

Agenda – February 26, 2007



10:00 AM	Introduction	
10:10 AM	Section 101	Definitions
10:20 AM	Section 119	Mandatory Requirements for Lighting Control Devices
10:40 AM	Section 130	Lighting Controls and Equipment
	Section 131	Lighting Controls That Shall be Installed
	Section 132	Outdoor Lighting Controls
	Section 133	Sign Lighting Controls
11:10 AM	Section 146	Requirements for Indoor Lighting
12:00 PM	Lunch	
1:00 PM	Section 147	Requirements for Outdoor Lighting
1:30 PM	Section 148	Requirements for Signs
1:45 PM	Section 149	Alterations, Prescriptive, Lighting
2:00 PM	Section 150	Residential Lighting
2:30 PM	Public comments	
5:00 PM	Adjourn	

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Mixed Occupancy



- Reduces the percent of “major” occupancy from 90% to 70% for application of envelope, HVAC and water heating requirements.
- Lighting requirements shall comply with Section 146.

Section
100

✓ Residential
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Both

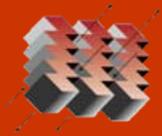
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Definitions Added or Modified



- **Alternative Calculation Methods Approval Manual**
- **Bay window**
- **Coefficient of Performance, Heat Pump**
- **Combustion Efficiency**
- **Conditioned Space, Directly**
- **Conditioned Space, Indirectly**
- **Curtain Wall**
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- **Daylight Area, Skylit**
- **Deadband**
- **Demand Response Period**
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- **Demand Responsive Lighting Control**
- **Dimming, Continuous**
- **Dimming, Stepped**
- **Fenestration Product, Field Fabricated**
- **Fenestration Product, Site Built**
- **GU24**
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- **Lighting Floor Area**
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- **Single Package Vertical Air Conditioner**
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- **Solar Heat Gain Coefficient, Total Fenestration**
- **Storage, Cooled**
- **Storage, Frozen**
- **Ufactor, Center of Glazing**
- **Ufactor, Total Fenestration Product**
- **Vacancy Sensor Lighting**
- **Visible Transmission, Center or Glass**
- **Visible Transimission, Total Fenestration Product**
- **Zone, Critical**
- **Zone, Non-Critical**

