FIRE SAFETY DURING CONSTRUCTION & DEMOLITION

When Required

The information contained in this standard has been developed to assist owners and general contractors to provide a minimum level of fire safety during construction, alteration, and demolition operations. This standard is intended for new building construction and significant building alteration projects in order to provide a reasonable degree of safety to life and property from fire.

This standard is intended to provide detailed instruction for fire safety during construction and demolition, as required by the California Fire Code (CFC), Chapter 33, and National Fire Protection Association (NFPA) Pamphlet 241. Compliance with NFPA 241 is required for items not specifically addressed in the CFC, or herein. This standard is not to be utilized to be in lieu of any other applicable State and/or Federal regulation related to construction site safety.

Definitions

Hot Work: Any work involving operations capable of initiating fires or explosions, including cutting, welding, brazing, soldering, grinding, thermal spraying, thawing pipe, torch-applied roofing, or any other similar activity.

Fire Watch: A temporary measure intended to ensure continuous and systematic surveillance of a building or portion thereof by one or more qualified individuals for the purposes of identifying and controlling fire hazards, detecting early signs of unwanted fire, raising an alarm of fire, and notifying the fire department.

Nuisance Alarm: Any alarm caused by mechanical failure, malfunction, improper installation, or lack of proper maintenance, or an alarm activated by a cause that cannot be determined.

Knox Rapid Entry System: Security devices utilized to secure keys for buildings or protect fire protection system components. All Knox systems are only accessible to fire department personnel.

Fire Prevention Program

A written Fire Protection Plan shall be developed for all construction projects at the discretion of the Fire Code Official. The plan shall be approved prior to Building Permit issuance. The written plan shall be consistent with the fire safety precautions as specified in this standard and the NFPA Pamphlet 241. The General Contractor is responsible for carrying out the provisions of the Fire Protection Plan and communicating it to all subcontractors. At a minimum the Fire Protection Plan shall include the following information:

- The name and contact phone number of the person(s) responsible for compliance with the Fire Protection Plan.

- Procedures for reporting emergencies to the Santa Clara Fire Department.
- Procedures for emergency notification, evacuation and/or relocation of all persons in the building under construction and any support structures as necessary.
- Procedures for maintaining egress/ingress in and around the construction site.
- Floor plans identifying the locations of exits, exit stairs, exit routes, portable fire extinguishers, and exterior emergency assembly points (EAP's).
- Procedures for the preservation of existing fire protection infrastructure/systems during construction and/or demolition.
- Procedures for installation of new fire protection infrastructure/systems as construction progresses.
- Procedures for maintaining fire department apparatus access roadways and communicating changes.
- Procedures for maintaining site plans identifying required fire apparatus access roadways and on-site fire hydrants.
- Procedures for hot work operations, management of hazardous materials, and removal of combustible debris.
- Organization and training of on-site personnel.
- Pre-fire plan.
- On-site security.
- Consideration of other special hazards.

Fire Prevention Program

The Owner shall designate a person to be the Fire Prevention Program superintendent who shall be responsible for the Fire Prevention Program and ensure that it is carried out through the completion of the project.

The Fire Prevention Program superintendent shall develop and maintain an approved Fire Protection Plan in cooperation with the Community Risk Reduction Division (CRRD) of the Santa Clara Fire Department.

Training of responsible personnel in the use of fire protection equipment shall be the responsibility of the Fire Prevention Program superintendent. The Fire Prevention Program superintendent shall determine that all fire protection equipment is maintained and serviced in accordance with the CFC and NFPA 241.

Fire Walls

When firewalls are required in combustible construction, the wall construction shall be completed (with all openings protected) immediately after the building is sufficiently weather protected at the location of the wall(s).

Fire Protection

All wood frame construction projects exceeding three stories in height, except R-3 occupancies, shall be provided with a listed fire alarm system provided with linear heat detection during construction. The fire alarm system is required to be monitored by a listed monitoring company. A fire permit for the installation and subsequent modifications of the system are required. The design and installation shall comply with the fire department's fire alarm for construction sites standard.

Fire Protection Devices

The Fire Prevention Program superintendent shall determine that all fire protection equipment is maintained and serviced in accordance with this code. The quantity and type of fire protection equipment shall be approved, and the fire protection equipment shall be inspected in accordance with the safety plan.

Construction Security

Construction projects exceeding three stories in height, or when determined necessary by the fire code official, shall have an electronic security system installed, (except for R-3 occupancies) during construction. The electronic data is required to be maintained 24 hours a day, seven days a week. The data is required to be maintained for a minimum of 30 days off-site and made available to the fire department upon request. The electronic security camera layout plan shall be incorporated into the construction safety plan and is required to be approved prior to the start of construction.

Phased Occupancy

When occupancy of one phase of a construction project is requested prior to the completion of the entire project, a Phased Occupancy Plan is required to be submitted to the fire department for approval. These requests must be made prior to Building Permit issuance. A Fire Protection Engineering firm or Fire Protection Engineer is required to develop the plan, supervise the implementation, and conduct field compliance inspections on a frequency determined necessary by the fire code official, but not less than twice a week.

Fire and Spill Reporting

The Fire Department shall be immediately notified of any and all fire and/or hazardous materials releases at the construction site. Readily accessible emergency telephone facilities shall be provided in an approved location at the construction site. The street address of the construction site shall be posted adjacent to the telephone, along with the street address of the construction site and the emergency notification number (9-1-1) shall be posted adjacent to the telephone.

