

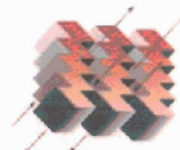
Nonresidential Fenestration

Charles Eley, AEC

DOCKET	
07-BSTD-1	
DATE	FEB 26 2007
RECD.	APR 29 2008

2008 California Building Energy Efficiency Standards

Public Workshop
February 26-27, 2007



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Fenestration Standards Appendix



- Modifies the procedure for determining nonresidential U-factor and SHGC values for site-built fenestration (<10,000 ft²) and for skylights.
- *Measure Evaluation Report*: Alternate Default Fenestration Thermal Properties (formerly NACM NI)

Section

Appendix

Residential

✓ Nonresidential
Both

✓ Envelope

Lighting

HVAC

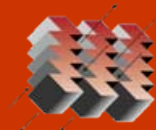
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Residential Windows



- Modifies the fenestration U-factor and SHGC values in the reference Package D.
- Adds a new Alternative Component Package to accommodate fenestration products with higher U- factors but with enhanced structural characteristics.
- *Measure Evaluation Report: CASE Study for Residential Windows*, http://www.energy.ca.gov/title24/2008standards/documents/2006-05-18_workshop/2006-05-16_RES_WINDOWS.PDF

Section

151

✓ Residential
Nonresidential
Both

✓ Envelope
Lighting
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VAV Zone Minimums



- Allows for “dual maximum” control of VAV boxes.
- Applies for direct digital control at the zone level.
- Insert figures from GG ASHRAE presentation
- *Measure Evaluation Report*: DDC to the Zone Level 1: VAV Zone Minimums,
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/DDC_ZONE_LEVEL_1_VAV.PDF

Section

144

Residential

✓ Nonresidential
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VAV Zone Minimums (current)



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Residential

✓ Nonresidential

Both

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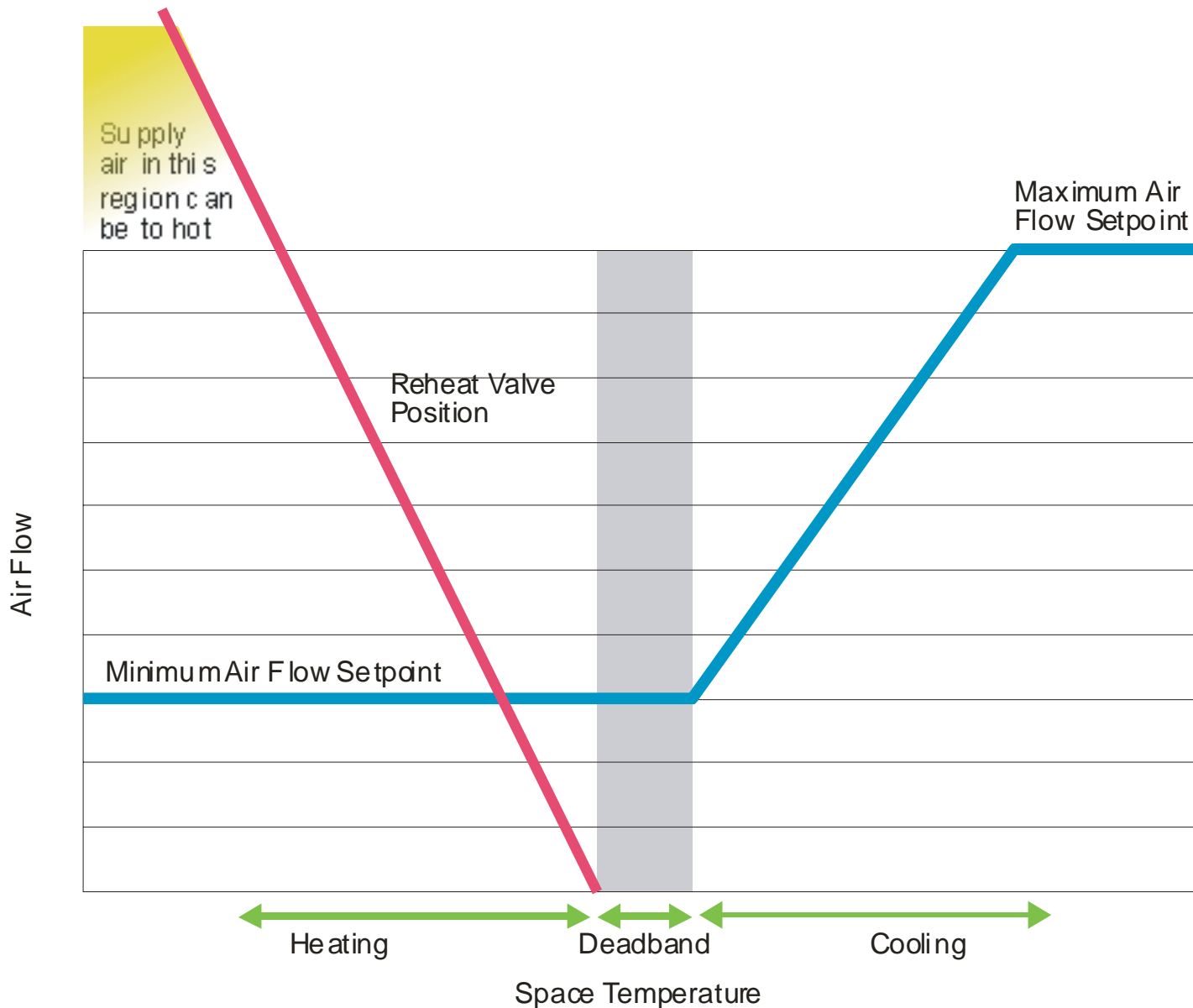
✓ Lighting

