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Climatic Data for Building Design Standards

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NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

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FOREWORD

ANSI/ASHRAE Standard 169 provides a comprehensive source of climate data for those involved in building design. It was established to provide climatic information for designing, planning, and sizing building energy systems and equipment, and is referenced in other standards such as Standards 90.1, 90.2, 90.4, 100, 127, and 189.1.

These data are compiled from the 2025 ASHRAE Handbook—Fundamentals, Chapter 14, "Climatic Design Information," and other data developed specifically for this standard from ASHRAE RP-1923, "Updating Climatic Design Information for the 2025 ASHRAE Handbook, Standard 169, and the Handbook of Smoke Control Engineering." Data and tables have been completely revised and updated from the 2021 edition. The standard now includes data for 12,424 station locations worldwide, an increase of 3187, or 35%.

Standard 169 includes supporting files that can be downloaded online. These include design condition tables for the 12,424 station locations along with electronic tables and climate zone maps.

1. PURPOSE

This standard provides recognized climatic data for use in building design and related equipment standards.

2. SCOPE

2.1 This standard covers climatic data used in ASHRAE standards, including dry-bulb, dew-point, and wet-bulb temperatures, enthalpy, humidity ratio, wind conditions, solar irradiation, latitude, longitude, and elevation, for locations worldwide.

2.2 This standard also includes statistical data, such as mean temperatures, average temperatures, mean/median annual extremes, daily ranges, heating and cooling degree-days and degree hours, hours and seasonal percentages within ranges of temperatures, as well as bins.

3. TERMINOLOGY

3.1 Definitions

degree-day: the difference in temperature between the outdoor mean temperature over a 24-hour period and a given base temperature. The classifications are defined as follows:

> ***cooling degree-day base 50°F, CDD50 (10°C, CDD10):*** for any one day, when the mean temperature is more than 50°F (10°C), there are as many degree-days as degrees Fahrenheit or Celsius temperature difference between the mean temperature for the day and 50°F (10°C) (mean temperature minus 50°F [10°C]). Annual cooling degree-days (CDDs) are the sum of the degree-days over a calendar year.
>
> ***heating degree-day base 65°F, HDD65 (18.3°C, HDD18):*** for any one day, when the mean temperature is less than 65°F (18.3°C), there are as many degree-days as degrees Fahrenheit or Celsius temperature difference between and 65°F (18.3°C) and the mean temperature for the day (65°F [18.3°C] minus the mean temperature). Annual heating degree-days (HDDs) are the sum of the degree-days over a calendar year.

grade: quality of station from A (best measured) to E (uncalibrated modeled).

period: years used to calculate the design conditions.

time zone: hours ahead or behind UTC, and time-zone code.

trend: slope of linear fit through yearly temperature, °F (°C) or degree-day values, °F/decade (°C/decade) or °F-day/decade (°C-day/decade).

variability: standard deviation of yearly temperature or degree-day values, °F (°C) or °F-day (°C-day).

3.2 Abbreviations, Initialisms, and Acronyms

CDD_n = cooling degree-days base n°F, °F·day (n°C, °C·day)

CZ = climate zone