



2019 CALIFORNIA GREEN BUILDING STANDARDS CODE

RESIDENTIAL MANDATORY MEASURES, SHEET 1 (January 2020, Includes August 2019 Supplement)

Y NA RESPON. PARTY
 YES = NOT APPLICABLE
 NA = RESPONSIBLE PARTY (i.e. ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR, ETC.)

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			<p>MAXIMUM INCREMENTAL REACTIVITY (MIR). The maximum change in weight of ozone formed by adding a compound to the "Base Reactive Organic Gas (ROG) Mixture" per weight of compound added, expressed to hundredths of a gram (g O₃/g ROG). Note: MIR values for individual compounds and hydrocarbon solvents are specified in CCR, Title 17, Sections 94700 and 94701.</p> <p>MOISTURE CONTENT. The weight of the water in wood expressed in percentage of the weight of the oven-dry wood.</p> <p>PRODUCT-WEIGHTED MIR (P_WMIR). The sum of all weighted-MIR for all ingredients in a product subject to this article. The P_WMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging). Note: P_WMIR is calculated according to equations found in CCR, Title 17, Section 94521 (a).</p> <p>REACTIVE ORGANIC COMPOUND (ROC). Any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere.</p> <p>VOC. A volatile organic compound (VOC) broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94506(a).</p>				<p>TABLE 4.504.1 - ADHESIVE VOC LIMIT_{1,2} (Less Water and Less Exempt Compounds in Grams per Liter)</p> <table border="1"> <thead> <tr> <th>ARCHITECTURAL APPLICATIONS</th> <th>VOC LIMIT</th> </tr> </thead> <tbody> <tr><td>INDOOR CARPET ADHESIVES</td><td>50</td></tr> <tr><td>CARPET PAD ADHESIVES</td><td>50</td></tr> <tr><td>OUTDOOR CARPET ADHESIVES</td><td>150</td></tr> <tr><td>WOOD FLOORING ADHESIVES</td><td>100</td></tr> <tr><td>RUBBER FLOOR ADHESIVES</td><td>60</td></tr> <tr><td>SUBFLOOR ADHESIVES</td><td>50</td></tr> <tr><td>CERAMIC TILE ADHESIVES</td><td>65</td></tr> <tr><td>VCT & ASPHALT TILE ADHESIVES</td><td>50</td></tr> <tr><td>DRYWALL & PANEL ADHESIVES</td><td>50</td></tr> <tr><td>COVE BASE ADHESIVES</td><td>50</td></tr> <tr><td>MULTIPURPOSE CONSTRUCTION ADHESIVE</td><td>70</td></tr> <tr><td>STRUCTURAL GLAZING ADHESIVES</td><td>100</td></tr> <tr><td>SINGLE-PLY ROOF MEMBRANE ADHESIVES</td><td>250</td></tr> <tr><td>OTHER ADHESIVES NOT LISTED</td><td>50</td></tr> <tr><td>SPECIALTY APPLICATIONS</td><td></td></tr> <tr><td>PVC WELDING</td><td>510</td></tr> <tr><td>CPVC WELDING</td><td>490</td></tr> <tr><td>ABS WELDING</td><td>325</td></tr> <tr><td>PLASTIC CEMENT WELDING</td><td>250</td></tr> <tr><td>ADHESIVE PRIMER FOR PLASTIC</td><td>550</td></tr> <tr><td>CONTACT ADHESIVE</td><td>80</td></tr> <tr><td>SPECIAL PURPOSE CONTACT ADHESIVE</td><td>250</td></tr> <tr><td>STRUCTURAL WOOD MEMBER ADHESIVE</td><td>140</td></tr> <tr><td>TOP & TRIM ADHESIVE</td><td>250</td></tr> <tr><td>SUBSTRATE SPECIFIC APPLICATIONS</td><td></td></tr> <tr><td>METAL TO METAL</td><td>30</td></tr> <tr><td>PLASTIC FOAMS</td><td>50</td></tr> <tr><td>POROUS MATERIAL (EXCEPT WOOD)</td><td>50</td></tr> <tr><td>WOOD</td><td>30</td></tr> <tr><td>FIBERGLASS</td><td>80</td></tr> </tbody> </table> <p>1. IF AN ADHESIVE IS USED TO BOND DISSIMILAR SUBSTRATES TOGETHER, THE ADHESIVE WITH THE HIGHEST VOC CONTENT SHALL BE ALLOWED. 2. FOR ADDITIONAL INFORMATION REGARDING METHODS TO MEASURE THE VOC CONTENT SPECIFIED IN THIS TABLE, SEE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 1168.