Section

101

Residential

Nonresidential

✓ Both

✓ Envelope

✓ Lighting

✓ HVAC

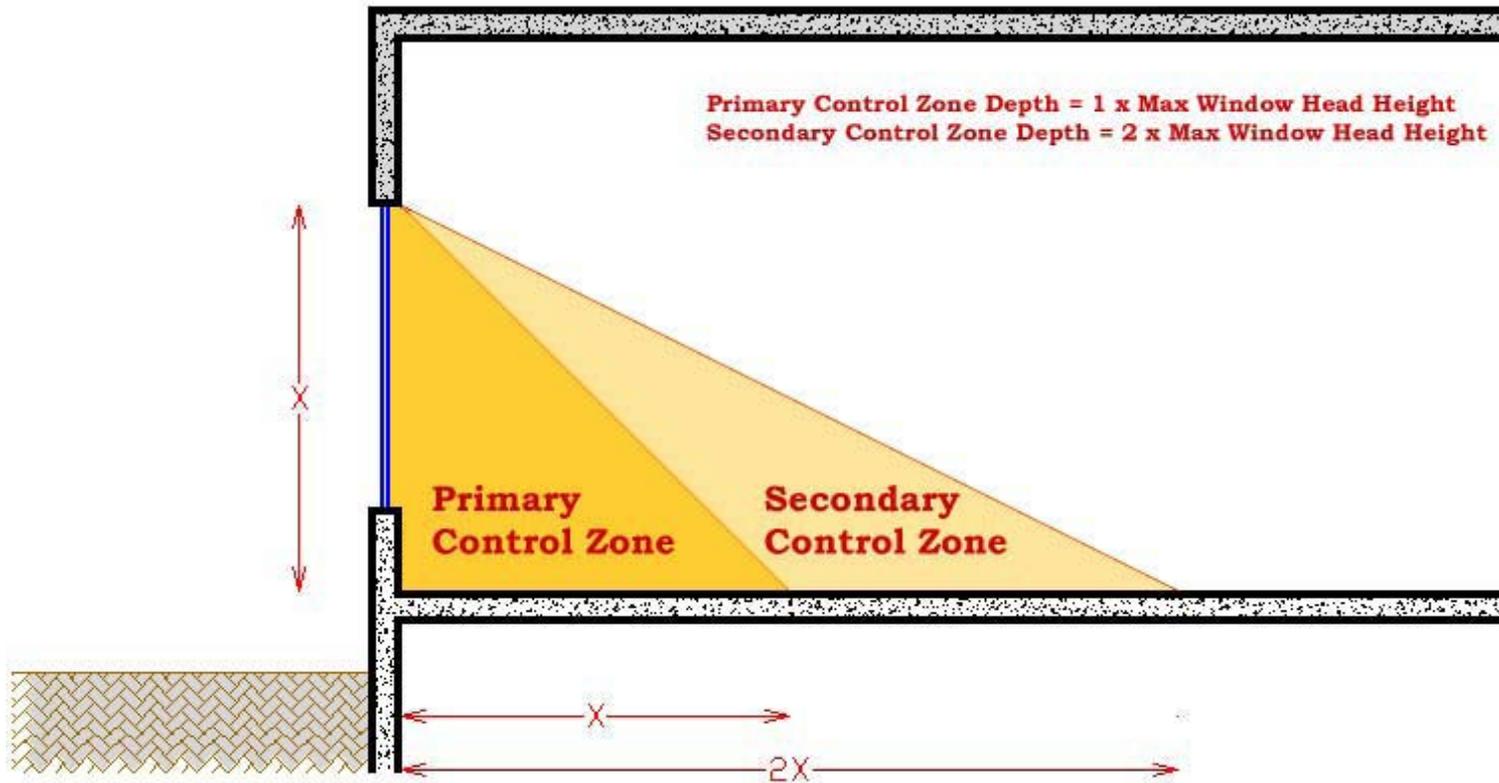
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Sidelighting



Section

101 (119, 131, 146)

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Mandatory Measures for Lighting Controls



- **Adds that indicator lights may consume no more than one watt.**
- **Expands the requirements for automatic time switches.**
- **Requires status indicator for occupant sensors.**
- **Adds requirements for multi-level occupancy sensors.**
- **Modifies the requirements for automatic daylighting controls.**
- **Requires that astronomical time switches store settings in the event of a power outage.**
- **Adds requirements for:**
 - Residential occupant sensors
 - Dimmers
 - Track lighting integral current limiters
 - LED Luminaires
 - Ballasts for residential luminaires
 - Dimmable fluorescent ballasts

Section

119

Residential

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Mandatory Measures for Lighting Controls



- **Requires outdoor lighting for high-rise residential and hotel motel guest rooms to meet 151(k)12.**
- **Modifies the way luminaire wattage is determined.**
- **Adds requirements for GU24 lamps, ballasts, and adapters.**

Section

130

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✓ Nonresidential

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Indoor Lighting Controls



- **Modifies the requirement for multi-level lighting controls.**
- **Requires manual controls for spaces with primary sidelit daylight areas greater than 250 ft² and automatic controls are required for spaces with a primary sidelit daylight areas greater than 2,500 ft².**
- **Requires occupant sensors for offices 250 ft² or smaller and all classrooms, training rooms, conference rooms less than 1,000 ft².**
- **Clarifies the requirement to control display lighting separately in retail stores.**
- **Requires demand response lighting controls (15%) for retail buildings with sales area greater than 50,000 ft².**

