Designation: ~~D6803 – 13~~ D6803 – 19

Standard Practice for Testing and Sampling of Volatile Organic Compounds (Including Carbonyl Compounds) Emitted from ~~Paint~~ Architectural Coatings Using ~~Small~~Small-Scale Environmental Chambers[1]

This standard is issued under the fixed designation D6803; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice ~~provides~~describes procedures for ~~preparing test samples of alkyd primer, alkyd paint, latex primer, or latex paint applied to building materials such as gypsum wallboard, wood, or engineered wood products and procedures for sampling~~ testing the emissions of volatile organic compounds ~~(VOCs) emitted from those test samples. Emissions are sampled from small environmental chambers operated under controlled conditions.~~(VOCs), formaldehyde, and other carbonyl compounds, from alkyd paint, latex paint, primer, and other architectural coating samples using a small-scale environmental chamber test facility.

1.2 This practice describes the requirements for the chamber test facility, the small-scale test chamber, the clean air supply system, the environmental controls, the environmental monitoring and data acquisition system, and the chamber air sampling system.

1.3 This practice describes procedures for ~~preparation of test specimens by application of primer or paint to common building materials. Use of the procedures described in this practice for tests with other application methods or substrates may affect the results and not meet the criteria recommended in the practice.~~documenting the paint and coating samples and for the handling and storage of these samples including splitting of samples into smaller containers for storage and subsequent testing.

1.4 This practice ~~describes procedures for collection of VOCs on sorbent tubes and carbonyl compounds on silica gel treated with 2,4-dinitrophenylhydrazine (DNPH) that require analytical methods for measurement of individual organic compound concentrations. This practice does not describe the detailed procedures of analytical methods, but refers to published methods for these analyses.~~identifies appropriate substrates to be used for the preparation of test specimens of paints and coatings, as well as procedures for preparing substrates for use.

1.5 This practice provides detailed procedures for preparing test specimens of paint and coating samples.

1.6 This practice ~~describes procedures for testing and sampling VOCs emitted from paint under controlled conditions. The test conditions, when combined with analytical data, can be used to calculate emission rates. This practice does not recommend a method for the calculations.~~generally describes chamber test procedures and chamber air sampling procedures. The details of these procedures are dependent upon the objectives of the test.

1.7 This practice does not recommend specific methods for sampling and analysis of VOCs, formaldehyde, and other carbonyl compounds. The appropriate methods are dependent upon the objectives of the test.

1.8 ~~Values stated in the International System of Units (SI)~~ The values stated in SI units are to be regarded as ~~the~~ standard. No other units of measurement are included in this standard.

1.9 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate ~~safety~~ safety, health, and ~~health~~environmental practices and determine the applicability of regulatory limitations prior to use.*

1.10 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

[1] This practice is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.05 on Indoor Air.

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2. Referenced Documents

2.1 *ASTM Standards:*[2]

D16 Terminology for Paint, Related Coatings, Materials, and Applications
D1005 Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers
D1212 Test Methods for Measurement of Wet Film Thickness of Organic Coatings
D1356 Terminology Relating to Sampling and Analysis of Atmospheres
~~D3686 Practice for Sampling Atmospheres to Collect Organic Compound Vapors (Activated Charcoal Tube Adsorption Method)~~
D3687 Practice for Analysis of Organic Compound Vapors Collected by the Activated Charcoal Tube Adsorption Method
D5116 Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products
D5197 Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology)
D5466 Test Method for Determination of Volatile Organic Compounds in Atmospheres (Canister Sampling Methodology)
D6196 Practice for Choosing Sorbents, Sampling Parameters and Thermal Desorption Analytical Conditions for Monitoring Volatile Organic Chemicals in Air
~~D6345 Guide for Selection of Methods for Active, Integrative Sampling of Volatile Organic Compounds in Air (Withdrawn 2018)~~[3]

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D6886 Test Method for Determination of the Weight Percent Individual Volatile Organic Compounds in Waterborne Air-Dry Coatings by Gas Chromatography

D8141 Guide for Selecting Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs) Emission Testing Methods to Determine Emission Parameters for Modeling of Indoor Environments

E355 Practice for Gas Chromatography Terms and Relationships

~~2.2 *Other Referenced Document:*[4]~~

~~Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Compendium Methods TO-15 and TO-17, EPA/625/R-96-010b, January 1999, (NTIS No. PB99-172355)~~

3. Terminology

~~3.1 *Definitions*—For definitions and terms used in this practice, refer to Terminology D1356, Terminology D16, and Practice E355. For definitions and terms related to test methods using small-scale environmental chambers, refer to Guide D5116.~~

3.1 *Definitions*—For definitions and terms used in this practice, refer to Terminology D1356, Terminology D16, and Practice E355. For definitions and terms related to test methods using small-scale environmental chambers, refer to Guide D5116.