</p>	ARCHITECTURAL APPLICATIONS	VOC LIMIT	INDOOR CARPET ADHESIVES	50	CARPET PAD ADHESIVES	50	OUTDOOR CARPET ADHESIVES	150	WOOD FLOORING ADHESIVES	100	RUBBER FLOOR ADHESIVES	60	SUBFLOOR ADHESIVES	50	CERAMIC TILE ADHESIVES	65	VCT & ASPHALT TILE ADHESIVES	50	DRYWALL & PANEL ADHESIVES	50	COVE BASE ADHESIVES	50	MULTIPURPOSE CONSTRUCTION ADHESIVE	70	STRUCTURAL GLAZING ADHESIVES	100	SINGLE-PLY ROOF MEMBRANE ADHESIVES	250	OTHER ADHESIVES NOT LISTED	50	SPECIALTY APPLICATIONS		PVC WELDING	510	CPVC WELDING	490	ABS WELDING	325	PLASTIC CEMENT WELDING	250	ADHESIVE PRIMER FOR PLASTIC	550	CONTACT ADHESIVE	80	SPECIAL PURPOSE CONTACT ADHESIVE	250	STRUCTURAL WOOD MEMBER ADHESIVE	140	TOP & TRIM ADHESIVE	250	SUBSTRATE SPECIFIC APPLICATIONS		METAL TO METAL	30	PLASTIC FOAMS	50	POROUS MATERIAL (EXCEPT WOOD)	50	WOOD	30	FIBERGLASS	80			<p>TABLE 4.504.2 - SEALANT VOC LIMIT (Less Water and Less Exempt Compounds in Grams per Liter)</p> <table border="1"> <thead> <tr> <th>SEALANTS</th> <th>VOC LIMIT</th> </tr> </thead> <tbody> <tr><td>ARCHITECTURAL</td><td>250</td></tr> <tr><td>MARINE DECK</td><td>760</td></tr> <tr><td>NONMEMBRANE ROOF</td><td>300</td></tr> <tr><td>ROADWAY</td><td>250</td></tr> <tr><td>SINGLE-PLY ROOF MEMBRANE</td><td>450</td></tr> <tr><td>OTHER</td><td>420</td></tr> <tr><td>SEALANT PRIMERS</td><td></td></tr> <tr><td>ARCHITECTURAL</td><td></td></tr> <tr><td>NON-POROUS</td><td>250</td></tr> <tr><td>POROUS</td><td>775</td></tr> <tr><td>MODIFIED BITUMINOUS</td><td>500</td></tr> <tr><td>MARINE DECK</td><td>760</td></tr> <tr><td>OTHER</td><td>750</td></tr> </tbody> </table>	SEALANTS	VOC LIMIT	ARCHITECTURAL	250	MARINE DECK	760	NONMEMBRANE ROOF	300	ROADWAY	250	SINGLE-PLY ROOF MEMBRANE	450	OTHER	420	SEALANT PRIMERS		ARCHITECTURAL		NON-POROUS	250	POROUS	775	MODIFIED BITUMINOUS	500	MARINE DECK	760	OTHER	750			<p>TABLE 4.504.3 - VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS_{2,3} GRAMS OF VOC PER LITER OF COATING, LESS WATER & LESS EXEMPT COMPOUNDS</p> <table border="1"> <thead> <tr> <th>COATING CATEGORY</th> <th>VOC LIMIT</th> </tr> </thead> <tbody> <tr><td>FLAT COATINGS</td><td>50</td></tr> <tr><td>NON-FLAT COATINGS</td><td>100</td></tr> <tr><td>NONFLAT-HIGH GLOSS COATINGS</td><td>150</td></tr> <tr><td>SPECIALTY COATINGS</td><td></td></tr> <tr><td>ALUMINUM ROOF COATINGS</td><td>400</td></tr> <tr><td>BASEMENT SPECIALTY COATINGS</td><td>400</td></tr> <tr><td>BITUMINOUS ROOF COATINGS</td><td>50</td></tr> <tr><td>BITUMINOUS ROOF PRIMERS</td><td>350</td></tr> <tr><td>BOND BREAKERS</td><td>350</td></tr> <tr><td>CONCRETE CURING COMPOUNDS</td><td>350</td></tr> <tr><td>CONCRETE/MASONRY SEALERS</td><td>100</td></tr> <tr><td>DRIVEWAY SEALERS</td><td>50</td></tr> <tr><td>DRY FOG COATINGS</td><td>150</td></tr> <tr><td>FAUX FINISHING COATINGS</td><td>350</td></tr> <tr><td>FIRE RESISTIVE COATINGS</td><td>350</td></tr> <tr><td>FLOOR COATINGS</td><td>100</td></tr> <tr><td>FORM-RELEASE COMPOUNDS</td><td>250</td></tr> <tr><td>GRAPHIC ARTS COATINGS (SIGN PAINTS)</td><td>500</td></tr> <tr><td>HIGH TEMPERATURE COATINGS</td><td>420</td></tr> <tr><td>INDUSTRIAL MAINTENANCE COATINGS</td><td>250</td></tr> <tr><td>LOW SOLIDS COATINGS₄</td><td>120</td></tr> <tr><td>MAGNESITE CEMENT COATINGS</td><td>450</td></tr> <tr><td>MASTIC TEXTURE COATINGS</td><td>100</td></tr> <tr><td>METALLIC PIGMENTED COATINGS</td><td>500</td></tr> <tr><td>MULTICOLOR COATINGS</td><td>250</td></tr> <tr><td>PRETREATMENT WASH PRIMERS</td><td>420</td></tr> <tr><td>PRIMERS, SEALERS, & UNDERCOATERS</td><td>100</td></tr> <tr><td>REACTIVE PENETRATING SEALERS</td><td>350</td></tr> <tr><td>RECYCLED COATINGS</td><td>250</td></tr> <tr><td>ROOF COATINGS</td><td>50</td></tr> <tr><td>RUST PREVENTATIVE COATINGS</td><td>250</td></tr> <tr><td>SHELLACS</td><td></td></tr> <tr><td>CLEAR</td><td>730</td></tr> <tr><td>OPAQUE</td><td>550</td></tr> <tr><td>SPECIALTY PRIMERS, SEALERS & UNDERCOATERS</td><td>100</td></tr> <tr><td>STAINS</td><td>250</td></tr> <tr><td>STONE CONSOLIDANTS</td><td>450</td></tr> <tr><td>SWIMMING POOL COATINGS</td><td>340</td></tr> <tr><td>TRAFFIC MARKING COATINGS</td><td>100</td></tr> <tr><td>TUB & TILE REFINISH COATINGS</td><td>420</td></tr> <tr><td>WATERPROOFING MEMBRANES</td><td>250</td></tr> <tr><td>WOOD COATINGS</td><td>275</td></tr> <tr><td>WOOD PRESERVATIVES</td><td>350</td></tr> <tr><td>ZINC-RICH PRIMERS</td><td>340</td></tr> </tbody> </table> <p>1. 