

Title 24 Energy Compliance for Nonresidential/Commercial Projects

What You Need to Know

The information given here assumes that the owner/client wishes to be most cost-effective in minimizing overall design and construction costs. The information also holds true for those who desire maximum design flexibility. For those who desire maximum energy efficiency, Title 24 compliance is a low level formality, so the information given here may be largely irrelevant to them.

Nonresidential Title 24 is divided up into three distinct areas: envelope (i.e. the building/space's exterior surfaces), lighting, and mechanical. In theory, energy compliance documentation is required for all but very simple projects that involve one, or more, of these three disciplines. All new lighting installations are now governed by Title 24. When space conditioning equipment will not be installed immediately, but there is a chance it may be installed in the future, Title 24 envelope compliance is highly advisable. As soon as a space is conditioned for the first time, all of Title 24 will kick in.

Unfortunately, there are often logistical roadblocks that prevent optimum cost-effectiveness in Title 24 compliance. Foremost among these roadblocks are the discreet divisions that exist between the various design disciplines (architecture, mechanical engineering, electrical engineering, interior design, etc.). Standard operating procedure is a kind of sequential design process in which each discipline tries hard not to step on the toes of other disciplines. Feedback from one discipline to another is generally minimized. The idea of adding another discipline—energy engineering—into the mix is generally discouraged by the other engineering disciplines (who carefully guard aspects of Title 24 that relate to them). Ironically, if the advice given here were adhered to, these engineers would have less to worry about.

Often, the Title 24 energy analyst is hired by the architect to handle only the architect's portion of the design: the envelope. In the case of simple tenant improvements, he may be hired only for lighting compliance. The standard operating procedure noted above is not optimal from a construction cost standpoint, because it prevents energy trade-offs between disciplines. The only way to get, and take advantage of, a building's entire energy budget is to **combine as many aspects of the design as possible into a single computerized performance analysis**. The 2005 Title 24 standards have made all aspects of energy compliance "tight," and have piled new requirements high on the *prescriptive* approach, so combined *performance* analysis is all the more important.

- 1) **Envelope:** The *prescriptive* standard requires tinted double glazing throughout the state. More tinting, and better U-factors are required in the harsher climates. "Cool roofs" are required on low-sloped structures. Skylights with automatic daylighting controls are required in "big box" buildings. The *performance* method of compliance can minimize or eliminate some of these requirements, especially if combined with mechanical and/or lighting compliance.
- 2) **Lighting:** Allowable lighting power densities have now been ratcheted down to very low levels for all types of occupancies. For example, the standard for office buildings is now 1.1 Watts/ft.², which corresponds to (2) F32T8 tubes with electronic ballast for every 57 square feet of floor area. There are three different methods to determine lighting compliance, but it is difficult to predict which one will yield the most flexibility; except that the "tailored approach" gives extra allowances for display lighting. There are some significant mandatory measures [including system timeclock(s) and various switching requirements], but these have no bearing on compliance calculations.
- 3) **Mechanical:** Systems must be properly sized, and must meet new federal efficiency standards. Also, units larger than 6¼ tons must have an integrated economizer (higher cooling efficiencies are an allowed alternative in some climates). The *prescriptive* standards require HERS verified "tight ducts" in some cases. There are some very significant mandatory measures and new "acceptance requirements", but these have no bearing on compliance calculations.

What You Need to Provide--Nonresidential Shell and/or Mechanical

This can be used as a transmittal form

Notes, plan sheet
number, or CAD
filename

Envelope/Shell Analysis and/or HVAC Load Calculations

Concept: A complete, measurable description of all surfaces that separate conditioned space from unconditioned spaces and/or the outside, with special attention to glazing. The building's location and cardinal orientation.

- Floor plan(s) dimensioned or to scale showing the following:
 - North arrow or plot line bearing
 - All exterior windows and doors
 - The extents of the conditioned space (possibly in mechanical plan)
 - Project address
 - All ceiling heights
- Window and door schedule/notes, or elevations to scale, indicating sizes, operator types, and frame material (metal, vinyl, wood, or fiberglass).
- Indications of all fenestration overhangs and side fins (possibly in roof plan, building sections, and/or elevations).
- Notes or details describing each unique construction assembly and its components. If "cool roof" roofing material will be installed, specify its reflectance.
- Indication(s) of the extents of each unique construction assembly (possibly via wall legend, building sections, elevations, foundation plan, framing plan(s), reflected ceiling plan(s), and/or roof plan).

N/A

Additional Information for Mechanical Compliance Analysis

Concept: Title 24 only "cares" about space conditioning and water heating systems that are for human comfort. This includes all HVAC systems that serve rooms humans may occupy whose thermostats have setpoints between 55°F and 90°F. Strict "process" equipment—such as food preparation appliances—may effect HVAC loads, however. In this case, the total wattage of appliances should be given on a zone by zone basis.

- Mechanical plan(s) showing the following:
 - Make and model of all HVAC units, including exhaust and makeup fans (if any).
 - Make and model of all water heating units and pumps.
 - Total Wattage of appliances that will add significant heat to a conditioned space (if any).
 - A duct layout, or indication of which HVAC units supply which rooms.

N/A

- Indication(s) of any of the following duct credits:
 - Duct insulation above minimum code
 - Ducts in conditioned space
 - Tight duct sealing (requires third party verification only if credit is taken)

From	Tel.	Project Name
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What You Need to Provide--Nonresidential Lighting and/or Additions

This can be used as a transmittal form

Notes, plan sheet
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filename

N/A

Lighting Analysis

Concept: For all new light fixture(s): A complete three dimensional description of each room, its occupancy, and its lighting system. Exterior landscaping, paving, outdoor lighting, and illuminated sign designations.

- Lighting plan(s) dimensioned or to scale showing the following:
 - All interior walls and doors
 - Descriptive room names
 - The location of all luminaires, with designations that match the luminaire schedule. Also indicate lamp heights for suspended and outdoor fixtures.
 - An indication of any proposed portable lighting and/or lighting integral to furniture/built-ins.

Project address

All ceiling heights

N/A

- An exterior lighting plan showing all luminaires, paving, and landscaping.
- A luminaire schedule or legend that contains the following data on each unique light fixture:
 - Standard lamp designation(s) and their wattage rating(s)
 - The quantity of each lamp in the fixture
 - The type of ballast for fluorescent fixtures

N/A

Additional Information for Existing-plus-Addition/Alteration

Reasons to use this method: As in residential additions, this method will nearly always minimize Title 24 requirements, and thus overall construction cost. It is the only way to get full credit for improving the existing structure. Without this method, fairly onerous compliance requirements are likely to affect design(s) and/or construction costs of nonresidential additions and alterations (especially shell components).

Concept: An energy snapshot/model of the permit space before any new work is done. There is no energy credit or penalty for existing permitted/grandfathered conditions, so be as accurate and honest as possible. A second energy model, which includes the new work, will take credit for all documented improvements.

- For the pre-existing building/space (as well as for the addition/alteration): All of the same information stated in the above categories. If some information is not known, it can be omitted, and standard defaults will be substituted.

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http://www.easytitle24.com/full_service.html