Section

131

Residential

✓ Nonresidential

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HVAC

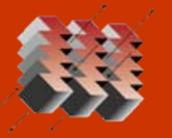
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Outdoor Lighting Controls



- **175 W changed to 150 W.**
- **Extends the exception for cutoff luminaires to certain replacements of pole mounted luminaires for hardscape.**

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132

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Sign Lighting Controls



- **Requires that all signs have automatic time switch control.**
- **Requires demand response controls for message board signs greater than 20 kW and internally illuminated signs greater than 8 kW.**
- **Photocontrol or astronomical automatic time switch required for signs normally off during daytime.**
- **Requires that signs normally on during the day have astronomical automatic time switch capable of reducing power by 65%.**

Section

133

Residential

✓ Nonresidential

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HVAC

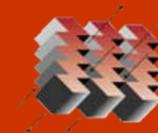
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Lighting Acceptance Requirements



- Requirements consolidated in Section 134.
- Lighting changes to NA7 to be presented at next workshop.

Section

134

Residential

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✓ Lighting

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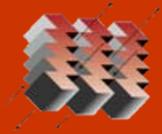
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Lighting Power Density



- **Removes the 0.20 W/ft² default allowance for task lighting and reduces the lighting power allowances for work spaces by 0.20 W/ft². In response to comments by CABEC.**
- **Removes the ability to count just the lowest power in spaces with multiple lighting systems and interlock controls.**
- **Requires multi-level occupant sensors for PAF credit in spaces less than 250 ft² and all classrooms, corridors, conference rooms and waiting rooms.**
- **Power adjustment factors for daylighting controls revised.**
 - There are three daylighting zones. Primary sidelit, secondary sidelit and daylit. These are defined in the definitions.
 - Credit for each depends on the effective aperture.
 - Credit extended to tubular skylights.
- **Clarifies lighting applications that are excluded. New exceptions added for videoconferencing studios and ATMs in garages.**

Section

146(a)

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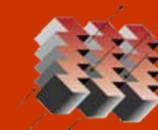
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Lighting Power Density



- Excludes retail and wholesale stores from using the whole building lighting power density method.
- Modifies the tailored method for retail stores with changes to the mounting height adjustment, lighting for display cases, and lighting for very valuable merchandise,
- Adds relative system efficiency for dimmable electronic ballasts (Table 146D).
- Changes some of the whole building lighting power density allowances, including the deletion of retail (Table 146E).
- Changes some of the area category lighting power allowances (Table 146F).
- Changes some of the tailored method allowances, in particular retail, and adds some new "primary functions" (Table 146G).

Section

146(b)

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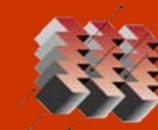
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Outdoor Lighting



- Modifies the method for determining lighting for hardscapes.
- Allows tradeoffs from general to specific but not the other way.
- Reduces LPD's in Tables 147-A and 147-B 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

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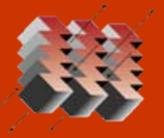
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Sign Lighting



- **Expands the prescriptive option for signs:**
 - **Efficient high pressure sodium**
 - **Neon**
 - **Cold cathode**
 - **Efficient fluorescent**
 - **Light emitting diodes**
 - **Efficient non-screw-in compact fluorescent**
- **Control requirements in Section 133**
- **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

148

Residential

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Alterations, Prescriptive, Lighting



- **Moved statement from compliance manual – alteration where 50% of the luminaires are changed must comply with prescriptive lighting requirements**
- **Indicates that replacement of wiring or lighting panel is considered an alteration and requires that prescriptive lighting requirements be met**
- **Indicates that the separation of an existing space into two or more spaces is also considered an alteration**

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149

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Low Wattage / LED Lighting



- **Adds a new luminaire efficacy of 35 lumens/watt for luminaires and LEDs less than 5W in power to support the use of low-wattage LEDs.**
- **Current Standard requires 40 lumens/watt for all luminaires less than 15 W in power.**

