# Bay Area Regional Energy Network (BayREN)

## Energy Code Permit Guides

The BayREN Codes & Standards team has developed a series of permit guides to assist local enforcing agencies in improving their permitting processes. These guides are provided for your use and distribution. The following permit guides are available:

1. Residential Fenestration Alteration
2. Residential Re-Roofing
3. Residential Water Heater Alteration
4. Nonresidential Re-Roofing
5. Nonresidential unitary HVAC systems
6. Nonresidential Indoor Lighting Alterations
7. Nonresidential Acceptance testing
8. Model Water Efficient Landscapes

If your jurisdiction would like any of the guides customized to include your building department's name and logo within the Header of the guide (see sample guide on the back of this page), please email the following to **codes@bayren.org**:

1. Name of the permit guides you are requesting customization for,
2. High Resolution Logo (JPEG, GIF, PNG or TIF file format), and
3. Additional information your department would like included in the Header in the order in which you would like it to be listed. (Example: Physical Address, Phone, Email Address, Website, Hours, Etc.)

# Residential Water Heater Alteration

## 2013 Energy Code Permit Guide

**County of Santa Clara**
**Department of Planning & Development**
County Government Center, East Wing
70 West Hedding St, 7th Floor
San Jose, California 95110

Permit DATE: Permit NUMBER: CA Climate Zone:

Permit ADDRESS: City, Zip:

This guide applies to: Storage gas water heaters with an input rating ≤ 75,000 Btu per hour; Instantaneous gas water heaters with an input rating ≤ 200,000 Btu per hour; and Electric water heaters. For other water heating system types and configurations refer to section 150.2(b) of the *2013 Building Energy Efficiency Standards*.

### WATER HEATER REPLACEMENT:

**What is the fuel type of the replacement water heater?**

- ☐ Natural gas or LPG/propane
- ☐ Electric Resistance (Allowed only if this is also the existing fuel type)

### WATER HEATER ADDITION:

**Is more than one water heater being added?**

- ☐ No
- ☐ Yes (Performance approach must be used)

**What is the fuel type of the additional water heater?**

- ☐ Natural gas or LPG/propane
- ☐ Electric Resistance (Allowed only if this is also the existing fuel type)

### TANK INSULATION:

**Is the Energy Factor of the water heater greater than 0.58?**

- ☐ Yes
- ☐ No, it is exactly 0.58. Minimum R12 external tank insulation must be installed
- ☐ Not applicable, no storage tank exists

### PIPE INSULATION:

**The following pipes must have at least one inch of insulation, if pipes are accessible**

- ☐ First five feet of hot and cold water pipes from the storage tank
- ☐ Hot water pipes between the water heater and kitchen

### RECIRCULATION SYSTEMS:

**Are you replacing a recirculation pump?**

- ☐ No, no recirculation system exists
- ☐ No, but a recirculation system already exists. Accessible pipes within an existing loop must be insulated at the time of the water heater replacement
- ☐ Yes. Demand recirculation systems with manual control pumps must be used and all pipes must be insulated

**Is a recirculation system being added?**

- ☐ No
- ☐ Yes (Performance approach must be used)

### Required Form:

- CF1R-ALT-01-E: Certificate of Compliance, Residential Alterations

### For more information on 2013 Title 24 Part 6 requirements:

- Visit the CEC website: **www.energy.ca.gov/title24/2013standards/**
- Contact the CEC energy code hotline at (800) 772-3300 or email: **title24@energy.state.ca.us**
- Contact the BayREN Codes & Standards Program by email: **codes@bayren.org**

SAMPLE CUSTOMIZED GUIDE



BAY AREA Regional Energy Network

# Residential New or Replacement Windows (Fenestration)

## 2013 Energy Code Permit Guide

***Fenestration*** includes windows, skylights, and doors with ≥ 50% glazed area

Permit DATE: Permit NUMBER: Climate Zone:

Permit ADDRESS: City, Zip:

### REPLACEMENT or MINOR ADDITION of WINDOWS:

**Are you increasing the total fenestration area by more than 75 ft$^2$?**

- ☐ Yes (skip to NEW WINDOWS)
- ☐ No (circle the applicable requirements in the table)

**Are you adding more than 16 ft2of skylight area?**

- ☐ Yes (skip to NEW WINDOWS)
- ☐ No (circle the applicable requirements in the table)

### NEW WINDOWS:

**Is the total fenestration area (existing plus new) less than or equal to 20% of conditioned floor area?**

- ☐ Yes (circle the applicable requirements in the table)
- ☐ No (performance approach must be used)

**Is the total area of West-facing fenestration (existing plus new) less than or equal to 5% of conditioned floor area? (Does not apply to Climate Zone 3)**

- ☐ Yes (circle the applicable requirements in the table)
- ☐ No (performance approach must be used)

### Residential Fenestration Requirements, 2013 Energy Code NR = No Requirement

| | CZ 2 | CZ 3 | CZ 4 | C Z 12 | New Skylights (up to 16 ft$^2$) | Replacement Windows (up to 75 ft$^2$) |
|---|---|---|---|---|---|---|
| **Maximum U-Factor** | 0.32 | 0.32 | 0.32 | 0.32 | 0.55 | 0.40 |
| **Maximum SHGC** | 0.25 | NR | 0.25 | 0.25 | 0.30 | 0.35 |

### Building Inspector:

Each new or replacement fenestration product must have a National Fenestration Rating Council (NFRC) Label whose values correspond to the table above; area-weighted average values may be used. Reference the signed and registered CF1R-ENV-01-E Fenestration Installation Certificate. If values are area-weighted averages, also reference the signed and registered CF1R-ENV-02-E Area Weighted Average Calculation Worksheet.

### Required Forms:

- CF1R-ALT-01-E: Certificate of Compliance, Non-HVAC Residential Alterations
- CF2R-ENV-01-E: Fenestration Installation Certificate (from installing contractor, before field inspection)

If Applicable:

