort at higher wind speeds than men. The difficulty to move starts at wind speeds above 9 m/s and the critical limit was found at 14 m/s.

The results show that wind speed and personal characteristics influence the perception of thermal comfort. The definition of comfort thresholds based on wind-tunnel experiments can be applied to the improvement of outdoor spaces.

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