

**FINDING EMERGENCY  
FOR  
PROPOSED EMERGENCY BUILDING STANDARDS  
OF THE  
OFFICE OF THE STATE FIRE MARSHAL  
REGARDING THE 2010 CALIFORNIA FIRE CODE  
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 9  
ANTIFREEZE SOLUTIONS WITHIN RESIDENTIAL BUILDING APPLICATIONS  
MODIFICATIONS TO NFPA 13, 13D AND 13R FIRE SPRINKLER STANDARDS**

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Government Code section 11346.1 mandates that any finding of emergency shall include a written statement which contains the information required by paragraphs (2) to (6), inclusive, of subsection (a) of Section 11346.5 and a description of the specific facts showing the need for immediate action.

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**FINDING OF EMERGENCY**

The following information is evidence that the amendments to Title 24, Part 2, California Building Code (CBC), Part 2.5 California Residential Code (CRC) and Part 9 California Fire Code (CFC) – NFPA 13, 13D and 13R reference standards as proposed by the Office of the State Fire Marshal (OSFM) are necessary for the immediate preservation of the public peace, health and safety or general welfare of the public relating to the design and construction of Group R occupancies and other dwelling unit applications where automatic fire sprinkler systems utilizing antifreeze solutions.

At the August meeting of the National Fire Protection Association (NFPA) Standards Council meeting held in Boston, Massachusetts a final decision was made to issue the tentative interim agreements (TIA) 1000, 995, and 994 on NFPA 13, NFPA 13R and NFPA 13D, respectively to the use of antifreeze solutions within all NFPA 13D applications and within the dwelling unit portions of NFPA 13 and NFPA 13R sprinkler systems. The issuance of the TIAs was based on a detailed research project conducted by in the NFPA Research Foundation in conjunction with Underwriters Laboratories, Inc. The use of antifreeze additives to new residential fire sprinkler systems is estimated to only affect less than 5 percent of the total state-wide residential fire sprinkler installations.

The SFM concurs with the NFPA recommendations in part and is proposing the modifications contained in this proposed emergency rulemaking for installation of residential fire sprinklers in areas prone to prolong freezing conditions while maintaining the highest level of public safety through the installation of residential fire sprinklers. This emergency rulemaking would require that only pre-mixed antifreeze solutions in concentrations not to exceed 40% propylene glycol and concentrations of glycerin not exceeding 50% in residential occupancies and other dwelling units be permitted for the protection of sprinkler pipe in freezing conditions where no other alternative to freeze protection is available. The research did not test the performance of diethylene glycol-water or ethylene glycol-water mixtures. As no performance information is available through the research study, the SFM proposes prohibiting their use within dwelling unit portions of the sprinkler system.

The SFM proposes where necessary to ensure that the regulations of the California Building Standards Code, establish and or maintain minimum requirements for the prevention of fire and for the protection of life and property against fire and panic in accordance with Health and Safety Code 13100.1 that foster, promote and develop ways and means of protecting life and property against fire and panic.

## **Background**

Automatic fire sprinkler systems with antifreeze solutions have more than 60 years of successful use in commercial applications and an equally successful experience since they have been in use in residential applications. Most fire fatalities occur in the home, and when home sprinklers are present, the risk of dying in a home fire decreases by 83%. The Office of the State Fire Marshal supports and urges the expanded use of residential sprinkler systems as the most effective way to prevent fire injury and death in the home and other residential occupancies. While OSFM emphasizes that residential sprinkler systems are and remain reliable and effective, a recent fire incident involving a sprinkler system that contained a **high** concentration antifreeze solution has raised concerns about the combustibility of antifreeze solutions in residential sprinkler systems. The incident involved a grease fire in a kitchen where a sprinkler system with a reported 71.2% concentration of antifreeze deployed. The fire resulted in a single fatality and serious injury to another person. (Recently, NFPA received a report of another incident, this time in a living room, which may have been exacerbated by the presence of an antifreeze solution.) Following the first incident, NFPA initiated a research project with the Fire Protection Research Foundation (Foundation) and an initial set of fire tests was also conducted by Underwriters Laboratories. Based on information learned from these efforts, NFPA issued an interim safety alert and recommendations in July 2010 and began additional research to gain further information on antifreeze solution performance under various fire scenarios. The Foundation has completed this additional research in a report entitled "Antifreeze Solutions in Home Fire Sprinkler Systems: Phase II Research Interim Report" (2010), and NFPA is providing updated safety information and guidance based on the test results.