- CF1R-ENV-02-E: Area Weighted Average Calculation Worksheet

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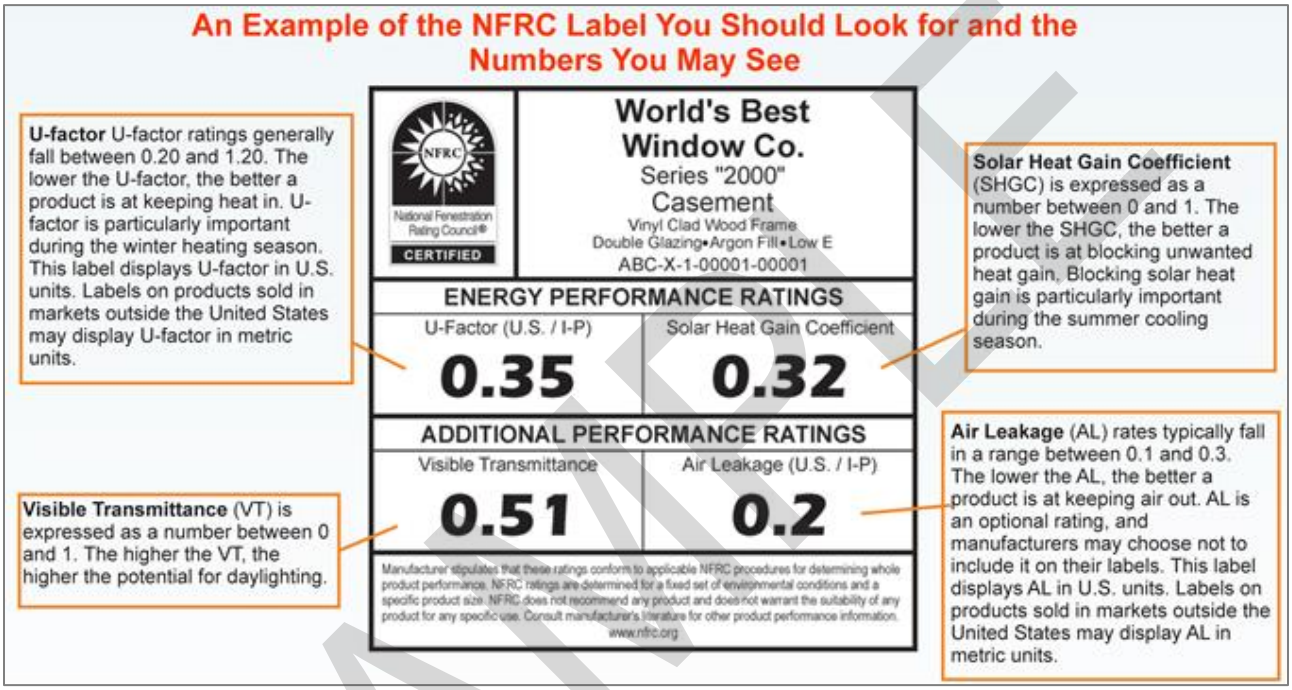
BAY AREA Regional Energy Network

# Residential New or Replacement Windows (Fenestration)

## 2013 Energy Code Permit Guide

**For more information on 2013 Title 24 Part 6 requirements:**

- Visit the CEC website: **www.energy.ca.gov/title24/2013standards/**
- Visit the NRFC website: **www.NFRC.org**
- Contact the CEC energy code hotline at (800) 772-3300 or email: **title24@energy.state.ca.us**
- Contact the BayREN Codes & Standards Program by email: **codes@bayren.org**




SAMPLE



BAY AREA Regional Energy Network

# Residential Re-Roofing

## 2013 Energy Code Permit Guide

Permit Issue DATE: Permit NUMBER: CA Climate Zone: **12**

Permit ADDRESS: City, Zip:

**COOL ROOF IS NOT REQUIRED** if any of the boxes below are checked.

**Cool Roof Exemptions:** Check any that apply.

- ☐ Roof pitch is less than 2:12
- ☐ Area to be re-roofed is less than 50% of total roof area
  Area to be re-roofed = _____ $ft^2$ Total roof area = _____ $ft^2$

**Cool Roof Alternatives:** Check any that apply.

- ☐ There is an attic radiant barrier
- ☐ There are NO ducts in the attic
- ☐ Ducts in the attic have been HERS-verified to be sealed to ≤ 6% leakage and insulated to ≥ R-6
- ☐ There is at least R-38 ceiling insulation
- ☐ There is at least R-4 insulation above the roof deck
- ☐ The installed roofing product has a profile ratio of rise to width of 1 to 5 for 50 percent or greater of the width of the roofing product
- ☐ There is at least a 1.0 inch air-space between the top of the roof deck and the bottom of the roofing product

**COOL ROOF IS REQUIRED** if none of the boxes above are checked. Circle applicable requirements in the Table.

**Prescriptive Requirements for COOL ROOFS** Does not apply to roof area covered by building-integrated photovoltaic (PV) and building-integrated solar thermal panels.

| | **BayREN Climate Zone** | **12** |
|---|---|---|
| Roof pitch > 2:12 | 3 year Aged Solar Reflectance, minimum | 0.20 |
| | AND Thermal Emittance, minimum | 0.75 |
| | OR Solar Reflective Index (SRI), minimum (This value must be calculated, see below) | 16 |

### Building Inspector:

Roofing material must have a Cool Roof Rating Council (CRRC) package label indicating compliance with the requirements in the table above. See page 2 of this guide for an example of a CRRC label, and instructions for calculating Aged Solar Reflectance and Solar Reflective Index.

### Required Forms:

- CF1R-ALT-01-E: Certificate of Compliance – Res Alterations (from contractor or owner)
- CF2R-ENV-05-E: Certificate of Installation – Cool Roof (from installing contractor to building department)
- CRRC label specifying Initial and Aged Solar Reflectance, and Thermal Emittance

If SRI value is used:

- CF1R-ENV-04-E: Solar Reflective Index Calculation Worksheet

SAMPLE

# Residential Re-Roofing

## 2013 Energy Code Permit Guide

### Explanation from the 2013 Title 24 Residential Compliance Manual:

- Complying products are labeled by the Cool Roof Rating Council (CRRC, **www.coolroofs.org**)
- CRRC label values for installed roofing products must meet or exceed T24 code requirements
- Solar Reflectance Index can be used instead of Aged Solar Reflectance and Thermal Emittance. To calculate Solar Reflectance Index, go to: **www.energy.ca.gov/title24/2013standards**

### Information from the Cool Roof Rating Council website

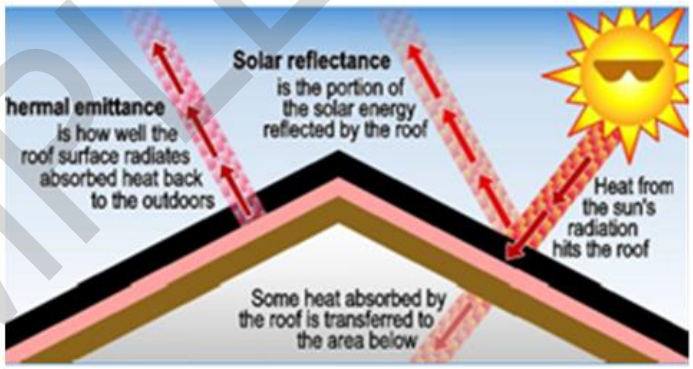
**www.coolroofs.org/resources/california-title-24**