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MORE INFORMATION IS AVAILABLE FROM THE AIR RESOURCES BOARD.</p>	COATING CATEGORY	VOC LIMIT	FLAT COATINGS	50	NON-FLAT COATINGS	100	NONFLAT-HIGH GLOSS COATINGS	150	SPECIALTY COATINGS		ALUMINUM ROOF COATINGS	400	BASEMENT SPECIALTY COATINGS	400	BITUMINOUS ROOF COATINGS	50	BITUMINOUS ROOF PRIMERS	350	BOND BREAKERS	350	CONCRETE CURING COMPOUNDS	350	CONCRETE/MASONRY SEALERS	100	DRIVEWAY SEALERS	50	DRY FOG COATINGS	150	FAUX FINISHING COATINGS	350	FIRE RESISTIVE COATINGS	350	FLOOR COATINGS	100	FORM-RELEASE COMPOUNDS	250	GRAPHIC ARTS COATINGS (SIGN PAINTS)	500	HIGH TEMPERATURE COATINGS	420	INDUSTRIAL MAINTENANCE COATINGS	250	LOW SOLIDS COATINGS ₄	120	MAGNESITE CEMENT COATINGS	450	MASTIC TEXTURE COATINGS	100	METALLIC PIGMENTED COATINGS	500	MULTICOLOR COATINGS	250	PRETREATMENT WASH PRIMERS	420	PRIMERS, SEALERS, & UNDERCOATERS	100	REACTIVE PENETRATING SEALERS	350	RECYCLED COATINGS	250	ROOF COATINGS	50	RUST PREVENTATIVE COATINGS	250	SHELLACS		CLEAR	730	OPAQUE	550	SPECIALTY PRIMERS, SEALERS & UNDERCOATERS	100	STAINS	250	STONE CONSOLIDANTS	450	SWIMMING POOL COATINGS	340	TRAFFIC MARKING COATINGS	100	TUB & TILE REFINISH COATINGS	420	WATERPROOFING MEMBRANES	250	WOOD COATINGS	275	WOOD PRESERVATIVES	350	ZINC-RICH PRIMERS	340			<p>TABLE 4.504.4 - FORMALDEHYDE LIMITS: MAXIMUM FORMALDEHYDE EMISSIONS IN PARTS PER MILLION</p> <table border="1"> <thead> <tr> <th>PRODUCT</th> <th>CURRENT LIMIT</th> </tr> </thead> <tbody> <tr><td>HARDWOOD PLYWOOD VENEER CORE</td><td>0.05</td></tr> <tr><td>HARDWOOD PLYWOOD COMPOSITE CORE</td><td>0.05</td></tr> <tr><td>PARTICLE BOARD</td><td>0.09</td></tr> <tr><td>MEDIUM DENSITY FIBERBOARD</td><td>0.11</td></tr> <tr><td>THIN MEDIUM DENSITY FIBERBOARD₂</td><td>0.13</td></tr> </tbody> </table> <p>1. VALUES IN THIS TABLE ARE DERIVED FROM THOSE SPECIFIED BY THE CALIF. AIR RESOURCES BOARD, AIR TOXICS CONTROL MEASURE FOR COMPOSITE WOOD AS TESTED IN ACCORDANCE WITH ASTM E 1333. FOR ADDITIONAL INFORMATION, SEE CALIF. CODE OF REGULATIONS, TITLE 17, SECTIONS 93120 THROUGH 93120.12. 2. THIN MEDIUM DENSITY FIBERBOARD HAS A MAXIMUM THICKNESS OF 5/16" (8 MM).</p>	PRODUCT	CURRENT LIMIT	HARDWOOD PLYWOOD VENEER CORE	0.05	HARDWOOD PLYWOOD COMPOSITE CORE	0.05	PARTICLE BOARD	0.09	MEDIUM DENSITY FIBERBOARD	0.11	THIN MEDIUM DENSITY FIBERBOARD ₂	0.13			<p>CHAPTER 7 INSTALLER & SPECIAL INSPECTOR QUALIFICATIONS 702 QUALIFICATIONS 702.1 INSTALLER TRAINING. HVAC system installers shall be trained and certified in the proper installation of HVAC systems including ducts and equipment by a nationally or regionally recognized training or certification program. Uncertified persons may perform HVAC installations when under the direct supervision and responsibility of a person trained and certified to install HVAC systems or contractor licensed to install HVAC systems. Examples of acceptable HVAC training and certification programs include but are not limited to the following:</p> <ol style="list-style-type: none"> State certified apprenticeship programs. Public utility training programs. Training programs sponsored by trade, labor or statewide energy consulting or verification organizations. Programs sponsored by manufacturing organizations. Other programs acceptable to the enforcing agency. <p>702.2 SPECIAL INSPECTION [HCD]. When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition to other certifications or qualifications acceptable to the enforcing agency, the following certifications or education may be considered by the enforcing agency when evaluating