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BUILDING ENERGY MODELING STEP-BY-STEP PROCEDURES FOR LEED CERTIFICATION

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ONLINE TRAINING BY KRISHNAJI PAWAR

LEED AP(BD+C), GSAS CGP, GCP, ISO 14001

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MODULE
L12

ASHRAE Standard 209-2024

KRISHNAJI PAWAR - CEO & FOUNDER

LEED AP(BD+C),GSAS CGP,GCP,ISO 14001

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BUILDING ENERGY MODELING : STEP-BY-STEP PROCEDURES FOR LEED CERTIFICATION

The ANSI/ASHRAE/IBPSA Standard 209-2024 is a significant advancement in energy modeling and building design, developed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the International Building Performance Simulation Association (IBPSA). It aims to provide a structured framework for practitioners in implementing building energy simulation tools throughout the design and construction phases of projects.

Learning Objectives

- Introduction and Course Outline
- Building Energy Modeling Checklists
- Scaling an imported drawing from AutoCAD
- **ASHRAE Standard 209-2024**
- BEM software inputs for the project section, facade, systems, and zones
- Setup and Running the Building Energy Modeling Simulation
- Review BEM Software Output Reports.
- Sample Energy Modeling Report
- Summary and Resources
- BEMP Practice Test V.4.1



INTRODUCTION

- Developed by ASHRAE and IBPSA, it provides a structured framework for energy simulation tools in building design.
- The standard aims to unify divergent methodologies in energy modeling, promoting accuracy, reliability, and transparency.
- It serves as a comprehensive guide for practitioners on how to effectively utilize energy simulation tools during building design phases.
- It aims to reduce variability in simulation outputs and promote integration of energy performance considerations into the overall design process.
- The standard is structured into several components: Definitions and Terminology, Simulation Process, Documentation and Transparency, and Quality Assurance.
- The standard outlines a systematic process for conducting energy simulations, similar to the scientific method in research.
- It emphasizes the importance of documenting assumptions, methodologies, and results for reproducibility and validation of findings.
- It includes guidelines for ensuring the quality and reliability of simulation outputs.
- The standard serves as a resource and a catalyst for change, promoting best practices in energy simulation and fostering a collective commitment to sustainable building practices.

PURPOSE AND SCOPE OF ASHRAE STANDARD 209

- ASHRAE Standard 209 is a framework for energy modeling in architectural design.
- It outlines procedures for conducting timely energy modeling, facilitating informed design decisions aligning with energy efficiency objectives.
- ASHRAE 209 is relevant for architects, engineers, and designers who aim to optimize energy use in their projects.
- The standard establishes minimum requirements for energy design assistance through building energy simulation and analysis.
- It outlines a structured approach to energy modeling that includes various phases of the design process.





THE TEN CYCLES OF ENERGY SIMULATION

- ASHRAE Standard 209 introduces ten distinct "cycles" of energy simulation.
- These cycles range from preliminary assessments to detailed analyses and verification of energy performance.
- These cycles include: Conceptual Design (Box Models), Schematic Design, Design Development, Construction Document Phase, Pre-Construction Simulation, As-Built Modeling, Measurement and Verification (M&V), Post-Occupancy Evaluation, Renovation and Retrofitting, and Continuous Improvement.



OBJECTIVES OF ASHRAE STANDARD 209

Specifications and Modeling Scope

- ASHRAE Standard 209 provides language to clearly specify the modeling scope required for any project.
- This specification ensures that different modeling proposals can be evaluated on a consistent basis.

Objectives of ASHRAE Standard 209

- Achieving LEED Energy Performance Credits: ASHRAE 209 helps project teams meet the energy components required to attain the Optimize Energy Performance Credit within the LEED framework.
- Guiding the Design Process: ASHRAE 209 provides a structured methodology for integrating energy modeling into the design process.
- Understanding Design Assistance Modeling: ASHRAE 209 elucidates the role of design assistance modeling in LEED projects.



ASHRAE 209: A TOOL FOR INTEGRATIVE DESIGN

- ASHRAE Standard 209, "Energy Simulation-Aided Design for Buildings," aims to define procedures for timely energy modeling.
- It defines minimum requirements for providing energy design assistance using building energy simulation and analysis.
- The standard is referenced in the LEED Integrative Process credit, but many architects, engineers, and designers are unaware of its benefits.
- It defines 10 different "cycles" of energy simulation a project might incorporate, from simple box models in concept design to as-built models used in measurement and verification.
- ASHRAE 209 provides language to specify the modeling scope required for any project, ensuring that competing modeling proposals can be assessed "apples to apples."





CONTACT US



+91 6363032722



info@beyondsmartcities.in



learn.beyondsmartcities.in



#55,HMR Layout ,Bengaluru ,India



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