California's Title 24 Building Energy Efficiency Standards establish minimum prescriptive values for 3-year Aged Solar Reflectance, Thermal Emittance, and Solar Reflectance Index. Requirements for residential buildings are limited to specific climate zones; in those climate zones they apply to all new construction, additions of at least 300 $ft^2$ and alterations that replace over 50% of the roof surface. There are numerous exceptions to these cool roofing requirements, such as for low slope roofs (pitch ≤ 2:12), roof areas covered by building-integrated photovoltaic panels, and roofs with thermal mass greater than 25 $lbs/ft^2$ over the roof membrane (green roofs).

| | Initial | Weathered |
|---|---|---|
| Solar Reflectance | 0.00 | Pending |
| Thermal Emittance | 0.00 | Pending |
| Rated Product ID Number | ____ | |
| Licensed Seller ID Number | ____ | |
| Classification | Production Line | |

Cool Roof Rating Council ratings are determined for a fixed set of conditions, and may not be appropriate for determining seasonal energy performance. The actual effect of solar reflectance and thermal emittance on building performance may vary.

Manufacturer of product stipulates that these ratings were determined in accordance with the applicable Cool Roof Rating Council procedures.




SAMPLE

### Changes from 2008 Energy Code:

- Distinctions between roofing product weight (more or less than 5 $lbs/ft^2$) have been removed
- The equation for calculating Aged from Initial Solar Reflectance was updated
- For residential alterations, an exception for increased roof insulation

### For more information on 2013 Title 24 Part 6 requirements:

- Visit the CEC website: **www.energy.ca.gov/title24/2013standards/**
- Contact the CEC energy code hotline at (800) 772-3300 or email: **title24@energy.state.ca.us**
- Contact the BayREN Codes & Standards Program by email: **codes@bayren.org**

# Residential Water Heater Alteration

## 2013 Energy Code Permit Guide

Permit DATE: Permit NUMBER: CA Climate Zone:

Permit ADDRESS: City, Zip:

This guide applies to: Storage gas water heaters with an input rating ≤ 75,000 Btu per hour; Instantaneous gas water heaters with an input rating ≤ 200,000 Btu per hour; and Electric water heaters 60 gallons or less. For other water heating system types and configurations refer to section 150.2(b) of the *2013 Building Energy Efficiency Standards*.

### WATER HEATER REPLACEMENT:

**What is the fuel type of the replacement water heater?**

- ☐ Natural gas or LPG/propane
- ☐ Electric Resistance (Allowed only if this is also the existing fuel type*)

### WATER HEATER ADDITION:

**Is more than one water heater being added?**

- ☐ No
- ☐ Yes (Performance approach must be used)

**What is the fuel type of the additional water heater?**

- ☐ Natural gas or LPG/propane
- ☐ Electric Resistance (Allowed only if this is also the existing fuel type*)

### TANK INSULATION:

**If the Energy Factor (EF) *equals* the values below, external tank insulation of at least R-12 must be installed**. If the EF of the new water heater is higher, no external insulation is needed.

- ☐ 40 gallon – minimum 0.62 EF
- ☐ 50 gallon – minimum 0.60 EF

### PIPE INSULATION:

**The following pipes must have at least one inch of insulation, if pipes are accessible**

- ☐ First five feet of hot and cold water pipes from the storage tank
- ☐ Hot water pipes between the water heater and kitchen

### RECIRCULATION SYSTEMS:

**Are you replacing a recirculation pump?**

- ☐ No, no recirculation system exists
- ☐ No, but a recirculation system already exists. Accessible pipes within an existing loop must be insulated at the time of the water heater replacement
- ☐ Yes. Demand recirculation systems with manual control pumps must be used and all pipes must be insulated

**Is a recirculation system being added?**

- ☐ No
- ☐ Yes (Performance approach must be used)

### Required Prescriptive Form:

- CF1R-ALT-01-E: Certificate of Compliance, Residential Alterations

### For more information on 2013 Title 24 Part 6 requirements:

- Visit the CEC website: **www.energy.ca.gov/title24/2013standards/**
- Contact the CEC energy code hotline at (800) 772-3300 or email: **title24@energy.state.ca.us**
- Contact the BayREN Codes & Standards Program by email: **codes@bayren.org.**

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* If replacing electric resistance water heater in a building where natural gas is available, a heat pump water heater or gas water heater must be installed.

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BAY AREA Regional Energy Network

# Nonresidential Re-Roofing

## 2013 Energy Code Permit Guide

Permit DATE: Permit NUMBER: CA Climate Zone:

Permit ADDRESS: City, Zip:

**COOL ROOF IS NOT REQUIRED** If any of the boxes below are checked.

**Cool Roof Exemptions:** Check any that apply.

- ☐ Roof area is over unconditioned space (e.g. warehouse) or process space (e.g. manufacturing)
- ☐ Area to be re-roofed does not exceed 2,000 $ft^2$ OR 50% of total roof area, whichever is greater
  Area to be re-roofed = _____ $ft^2$ Total roof area = _____ $ft^2$

**Cool Roof Exceptions:** Check any that apply.

- ☐ In CZ 3, wood-framed roof has a U-factor ≤ 0.039
- ☐ In CZ 3, metal building roof has a U-factor ≤ 0.048
- ☐ Roof constructions that have thermal mass with a weight of ≥ 25 lb/$ft^2$ over the roof membrane

**COOL ROOF IS REQUIRED** If none of the boxes above are checked.

**Table 1. Prescriptive Requirements for COOL ROOFS** Circle the applicable requirements.

*Solar Reflective Index values must be calculated, see Page 2 of this guide.

| **Nonresidential Buildings** | | |
|---|---|---|
| Low-sloped roof pitch ≤ 2:12 | 3 year Aged Solar Reflectance, minimum<br>AND Thermal Emittance, minimum | 0.63<br>0.75 |
| | OR Solar Reflective Index, minimum* | 75 |
| Steep-sloped roof pitch > 2:12 | 3 year Aged Solar Reflectance, minimum<br>AND Thermal Emittance, minimum | 0.20<br>0.75 |
| | OR Solar Reflective Index, minimum* | 16 |
| **Hotel, Motel, and High-rise Residential Buildings** | | |
| Steep-sloped roof pitch > 2:12<br>All roof weights | 3 year Aged Solar Reflectance, minimum<br>AND Thermal Emittance, minimum | 0.20<br>0.75 |
| | OR Solar Reflective Index, minimum* | 16 |

**Optional:** For nonresidential buildings with low-sloped roofs, the 2013 code allows a tradeoff between increased roof/ceiling insulation and reduced Aged Solar Reflectance values. To use this option, circle the actual U-factor of the building's roof/ceiling assembly in Table 2, and the corresponding minimum Aged Solar Reflectance value.