Section
150(k)

✓ Residential
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Residential Lighting Mandatory Features



- Re-defines high efficacy and low efficacy luminaires for low wattages. **See 150(k)1., 2. and 3.**
- Specifies minimum 20 Hz frequency for electronic ballasts 13 W or greater. **See 150(k)4.**
- Requires that permanently installed night lights be high efficacy. **See 150(k)5.**
- Adds new requirements for switching and controls. **See 150(k)6.**
- Modifies 50% high efficacy requirement for kitchens. **See 150(k)7.**
- Limits power to 20 W/ft for lighting internal to cabinets. **See 150(k)8.**
- Extends high efficacy requirement to closets 70 ft² or larger. **See 150(k)9.**
- Adds exception for detached storage buildings less than 1,000 ft². **See 150(k)10.**
- Modifies ICAT requirements. **See 150(k)11.**
- Expands the control exception for outdoor lighting fixtures. **See 150(k)12.**
- Internally illuminated address signs shall comply with 148. **See 150(k)13.**

Section

150(k)



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Agenda – February 27, 2007



- 10:00 AM Introductions Mazi Shirakh, CEC
- 10:10 AM Section 101 Definitions and Rules of Construction
- 10:30 AM Section 110 Systems and Equipment—General
- Section 112 Mandatory Requirements for Space-Conditioning Equipment (PCT)
- Section 113 Mandatory Requirements for Service Water-Heating Systems
- Section 114 Mandatory Requirements for Pool and Spa Heating Systems
- Section 116 Mandatory Requirements for Fenestration Products
- Section 118 Mandatory Requirements for Insulation
- Ref. NA6 Alternate Default Fenestration Thermal Properties
- 12:00 PM Lunch Break
- 01:00 PM Section 121 Requirements for Ventilation
- Section 122 Required Controls for Space-Conditioning Systems
- Section 125 Required Nonresidential Mechanical System Acceptance
- Section 126 Mandatory Requirements for Refrigerated Warehouses
- 02:00 PM Section 144 Requirements for Space Conditioning Systems
- Section 145 Requirements for Service Water Heating Systems*
- Ref. NA7 Acceptance Requirements for Mechanical and Fenestration
- Section 150 Residential Mandatory Features And Devices – Other Than Lighting
- 02:20 PM Section 151 Residential Performance and Prescriptive Compliance Approaches
- Section 152 Residential Additions And Alterations
- 02:50 PM Public comments
- 05:00 PM Adjourn

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Mixed Occupancy



- Reduces the percent of “major” occupancy from 90% to 70% for application of envelope, HVAC and water heating requirements.
- Lighting requirements shall comply with Section 146.

Section
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Definitions Added or Modified



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- **Demand Responsive Lighting Control**
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- **GU24**
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- **Residential Space Type**
- **Single Package Vertical Air Conditioner**
- **Single Package Vertical Heat Pump**
- **Solar Heat Gain Coefficient, Center of Glazing**
- **Solar Heat Gain Coefficient, Total Fenestration**
- **Storage, Cooled**
- **Storage, Frozen**
- **Ufactor, Center of Glazing**
- **Ufactor, Total Fenestration Product**
- **Vacancy Sensor Lighting**
- **Visible Transmission, Center or Glass**
- **Visible Transimission, Total Fenestration Product**
- **Zone, Critical**
- **Zone, Non-Critical**

Section

101

Residential

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Programmable Communicating Thermostats



- Establishes minimum requirements for programmable communicating thermostats (PCTs) that can respond to signals from the utility to setback thermostat setpoints in response to price changes or emergency events.
- Required as mandatory measures in Section 150 for low-rise residential.
- 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

112(c), 150

✓ Residential
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Equipment Efficiency



- **Updates the efficiency requirements for non-NAECA equipment to be consistent with ASHRAE 90.1-2007.**
- **Creates new classes of equipment for SPVAC and SPVHP.**
- **Takes effect 1/1/2010.**
- ***Measure Evaluation Report: See on ASHRAE 90.1-2007.***

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112

Residential

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Recirculating Water Heating



- **Added a mandatory requirement for Reverse Flow Prevention to include a check valve on cold water make-up pipe**
- **Added a mandatory requirement for an automatic air release on hot water return just before recirculation pump.**
- **Added a mandatory requirement to prevent crossover.**
- **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**

Section

113(c)5.

