Summary of IEQ related updates to the 2013 Building Energy Efficiency Standards

Process Ventilation

Detailed proposals presented within CEC 2013 Building Energy Efficiency Standards Proceeding,

April 11 Staff Workshop:

http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/2011-04-11_workshop/presentations/

Laboratories:

- VAV fume exhaust hoods
  - Alarms on low face velocity and room balance
  - Acceptance testing
- ASHRAE 90.1 – 2010 Fan power limitations, with credit adjustments for filtration, sound attenuation, heat recovery, etc.

TABLE 6.5.3.1.1B Fan Power Limitation Pressure Drop Adjustment

Device	Adjustment
Credits	
Fully ducted return and/or exhaust air systems	0.5 in. w.c. (2.15 in. w.c. for laboratory and vivarium systems)
Return and/or exhaust airflow control devices	0.5 in. w.c.
Exhaust filters, scrubbers, or other exhaust treatment	The pressure drop of device calculated at fan system design condition
Particulate Filtration Credit: MERV 9 through 12	0.5 in. w.c.
Particulate Filtration Credit: MERV 13 through 15	0.9 in. w.c.
Particulate Filtration Credit: MERV 16 and greater and electronically enhanced filters	Pressure drop calculated at 2× clean filter pressure drop at fan system design condition
Carbon and other gas-phase air cleaners	Clean filter pressure drop at fan system design condition
Biosafety cabinet	Pressure drop of device at fan system design condition
Energy Recovery Device, other than Coil Runaround Loop	(2.2 × Energy Recovery Effectiveness—0.5 in w.c. for each airstream
Coil Runaround Loop	0.6 in. w.c. for each airstream
Evaporative humidifier/cooler in series with another cooling coil	Pressure drop of device at fan system design condition
Sound Attenuation Section	0.15 in. w.c.
Exhaust system serving fume hoods	0.35 in. w.c.
Laboratory and vivarium exhaust systems in high-rise buildings	0.25 in. w.c./100 ft of vertical duct exceeding 75 ft

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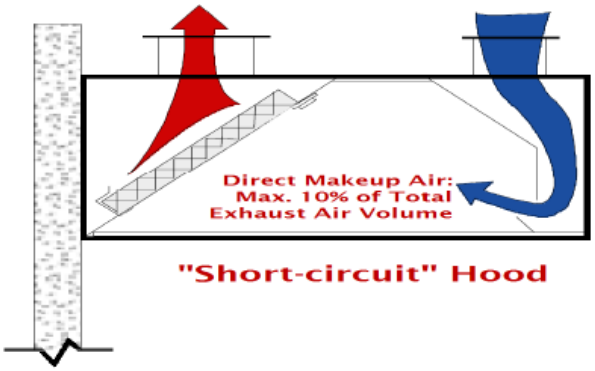
Commercial Kitchens:

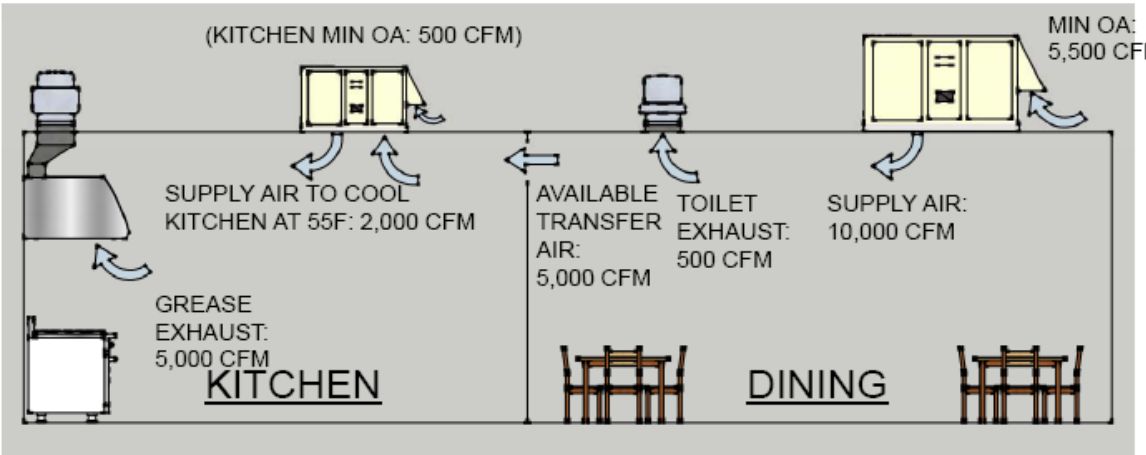
- No short circuit hoods



Proposed Code Statement:

Replacement air introduced directly into the hood cavity of kitchen exhaust hoods shall not exceed 10% of the hood exhaust airflow rate.