**Table 2. Tradeoff Values for Aged Solar Reflectance** Circle the applicable requirements.

| **Roof/Ceiling Insulation Tradeoffs** | | |
|---|---|---|
| Aged Solar Reflectance | Metal Building U-factor | Other Building Types U-factor |
| 0.62-0.60 | 0.061 | 0.036 |
| 0.59-0.55 | 0.054 | 0.034 |
| 0.54-0.50 | 0.049 | 0.032 |
| 0.49-0.45 | 0.047 | 0.030 |
| 0.44-0.40 | 0.043 | 0.028 |
| 0.39-0.35 | 0.039 | 0.027 |
| 0.34-0.30 | 0.035 | 0.025 |
| 0.29-0.25 | 0.033 | 0.024 |

SAMPLE



BAY AREA Regional Energy Network

**ROOF INSULATION IS NOT REQUIRED** if any of the boxes below are checked.

**Exception to Roof Insulation Requirements:** Check any that apply.

- ☐ Existing roof is already insulated to at least R-7 or has a U-factor less than 0.089
- ☐ The roof is not exposed to the roof deck or roof recover boards
- ☐ If mechanical equipment is located on the roof and will not be disconnected and lifted as part of the roof replacement, see Section 141.0(b)2Biii of the *2013 Building Energy Efficiency Standards*

**ROOF INSULATION IS REQUIRED** if none of the boxes above are checked.

**Table 3. Mandatory Insulation Requirements for Roof Alterations** Circle the applicable requirements.

| | **BayREN Climate Zone** | **2** | **3** | **4** | **12** |
|---|---|---|---|---|---|
| **Nonresidential Buildings** | Continuous insulation R-value / Roof assembly U-factor | R-14 / 0.055 | R-8 / 0.082 | R-8 / 0.082 | R-14 / 0.055 |
| **High-rise Residential & Guest Rooms of Hotel/Motel Buildings** | Continuous insulation R-value / Roof assembly U-factor | R-14 / 0.055 | R-14 / 0.055 | R-14 / 0.055 | R-14 / 0.055 |

**Building Inspector:** Roofing material must have a Cool Roof Rating Council (CRRC) package label indicating compliance with the requirements in the table above. If re-roofing involves a field applied liquid coating, see Section 110.8(i)4, Table 110.8-C of the *2013 Building Energy Efficiency Standards*.

**Required Forms**:

- NRCC-ENV-02-E: Certificate of Compliance for Envelope Component
- NRCI-ENV-01-E: Certificate of Installation for Envelope (from installing contractor, before field inspection)
- Cool Roof Rating Council (CRRC) label indicating compliance with applicable requirements

If Applicable:

- NRCC-ENV-03-E: Solar Reflectance Index Calculation Worksheet
  (if this value is used instead of Aged Solar Reflectance and Thermal Emittance values)

**For more information on 2013 Title 24 Part 6 requirements:**

- Visit **www.energy.ca.gov/title24/2013standards/**
- Contact the energy code hotline at (800) 772-3300 or email: **title24@energy.state.ca.us**
- Contact the BayREN Codes & Standards Program by email: **codes@bayren.org**

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# Nonresidential Unitary HVAC Systems

**2013 Energy Code Permit Guide**

## Certificates of Compliance

The following forms must be submitted, as applicable, when replacing or installing new HVAC equipment or when modifying or replacing ductwork located in unconditioned space or outside.

**Approaches**

| Prescriptive | | | Performance | Prescriptive & Performance | |
|---|---|---|---|---|---|
| All HVAC Systems | Simple Unitary Systems | Water Cooling Towers | Forms for All HVAC Systems: | *New Buildings also require design commissioning Certificate of Compliance forms* | |
| NRCC-MCH-01-E<br>NRCC-MCH-02-E<br>NRCC-MCH-03-E | NRCC-MCH-04-E<br>NRCC-MCH-05-E | NRCC-MCH-06-E | NRCC-PRF-01-E | NRCC-CXR-01-E<br>NRCC-CXR-02-E<br>NRCC-CXR-03-E<br>NRCC-CXR-04-E<br>NRCC-CXR-05-E | Design Review Kick-off Meeting<br>General Construction Documents<br>Simple HVAC Systems<br>Complex HVAC Systems (if not all HVAC systems are Simple)<br>Design Review Signature Page |

| | |
|---|---|
| Acceptance Testing | • The list of Acceptance Tests required for each permit is on form NRCC-MCH-01-E or NRCC-MCH-04-E. Completed Acceptance test forms will need to be seen by field inspector and provided to building owner.<br>• All **NEW** HVAC systems must complete the "Outside Air" Acceptance Test and document the results on NRCA-MCH-02A. |

## Mandatory Measures

Can also be found on NRCC-MCH-02, Page 1of 3 – All applicable measures should be noted on plans.

| Measure | Section | Requirements |
|---|---|---|
| Thermostat Requirements | Section 120.2(a) | Thermostat controls are required for each HVAC zone |
| | Section 110.2(b) | Thermostats for heat pump with supplementary electric heat must prevent electric resistance heating when load can be met by heat pump |
| | Section 120.2(c) | Provide shut-off, reset and setback controls |
| | Section 120.2(h) | Systems with Direct Digital Controls to the zone level shall include centralized demand shed control for non-critical spaces |
| | Section 120.1(c)5 | Automatically setup cooling temperature 2°F and heating temperature 2°F and automatically reset minimum ventilation with an Occupant Sensor Control for the following occupancies:<br>▪ Multi-purpose rooms less than 1,000 sf.<br>▪ Classrooms, conference, convention, auditorium and meeting center rooms greater than 750 sf.<br>▪ Exceptions:<br>o If spaces controlled by demand control ventilation with economizers.<br>o If HVAC system has full load demand of 2 Kw or less.<br>Hotel-motel guest rooms shall have captive key, occupancy sensing controls or automatic controls that automatically setup the cooling temperature 5°F and set-down the heating temperature 3°F 30 minutes after the room is vacated. |
| Minimum HVAC Gas/Oil Equipment Efficiencies | *Source: 2015 Appliance Efficiency Regulations, July 2015, CEC-400-2015-021* | |

| **HVAC System** | **Fuel** | **BTUH** (Input) | **Enclosure** | **AFUE** |
|---|---|---|---|---|
| Split System & Package Units | Gas | < 225,000 | Weatherized | 0.81 |
| | | | Non-Weatherized | 0.80 |
| | | ≥ 225,000 | | 0.80 |
| | Oil | < 225,000 | Weatherized | 0.78 |
| | | | Non-Weatherized | 0.83 |
| | | ≥ 225,000 | | 0.81 |