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Residential Pools



- **Requires two-speed motors on residential pool pumps over 1 hp**
- **Sets maximum suction and return velocities and other pipe design criteria**
- **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

Section

114

✓ Residential
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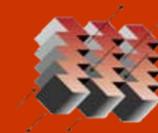
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Default Fenestration U-Factors



- **Default values added for glass block.**
- **Other values clarified**
- **Procedure for curtain walls less than 10,000 ft² and skylights moved to Appendix NA6.**

Section

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Alternate Default Fenestration Properties



- **May be used for skylights and site-built fenestration less than 10,000 ft²**
- **Previously NACM NI**
- **U-factor for total product is a function of the center of glass U-factor**
- **Default table from ASHRAE HOF deleted.**
- **Procedure for SHGC unchanged.**

Section

NA6

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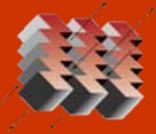
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Demand Control Ventilation



- **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.

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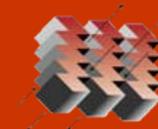
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Global Temperature Adjustment



- **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)

Residential

✓ Nonresidential

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Acceptance Requirements



- **Consolidates acceptance requirements for nonresidential HVAC systems in one place.**
- **References Appendix NA7 (formerly NACM NJ)**

Section

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Residential



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Acceptance Requirements



- **Adds verification procedures to confirm that fenestration specifications on building plans match those on NFRC Label Certificate**
- **Updates mechanical requirements to reflect new control requirements of Section 144**
- **Removes separate procedure for water loop heat pump controls; refer instead to hydronic system variable flow controls**

Section

NA7

Residential

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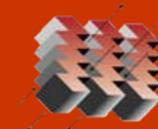
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Refrigerated Warehouses



- **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

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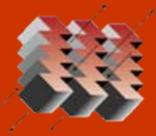
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VAV Zone Minimums



- **Allows for “dual maximum” control of VAV boxes.**
- **Applies for direct digital control at the zone level.**
- **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

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144(d)