3.1.1 *chamber loading ratio, n*—the total amount of test specimen exposed in the chamber divided by the net or corrected internal air volume of the chamber. **D5116**

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *alkyd ~~paint~~—paint, n*—a paint, also referred to as oil paint, ~~it is a paint~~ that contains drying oil or oil varnish as the basic ~~vehicle~~ ingredient.

~~3.2.2 *chamber loading (m^2/m^3)*—the exposed surface area of the test specimen coated with paint divided by the test chamber volume.~~

3.2.2 *clean ~~air~~—air, n*—air that does not contain any ~~individual VOC at a concentration~~ airborne contaminants in excess of ~~2~~ ~~µg/m~~defined limits.[3] ~~and does not contain greater than 10 µg/m^3 for the sum of the VOCs measurable in the sample. The air should be conditioned to remove particulates and ozone.~~

3.2.3 *environmental ~~enclosure~~—enclosure, n*—a temperature controlled enclosure of sufficient size to contain the test chamber(s) and allow adequate access to ~~it to~~ conduct ~~the~~ testing.

3.2.4 *latex ~~paint~~—paint, n*—a paint containing a stable aqueous dispersion of synthetic resin, produced by emulsion polymerization, as the principal constituent of the ~~binder. Modifying resins may be present.~~ binder and other potential modifying resins.

3.2.5 *~~primer~~—primer, n*—~~the first of two or more coats of a paint.~~a paint used as a preparatory coating that is applied to materials to facilitate adhesion of a finish coating to the surface.

3.2.6 *~~spreading rate~~—coverage rate, n*—the area covered by a unit volume of coating material ~~(for example, square~~expressed as m^2 ~~metres per litre /~~L or cm^2~~/mL). It may also be referred to as /~~mL.coverage or coverage rate on paint container labels.~~

3.2.7 *test ~~specimen~~—specimen, n*—a ~~specimen~~subsample of ~~the~~a paint sample applied to a substrate such as gypsum wallboard, wood, ~~or engineered wood products.~~ engineered wood products, or metal and used for testing in an environmental chamber.

4. Summary of Practice

4.1 Large quantities of architectural coatings are used indoors in buildings. Primers and various types of paint are applied to walls and other large surface areas. Wood floors and concrete floors are finished with different types of architectural coatings. Surfaces may be re-coated relatively frequently often while buildings are in use and occupied. There is a need for standardized procedures to qualitatively and quantitatively characterize the emissions of VOCs from such coatings as these emissions have impacts on indoor air quality and potential inhalation exposures of building occupants.

4.2 ~~This practice describes~~ The purpose of this practice is to define standardized procedures for testing ~~and sampling~~ paints and other architectural coatings for their emissions of VOCs, ~~including formaldehyde~~ formaldehyde, and other carbonyl ~~compounds, from paint applied to building materials such as gypsum wallboard, wood, and engineered wood products. Emissions tests are conducted using small environmental chambers operated in a dynamic mode with continuous flow of humidified VOC-free air through the chambers. The environmental chambers are operated at designated conditions of airflow rate, temperature, and relative humidity. The VOCs in the emissions are sampled by adsorption on an appropriate single, or multiple sorbent media that can be analyzed by thermal desorption and combined gas chromatography/mass spectrometry (GC/MS) or GC/flame ionization detection (GC/FID). Other VOC sampling methods such as the collection of whole air samples in passivated canisters by Test Method~~ compounds. These procedures expand upon the best practices ~~D5466 may offer advantages for some applications. Refer to~~ for small-scale chamber emission testing described in Guide ~~D6345~~D5116 ~~for a discussion of the relative merits of different methods of active, integrative VOC sampling. Formaldehyde and other carbonyl compounds are collected on silica gel coated with DNPH reagent that can be analyzed by high performance liquid chromatography (HPLC).~~.