# Nonresidential Unitary HVAC Systems

## 2013 Energy Code Permit Guide

| Mandatory Measures<br>Can also be found on NRCC-MCH-02, Page 1of 3 – All applicable measures should be noted on plans. | | |
|---|---|---|
| **Measure** | **Section** | **Requirements** |
| Ventilation | Section 120.1(b)<br><br>Section 120.2(f) | Conditioned spaces shall provide mechanical ventilation equal to the ventilation rate in Table 120.1-A of the Standards or Tables 4-13 and 4-14 of the 2013 Non-Residential Compliance Manual or 15 cfm times the expected number of occupants, whichever is greater.<br>▪ Exceptions:<br>o Natural ventilation permanently open to and within 20 sf of operable wall and roof openings to the outside with a free unobstructed area equal to at least 5% of the area served. Distance to operable opening increased to 25 sf for high-rise residential, hotel and motel guest rooms.<br>Supply air and exhaust equipment shall have dampers on fresh air intake and exhaust locations that automatically close upon fan shutdown |
| Demand Control Ventilation | Section 120.1(c) | HVAC equipment with an economizer serving spaces with an occupant density of 25 occupants/1,000 sf or more (40sf/occupant) shall have a separate Demand Control Sensor for each enclosed area that meets or exceeds this occupancy density. |
| Economizer Fault Detection and Diagnostic Controls | Section 120.2(i) | Unitary direct expansion HVAC units rated at 54,000 BTUH or higher that have an economizer shall include a Fault Detection and Diagnostic (FDD) system |
| Isolation Zones | Section 120.2(g) | HVAC equipment serving spaces larger than 25,000 sf shall be divided into separate isolation zones. |
| Duct insulation | Section 120.4(a) | ▪ R-8 when ducts are located in unconditioned spaces.<br>▪ R-4.2 when ducts in indirectly conditioned spaces.<br>▪ No requirement when ducts located in conditioned spaces |
| Relocation of existing equipment | NR Manual Section 4.9.1.B | ▪ When existing heating or cooling systems or components are moved within a building the existing systems and components need not comply with Mandatory Measures nor with Prescriptive or Performance compliance requirements. |

| PRESCRIPTIVE REQUIREMENTS | | |
|---|---|---|
| **Measure** | **Section** | **Requirements** |
| Zone Controls | Section 140.4(d) | Each space conditioning zone shall have controls to prevent reheating, recooling and simultaneous heating and cooling |
| Economizers | Section 140.4(e)1,2,3,4 & 5 | Mechanical cooling systems with a cooling capacity exceeding 54,000 Btu/hr shall have either:<br>▪ An air economizer capable of modulating outside air and return air dampers to supply 100 percent of the design airflow as outside air; or<br>▪ A water economizer capable of providing 100 percent of the expected cooling at an outside air temperature of 50°F dry-bulb and 45°F wet-bulb.<br>▪ Economizer Trade-off Table 140.4. Increase cooling efficiency listed below: |

| Climate Zone | Efficiency Improvement | Example |
|---|---|---|
| 2, 3 & 4 | 65% | SEER 14 → SEER 21.1 |
| 12 | 30% | SEER 14 → SEER 18.2 |

| HERS REQUIREMENTS | | | |
|---|---|---|---|
| DUCT LEAKAGE INSPECTION AND TESTING<br>NRCC-MCH-02-E, Page 1 of 3 or NRCC-MCH-05-E, Page 1 of 2 | | | |
| | | Required When: | Exceptions: |
| *PRESCRIPTIVE APPROACH* | New Construction* (Section 140.4(l) 1,2 & 3)<br><br>*Individual zones not to exceed 5,000 sqft.* | • More than 25% of the ductwork surface area is located in unconditioned space or outside; **and**<br>• The HVAC unit has a constant volume fan; **and**<br>• The HVAC system serves a single zone; **and**<br>• The zone served by the HVAC unit is less than 5,000 sf | • Institutional Occupancies.<br>• Historic structures when waived by the building official<br>• Temporary buildings |
| | Altered Duct Systems<br>Section 141.0(b)2D | • If the existing HVAC System meets all the requirements for "New Construction" (above)<br>• The ductwork is modified (No exception for minor ductwork changes) | • Same exceptions as "New Construction" above. Plus, the following:<br>• When existing ductwork remains and is constructed, insulated or sealed with asbestos. |
| | Altered HVAC System<br>Section 141.0(b) 2Eii | • If the existing HVAC System meets all the requirements for "New Construction" (above)<br>• HVAC equipment is added or replaced; or<br>• The outside condenser on a split system is replaced.<br>• The cooling coil is replaced.<br>• The heating coil is replaced. (Gas heat exchanges are exempt)<br>• The air handler is replaced | • Same exceptions as "New Construction" and "Altered Duct System" above.<br>• When the HVAC unit is replaced or altered and, no ductwork is modified, and the existing ductwork was previously sealed, inspected, tested and formally certified for compliance with an approved HERS Provider, and a copy of the previous duct leakage certification is provided to the building official. |
| *PERFORMANCE APPROACH* | NRCC-PRF-01, Section E – HERS Verification<br>HERS inspection and testing not required unless specifically listed in the NRCC-PRF-01-E form. Duct sealing can be traded off against other features. If duct testing is listed in the NRCC-PRF-01-E it is required even if the ductwork does not meet the requirements of Section 140.4(l) 1,2 & 3. | | |
| ** No exceptions for ductwork **less than 40 linear ft. (Only for residential)*** | | | |

| LOW-LEAKAGE AIR HANDLER | |
|---|---|
| | Requirements |
| *PRESCRIPTIVE APPROACH* | N/A |
| *PERFORMANCE APPROACH* | • Optional credit available if requirement listed in form NRCC-PRF-01-E - Section E – HERS Verification.<br>• Low leakage air handler must be listed in the CEC directory of approved air handlers. **http://www.energy.ca.gov/title24/equipment_cert/llahu/low_leakage_air_handling_units.pdf** |

## For more information on 2013 Title 24 Part 6 requirements:

- Visit **www.energy.ca.gov/title24/2013standards/**
- Contact the energy code hotline at (800) 772-3300 or email: **title24@energy.state.ca.us**
- Contact the BayREN Codes & Standards Program by email: codes@bayren.org

# Nonresidential Indoor Lighting Alterations

## 2013 Energy Code Permit Guide

### Step 1: Applicability

| | Yes | No |
|---|---|---|
| Is **wiring modification** required other than to install controls? | ☐ | ☐ |
| Does the lighting alteration not qualify as a **Luminaire Modification-in-Place**? | ☐ | ☐ |
| Are seventy or more[1] luminaires being replaced for any floor/tenant space in the building this year? | ☐ | ☐ |
| Are more than 10% of the luminaires being replaced in this room? | ☐ | ☐ |

