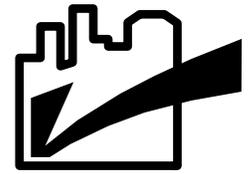


Scope and Application Guide



COMcheck-EZ™

March 1998

COMcheck-EZ™ is an optional way to demonstrate compliance with energy codes for commercial and high-rise residential buildings. It applies to most commercial buildings and high-rise residential buildings three stories or more above grade. Residential buildings, townhouses, and garden apartments with three stories or fewer are normally covered under residential energy codes. A building designed and constructed to meet the COMcheck-EZ requirements generally meets or exceeds the energy efficiency of a similar building constructed to meet ASHRAE/IES Standard 90.1-1989 requirements.

The COMcheck-EZ materials simplify and clarify energy code requirements. They have a different format than

provisions and those having no impact on overall energy performance were deleted during COMcheck-EZ development. COMcheck-EZ may be used only in jurisdictions where the adopting authority has approved its use.

COMcheck-EZ includes a manual method (prescriptive compliance path) and a software method (system performance compliance path). Either method can be used to demonstrate that a proposed building design complies with the COMcheck-EZ requirements.

Only construction referenced in the building permit application must comply with the COMcheck-EZ requirements. Each system—envelope, mechanical, and lighting—can comply separately. For example, if the building permit application is for only the lighting system, then the envelope and mechanical provisions do not apply.

COMcheck-EZ can be used in conjunction with other energy codes. Its requirements can be mixed with other energy code requirements only if separate permits are being requested for each system (envelope, mechanical, and lighting). In this case, COMcheck-EZ is designed to allow a building to comply using requirements contained in another energy code if a separate permit is being requested for the system covered by the other code. For example, an applicant can apply for a shell permit using COMcheck-EZ for the envelope requirements. When requesting a permit for the mechanical system, the applicant can use either the COMcheck-EZ or another energy code's requirements approved by the administrative authority enforcing the adopted code.

This guide provides building design professionals and code enforcement officials an overview of the COMcheck-EZ materials and explains how the requirements apply to a variety of commercial building situations.

You can access a U.S. Department of Energy Building Standards and Guidelines Program (BSGP) web site at <http://www.energycodes.org> to learn about COMcheck-EZ and get free downloads of the complete package of materials. If you have questions about the COMcheck-EZ materials, call the BSGP hot line at 1-800-270-CODE.

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ASHRAE/IES Standard 90.1-1989. Redundant

COMcheck-EZ Materials

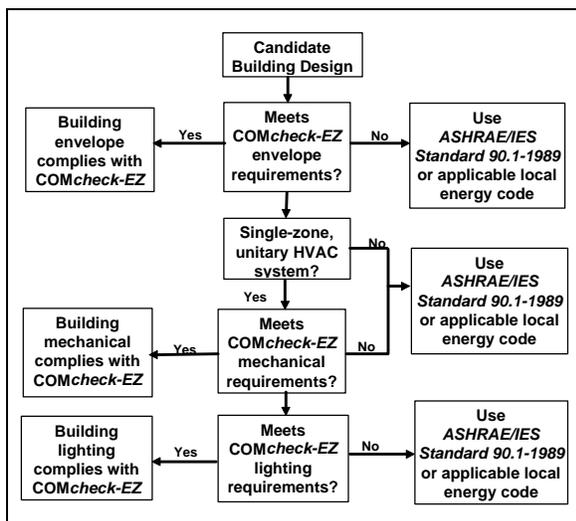
The COMcheck-EZ materials include

- *Scope and Application Guide*
- *Envelope Compliance Guide*
- *Mechanical Compliance Guide*
- *Lighting Compliance Guide*
- *Software Compliance Guide*
- *State Maps and Prescriptive Packages*
- *Field Inspection Checklist*
- *Software Diskette*

The Envelope, Mechanical, and Lighting Compliance Guides contain energy efficiency requirements. They provide direction in completing each compliance certificate used to demonstrate code compliance. These guides limit the user to a prescriptive compliance path with no performance tradeoffs.

When performance tradeoffs and greater design flexibility are desired for one or more systems (envelope, mechanical, and lighting), the COMcheck-EZ software provides a performance path alternative for each system and generates a report used to demonstrate compliance.

For code enforcement officials, EZ tips for plan check and field inspection are included at the end of each compliance guide. The Field Inspection Checklist is useful when inspecting buildings for COMcheck-EZ compliance.



Steps to Determine Compliance

Envelope Compliance

The *Envelope Compliance Guide* contains energy efficiency requirements related to the building envelope. General

requirements are included for limiting air leakage, certifying components, and installing vapor retarders. Climate-specific requirements are provided in the prescriptive packages for each climate zone.