the qualifications of a special inspector:</p> <ol style="list-style-type: none"> Certification by a national or regional green building program or standard publisher. Certification by a statewide energy consulting or verification organization, such as HERS raters, building performance contractors, and home energy auditors. Successful completion of a third party apprentice training program in the appropriate trade. Other programs acceptable to the enforcing agency. <p>Notes:</p> <ol style="list-style-type: none"> Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code. HERS raters are special inspectors certified by the California Energy Commission (CEC) to rate homes in California according to the Home Energy Rating System (HERS). <p>[BSC] When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition, the special inspector shall have a certification from a recognized state, national or international association, as determined by the local agency. The area of certification shall be closely related to the primary job function, as determined by the local agency.</p> <p>Note: Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.</p>			<p>DIVISION 4.5 ENVIRONMENTAL QUALITY (continued) 4.504.3 CARPET SYSTEMS. All carpet installed in the building interior shall meet the testing and product requirements of at least one of the following:</p> <ol style="list-style-type: none"> Carpet and Rug Institute's Green Label Plus Program. California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers" Version 1.1, February 2010 (also known as Specification 01350), certified as a CHPS Low-Emitting Material in the Collaborative for High Performance Schools (CHPS) High Performance Products Database. Scientific Certifications Systems Indoor Advantage[®] Gold. <p>4.504.3.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.</p> <p>4.504.3.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 4.504.1.</p> <p>4.504.4 RESILIENT FLOORING SYSTEMS. Where resilient flooring is installed, at least 80% of floor area receiving resilient flooring shall comply with one or more of the following:</p> <ol style="list-style-type: none"> Products compliant with the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers", Version 1.1, February 2010 (also known as Specification 01350), certified as a CHPS Low-Emitting Material in the Collaborative for High Performance Schools (CHPS) High Performance Products Database. Products certified under UL GREENGUARD Gold (formerly the Greenguard Children & Schools program). Certification under the Resilient Floor Covering Institute (RFC) FloorScore program. Meet the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers", Version 1.1, February 2010 (also known as Specification 01350). <p>4.504.5 COMPOSITE WOOD PRODUCTS. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the buildings shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections, as shown in Table 4.504.5</p> <p>4.504.5.1 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:</p> <ol style="list-style-type: none"> Product certifications and specifications. Chain of custody certifications. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.). Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269, European EN 13986 standards, and Canadian CSA 0121, CSA 01151, CSA 0163 and CSA 0225 standards. Other methods acceptable to the enforcing agency. <p>4.505 INTERIOR MOISTURE CONTROL 4.505.1 General. Buildings shall meet or exceed the provisions of the <i>California Building Standards Code</i>.</p> <p>4.505.2 CONCRETE SLAB FOUNDATIONS. Concrete slab foundations required to have a vapor retarder by California Building Code, Chapter 19, or concrete slab-on-ground floors required to have a vapor retarder by the California Residential Code, Chapter 5, shall also comply with this section.