- limitations on use of conditioned air for kitchen hood exhaust - Use of available transfer air



Summary of IEQ related updates to the 2013 Building Energy Efficiency Standards

- Maximum hood air flows

Table 4: Maximum Net Exhaust Flow Rate, CFM per Linear Foot of Hood Length

Type of Hood	Light Duty Equipment	Medium Duty Equipment	Heavy Duty Equipment	Extra Heavy Duty Equipment
Wall-mounted Canopy	140	210	280	385
Single Island	280	350	420	490
Double Island	175	210	280	385
Eyebrow	175	175	Not Allowed	Not Allowed
Backshelf/ Pass-over	210	210	280	Not Allowed

- Demand controlled hood exhaust – reduce exhaust and make-up air fans speed when demand for Capture & Containment is reduced
- Acceptance Testing
- Reach: Energy recovery – pre-condition outside air

Parking Garages:

- DCV using CO sensors – exhaust fans reduce to 50% air flow using 30% full load power when CO is within acceptable limits

Outside Air Ventilation

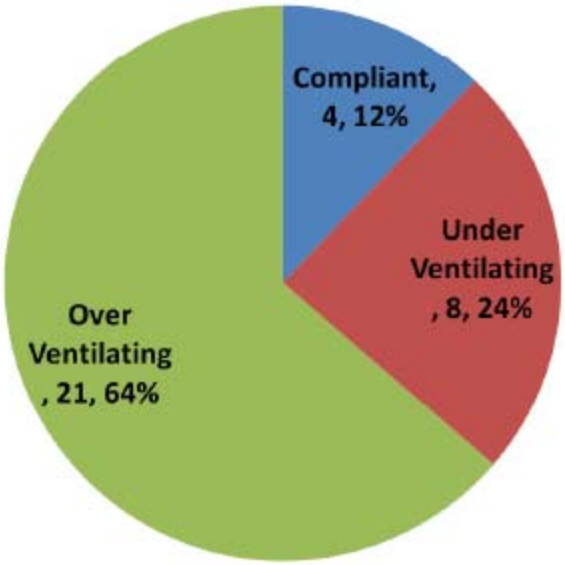
Residential:

- Acceptance testing of mechanical ventilation systems
- New prescriptive requirement for ventilative cooling in most climate zones

Summary of IEQ related updates to the 2013 Building Energy Efficiency Standards

Nonresidential: (April 11 Staff Workshop)

Current status of CA commercial buildings, based on field testing:



- Require factory calibration of CO2 sensors
- Add field verification of CO2 sensors to acceptance testing
- Confirm dynamic control of outside air
- Confirm pre-occupancy purge for all system types
- Verify proper location of OA ducts in plenum systems
- Correct CO2 mounting height in Compliance Manual
- Add guidance for measuring air flow in Compliance Manual

Infiltration Reductions

Residential: (May 31 Staff Workshop)

- Staff's current proposal is to leave infiltration requirements at 7.6 ACH50 (2012 IECC is at 3 ACH50)
- New prescriptive requirement for Quality Insulation Installation (QII) field inspections
- Exterior R-4 wall insulation requirements will also reduce infiltration