Mechanical Compliance

The *Mechanical Compliance Guide* contains energy efficiency requirements for heating, cooling, ventilating, and water heating. Included are requirements for heating and cooling system controls, outdoor-air ventilation, duct construction, water-heating systems, and swimming pool heaters. This guide also contains instructions for trading off economizers with higher-efficiency cooling equipment and recommendations for documenting that your mechanical design meets the COMcheck-EZ requirements.

Lighting Compliance

The *Lighting Compliance Guide* contains basic energy efficiency requirements for lighting systems. This guide identifies control, switching, and wiring requirements and types of exterior-lighting sources that comply. It also shows you how to demonstrate compliance with building- or area-specific interior-lighting power limits.

Software Compliance

The *Software Compliance Guide* provides instructions on installing and using the COMcheck-EZ software. The software is a highly flexible way to demonstrate compliance with minimal input. The software is designed to run on most Windows-based computers. The envelope portion allows roof, wall, window, floor, and skylight performance tradeoffs within the permit stage. The lighting portion allows you to quickly determine if your lighting design meets the COMcheck-EZ interior-lighting power limits. The mechanical portion displays a checklist of mechanical requirements and prints this checklist in the form of a mechanical compliance certificate. The software automatically generates a report that can be affixed to project plans and submitted to code enforcement personnel to demonstrate compliance.

State Maps and Prescriptive Packages

The Envelope and Mechanical Compliance Guides contain requirements that vary with climate. The State Maps and Prescriptive Packages are used to identify the climate zone and corresponding prescriptive package number for your proposed design used in determining climate-specific requirements.

Field Inspection Checklist

The *Field Inspection Checklist* helps ensure required energy efficiency measures are properly installed in the building in accordance with the building plans and specifications.

Scope

COMcheck-EZ can be used to demonstrate energy code compliance in the design and construction of most types of commercial and high-rise residential buildings. You must use the software method to demonstrate envelope compliance for buildings having a window-wall ratio (WWR) of more than 40%. In demonstrating compliance with mechanical codes, its use is limited to single-zone, unitary HVAC systems and certain heating-only hydronic systems.

Applicable buildings include

- offices
- retail, grocery, and wholesale stores
- restaurants
- assembly and conference areas
- industrial work buildings
- commercial or industrial warehouses
- schools and churches
- theaters

- apartment buildings and condominiums with four or more habitable stories
- hotels and motels.

COMcheck-EZ requirements do not apply to

- very low energy use buildings (less than 3.4 Btu per hour per square foot or 1 watt per square foot of floor area)
- buildings or portions of buildings that are neither heated nor cooled
- buildings designated as historic.

Applications

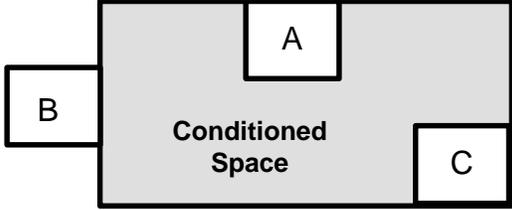
The following sections explain how COMcheck-EZ applies to a variety of typical building situations. While these examples can help illustrate various code applications, your local building department has the final authority on how to apply COMcheck-EZ to a project.

Unconditioned Spaces

Unconditioned spaces are exempt from the COMcheck-EZ envelope requirements. Unconditioned spaces may contain limited heating or cooling equipment. This equipment must meet the COMcheck-EZ mechanical or lighting provisions. To determine if a space is unconditioned, ask the following questions:

- Does the heating system capacity exceed 10 Btu per hour or the cooling system capacity exceed 5 Btu per hour per square foot of floor area?
- Is the conductance of heat from the space to the outdoors greater than to an adjacent conditioned space?

If the answer is no to both of the above questions, the space is unconditioned.

Question
<p>The sketch below shows a one-story building with four different spaces. Spaces A, B, and C do not have installed heating or cooling equipment and are not controlled for human comfort. Are any of these spaces exempt from the COMcheck-EZ requirements?</p> 
Answer
<p>The conductivity of heat is based on the wall area and the amount of insulation in the walls separating conditioned space from unconditioned space and unconditioned space from the outdoors. Space A is in contact with conditioned space on three sides. Space C is in contact with conditioned space on two sides. Space B is in contact with conditioned space on only one side. If we assume that all of the walls shown have the same amount of insulation, the conductance of the walls between the conditioned space and spaces A and C is greater than or equal to the conductance of the walls in contact with the outdoors. Spaces A and C are considered conditioned spaces and thus must meet the COMcheck-EZ requirements. Space B does not have to meet the COMcheck-EZ requirements because the heat conductance to the outdoors is greater than the heat conductance to the conditioned space.</p>

A problem occurs when a building owner erects an unconditioned shell building and fails to comply with energy efficiency requirements. When a future tenant applies for a permit to install heating and cooling equipment, the building envelope must be brought into compliance, possibly requiring significant alterations. The lighting system, if installed in conjunction with the shell building, must also be brought into compliance in a similar situation.