4.3 Requirements are defined for an appropriate chamber test facility that includes one or more small-scale test chambers and the associated clean air supply system, the environmental control and monitoring systems, and the system for sampling chamber exhaust air for VOCs.

4.4 Procedures are defined for documenting representative samples of paints and coatings and for their handling in the laboratory prior to conducting emission tests.

4.5 VOC emissions from paints and coatings often are strongly influenced by the substrate to which they are applied. In order to assess potential impacts of VOC emissions on indoor air quality, substrates should be representative of how the products are typically used. This practice identifies representative substrates and application procedures for several common types of interior paints and coatings.

4.6 This practice generally describes chamber test procedures and chamber air sampling procedures but does not recommend specific methods for sampling and analysis of VOCs, formaldehyde, and other carbonyl compounds.

4.7 This practice ~~describes the procedures for handling and storage of paint, setup of small test chambers, preparation~~ does not extend to the measurement of emissions of semi-volatile organic compounds (SVOCs). Refer to Guide D8141~~of test specimens, chamber performance tests, sampling and reporting.~~ for a discussion of methods appropriate for SVOCs.

5. Significance and Use

5.1 Latex ~~and alkyd paints~~ paints, alkyd paints, and primers are used as coatings for walls, wooden trim, and furnishings in occupied buildings. Paint may be applied to large surface areas and may be applied repeatedly during the lifetime of a building. VOCs are emitted from paint after application to surfaces.

5.2 Many other types of architectural coatings may be used in large quantities indoors in buildings. In particular, many different types of coatings are used for floors including wood floor stains and finishes and concrete sealers, hardeners, and stains. Two component finishes are often mixed on site and are applied to floors and other surfaces to create a finished surface.

5.3 There is a need for ~~data on emissions from paint. The data can be used to compare emissions from different products. The data may be used to assist manufacturers in reducing or eliminating~~standardized procedures for measuring the emissions of VOCs from paint and coating samples that can be reproduced by different laboratories and that can used for the assessment of the acceptability of VOC emissions from ~~their products. The data may be used to predict concentrations of VOCs in a room or building when used with appropriate indoor air quality models.~~ paints and coatings that are intended for use indoors in occupied spaces. This practice describes standardized procedures that can be incorporated into test methods used for the purpose of estimating the impacts of cured paints and coatings on indoor air quality. Different procedures are required for the estimation of VOC exposures to workers applying such products.

~~5.3 Standard test practices and procedures are needed for the comparison of emissions data from different laboratories.~~

6. Apparatus

6.1 This practice requires the use of an environmental chamber testing facility and an air sample collection ~~systems.~~system.

6.2 *Environmental Chamber Testing ~~Facility,~~ Facility*—~~consisting~~ The facility consists of a test chamber, a controlled-temperature environmental enclosure, a system for supplying clean ~~and conditioned~~ air to the chamber, ~~and fittings and manifolds~~ a humidification system, and a manifold on the chamber exhaust outlet for the collection of air samples. All materials and components in contact with the test specimen or air prior to sample collection ~~should~~shall be chemically inert and accessible for cleaning. Suitable materials include stainless steel and glass. All gaskets and flexible components ~~should~~shall be made from chemically inert materials. General guidance for design, construction, configuration, and validation of a test chamber facility is provided in Guide D5116.