HVAC

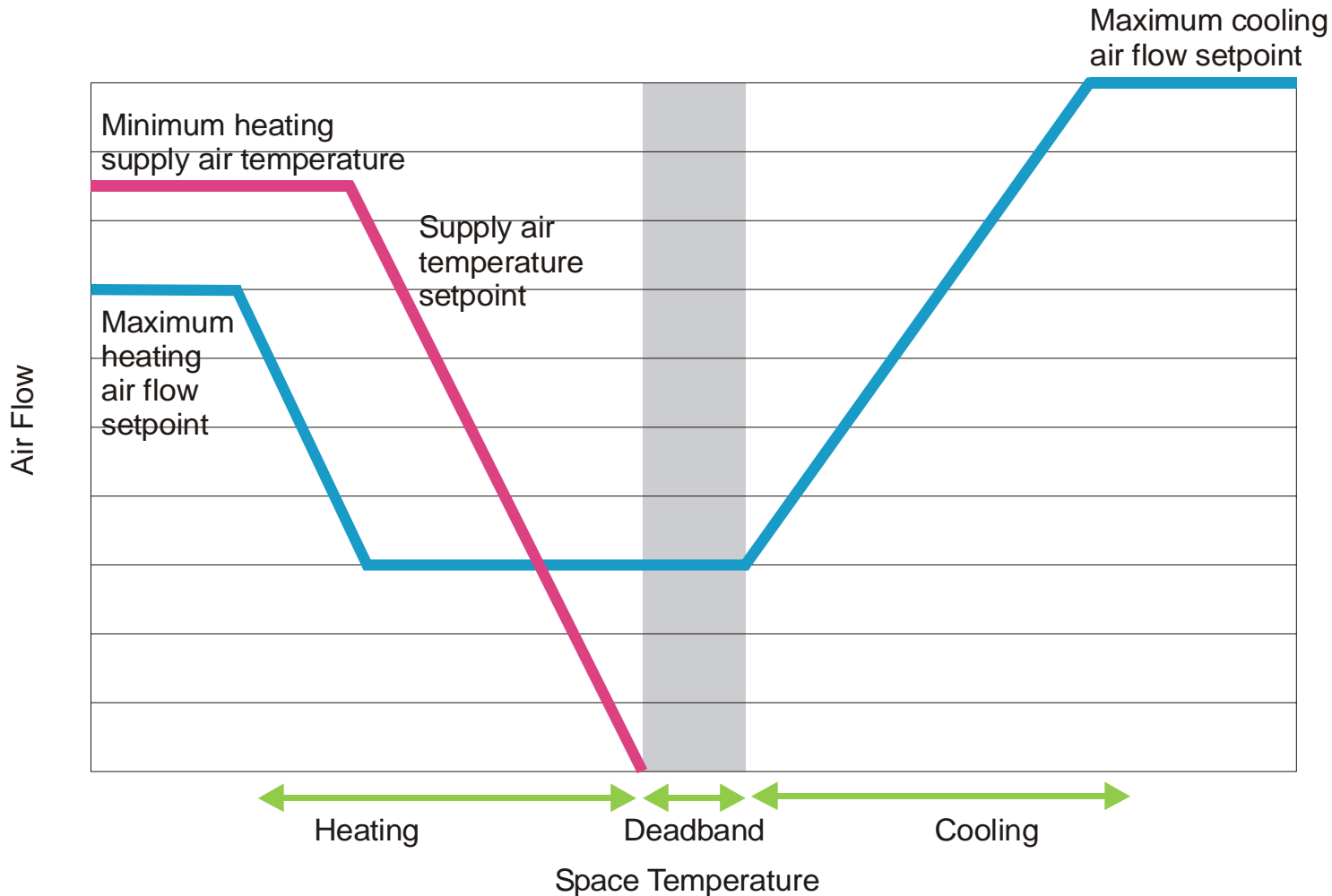
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VAV Zone Minimums (as modified)