*If you checked **yes** to any of the boxes above, proceed to the Step 2. If you checked **no** to all boxes, then you may install any lighting that does not add wattage. No further steps required.*

### Step 2: Lighting Power Density (LPD)

| | Yes | No |
|---|---|---|
| Is the lighting alteration part of a **general remodel**? | ☐ | ☐ |
| Does proposed LPD (proposed total watts / square footage of space) exceed the allowed LPD? [2] | ☐ | ☐ |

*If you check **yes** to both of the boxes above, the proposed alteration as is not allowed by code. If one or both are checked, proceed to Step 3.*

### Step 3: Requirements

| | Yes | No |
|---|---|---|
| Is the installed lighting power density less than 85% of what is allowed for your occupation type?[2] | ☐ | ☐ |

*If lighting alteration is part of a **general remodel** and you checked **yes** to the box above, comply with **Set A**.*
*If lighting alteration is part of a **general remodel** and you checked **no** to the box above, comply with **Set B**.*
*If lighting alteration is **NOT** part of a **general remodel** and you checked **yes** to the box above, comply with **Set A or C**.*
*If lighting alteration is **NOT** part of a **general remodel** and you checked **no** to the box above, comply with **Set B or C**.*

| | Sets of Requirements | Code Section |
|---|---|---|
| **A.** | Area Controls | 130.1(a) |
| | Shut-Off Controls | 130.1(c) |
| | Install either a Bi-Level Control or meet requirements for Multi-Level Controls | 130.1(b) |
| **B.** | Multi-Level Controls | 130.1(c) |
| | Daylighting Controls | 130.1(d) |
| **C.** | Rated LPD of the luminaires you are installing must be AT LEAST 50% (for office, retail or hotel/motel occupancies) or 35% (for all other occupancies) lower than the rated power of the luminaires you are replacing, and meet the requirements of: | |
| | Area Controls: manual on/off, readily accessible, switch in same room, dimmers with manual on, other controls cannot override manual controls, etc. | 130.1(a)1, 2, 3 |
| | Shut off controls: automatic shutoff during unoccupied periods (not countdown timers in certain spaces), override for timers no more than 2 hours, holiday shut off for timers, occupant sensors must shut off ALL lights in space, partial on/off in certain stairs and corridors) | 130.1(c) 1A-C, 2, 3, 4, 5,6A |

### If the above requirements apply to your installation, the following forms are required:

- NRCC-LTI-01-E: Certificate of Compliance and Field Inspection Checklist
- NRCC-LTI-03-E: Certificate of Compliance - Indoor Lighting Power Allowance
- NRCC-LTI-02-E: Certificate of Compliance - Lighting Controls Credit Worksheet (if you are taking controls credits)
- NRCC-LTI-05-E: Certificate of Compliance - Line Voltage Track Lighting Worksheet (if you are installing track lighting)
- NRCA-LTI-02-A: Lighting Controls (for non-daylighting controls that control more than 20 luminaires)
- NRCA-LTI-03-A: Automatic Daylighting (for daylighting controls that control more than 20 luminaires)
- NRCA-LTI-04-A: Demand Responsive Lighting Controls (for demand responsive controls that control more than 20 luminaires)

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[1] Count this installation as part of the total number of replacements this year
[2] *Table 140.6-C*

| Glossary | |
|---|---|
| **Wiring Modification** | Any change to the panelboard or branch circuit wiring, including line voltage switches, relays, contactors, dimmers and other control devices providing power to the lighting system. |
| **Luminaire Modification-In-Place** | Alterations where lighting is modified without adding or moving luminaires. |
| **Luminaire Modification-In-Place Qualifications** | 1. Replacing lamps and ballasts with like type or quantity in a manner that preserves the original luminaire listing.<br>2. Changing the number or type of light source in a luminaire including: socket renewal, removal or relocation of sockets or lamp holders, and/or related wiring internal to the luminaire including the addition of safety disconnecting devices.<br>3. Changing the optical system of a luminaire in part or in whole.<br>4. Replacement of whole luminaires one for one in which the only electrical modification involves disconnecting the existing luminaire and reconnecting the replacement luminaire. (141.0(b)2Iiii) |
| **General Remodel** | Any alteration that adds, removes, or replaces walls or ceilings along with any redesign of the lighting system |

## For more information on 2013 Title 24 Part 6 requirements:

- Visit **www.energy.ca.gov/title24/2013standards/**
- Contact the energy code hotline at (800) 772-3300 or email: **title24@energy.state.ca.us**
  Contact the BayREN Codes & Standards Program by email: **codes@bayren.org**

# Nonresidential Indoor Lighting Alterations

## 2013 Energy Code Permit Guide

*TABLE 140.6-C AREA CATEGORY METHOD - LIGHTING POWER DENSITY VALUES (WATTS/FT²)*

| PRIMARY FUNCTION AREA | | ALLOWED LIGHTING POWER (W/ft²) |
|---|---|---|
| Auditorium Area | | 1.5[3] |
| Auto Repair Area | | 0.9[2] |
| Beauty Salon Area | | 1.7 |
| Civic Meeting Place Area | | 1.3[3] |
| Classroom, Lecture, Training, Vocational Areas | | 1.2[5] |
| Commercial and Industrial Storage Areas (conditioned and unconditioned) | | 0.6 |
| Commercial and Industrial Storage Areas (refrigerated) | | 0.7 |
| Convention, Conference, Multipurpose and Meeting Center Areas | | 1.4[3] |
| Corridor, Restroom, Stair, and Support Areas | | 0.6 |
| Dining Area | | 1.1[3] |
| Electrical, Mechanical, Telephone Rooms | | 0.7[2] |
| Exercise Center, Gymnasium Areas | | 1.0 |
| Exhibit, Museum Areas | | 2.0 |
| Financial Transaction Area | | 1.2[3] |
| General Commercial and Industrial Work Areas | Low bay | 0.9[2] |
| | High bay | 1.0[2] |
| | Precision | 1.2[4] |
| Grocery Sales Area | | 1.2[6 and 7] |
| Hotel Function Area | | 1.5[3] |
| Kitchen, Food Preparation Areas | | 1.6 |
| Laboratory Area, Scientific | | 1.4[1] |
| Laundry Area | | 0.9 |

| PRIMARY FUNCTION AREA | | ALLOWED LIGHTING POWER (W/ft²) |
|---|---|---|
| Library Area | Reading areas | 1.2[3] |
| | Stack areas | 1.5[3] |
| Lobby Area | Hotel Lobby | 1.1[3] |
| | Main entry lobby | 1.5[3] |
| Locker/Dressing Room | | 0.8 |
| Lounge Area | | 1.1[3] |
| Malls and Atria | | 1.2[3] |
| Medical and Clinical Care Area | | 1.2 |
| Office Area | > 250 square feet | 0.75 |
| | ≤ 250 square feet | 1.0 |
| Parking Garage Area | Parking Area | 0.14 |
| | Dedicated Ramps | 0.3 |
| | Daylight Adaptation Zones [9] | 0.6 |
| Religious Worship Area | | 1.53 |
| Retail Merchandise Sales, Wholesale Showroom Areas | | 1.2[6 and 7] |
| Theater Area | Motion picture | 0.9[3] |
| | Performance | 1.4[3] |
| Transportation Function Area | | 1.2 |
| Videoconferencing Studio | | 1.2[8] |
| Waiting Area | | 1.1[3] |
| All other areas | | 0.6 |