Residential

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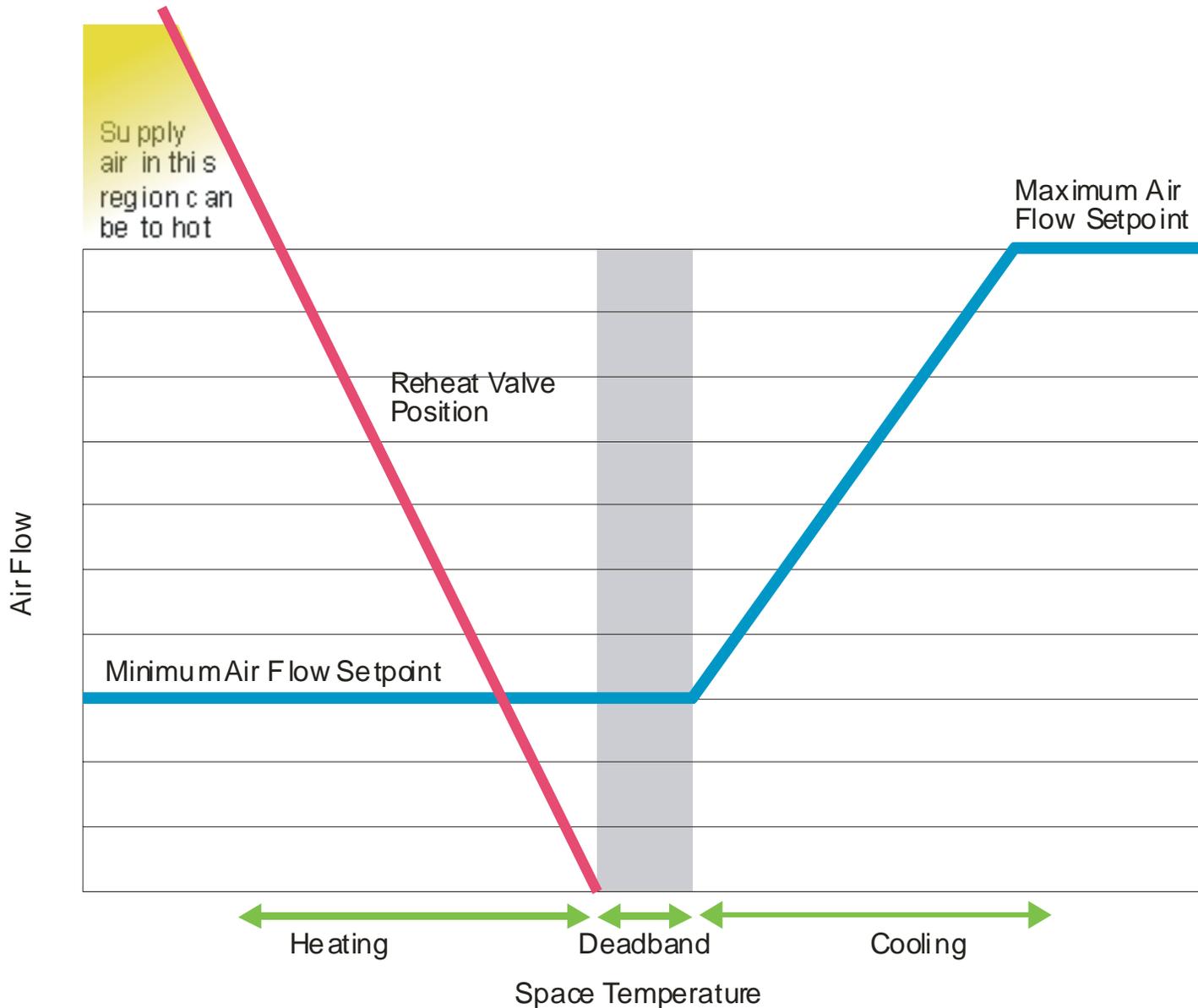
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VAV Zone Minimums (current)



Section
144(d)