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Residential
✓ Nonresidential
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✓ Lighting
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Global Temperature Adjustment



- Requires that controls have the capability to automatically reset the temperature setpoints of all non-critical zones by 1 to 4°F from a single central command in the building energy management and control system (EMCS).
- Limited to buildings that have direct digital control (DDC) at the zone level.
- *Measure Evaluation Report: DDC to the Zone Level 2: Demand Shed Controls*,
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/2006-07-11_DDC_LEVEL2.PDF

Section

122 (h), ACM

Residential

✓ Nonresidential

Both

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Lighting

✓ HVAC

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Hydronic Pressure Reset



- Requires demand based reset of the pressure setpoint for pumps serving variable flow systems based on valve demand.
- This measure is the hydronic analog of the existing prescriptive measure for supply air pressure reset.
- *Measure Evaluation Report*: DDC to the Zone Level 3: Hydronic Pressure Reset,
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/2006-07-11_DDC_LEVEL2.PDF

Section

144 (j) 6

Residential

✓ Nonresidential

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✓ HVAC

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Demand Control Ventilation



- Extends the requirement for demand control ventilation to high occupant density zones served by multiple zone systems.
- Limited to buildings that have direct digital control (DDC) at the zone level.
- *Measure Evaluation Report: DDC to the Zone Level 4: Demand Control Ventilation (DCV)*,
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/DDC_ZONE_MEASURE_4_DCV.PDF

Section

121 (c) 3

Residential

✓ Nonresidential
Both

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✓ Lighting
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Supply Air Temperature (SAT) Reset



- Clarifies the requirement for demand based supply air temperature reset for variable air volume (VAV) systems that operate when the system is on 100% free cooling from the air-side economizer.
- *Measure Evaluation Report*: DDC to the Zone Level 5: Supply Air Temperature Reset,
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/2006-07-11_DDC_MEASURE5.PDF

Section

144 (f)

Residential

✓ Nonresidential

Both

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✓ HVAC

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Single Zone VAV



- Requires variable speed drive or two-speed fan control for single zone packaged equipment with a cooling capacity of 110,000 Btu/h or greater.
- To take effect 1/1/2012.
- *Measure Evaluation Report: Single Zone VAV Systems*, http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/SINGLE_ZONE_VAV_SYSTEMS.PDF

Section

125, 144

Residential

✓ Nonresidential
Both

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✓ HVAC
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Deadband Control for WLHPs