6.2.1 *Test ~~Chamber,~~ Chamber*—The test chamber shall be constructed of inert ~~materials~~ materials, either electro-polished stainless steel or glass. The chamber shall be of sufficient size to hold the test specimen. ~~Small test chambers~~ Chambers may range in size from a few litres to ~~5 m~~a few^3~~. Procedures recommended in this~~ cubic metres as described in Guide D5116~~practice have been evaluated using test chambers with a~~. A volume of 0.053 m^3~~. This volume~~ is used in ~~the~~this practice only for discussion and illustrative purposes. ~~Chambers~~ Small-scale chambers of different ~~size~~sizes and ~~shape~~shapes may be used if the ~~standard~~ test ~~chamber~~ conditions can be maintained and chamber performance at these conditions can be demonstrated. The chamber ~~should~~shall be equipped with an opening large enough for loading the test specimen and for cleaning the chamber. The chamber ~~will~~shall be equipped with a port to supply air to the chamber, an air outlet from the chamber, and ports for temperature and relative humidity probes. The chamber may be equipped with a fan to promote mixing in the chamber and to achieve the desired air ~~velocity~~speed across the surface of the test specimen. See Guide D5116, Section 5.3.3, for additional guidance on the use of fans. The performance of the chamber ~~should~~shall be evaluated prior to its use to determine ~~air-tightness,~~airtightness, surface adsorption ~~effects, air mixing, and air velocity at~~ effects and air mixing. If a fan is used, the air speed at 1 cm above the surface of the ~~substrate. Some of the chamber performance (that is, air mixing and air velocity) should~~ substrate shall be demonstrated to be in the range

of 0.1 m/s to 0.3 m/s. The chamber performance for air mixing (and air speed if a fan is used) shall be evaluated with ~~an uncoated test~~ representative substrate in place. The chamber performance ~~should~~shall be tested and demonstrated following the guidelines presented in Guide D5116.

6.2.2 *Environmental ~~Enclosure,~~ Enclosure*—The chamber shall be maintained in an enclosure that is of sufficient size to accommodate ~~the test chamber and~~ one or more test chambers and that is capable of maintaining the desired temperature ~~within 0.5°C.~~of the chamber(s) within ±1°C. The enclosure shall be constructed of inert materials and be easily accessible for air sampling

6.2.3 *Clean Air Supply ~~System,~~ System*—~~capable of supplying a~~ A controlled flow of ~~clean, humidified air into~~ clean air shall be supplied to the test chamber, as described in Guide D5116. The system ~~should~~shall incorporate hardware for removing particles, ozone, and VOCs from the ~~air supplied to the chamber(s).~~ supply air. Concentrations of VOCs and aldehydes measured at the chamber inlet ~~should~~shall not exceed 2 µg/m^3 for any single target compound ~~or 10~~and 20 µg/m^3 for the sum of all measurable ~~VOCs in the sample. The relative humidity (RH) of the air supplied to the chamber(s) should be controlled to the desired set point within ±5 % RH. The~~ VOCs. The flow rate of the air supplied to the chamber ~~should~~shall be controlled within ~~±5 %~~ ±2 % of the set-point airflow ~~rate. Ideally, the chamber system will~~rate with an accuracy of ±2 %. It is recommended that inlet airflow rate be controlled using a calibrated electronic mass flow controller(s). The airflow rate shall be referenced to standard temperature and pressure, typically 25°C, 101 kPa for indoor air applications. The chamber system shall be designed such that a positive pressurization of the chamber of ~~approximately 10~~ ≤10 Pa relative to the environmental enclosure ~~will be maintained and monitored at all times during the test.~~is maintained throughout the test. The relative humidity (RH) of the air supplied to the chamber(s) shall be controlled to the desired set point within ±5 % RH with an accuracy of ±5 %. This is often achieved by splitting the inlet airflow rate 50/50 between dry air and air that passes through a water bubbler held at the same temperature as the chamber.

6.2.4 *Environmental Measurement ~~System,~~ System*—A data acquisition system consisting of hardware and software shall be used to measure and record the temperature, RH, ~~and airflow rates during operation of the test system.~~ inlet airflow rate, and sampling airflow rates throughout each test. A system for ~~continuous~~ relatively high frequency recording of the data is ~~recommended.~~required. Sampling at one hertz with recording of averages at one-minute intervals is recommended. At a minimum, data shall be recorded every five minutes.

6.3 *Air Sampling ~~Systems,~~ System*—~~consisting of sorbent tubes and DNPH-silica gel cartridges,~~ An air sampling system consisting of a sampling manifold, a vacuum ~~pumps,~~pump(s), and airflow ~~controllers/meters.~~ controllers/meters shall be used. Airflow controllers ~~should~~shall control the ~~airflow rate through the sampling system to within 5 %~~sampling airflow rates to within ±2 % of the specified ~~value. All system components between the chamber and the sampling media should be constructed of chemically inert materials.~~values with an accuracy of ±2 %. It is recommended that sampling airflow rates be controlled using calibrated electronic mass flow controllers. Sampling airflow rates shall be referenced to standard temperature and pressure, typically 25°C, 101 kPa. Sampling initiation and termination times can be programmed and controlled with solenoid values operated by the data acquisition system.

