



STANDARD

ANSI/ASHRAE Standard 209-2018

Energy Simulation Aided Design for Buildings Except Low-Rise Residential Buildings

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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

ASHRAE Standard 209 describes a methodology to apply building energy modeling to the design process. The Standard Project Committee recognizes the important role building energy modeling plays in informing the design and operation of low-energy buildings. The standard was created to define reliable and consistent procedures that advance the use of timely energy modeling to quantify the impact of design decisions at the point in time at which they are being made. The committee believes such an approach will improve modeling effectiveness, realize greater savings, and support achieving increasingly aggressive energy savings targets.

The standard defines general modeling requirements coupled with eleven modeling cycles, each with specific modeling goals that align with distinct phases of the design, construction, or operation process. Each modeling cycle is an extension of the general modeling requirements, which represents a best-practices approach for using modeling to inform design. Seven of the modeling cycles coincide with the building design phase, three modeling cycles are applied during building construction, and one occurs postoccupancy. The postoccupancy analysis is included to help both the owner and modeler understand how modeled results compare to actual energy performance to inform operation and assumptions used in future modeling projects.

The minimum requirements of the standard can be met by completing a load-reducing modeling cycle early in the design process, as well as one additional design-phase modeling cycle. The full set of modeling cycles were developed to provide holistic modeling guidance and are included for completeness. They can be selectively adopted by organizations that desire a more robust treatment for realizing their specific project objectives. While the standard can be applied with any design process, it is best utilized when included as part of an integrative design process.

It is expected the standard will be adopted by organizations that certify high-performance buildings, as well as by utilities and agencies that provide incentives for using modeling to inform design. It can be referenced as part of a project scope of work by building owners and architects seeking an effective, uniform way to use energy modeling to achieve performance objectives.

1. PURPOSE

Define minimum requirements for providing energy design assistance using building energy simulation and analysis.

2. SCOPE

This standard applies to new buildings or major renovations of, or additions to, existing buildings using energy simulation

during the design process. This standard does not apply to single-family houses, multifamily structures of three stories or fewer above grade, manufactured houses (mobile homes), or modular homes.

3. DEFINITIONS, ABBREVIATIONS, AND ACRONYMS

3.1 General

Certain terms, abbreviations, and acronyms are defined in this section for the purposes of this standard. These definitions are applicable to all sections of this standard.

3.2 Definitions

actual meteorological year (AMY): a data set comprising one year of historical, hourly measured or derived weather observations for a specific location.

authority having jurisdiction (AHJ): the agency or agent responsible for enforcing this standard.

balance-point temperature: the outdoor temperature at which a building's heat loss to the environment is equal to internal heat gains from people, lights, and equipment.

baseline: the building design or level of energy performance used as the basis of comparison against other project alternatives, usually based on a hypothetical design defined by building standards or based on the currently proposed building design at the time of modeling cycle analysis.

building energy simulation: building energy estimation using a computer simulation program.

building performance rating system: a program to assess energy and/or environmental performance of a building design. (**Informative Note:** e.g., the Leadership in Energy and Environmental Design [LEED] program developed by the U.S. Green Building Council and the Green Globes program developed by the Green Building Initiative.)

change order: a request to modify the original scope of work after construction has begun. The need for a change order can include product substitutions, design changes, and differing site conditions. A request for a change order may be originated by the owner, a member of the design team, the contractor, or a subcontractor and typically is initiated using either a change order proposal request, a change order proposal, or a change directive. If approved, change orders permanently modify the scope of work and contract.

charrette: a meeting of project stakeholders to discuss design goals and design strategies.

comparative analysis: a modeling exercise comparing the performance of two or more design alternatives in which the important result is the relative performance of alternatives.

compliance analysis: a modeling exercise to demonstrate design compliance with energy standards or other program requirements.

construction document phase: the final portion of the design process in which detailed plans and specifications are completed.

design constraint: a condition that must be satisfied as a part of an optimization process in order for a design to be feasible.