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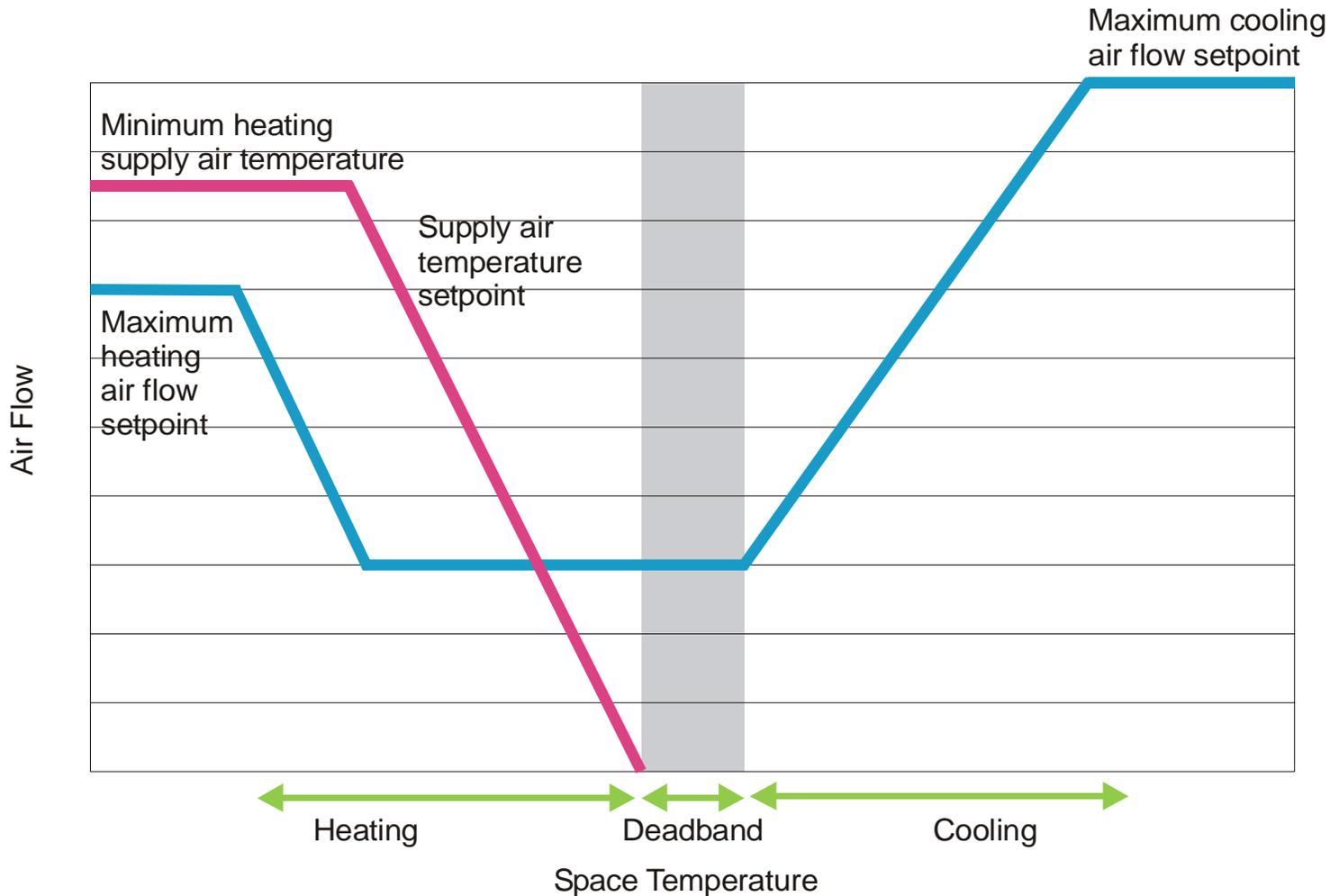
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VAV Zone Minimums (as modified)



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144(d)

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Supply Air Temperature (SAT) Reset



- **Deletes the exception for VAV with variable frequency drives.**
- **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



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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

Both

Envelope

Lighting

✓ HVAC

Water Heating

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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(j)7.

Residential

✓ Nonresidential

Both

Envelope

Lighting

✓ HVAC

Water Heating

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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

144(I)

Residential

✓ Nonresidential
Both

Envelope

Lighting

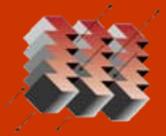
✓ HVAC
Water Heating

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Residential Non-lighting Mandatory Features



- **Lighting measures presented yesterday.**
- **Bay Window roofs and floors shall be insulated to meet the wall insulation requirements of Package D. See 150(c)**
- **Requires PCTs. See 150(i)**
- **Recirculation systems in multi-family shall meet the requirements of 113(c)5. See 150(n).**

Section

150

✓ Residential
Nonresidential
Both

✓ Envelope
Lighting
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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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Residential Additions and Alterations



- Clarifies the 5% maximum for west facing glazing relative to additions and alterations.
- Clarifies the application of the performance approach to alterations. **See 152(b)2.**

Section

152

✓ Residential
Nonresidential
Both

✓ Envelope
✓ Lighting
✓ HVAC
✓ Water Heating

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