</p> <p>4.505.2.1 Capillary break. A capillary break shall be installed in compliance with at least one of the following:</p> <ol style="list-style-type: none"> A 4-inch (101.6 mm) thick base of 1/2 inch (12.7mm) or larger clean aggregate shall be provided with a vapor barrier in direct contact with concrete and a concrete mix design, which will address bleeding, shrinkage, and curling, shall be used. For additional information, see American Concrete Institute, ACI 302.2R-06. Other equivalent methods approved by the enforcing agency. A slab design specified by a licensed design professional. <p>4.505.3 MOISTURE CONTENT OF BUILDING MATERIALS. Building materials with visible signs of water damage shall not be installed. Wall and floor framing shall not be enclosed when the framing members exceed 19 percent moisture content. Moisture content shall be verified in compliance with the following:</p> <ol style="list-style-type: none"> Moisture content shall be determined with either a probe-type or contact-type moisture meter. Equivalent moisture verification methods may be approved by the enforcing agency and shall satisfy requirements found in Section 101.8 of this code. Moisture readings shall be taken at a point 2 feet (610 mm) to 4 feet (1219 mm) from the grade stamped end of each piece verified. At least three random moisture readings shall be performed on wall and floor framing with documentation acceptable to the enforcing agency provided at the time of approval to enclose the wall and floor framing. <p>Insulation products which are visibly wet or have a high moisture content shall be replaced or allowed to dry prior to enclosure in wall or floor cavities. Wet-applied insulation products shall follow the manufacturers' drying recommendations prior to enclosure.</p> <p>4.506 INDOOR AIR QUALITY AND EXHAUST 4.506.1 Bathroom exhaust fans. Each bathroom shall be mechanically ventilated and shall comply with the following:</p> <ol style="list-style-type: none"> Fans shall be ENERGY STAR compliant and be ducted to terminate outside the building. Unless functioning as a component of a whole house ventilation system, fans must be controlled by a humidity control. <ol style="list-style-type: none"> Humidity controls shall be capable of adjustment between a relative humidity range less than or equal to 50% to a maximum of 80%. A humidity control may utilize manual or automatic means of adjustment. A humidity control may be a separate component to the exhaust fan and is not required to be integral (i.e., built-in) <p>Notes:</p> <ol style="list-style-type: none"> For the purposes of this section, a bathroom is a room which contains a bathtub, shower or tub/shower combination. Lighting integral to bathroom exhaust fans shall comply with the <i>California Energy Code</i>. <p>4.507 ENVIRONMENTAL COMFORT 4.507.2 HEATING AND AIR-CONDITIONING SYSTEM DESIGN. Heating and air conditioning systems shall be sized, designed and have their equipment selected using the following methods:</p> <ol style="list-style-type: none"> The heat loss and heat gain is established according to ANSI/ACCA 2 Manual J - 2011 (Residential Load Calculation), ASHRAE handbooks or other equivalent design software or methods. Duct systems are sized according to ANSI/ACCA 1 Manual D - 2014 (Residential Duct Systems), ASHRAE handbooks or other equivalent design software or methods. Select heating and cooling equipment according to ANSI/ACCA 3 Manual S - 2014 (Residential Equipment Selection), or other equivalent design software or methods. <p>Exception: Use of alternate design temperatures necessary to ensure the system functions are acceptable.</p>
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