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ANSI/ASHRAE Standard 138-2021
Method of Testing for Rating Ceiling Panels for Sensible Heating and Cooling

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NOTE

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FOREWORD

Standard 138 establishes uniform methods of laboratory testing for rating the thermal performance of ceiling panels manufactured for radiant panel heating and cooling of indoor spaces. This standard covers steady-state testing of ceiling panels at panel surface temperatures from 24°C to 65°C (75°F to 149°F) for nonmetal heat transfer elements in the ceiling panel or from 24°C to 150°C (75°F to 302°F) for metal heat transfer elements in the ceiling panel. Sensible cooling ceiling panels are tested from 14°C to 24°C (57°F to 75°F). This standard provides correction factors with respect to defined test conditions for the size of the test room, barometric pressure in the test location, and average air velocity in the vicinity of the test panels in order to ensure repeatable test results.

This is a revision of Standard 138-2013. This standard was prepared under the auspices of ASHRAE. It may be used in whole or in part by an association or government agency with due credit to ASHRAE. Adherence is strictly on a voluntary basis and merely in the interest of obtaining uniform guidelines throughout the industry. The 2021 edition of the standard has been revised to update to references.

1. PURPOSE

This standard establishes uniform methods of laboratory testing for rating steady-state thermal performance of ceiling panels used in indoor spaces for sensible heating, sensible cooling, or both. The objective is to rate ceiling panels under repeatable conditions.

2. SCOPE

2.1 This standard specifies procedures, apparatus, and instrumentation for rating thermal performance of ceiling panels in a specific indoor configuration and thermal conditions.

2.2 Thermal performance of a ceiling panel is measured in terms of heat delivered or heat removed by the ceiling panel as a function of the average fluid temperature of the heat transfer medium in the ceiling panel and the temperatures characterizing the surrounding indoor space.

2.3 This standard covers testing of ceiling panels in the following effective panel surface high and low temperature range limits:

a. *Sensible Heating Ceiling Panels*: From 24°C to 65°C (75°F to 149°F) for nonmetal heat transfer elements in the ceiling panel or from 24°C to 150°C (75°F to 302°F) for metal heat transfer elements in the ceiling panel
b. *Sensible Cooling Ceiling Panels*: From 14°C to 24°C (57°F to 75°F)

2.4 This standard does not cover the following ceiling panels:

a. Hybrid (combined thermal radiation and forced-convection: load-sharing) ceiling panels
b. Ceiling panels that are embedded into the ceiling, wall, or floor structure
c. Test methods for design, production, or field-testing of ceiling panels

3. UNITS OF MEASUREMENT

3.1 System of Units. In this standard, the International System of Units (SI) is used. Inch-pound (I-P) units are shown parenthetically. Values shall be based on the National Institute of Standards and Technology (NIST) values, which, in turn, are based on the fundamental values of the International Bureau of Weights and Measures.

3.2 Basic Units. The unit of length is meter, designated m (foot or inch, designated ft or in.). The unit of mass is the kilogram, designated kg (pound, designated lb), and the unit of time is second or hour, designated s or h. The unit of temperature is degree Celsius, designated °C (degree Fahrenheit, designated °F), or kelvin, designated K (degree rankine, designated °R). The unit of force is the newton, designated N (pound-force, designated lb_f).