6.3.1 All system components between the chamber and the sampling media shall be constructed of chemically inert materials. A glass or ~~stainless steel~~ stainless-steel manifold ~~should~~shall be connected to the outlet of the chamber for collection of air samples. The manifold ~~should~~shall be designed for collection of multiple samples simultaneously. The manifold shall be maintained at the same temperature as the chamber. It is recommended that the exhaust from the manifold ~~should~~ be vented into a laboratory fume hood or other appropriate exhaust ~~device~~ to ~~prevent~~minimize contamination of the air in the ~~laboratory or~~ environmental enclosure.

6.3.2 ~~Vacuum pumps should~~ A vacuum pump shall be used to draw air through the ~~sorbent tubes.~~sampling media. The required airflow rate is a function of the type of sampler used, the ~~size of the chamber,~~ air change rate and the ~~air change rate.~~chemical source strength. The total airflow rate through the samplers generally ~~should~~shall not exceed ~~50 %~~ 50 % of the ~~flow~~airflow rate from the chamber ~~outlet.~~ exhaust or shall be demonstrated to not reduce the positive pressurization of the chamber. For collection of ~~VOCs on sorbent tubes, the pump should be capable of maintaining a constant flow in the range of~~VOC samples, the typical sampling airflow rate range is 10 to 200 ~~mL/min.~~cm^3/min. For collection of air samples ~~on DNPH-silica gel cartridges, the pump should be capable of maintaining a constant flow in the range of 100 to 500 mL/min.~~for analysis of formaldehyde and other low molecular weight carbonyl compounds, the typical sampling airflow rate is 100 to 1000 cm^3/min.

~~6.3.3 For collection of VOCs during the emissions test, tubes containing single or multiple sorbents may be used. The sorbents may be porous polymers or graphitized carbon blacks. Select an appropriate single or multi-layered sorbent tube following the procedures in Practice D6196, Guide D6345, and EPA Method TO-17. Recommendations on the use of sorbent tubes from manufacturers or suppliers should be followed in selecting the sampling airflow rate and sampling period to avoid breakthrough of VOCs through the sorbent tube. The required air sampling volume at each collection time point should be determined through consideration of the safe sampling volume (SSV, see Practice D6196) of the VOC with the lowest retention volume, concentrations to be measured, and detection limits of the analytical method.~~

~~6.3.4 For collection of VOCs during the first 10 to 20 h following application of alkyd primer or paint, charcoal sorbents (Practice D3686) may be used due to the high concentrations of VOCs in the chamber air.~~

~~6.3.5 For collection of formaldehyde and other carbonyl compounds, DNPH-silica gel cartridges should be used following the Test Method D5197.~~

6.3.3 ~~An airflow meter/controller should be used to control and measure the airflow rate during sample collection. The controller may consist of a precision flow control valve, a critical orifice, or a mass flow controller. The measurement device may consist of soap film bubble meter, calibrated high precision rotameter, or mass flow meter. A mass flow meter/controller is recommended for use during sample collection. All flow measurements should be referenced to standard temperature and pressure.~~Provisions shall be made to collect multiple air samples of each type at each time point. Replicate samples may be required for quality control purposes and also to accommodate potentially large concentration differences among analytes of interest at early time points.

7. ~~Procedures~~Procedure for Paint and Coating Selection, Handling, and Storage

7.1 Procedures for selection of the paint or coating sample to be tested are a function of the ~~objectives of the tests. Paint~~ study objectives. Paint and coating samples may be procured from ~~clients,~~ manufacturers, distributors, retailers, or ~~retailers.~~ other sources. Record pertinent information upon receipt of the ~~paint~~sample including date of acquisition, source of the ~~paint,~~sample, manufacturer, container size, gloss level, intended application(s), date of manufacturing (if available), lot number, and other relevant ~~information on the label.~~ information. Obtain and review the ~~Material~~ Safety Data Sheet ~~(MSDS) for the paint. At least~~ (SDS) and the Technical Data Sheet (TDS) for the paint or coating. The density of the paint or coating and the recommended coverage rate are required for preparation of representative test specimens. It is recommended that two containers of the same lot number ~~of paint should be procured (one for testing~~ be procured, that is, one to test and one to ~~archive).~~archive.