### **◆ Key findings of fire tests**

- Both the 40% propylene glycol and 50% glycerin solutions demonstrated similar performance to that of water alone for fire control throughout the series of tests.
- Antifreeze solutions with concentrations of propylene glycol exceeding 40% and concentrations of glycerin exceeding 50% have the potential to ignite when discharged through automatic sprinklers.
- Based on the results of this research, antifreeze solutions of propylene glycol exceeding 40% and glycerin exceeding 50% are not appropriate for use in residential fire sprinkler systems.
- Consideration should be given to reducing the acceptable concentrations of these antifreeze solutions by an appropriate safety factor.

Though the NFPA Standards Council issued tentative interim amendments (TIA) to NFPA 13, *Standard for the Installation of Sprinkler Systems*; NFPA 13D, *Standard for Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*; and NFPA 13R, *Standard for Installation of Sprinkler Systems in Residential Occupancies Up To and Including Four Stories in Height* banning the use of antifreeze in sprinkler systems in new construction of residences, the Standards Council continued to recognize the use of antifreeze in existing protected structures based on the report released by the research group.

Based on the detailed evaluation of the NFPA research report, pre-mixed antifreeze solutions in concentration not to exceed 40% propylene glycol and concentration of glycerin not exceeding 50% and research showed that these concentrations performed in the same manner as water. The research did not test the performance of diethylene glycol-water or ethylene glycol-water mixtures. As no performance information is available through the study, the SFM proposes prohibiting their use within dwelling unit portions of the sprinkler system. The use of antifreeze solutions is one measure for the protection of residential sprinkler pipe in freezing conditions, shall only be used as a last method for protection, consideration given to recorded prolonged temperatures, and approved by the authority having jurisdiction.

## **AUTHORITY AND REFERENCE**

The CBSC proposes to adopt these building standards under the authority granted by Health and Safety Code Section 18949.2 (a)

The purpose of these building standards is to implement, interpret, and make specific the provisions of Health and Safety Code section 13100.1, 13108, 13113, 13143, 13210, 13211, 17921(b) and 18949.2(b) and (c).

**Authority:**

- Health and Safety Code Sections 13100.1, 13108, 13143, 13210, 13211, 17921(b), 18928(a), and 18949.2(b) and (c)

**Reference:**

- Health and Safety Code Sections 13108, 13113, 13211, 17921(b) and 18949.2(b) and (c)

**INFORMATIVE DIGEST**

**Summary of Existing Laws**

**Health and Safety Code Section 13108 (a)** The State Fire Marshal shall prepare and adopt building standards related to the means of egress, the installation of fire alarms and fire extinguishing systems in any state-owned building or in any state-occupied building.

**Health and Safety Code Section 13113** A automatic sprinkler system shall be installed in all 24-hour institutional type occupancies, and homes for the care of aged or senile persons.

**Health and Safety Code Section 13133(a)** The State Fire Marshal shall develop and adopt regulations establishing new occupancy classifications and specific fire safety standards appropriate for residential facilities, and residential care facilities for the elderly. These fire safety standards shall apply uniformly throughout the state.

**Health and Safety Code Section 13143** Existing law requires the State Fire Marshal to prepare and adopt regulations establishing minimum requirements for the prevention of fire and for the protection of life and property against fire and panic in any building or structure used or intended for use as an asylum, jail, mental hospital, hospital, home for the elderly, children's nursery, children's home or institution, school, or any similar occupancy of any capacity, and in any assembly occupancy where 50 or more persons may gather.

**Health and Safety Code Section 13210** Existing law defines high-rise structures as: 1) "Existing high-rise structure" as a high-rise structure, of which is construction commenced or completed prior to July 1, 1974, 2) "High-rise structure" means every building of any type of construction or occupancy having floors used for human occupancy located more than 75 feet above the lowest floor level having building access, except buildings used as hospitals, as defined in Section 1250 and 3) "New high-rise structure" means a high-rise structure, the construction of which is commenced on or after July 1, 1974.