- Requires deadband controls on water loop heat pumps to prevent simultaneous heating and cooling. Other measures that affect other sections will be covered at a later workshop.
- Requirement from ASHRAE 90.1-2007.
- *Measure Evaluation Report: Building Envelope and HVAC*, http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/DRAFT_BUILDING_ENVELOPE_HVAC.PDF

Section

144

Residential

✓ Nonresidential

Both

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✓ HVAC

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Refrigerated Warehouses



- Extends the Standard for refrigerated warehouses with a cold storage and frozen storage area exceeding 3,000 square feet.
- Requirements cover insulation and mechanical equipment (evaporators, condensers and compressors).
- *Measure Evaluation Report: Refrigerated Warehouses*, http://www.energy.ca.gov/title24/2008standards/documents/2007-02-26-27_workshop/2007-02-14_REFRIGERATED_WAREHOUSES.PDF

Section

126

Residential

✓ Nonresidential

Both

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Lighting

✓ HVAC

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Equipment Efficiency



- Updates the efficiency requirements for non-NAECA equipment to be consistent with ASHRAE 90.1-2007.
- *Measure Evaluation Report: ASHRAE 90.1-2007 Efficiency Requirements*

Section
**112, Table
144 – A/B**

✓ Residential
Nonresidential
Both

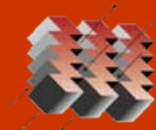
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Lighting
✓ HVAC
Water Heating

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Programmable Communicating Thermostats



- Requires programmable communicating thermostats (PCTs) that can respond to signals from the utility to setback thermostat setpoints in response to price and events.
- *Measure Evaluation Report: Demand Responsive Control of Air Conditioning via Programmable Communicating Thermostats (PCTs),*
http://www.energy.ca.gov/title24/2008standards/documents/2006-02-22+23_workshop/2006-02-15_PROGRAMBLE_COMM.PDF

Section

150, 112(c)

✓ Residential
Nonresidential
Both

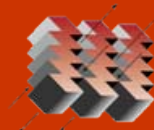
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Lighting
✓ HVAC
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Acceptance Requirements



- *Measure Evaluation Report: Acceptance Requirements – (all except lighting)*

Section

125, NA7

Residential

✓ Nonresidential

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✓ Envelope

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✓ HVAC

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Lighting Power Density



- Lowers the prescriptive lighting power density values in Tables 146-B, 146-C and 146-D for high bay and retail spaces to reflect advances in electronic ballasts and metal halide lamps.
- *Measure Evaluation Report: BLD-1, Changes to Lighting Power Density Values Affected by Developments in Electronic Ballasts for Metal Halide Lighting*, http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/MEASURE_BLD_01.PDF

Section
**146 (Tables
146-D and E)**

✓ Residential
Nonresidential
Both

✓ Envelope
Lighting
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Lighting Power Density



- Prescriptive lighting power density values for convention centers, office buildings and parking garages were lowered to be in line with ASHRAE 90.1-2007.
- Whole Building Method: Table 146-B (now 146-E): Conv centers 1.3→1.2; Office bldg 1.1→1.0; Parking Garage 0.4→0.3
- Area Category Method: Table 146-C (now 146-F): Auto repair 1.1→ 0.9; Office 1.2→1.1; Parking Area 0.2; Parking Ramps and Entries – 0.6
- *Measure Evaluation Report*: Measure BLD-2, Changes to Lighting Power Density Values: Bringing Certain Values in Line with Standard 90.1,
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/MEASURE_BLD_02.PDF

Section
**146 (Tables
146-D and E)**

✓ Residential
Nonresidential
Both

✓ Envelope
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Lighting Power Density



- Two new project types have been identified by the Commission as needing specific LPD allowances and other rules, namely (a) Salons and (b) Video Conferencing Facilities.
- Salon-1.7 W/ft² Video conf – 3.2 W/ft²
- Models were built based on design recommendations of the IESNA in RP-2-01 and DG-17-05
- *Measure Evaluation Report*. Measure BLD-3, Added Space Types and LPD values to Section 146,
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/MEASURE_BLD_03.PDF

Section

146

Residential

✓ Nonresidential

Both

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✓ Lighting

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Lighting Occupancy Controls



- Requires automatic occupancy-based shutoff controls for classrooms, lecture halls and convention centers as is recommended by ASHRAE 90.1.
- *Measure Evaluation Report*: Measure BLD-4, Added Requirement for Motion (Occupant) Sensing Controls for Lighting in Certain Rooms.