~~7.2 Upon receipt of the paint, it should be split into storage vials for handling and testing. The paint should be mixed in the original container on a paint shaker before the split.~~

7.2 ~~Split the paint into aliquots. Special care should be taken to minimize the loss of volatile compounds during the process. Paint containers should not be left open except when required for transfer to storage vials. The size of the aliquot and storage vial is a function of the amount of paint required for the test. Vials of 40 to 60 mL volumes hold sufficient paint for GC/MS analyses of the liquid product or preparation of test specimens of 256 cm~~Upon receipt of a sample, it may ~~^{2} area for chamber tests. Store paint in clean amber glass vials that can be sealed with caps that have Teflon liners. Clean vials with alkaline detergent, rinse thoroughly with deionized water, then dry before use. Individual vials of paint are used for testing to minimize losses of volatile compounds during handling and preparation of test specimens. Repeated opening of a large container of paint will result in losses of VOCs.~~be advantageous to split the sample into multiple storage vials, for example if multiple emission tests or VOC content tests are required. The sample shall be mixed in the original container, typically on a paint shaker, before the split.

7.2.1 Special care should be taken to minimize the loss of volatile compounds during the splitting process. Sample containers shall not be left open except when required for transfer of their content to storage vials.

7.2.2 The size of the aliquot and the storage vial is a function of the amount of product required for each test. Vials of 100-mL volume hold sufficient material for analysis of VOC content by Test Method D6886 or for preparation of test specimens of ~250-cm^2 area for emission tests. Use clean amber glass vials sealed with polytetrafluoroethylene-lined caps. Prior to use, clean vials with dilute alkaline detergent and rinse thoroughly with deionized water.

7.2.3 Pour the mixed paint or coating sample into the vials, filling the vials to near the top to minimize the headspace volume. Place two, or more, clean glass or stainless-steel balls in the vial to aid in mixing prior to use of the sample. Prepare a sufficient number of sample vials for all planned tests. Label the vials individually with a sample code and the date of preparation.

7.2.4 Store the vials of the samples and the original containers of the paint or coating sample in the dark at room temperature.

~~7.4 Pour the mixed paint into the vials, filling the vial to near the top to minimize the volume of headspace and loss of VOCs when the vial is opened. Two or more clean stainless steel balls may be placed in the vial to aid in mixing prior to use of the sample. Prepare a sufficient number of sample vials for all analyses and tests planned for the paint. Label the vials individually with a sample code and the date of preparation.~~

~~7.5 Store the vials of the paint samples and the original containers of the paint in the dark at room temperature.~~

7.3 Use the paint or coating sample within the manufacturer's specified shelf-life time. It is recommended that VOC concentrations ~~should~~ be measured ~~by GC/MS or GC/FID~~ after extended periods of storage to verify that they have not changed during storage, for example, by Test Method D6886. Compare the concentrations of the VOCs to results from the original analyses performed ~~immediately~~soon after the ~~paint~~sample was obtained.

8. ~~Procedures~~Procedure for Preparation of ~~Test Specimens~~Substrate Materials

8.1 Procure ~~the~~ and cut a substrate material that is appropriate for testing ~~the~~VOC emissions from the ~~paint. The substrate should not emit any of the compounds that are to be quantified in the emissions from the paint or compounds that may interfere with quantification of the emissions from the paint. Cut the substrate material to an appropriate size (for example, 16 cm by 16 cm for a loading of 0.5 m~~paint or coating. ~~^{2}/m^3 in a 0.053 m^3 chamber). Use an appropriate cutting device to obtain smooth edges. If necessary, sand wood substrate to provide a smooth surface.~~

8.1.1 Wall paints typically are applied to gypsum board. Use standard, untreated gypsum board with a thickness of approximately 16-mm thick. Apply the paint to the finished surface side. Each lot of gypsum board shall be tested for emissions of VOCs prior to use. Note that some gypsum board emits formaldehyde at a rate that may result in the chamber concentration of formaldehyde exceeding the background requirement.