



State of California—Health and Human Services Agency
California Department of Public Health
Environmental Health Laboratory Branch



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Governor

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To California Agency Stakeholders:

Subject: Update on *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*

The California Department of Public Health's Indoor Air Quality Program is planning to revise the *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*¹ (CA/DHS/EHLB/R-174). The document (*Standard Practice* or sometimes called "Section 01350") was issued in July 2004.

Background

In 1990, the California legislation directed the Indoor Air Quality (IAQ) Program to develop guidelines for the reduction of exposure to volatile organic compounds (VOCs) from building construction materials in newly constructed or remodeled office buildings². The IAQ Program issued the report, *Reducing Occupant Exposure to Volatile Organic Compounds (VOCs) From Office Building Construction Materials: Non-Binding Guidelines*³. This 1996 report provided a simple technical approach for evaluating, selecting, and installing building construction materials in order to minimize occupant exposures to VOCs emitted from these materials.

In 1999, the California Integrated Waste Management Board (CIWMB) initiated a multi-stakeholder process to develop "sustainability" criteria for office furniture which could be used in the pending State contract. CIWMB staff convened State agencies to address energy efficiency (lighting), material recycled content and recyclability, and enhanced IAQ, and they hired several consultants to help draft the *Special Environmental Specifications for Office Furniture*⁴. In it, we adopted the IAQ Program's approach to low-VOC emitting materials, drawing from testing protocols and the limited set of allowable VOC limits used for the San Francisco Public Library. The Office Furniture contract was successful bid in 2000.

¹ Available on-line at <http://www.cal-iaq.org/VOC/>

² California Health and Safety Code §105405, added under AB 3588, Speier, Statutes of 1990, Chapter 1229 <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=105001-106000&file=105400-105430>

³ <http://www.cal-iaq.org/VOC/VOC.html>

⁴ <http://www.cal-iaq.org/VOC/workstation.pdf>

At the same time, another multi-agency group, the California Sustainable Building Task Force⁵, was formed to direct State “green building” requirements, which were notably applied in the design and construction of the State’s Capitol Area East End Complex, completed 2002-03. The *Special Environmental Specifications* for the CAEEC required material testing for VOC emissions and expanded the health-based exposure limits to all chemicals with Chronic Reference Exposure Levels (CREL) issued by Office of Environmental Health Hazard Assessment (OEHHA). The CAEEC specifications were rewritten in Construction Specification Institute format, and they became known under the moniker of their CSI section: 01 35 00 General Requirements - Special Project Procedures) or simply “Section 01350”. The Collaborative for High Performance Schools (CHPS) subsequently adopted the specifications for their Low-emitting Material IEQ credit⁶ in 2002.

Section 01350 received wide acceptance from numerous manufacturers of building materials due to its flexibility, relative low cost, and the fact that it is the only health-based building material specification⁷. As laboratories started to implement the VOC testing requirements within *Section 01350* on a wider scale, it became apparent that certain sub-sections of this specification needed to be expanded. In 2004, the Program issued its *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers (Standard Practice)*. Its highlights were the more detailed requirements given for testing and the allowable emission limits tied explicitly to health-based exposure levels.

Notably, the *Standard Practice* addresses:

- Specific procedures for specimen receiving, handling, and preparation
- Requirements for 10-day conditioning of test specimens at 23±2°C and 50±10% RH, followed by a 96-hr test (sample collection at 24, 48 and 96 hr), based on the ASTM *Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products*⁸.
- Identification of the following chemicals of concern as listed by Cal-EPA:
 - Chemicals with established Chronic Reference Exposure Levels⁹ (CRELs).
 - Chemicals listed as: (a) probable or known carcinogens, or (b) reproductive toxicants under Proposition 65¹⁰.
 - Ten most abundant compounds.
- Exposure modeling using emissions factors calculated from the small chamber tests for identified chemicals of concern to derive “modeled” indoor air concentrations for specific applications (e.g., office space or classroom) using default ventilation rates, quantities and surface areas of the material to be installed, and space volumes.