Newly Conditioned Spaces

When an unconditioned space becomes conditioned, the space is considered an addition. All envelope, lighting, and mechanical systems and components associated with the addition must comply with the COMcheck-EZ requirements as if the addition were a new building.

Many code enforcement jurisdictions require that building owners sign an affidavit when applying for the initial building permit for a shell building. The owner acknowledges in the affidavit the potential difficulties associated with postponing envelope or lighting compliance. To minimize these difficulties, permit applicants should demonstrate compliance when each system is installed.

New Construction in Existing Buildings

Tenant improvements in an existing building (the base building has been constructed, but the individual tenant spaces have not been completed) are considered new construction. All envelope, lighting, and mechanical systems and components being installed must comply with some or all of the COMcheck-EZ requirements.

Existing systems and components not subject to the current permit application must comply with the COMcheck-EZ requirements when conditioning previously unconditioned space.

Alterations to Existing Conditioned Spaces

Alterations to existing conditioned spaces must comply with the following criteria:

- Altered portions of a system must comply with the COMcheck-EZ requirements; unchanged portions do not have to comply.
- If an alteration increases the altered system's energy use, the alteration must comply with all of the COMcheck-EZ requirements applying to that system.
- Each altered component must meet the requirements applying only to the altered component.
- New systems in alterations must comply with the COMcheck-EZ requirements.

In most cases, existing envelope, lighting, and mechanical systems and components set the requirements for alterations. For example, envelope alterations comply if the overall performance of the envelope is not degraded. Similarly, lighting alterations comply if the building's overall connected lighting load does not increase. Mechanical alterations are governed primarily by the requirements for each altered component.

Question
A building owner wants to install a new window in an old building, which will increase the glazing area. How can COMcheck-EZ help demonstrate compliance?
Answer
The new window will degrade the overall building performance. Therefore, the increased glazing area must be offset with other envelope improvements. You can use the COMcheck-EZ software to show that additional insulation will offset the added glazing by ensuring the building's compliance margin with the new glazing is at least as large as its compliance margin without the new glazing.

Question
A building owner wants to rearrange some interior partitions and reposition the light fixtures in the affected rooms. Do any COMcheck-EZ requirements exist for this alteration?
Answer
Because no change exists in the connected lighting load, only the control, switching, and wiring requirements apply. For example, each newly arranged room must have a light switch, and any one- or three-lamp ballast must be tandem-wired.

Additions

Additions are newly constructed conditioned spaces or previously unconditioned spaces after heating or cooling equipment has been installed. All additions must comply with the COMcheck-EZ requirements.

Envelope, lighting, and mechanical systems and components in additions are treated the same as they are for new buildings. Existing systems simply extended into an addition do not have to be brought up to COMcheck-EZ efficiency levels.

For additions, the following two options can be used to demonstrate compliance:

1. Treat the addition as a stand-alone building and ignore the common walls between the existing building and the addition. You can use either the COMcheck-EZ manual or software method to demonstrate compliance for this option.

2. Combine the existing building with the addition. You can use only the COMcheck-EZ software method to demonstrate compliance for this option.

Buildings with Multiple-Occupancy Types

COMcheck-EZ addresses buildings with multiple-occupancy types as follows:

- **Minor Occupancy** - If an occupancy type takes up less than 10 percent of a building's conditioned floor area, then the area devoted to that occupancy type must meet the same requirements as the major-occupancy type.
- **Multiple and Single Occupancy** - COMcheck-EZ uses the same compliance process for commercial buildings with multiple-occupancy types as for those with a single-occupancy type. The manual and software methods allow you to specify several occupancy types.
- **Hotel/Motel and Commercial Occupancy** - COMcheck-EZ uses the same compliance process for hotel/motel-occupancy and commercial-occupancy types as it uses for multiple-occupancy and single-occupancy types.
- **Mixed Residential and Commercial Occupancy** - This occupancy type occurs when a building has three or fewer stories and contains both residential and commercial occupants, with the minor-occupancy type taking up more than 10 percent of the building's conditioned floor area. The residential and commercial occupancies are considered separately because they fall under two different scopes. Thus, two compliance submittals must be prepared using the appropriate calculations and forms from the respective codes for each.

Change in Occupancy

COMcheck-EZ requirements generally do not apply to occupancy changes. However, if physical changes are made to the building, the rules for alterations or additions may apply. Your code enforcement official will need to evaluate these changes on a case-by-case basis to determine energy requirements.