FOOTNOTES FOR TABLE 140.6-C:
See Section 140.6(c) 2 for an explanation of additional lighting power available for specialized task work, ornamental, precision, accent, display, decorative, and white boards and chalkboards, in accordance with the footnotes in this table. The smallest of the added lighting power listed in each footnote below, or the actual design wattage, may be added to the allowed lighting power only when using the Area Category Method of compliance.

| Footnote number | Type of lighting system allowed | Maximum allowed added lighting power. (W/ft² of task area unless otherwise noted) |
|---|---|---|
| 1 | Specialized task work | 0.2 W/ft² |
| 2 | Specialized task work | 0.5 W/ft² |
| 3 | Ornamental lighting as defined in Section 100.1 and in accordance with Section 140.6.(c)2. | 0.5 W/ft² |
| 4 | Precision commercial and industrial work | 1.0 W/ft² |
| 5 | Per linear foot of white board or chalkboard. | 5.5 W per linear foot |
| 6 | Accent, display and feature lighting - luminaires shall be adjustable or directional | 0.3 W/ft² |
| 7 | Decorative lighting - primary function shall be decorative and shall be in addition to general illumination. | 0.2 W/ft² |
| 8 | Additional Videoconferencing Studio lighting complying with all of the requirements in Section 140.6(c) 2Gvii. | 1.5 W/ft² |
| 9 | Daylight Adaptation Zones shall be no longer than 66 feet from the entrance to the parking garage | |



BAY AREA Regional Energy Network

# Nonresidential Acceptance Testing

## 2013 Energy Code Permit Guide

### What is Acceptance Testing?

Acceptance testing, also known as acceptance criteria verification, is a test performed in the field to determine if specific requirements are met for optimal operational efficiency and to avoid premature system failure. To certify compliance with the acceptance requirements, Certification of Acceptance documents must be completed and collected by field inspectors prior to the permit closing. Certain lighting, HVAC controls, air distribution ducts, envelope features, and equipment needing proper calibration, require acceptance testing at the time of commissioning.

### Steps for collecting Certificate of Acceptance documents:

| To be completed by | Instructions |
|---|---|
| Permit Tech | 1. Determine scope of project and building features being installed. |
| Permit Tech | 2. For each question, checkmark "Yes" for applicable building features. |
| Field Inspector | 3. For applicable features check marked "Yes", checkmark "Collected" after corresponding signed and completed Certification of Acceptance document have been collected |
| Field Inspector | 4. If it is agreed that an acceptance test is not needed, then remove "Yes" checkmark. |
| ***Do not*** *close the permit until the installed feature meets the acceptance testing requirements and the form is completed and signed.* | |

| | Permit Tech | | Field Inspector | |
|---|---|---|---|---|
| **Scope** | **Building Feature** | **Yes** | **Corresponding Certification of Acceptance document** | **Collected** |
| **Mechanical** | **Outdoor Air –** Will there be a space that is required to have mechanical ventilation being installed? | | NRCA-MCH-02-A | |
| | **Constant Volume Single Zone HVAC –** Are constant, single zone, unitary air conditioner and/or heat pump systems being installed? | | NRCA-MCH-03-A | |
| | **Air Distribution Duct Leakage Testing –** Are new or replaced space conditioning system ducts serving new or existing buildings being installed? | | NRCA-MCH-04-A | |
| | **Air Economizer Controls –** Will cooling fan systems with a design total mechanical cooling capacity over 54,000 Btu/hr be installed? | | NRCA-MCH-05-A | |
| | **Demand Control Ventilation-** Are HVAC systems with an air economizer, a design occupant density greater than or equal to 25 people per 100 sq. ft., or either a single zone system with any controls or a multiple zone system with direct digital controls to the zone level required? | | NRCA-MCH-06-A | |
| | **Supply Fan Variable Flow Controls –** Will variable air volume systems be installed? | | NRCA-MCH-07-A | |
| | **Valve leakage Test –** Are hydronic variable flow, water-cooled air conditioners and/or hydronic heat pump systems being installed? | | NRCA-MCH-08-A | |
| | **Supply Water Temperature Reset Controls –** Are systems with a design capacity exceeding 500,000 Btu/hr supplying chilled or heated water being installed? | | NRCA-MCH-09-A | |
| | **Hydronic System Variable Flow Controls –** Will hydronic variable flow systems be installed? | | NRCA-MCH-10-A | |
| | **Automatic Demand Shed Controls –** Will HVAC Systems with Direct Digital Control to the Zone level be installed? | | NRCA-MCH-11-A | |
| | **FDD Package Direct Expansion Units –** Are new air-cooled unitary direct-expansion units, equipped with an economizer and mechanical cooling capacity at AHRI conditions of greater than or equal to 54,000 Btu/hr being installed? | | NRCA-MCH-12-A | |
| | **FDD Air Handling Units and Zone Control Units -** Are air handling units and/or zone terminal units being installed? | | NRCA-MCH-13-A | |
| | **Distributed Energy Storage DX-AC Systems –** Are distributed energy storage DX-AC systems being installed? | | NRCA-MCH-14-A | |



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# Nonresidential Acceptance Testing

