

California's Environmental Specification Section 01350 for Building Materials: A Historical Perspective



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Capitol Area East End Complex:

First Comprehensive Approach to Sustainable Construction:

1997: Legislature authorized construction of 1.5 M ft² state office complex in Sacramento (5 buildings; 2 contractors)

1999: Legislature required DGS to incorporate “green” measures in this project

Green Team was formed:

Department of Health Services

Air Resources Board

Integrated Waste Management Board

Energy Commission



Capitol Area East End Complex, continued

1999: Green Team and DGS were successful in incorporating measures in the project specifications for:

⇒ IAQ

⇒ Energy efficiency

⇒ Other sustainability measures

⇒ Bid review/contractor selection: 20% of scoring for sustainable design measures/enhancements and team experience

⇒ **Green Team** continued to oversee the design and construction of both projects until they were completed



California Sustainable Building Task Force

2000: Governor Davis's Executive Order D-16-00 mandated the development of strategies to:

*“...site, design, deconstruct, construct, renovate, operate, and maintain buildings that are models of energy, water, and materials efficiency while providing **healthy, productive and comfortable indoor environments** and long-term benefits to Californians”*

2000: Task Force formed with over 32 State Agencies

2001: Report is released: *Building Better Buildings: A Blueprint for Sustainable State Facilities*



Office Furniture Systems Specifications

Developed as part of a state-wide contract (3-yr, \$60M)

⇒ Contained requirements for

→ VOCs

→ Recycled contents

→ Lighting

⇒ Timeline: about one year to develop (w/input from state agencies, manufacturers, private labs).

Levin/Alevantis: Lead authors for IAQ. Released December 2000.

⇒ Critical role by CIWMB and Secretary Aileen Adams

⇒ Cost: Similar to previous contract!



Office Furniture Systems: *VOC Specifications*

- ⇒ Standard workstation defined
- ⇒ 10 day pre-conditioning @ 3.0 ach
- ⇒ 96-hr test @ 1.0 ach – results @ 0.5 ach
- ⇒ Testing per ASTM D5116-97 & USEPA RTI ETV
- ⇒ Max concentrations based on European Union's guidelines (1997) for 7 classes of VOCs (alkanes, aromatics, terpenes, halocarbons, esters, aldehydes and ketones (excl. HCHO), other). List of 65 target compounds
- ⇒ Max concentration for HCHO
(20 ppb target/50 ppb probationary accepted)
- ⇒ $\pm 50\%$ deviation from max during the contract



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Johns Manville Fiber Glass Building Insulation to be Formaldehyde-Free

ATLANTA, Feb. 7, 2002 – Johns Manville has announced that it will begin manufacturing an entire line of formaldehyde-free fiber glass building insulation for residential and commercial use. All Johns Manville building insulation will be manufactured with a unique new binder that removes Johns Manville insulation as a potential source of formaldehyde in the indoor air environment and eliminates formaldehyde emissions during manufacturing. The announcement was made at a pre-trade show press conference on February 7, 2002 in advance of the National Association of Homebuilders' International Builders Show in Atlanta.



Special Environmental Requirements for Building Materials (Section 01350)

A specification for screening building materials based on:

- ⇒ VOCs
- ⇒ Resource Efficiency
- ⇒ Material Recyclability

VOC section based on:

- ⇒ Office Furniture Systems Specification
- ⇒ Levin/Hodgson published work
- ⇒ Bernhein/Levin work @ SF Library



Section 01350, continued:

- ⇒ *Spring 2001*: Based on the Office Furniture Systems Specification, *Hensel Phelps* (contractor for Block 225 of the Capitol Area East End Complex) releases Section 01350. Levin/Bernheim/Hodgson/Alevantis: Lead authors. Peer review input from IAQ researchers & others
- ⇒ *Fall 2001*: Revised Section 01350 included in *CHPS Best Practices Manual* and in *Reference Specifications for Energy and Resource Efficiency*.
- ⇒ *Fall 2004*: DHS issues CA/DHS/EHLB/R-174 *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*.



Section 01350

IAQ Specifications:

- ⇒ 10-day conditioning followed by 96-hr test
- ⇒ Sample collection @ 24, 48, and 96-hr per ASTM D5116-97.
- ⇒ Identification of the following chemicals of concern as listed by CalEPA
 - ⇒ Probable or known carcinogens
 - ⇒ Reproductive toxicants
 - ⇒ Chemicals with Chronic Reference Exposure Levels (CRELs)



Section 01350

IAQ Requirements (continued):

- ⇒ Building modeled concentrations based on 96-hr emission factors, quantity, and ach
- ⇒ Modeled concentrations $< \frac{1}{2}$ of CRELs
- ⇒ Max modeled concentration for HCHO $< \frac{1}{2}$ of 27 ppb



Section 01350

Other Requirements (continued):

- ⇒ Sequencing/Flush-out
- ⇒ Minimum Requirements for Recycled Contents



How has Section 01350 been used since 2001?

- ⇒ Incorporated in state's standard agreement for engineering and architectural services
- ⇒ Significant number of materials tested since 2001
- ⇒ Considered as the leading health-based specification
- ⇒ Large impact on the market



How has Section 01350 been used since 2001? (continued):

Certification Programs where 01350 is required:

- ⇒ CHPS
- ⇒ CRI Green Label Plus
- ⇒ Resilient Flooring Institute FloorScore
- ⇒ SCS Indoor Advantage Gold
- ⇒ GreenGuard Children and Schools



How has Section 01350 been used since 2001?

Other Programs where 01350 is required:

- ⇒ BIFMA e3-2008 – *Furniture Sustainability Standard*
- ⇒ ICC-ES SAVE (*Sustainable Attributes Verification and Evaluation*)
- ⇒ LEED
- ⇒ Green Guide for Healthcare
- ⇒ ASHRAE Standard 189.1 – *Std for the Design of High-Performance Green Bldgs* (publication in 2010)
- ⇒ CA Green Building Code



Suggested Long Term Goals

- ⇒ Authoritative national adoption such as ASTM, USEPA, CARB, ANSI, etc.
- ⇒ Create a single document. CDPH Standard Practice and CHPS Section 01350 overlap.
- ⇒ Responsive to new chemical compositions of products in the marketplace.
- ⇒ Develop relevant criteria for more indoor pollutants
- ⇒ Address wet product short-term emissions



Suggested Long-Term Goals (cont'd)

- ⇒ Address SVOCs – phthalates, fire retardants, pesticides
- ⇒ Address cleaning and finishing products



Conclusions

- ⇒ California's IAQ requirements along with other testing programs have resulted in healthier bldg materials with increased recycled contents
- ⇒ Since California economy is among the largest in the world, market transformations in CA have had national implications

Comparison study of testing programs funded by USEPA and authored by Bruce Tichenor

http://www.epa.gov/iaq/pdfs/tichenor_report.pdf