Section

131 (d) 4

Residential

✓ Nonresidential
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✓ Lighting
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Outdoor Lighting



- LPD's in Tables 147-A and 147-B will be reduced due to the change of the base metal halide lamp source from probe start to pulse start per the 2008 Appliance Standards.
- *Measure Evaluation Report: Outdoor Lighting*,
http://www.energy.ca.gov/title24/2008standards/documents/2006-05-18_workshop/2006-05-15_DRFT_CASEREPT_OUTDR_LGHTNG.PDF

Section

147

Residential

✓ Nonresidential

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✓ Lighting

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Low Wattage / LED Lighting



- A luminaire efficacy of 35 lumens/watt was added for luminaires and LEDs less than 5W in power to support the use of low-wattage LEDs.
- *Measure Evaluation Report: n/a*

Section

150

Residential

✓ Nonresidential

Both

Envelope

✓ Lighting

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Sidelighting



- This change defines a primary sidelit and secondary sidelit area for use in photocontrols. Manual controls are required for spaces with primary sidelit areas greater than 250ft² and automatic controls are required for spaces with a primary sidelit area greater than 2,500ft².
- *Measure Evaluation Report: Sidelighting – Daylighting Requirements for Sidelit Areas near Windows*,
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/2006-07-07_DRAFT_SIDELIGHTING_REP.PDF

Section

119, 131

Residential

✓ Nonresidential

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✓ Lighting

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Lighting – Demand Response



- The proposal recommends a mandatory requirement for demand responsive lighting controls in retail spaces greater than 50,000 ft². An exception is given to spaces with daylighting controls are installed on 50% of the lighting power.

- *Measure Evaluation Report: Demand Responsive Controls for Indoor Lighting*
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/2006-07-11_INDOOR%20LIGHTING.PDF

Section

101, 131

Residential

✓ Nonresidential

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✓ Lighting

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Skylights



- The change: (1) drops minimum space requirement for skylights to 8,000 ft²; increases the stringency of the credit for photocontrols for skylit area (<2,500 ft²); provides power adjustment factors as a lookup table; removes multi-level control requirement when LPD<0.5 ft².
- *Measure Evaluation Report: Updates to Skylighting Requirements*,
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/2006-07-11_SKYLIGHTS.PDF

Section
131, 146; 143
(future wrkshp)

Residential
✓ Nonresidential
Both

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✓ Lighting
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Sign Lighting



- This measure requires automatic time and daylight responsive lighting controls for all outdoor signs, requires automatic dimming controls for outdoor signs that are illuminated during daytime hours,
- *Measure Evaluation Report: Requirements for Signs*, http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/2006-07-07_DRAFT_SIGN_REP.PDF

Section

133, 148

Residential

✓ Nonresidential

Both

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✓ Lighting

HVAC

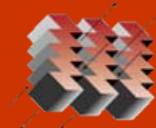
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Residential Pools



- This mandatory measure requires two-speed motors on residential pool pumps over 1 hp, sets maximum suction and return velocities and other pipe design criteria and indicates that multi-port valves (MPVs) be sized to manufacturer's recommendations.
- *Measure Evaluation Report: Residential Swimming Pools*, http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/2006-07-10_RESIDENTIAL_SWIMMING_POOL.PDF

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114

✓ Residential
Nonresidential
Both

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Recirc. Water Heating



- *Measure Evaluation Report: Central Hot Water Distribution Systems in Multifamily Buildings*,
http://www.energy.ca.gov/title24/2008standards/documents/2006-07-12_workshop/presentations/2006-07-10_CNTRL_HOT_WTR_MULTIFAMILY_BLDGS.PDF (note: workshop report is incomplete)
- *Measure Evaluation Report:*

Section

113 (c) 5

Residential

Nonresidential

✓ Both

Envelope

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✓ Water Heating

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