## 2013 Energy Code Permit Guide

| | Permit Tech | | Field Inspector | |
|---|---|---|---|---|
| **Scope** | **Building Feature** | **Yes** | **Corresponding Certification of Acceptance document** | **Collected** |
| | **Thermal Energy Storage Systems –** Will thermal energy storage systems be installed? | | NRCA-MCH-15-A | |
| | **Air Supply Temperature reset Controls –** Will a space-conditioning systems supplying heated or cooled air to multiple zones will be installed? | | NRCA-MCH-16-A | |
| | **Condenser Water Temperature reset Controls –** Will new condenser water temperature reset controls be installed on new or existing systems? | | NRCA-MCH-17-A | |
| | **Energy Management Control Systems –** Will an energy management control system be installed? | | NRCA-MCH-18-F | |
| **Envelope** | **Fenestration –** Will site-built windows be installed? | | NRCA-ENV-02-F | |
| **Indoor Lighting** | **Lighting Controls –** Will luminaire addition, alteration, skylights, modifications in-place (>40 fixtures), lighting wiring alterations and illuminated signs be installed? | | NRCA-LTI-02-A | |
| | **Automatic Daylighting Controls –** Will a luminaire addition be installed? | | NRCA-LTI-03-A | |
| | **Demand Response Lighting Controls –** Will luminaire addition/alteration take place and is the building larger than 10,000 sf? | | NRCA-LTI-04-A | |
| **Outdoor Lighting** | **Outdoor Lighting Controls –** Does the scope include replacing 10% or more luminaires, incandescent luminaire >100 watts, luminaire rated >150 watts, sales frontage lighting, sales lots and canopies, façade lighting, hardscape lighting, additional lighting power allowance or sign lighting? | | NRCA-LTO-02-A | |
| **Process** | **Compressed Air Systems –** Are compressed air systems being installed? | | NRCA-PRC-01-F | |
| | **Kitchen Exhaust Systems –** Will kitchen exhaust systems be installed? | | NRCA-PRC-02-F | |
| | **Garage Exhaust Systems –** Are enclosed parking garages in the scoped? | | NRCA-PRC-03-F | |
| | **Evaporator Fan Motor Controls –** Will new fan-powered evaporators used in coolers and freezers be installed? | | NRCA-PRC-04-F | |
| | **Evaporator Condenser Controls –** Will new fan-powered evaporative-cooled condensers on new refrigeration systems be installed? | | NRCA-PRC-05-F | |
| | **Air Cooled Condenser Controls –** Will new fan-powered air-cooled condensers on new refrigeration systems be installed? | | NRCA-PRC-06-F | |
| | **Variable Speed Compressor –** Are compressor systems utilized in refrigerated warehouses being installed? | | NRCA-PRC-07-F | |
| | **Electric Resistance Under Slab Heating System –** Will electric resistance under slab heating will be installed? | | NRCA-PRC-08-F | |



BAY AREA Regional Energy Network

# Model Water Efficiency Landscape Ordinance (MWELO)

## 2015 Ordinance Applicability Guide

### What is MWELO?

The state of California is in a severe drought and landscape irrigation accounts for almost half of our urban water use. The Model Water Efficiency Landscape Ordinance (MWELO) was established in response to the constraint on our water supply to increase efficiency standards and salvage this resource.

### What does this mean for me?

Depending on the type of landscape you currently have or plan to have, you may be subject to MWELO requirements enforced by your local water agency or purveyor.

### How do I know if I need to follow MWELO standards?

If you are pursuing a project associated with landscape subject to Planning Department review and/or subject to a city permit, MWELO may be applicable. Other exceptions and restrictions may apply. Follow the guide below to find out if your landscape meets the parameters of the MWELO requirements.

**The following cities are subject to additional requirements. Contact your city for further details.**

- Fremont
- Hayward

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## Step 1: Basic Applicability

| | Yes | No |
|---|---|---|
| Is this a new construction with **landscape area** greater than or equal to 500 square feet? | ☐ | ☐ |
| Is this an existing property with a **new landscape area** greater than or equal to 500 square feet? | ☐ | ☐ |
| Is this a **rehabilitated (re-landscaping or replacement) landscape project** greater than or equal to 2500 square feet? | ☐ | ☐ |

If you checked yes to any of the above boxes, proceed to Step 2. If you checked no to all, MWELO does NOT APPLY

## Step 2: Exceptions to Applicability

| | Yes | No |
|---|---|---|
| Is the landscape area a registered **historical site**? | ☐ | ☐ |
| Is the landscape area an **ecological restoration project** that does not require a permanent irrigation system site? | ☐ | ☐ |
| Is the landscape area a part of a **botanical garden** or **arboretum** open to the general public? | ☐ | ☐ |

If you checked no to all of the above, proceed to Step 3. If you checked yes any of the boxes, MWELO does NOT APPLY

## Step 3: Limited Applicability

| | Yes | No |
|---|---|---|
| Is the landscape area a cemetery? | ☐ | ☐ |
| Is the landscape area an **existing landscape**? | ☐ | ☐ |
| Is the landscape area a new landscape 500 to 2500 square feet? | ☐ | ☐ |
| Is the landscape area less than 2500 square feet and using **graywater** or **rainwater** to meet the landscape water needs? | ☐ | ☐ |

If you checked yes to any of the above, you may be subject to limited ordinance management and reporting. Check with local agency. If checked no to all of the above, you are subject to MWELO compliance.

# Model Water Efficiency Landscape Ordinance (MWELO)

## 2015 Ordinance Applicability Guide

| Glossary | |
|---|---|
| **MWELO** | Model Water Efficiency Landscape Ordinance |
| **Existing Landscape** | Landscape over one acre in size installed before December 1 2015 |
| **New Landscape** | A new building or new development with associated landscaping that is subject to Planning Department review and/or subject to a city permit |
| **Rehabilitated Landscape** | Projects associated with re-landscaping or replacement landscaping subject to Planning Department review and/or subject to a city permit |
| **Landscape Area** | Planting areas, turf areas, and water features in a landscape design plan subject to the water allowance calculated through the ordinance [visit CA Water Resource website for equation to calculate water allowance]. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or non-development (e.g. open spaces and existing native vegetation). |
| **Landscape Project** | Total area of landscape in a project as defined by the "landscape area" |
| **Historical Site** | An official location where pieces of political, military, cultural or social history have been preserved due to their cultural heritage value |
| **Ecological Restoration Project** | Projects where the site is intentionally altered to establish a defined, indigenous, historic ecosystem |
| **Botanical Garden/Arboretum** | Establishments where plants are grown for display to the public and often for scientific study |
| **Special Landscape Area** | Areas of the landscape dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water |
| **Graywater** | Untreated wastewater that has not been contaminated by bodily waste (ex. Wastewater from clothes washers) |
| **Rainwater** | Water harvested from rain |

## For more information on the Model Water Efficiency Irrigation Ordinance:

- Visit the CA Department of Water Resources: **www.water.ca.gov/wateruseefficiency/landscapeordinance/**
- Contact your local water agency or planning department for permits and additional local ordinance requirements (if applicable)
- Fremont WELO Requirements: http://www.stopwaste.org/resource/fremont-landscape-requirements
- Hayward WELO Requirements: http://www.stopwaste.org/resource/hayward-bay-friendly-water-efficient-landscape-ordinance



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