⁵ <http://www.ciwmb.ca.gov/Greenbuilding/TaskForce/>

⁶ http://www.chps.net/manual/documents/Sec_01350.doc

⁷ <http://www.ciwmb.ca.gov/GreenBuilding/Specs/Section01350/>

⁸ American Society for Testing & Materials, ASTM Standard D5116-97; superseded in 2006 by D5116-06

⁹ http://www.oehha.ca.gov/air/chronic_rels/index.html

¹⁰ <http://oehha.ca.gov/prop65/pdf/2009FebruaryStat.pdf>

- Allowable limits for modeled indoor air concentration at 14 days (i.e., 96-hr after the 10-d conditioning period) not to exceed half of the CREL, with the exception of formaldehyde and acetaldehyde. At that time, the CREL for formaldehyde was 3 $\mu\text{g}/\text{m}^3$, which was deemed unobtainable; instead, 33 $\mu\text{g}/\text{m}^3$ was set as the concentration limit, an extrapolated value based on the Acute REL at that time and an 8-hour exposure period. The allowable limit for acetaldehyde was set at the full CREL of 9 $\mu\text{g}/\text{m}^3$.

Subsequently, the health-based criteria of the *Standard Practice* were incorporated into the State of California *Open Office Panel Systems 2007-2008* purchasing criteria issued by the Department of General Services¹¹. The State of Minnesota government similarly adopted these environmental purchasing criteria. A variety of other product certification programs have adopted or adapted the *Standard Practice*; these include the *Leadership in Environmental Energy and Design* (LEED) Indoor Environmental Quality criteria¹²; the *National Green Building Standard*¹³; and *Business and Institutional Furniture Sustainability Standard*¹⁴.

Update of the Standard Practice

It has been five years since the Program issued its *Standard Practice*, and we recognize that revision is necessary to ensure continuous improvement of its testing protocols as well as to ensure its application of current health standards. The elements of the *Standard Practice* include both laboratory practice and public health policy. Our intention is to convene State agency stakeholders (ARB, OEHHA, DGS, and CIWMB) that worked with CDPH in its initial development to advise us with the revision. The Program aims to issue a draft document by October 2009; this will be circulated for peer review and for stakeholder comment for 45-days. Our goal is to complete the update before the end of 2009.

The *Standard Practice* revision will address the following tasks:

Update testing protocols

- Revise in accordance with current best practices (see Note 5)
- Allow shorter material “conditioning” times for selected product categories, as appropriate
- Expand categories of materials for testing
- Consolidate flooring categories
- Update exposure model parameters (e.g., default material areas, ventilation rates, etc.)
- Advise on alternate exposure scenarios

¹¹ http://www.cal-iaq.org/VOC/IAQ_Spec_from_080303143243710.pdf

¹² Issued by the U.S. Green Building Council (USGBC),
<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222>

¹³ Issued in 2008 by the National Association of Home Builders (NAHB) <http://www.nahbgreen.org/>

¹⁴ Business and Institutional Furniture Manufacturers Association, BIFMA, E3-2008
http://www.bifma.org/public/SusFurnStdArchive/Draft/2008-06-06_BIFMA_e3-2008.pdf

Improve health protection

- Incorporate updated health guidance, notably the new CREL for formaldehyde
- Reevaluate truncated target list for carpet
- Consider addition of exposure limits for new chemical classes (e.g., asthmagens, semi-VOCs)

Form of the Standard

The *Standard Practice* was issued in accordance with the policies of the California Department of Health Services (now the Department of Public Health). It was based on the most germane and up-to-date scientific and technical information at the time on the issues presented. Its objective is to fulfill the Department's mandate to provide guidance for reducing occupant exposure to VOCs emitted from building construction materials; however, it may **not** provide complete protection in all situations or against all health hazards related to such exposure. The protocols in the document are not regulations and are exempt from the procedures for adoption of regulations, including review and approval by the Office of Administrative Law (see Government Code Section 11340 *et seq.*¹⁵).

The *Standard Practice* is in the public domain, and the State has no financial interest in its use or application. This revision is intended to ensure its continuous improvement as the relevant science and practice advance. As in the past, we are asking for the technical input and assistance of our partner State agencies and other stakeholders to assure its enduring benefits to the State.

We plan to convene stakeholders later this spring to identify key concerns, constraints, and resources available to address our objectives. If you have any questions or concerns about the process, please feel free to contact me at 510-620-2864 or jed.waldman@cdph.ca.gov.

Sincerely yours,



Jed Waldman, PhD, Chief
Indoor Air Quality Section

¹⁵ <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=11001-12000&file=11340-11342.4>