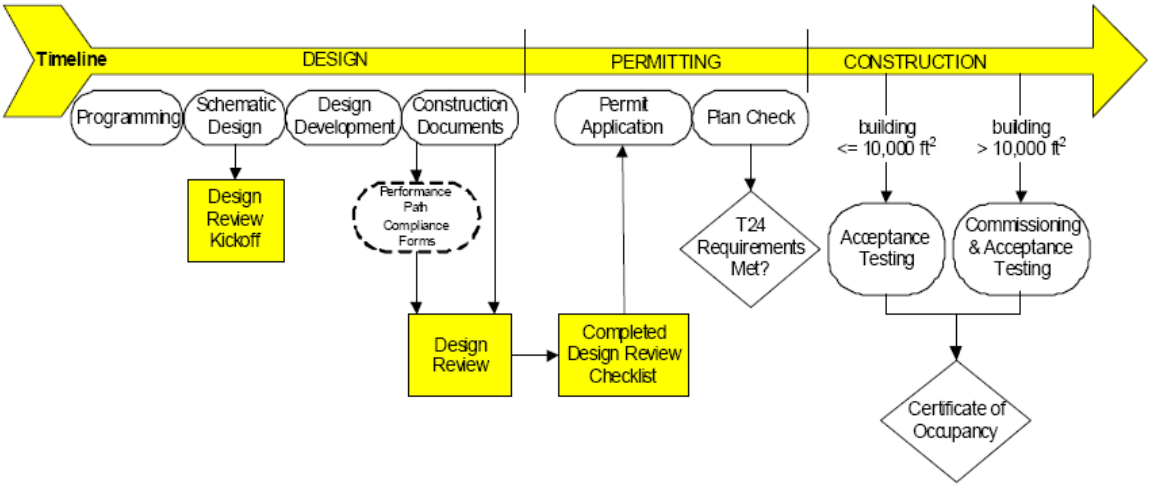
Nonresidential: (August 17 Staff Workshop)

Summary of IEQ related updates to the 2013 Building Energy Efficiency Standards

- Except in mild climate zones, adopt 2012 IECC air sealing requirements: 2.0 L/s-m² @ 75 Pa (0.40 cfm/ft² @ 0.3" w.g.)

Nonresidential Commissioning (April 18 Staff Workshop)

- Adding Design Review requirements to
  - ✓ Confirm design conforms to codes
  - ✓ Confirm performance path energy modeling inputs are reflected in design documents
  - ✓ Confirm that CALGreen and Acceptance Testing requirements are reflected in design documents
- Design Reviewer Qualifications differ by project size & complexity
  - ✓ Self Review for simple systems and < 10K sqft
  - ✓ In-house review < 50,000 sqft by registered engineer (engineering associate with no project involvement)
  - ✓ 3rd party review > 50,000 sqft or complex HVAC systems by registered engineer



Acceptance Testing (April 18 Staff Workshop)

- Additional tests (not all presented at the same workshop)
- Specific changes to compliance forms to
  - ✓ Improve clarity
  - ✓ Document additional details
  - ✓ Improve functional test procedures & documentation processes
- At-A-Glance Guides to be added to compliance manuals

Summary of IEQ related updates to the 2013 Building Energy Efficiency Standards

ZNE Standards by 2020

Preview of next three residential code updates:

2013

- More insulation (+ R4 on walls and roof deck)
- Better windows (U=0.32, SHGC=0.25)
- Quality Insulation Installation – field inspections
- Ventilative cooling (e.g. Whole House Fans)
- Communicating T-stat
- Reduce wasted hot water through better plumbing design
- Stricter high efficacy lighting & vacancy sensor requirements
- Limited ability to use PVs for code compliance
- Limited ability to use high efficiency appliances for code compliance

2017

- Increase envelope R-values
- Reduce infiltration (3 ACH50)
- Thermal mass requirements
- Further reduce wasted hot water (e.g. designed plumbing systems)
- Solar thermal requirements
- More high efficacy lighting
- Heating/Cooling fault detection reporting via communicating T-stats
- More options to use PV for code compliance
- Third-party performance verification (HERS rating)

2020

- Reduce infiltration (1 ACH50)
- Thermal mass & solar targeting requirements (e.g. “passive design”)
- All high efficacy lighting
- High efficiency HVAC (e.g. ductless heating & cooling systems)
- Central core water heating design with waste recovery
- High efficiency appliances
- Plug load management / home automation system
- PV requirements
- Cool pavements

Summary of IEQ related updates to the 2013 Building Energy Efficiency Standards

Existing Buildings

Building Energy Performance Ratings

- Home Energy Ratings (HERS Whole House program)
  - ✓ Currently, can be done with or without combustion safety testing
  - ✓ All current utility incentive programs using HERS Whole House DO require combustion safety testing
- Building Energy Asset Rating System (BEARS) – under development
  - ✓ Should include IEQ metrics

Additions & Alterations

- CEC will need to put more focus on existing buildings in Title 24, Part 6