**Health and Safety Code Section 13211** – Existing law requires the State Fire Marshal to prepare and have adopted regulations establishing minimum requirements for the prevention of fire and for the protection of life and property against fire and panic in high-rise structures.

**Health and Safety Code Section 17921(b)** The State Fire Marshal shall adopt, amend, or repeal and submit building standards for approval pursuant to the provisions of Chapter 4 (commencing with Section 18935) of Part 2.5, and the State Fire Marshal shall adopt, amend, and repeal other rules and

regulations for fire and panic safety in all hotels, motels, lodging houses, apartment houses and dwellings, buildings, and structures accessory thereto. These building standards and regulations shall be enforced pursuant to Sections 13145 and 13146; however, this section is not intended to require an inspection by a local fire agency of each single-family dwelling prior to its occupancy.

**Health and Safety Code Section 18928 (a)** requires each state agency adopting or proposing adoption of a model code, national standards, or specification shall reference the most recent edition of applicable model codes, national standards, or specifications.

**Health and Safety Code Section 18949.2 (b)** – This law provides that the State Fire Marshal shall remain the state agency responsible for the developing building standards to implement the state’s fire and life safety policy.

(c) This section of Health and Safety Code § 18949.2 provides that the state’s fire and life safety building standards, as developed by the State Fire Marshal and adopted by the Commission, shall be continued to be based on the state’s fire and life safety policy goals and mandates.

### **Summary of Existing Regulations**

The SFM currently amends and adopts through the California Building Standards Commission, California Code of Regulations, Title 24, Parts 2 CBC, Part 2.5 CRC and Part 9 CFC with NFPA 13, 13D and 13R referenced standards with SFM amendments relating to regulations that establish minimum requirements for the prevention of fire and for the protection of life and property against fire and in any building or structure used or intended for use as defined in each of the Health and Safety Code references shown above. These regulations contain provisions for automatic fire sprinkler systems required in such occupancies and the protection from system freeze in cold weather events.

### **Summary of Effect**

These propose emergency regulations would require that only pre-mixed antifreeze solutions in concentrations not to exceed 40% propylene glycol or concentrations of glycerin not exceeding 50% in residential occupancies and other dwelling units be permitted for the protection of sprinkler pipe in freezing conditions where no other alternative to freeze protection is available.

### **Comparable Federal Statute or Regulation**

The OSFM has determined that there are not comparable federal regulations or statutes that address these specific provisions found in the 2010 California Building Standards Code or the NFPA 13, 13D and 13R referenced standards.

### **Policy Statement Overview**

The functions of the office shall be to foster, promote and develop ways and means of protecting life and property against fire and panic. The broad objective of these proposed emergency regulations are to establish minimum standards for installation of residential fire sprinklers in areas prone to prolong freezing conditions while maintaining the highest level of public safety through the installation of residential fire sprinklers.

The SFM further proposes where necessary to ensure that the regulations of the California Building Standards Code, establish and or maintain minimum requirements for the prevention of fire and for the protection of life and property against fire and in any building or structure used or intended for use as defined in each of the Health and Safety Code references shown above in the summary of existing laws.

**MATTERS PRESCRIBED BY STATUTE APPLICABLE TO THE AGENCY OR TO ANY SPECIFIC REGULATION OR CLASS OF REGULATIONS**

The SFM has determined that there are no other matters prescribed by statute applicable to the agency or to any specific regulation or class of regulation.

**MANDATE ON LOCAL AGENCIES OR SCHOOL DISTRICTS**

The SFM has determined that the proposed regulatory action would not impose a mandate on local agencies or public school districts.

**FISCAL IMPACT STATEMENT**

- A. Cost or Savings to any state agency: **No**
- B. Cost to any local agency required to be reimbursed under Part 7(commencing with Section 17500) of Division 4: **No**
- C. Cost to any school district required to be reimbursed under Part 7 (commencing with Section 17500) of Division 4: **No**
- D. Other non-discretionary cost or savings imposed on local agencies: **No**
- E. Cost or savings in federal funding to the state: **No**