Access and Parking

Fire Department Apparatus Access Roadways: All construction sites shall be accessible by fire department apparatus by means of roadways having an all-weather driving surface of not less than 20 feet of unobstructed width. The roadways shall have the ability to withstand a 75,000-pound load and have a minimum of 13½ feet of vertical clearance. Dead-end fire access roads in excess of 150 feet in length shall be provided with approved turnarounds. When approved by the CRRD, temporary access roadways may be utilized until such time as permanent roadways are installed. At a minimum, temporary roadways shall consist of 6 inches of Class 2 aggregate base rock compacted to a minimum of 95%. It is the General Contractor's responsibility to ensure the integrity of the roadway is maintained.

Premises Identification: Address signage shall be provided at each entrance to the site. If there are multiple buildings being constructed, a temporary premises map showing the location and designation of each building shall also be provided. All signage shall be of an approved size, weather-resistant, and be maintained until replaced by permanent signs.


Vehicle Parking: All vehicles shall be parked a minimum of 20 feet from new buildings under construction.

Exceptions:

- Vehicles that are temporarily parked for loading/unloading or other construction-related operations (vehicles shall not be left unattended at any time).
- Private vehicles may be parked in parking garages of Type I construction if the automatic fire sprinkler system is in service and vertical openings are protected.

Emergency Site Access: A Knox Company rapid entry system shall be provided as directed by the CRRD. For detailed requirements regarding Knox Systems, see the CRRD Knox Systems Installation Standard.

Exit Requirements

Required Means of Egress shall be maintained during construction and demolition, remodeling or alterations and additions to any building. All exits shall be identified in the Fire Protection Plan.

Stairs Required: Each level above the first story in multi-story buildings that require two exit stairways shall be provided with at least two usable exit stairways after the floor decking is installed. The stairways shall be continuous and discharge to grade level. Stairways serving more than two-floor levels shall be enclosed (with openings adequately protected) after exterior walls/windows are in place. Exit stairs in new and in existing, occupied buildings shall be lighted and maintained clear of debris and construction materials at all times.

> Exception: For multi-story buildings, one of the required exit stairs may be obstructed on not more than two contiguous floor levels for the purposes of stairway construction (i.e., installation of gypsum board, painting, flooring, etc.)

Emergency Assembly Points (EAPs): Designated exterior assembly points shall be established for all construction personnel to relocate to upon evacuation. The assembly points shall also be identified in the Fire Protection Plan.

Fire Protection Systems

Water Supply: An approved water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible construction material arrives on the site, or vertical construction begins.

Fire Hydrants: Where underground water mains and hydrants are required for the building(s) under construction, they shall be installed, completed, and in-service prior to combustible construction material arriving on site, or vertical construction begins.

Standpipe Systems: Where standpipes are required, standpipes shall be installed when the progress of construction is more than 30 feet in height above the lowest level of fire department vehicle access. Not less than one standpipe shall be provided for use during construction (additional standpipes may be required). Such standpipe shall be provided with fire department hose connections at accessible locations adjacent to usable stairs. Such standpipes shall be extended as construction progresses to within one floor of the highest point of construction having secured decking or flooring. Each floor shall be provided with a 2½-inch valve outlet for fire department use. Where a building is being demolished and a standpipe exists within such a building, such standpipe shall be maintained in an operable condition to be available for use by the fire department. Such standpipe shall be demolished with the building but shall not be demolished more than one floor below the floor being demolished.

Fire Sprinkler Systems: Where automatic fire sprinkler systems are required to be installed in new buildings, the system shall be placed in service as soon as possible. After inspection approval from the Fire Department, each floor level of sprinkler piping shall be placed into service whenever possible. Protective caps may be installed on the active sprinklers during the installation of drywall, texturing, and painting, but should be removed immediately after this work is completed and at the end of each workday. For system activation notification, an exterior alarm bell can be installed and connected to the sprinkler water flow device prior to

the installation of the monitoring system. Fire sprinkler systems undergoing modifications shall be returned to service at the end of each workday unless otherwise approved.

Operation of valves: Operation of sprinkler control valves shall be allowed only by properly authorized personnel. When the sprinkler protection is being regularly turned off and on to facilitate the connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

Fire Department Connections (FDC): Fire apparatus vehicle access shall be provided to within 100 feet of temporary or permanent FDC's. Adequate signage shall be provided throughout the course of construction to ensure fire protection equipment can be quickly located.

Fire Alarm Systems: Fire alarm systems shall be maintained operational at all times during building alterations. When an alteration requires modification to a portion of the fire alarm system, the portion of the system requiring work shall be isolated and the remainder of the system shall be kept in service whenever practical. When it is necessary to shut down an entire fire alarm system, a fire watch or other mitigation approved by the CRRD shall be implemented until the system is returned to service.

Fire Extinguishers: In general, portable fire extinguishers shall be provided such that the travel distance to any extinguisher does not exceed 75 feet. Mounting height to the top of the extinguisher shall not exceed 5 feet. Fire extinguishers shall not have less than a 2A:10B:C rating or as directed by the CRRD. It is the General Contractor's responsibility to ensure that an adequate number of individuals are trained in the proper use of portable fire extinguishers. Structures under construction, alteration, or demolition shall be provided with an approved portable fire extinguisher in at least the following locations:

- At each stairway on all floor levels where combustible materials have accumulated.
- In every storage and construction shed.
- Additional portable fire extinguishers shall be provided where special hazards exist including, but not limited to, the storage and use of flammable and combustible liquids.

Fire Watch: Whenever fire and/or life safety systems are not yet in place or are impaired, the Fire Prevention Program superintendent shall initiate a fire watch in accordance with the CRRD

standard. The Fire Department shall be immediately notified of the type and duration of the impairment.

Smoking: Smoking is prohibited anywhere inside or on the roof of buildings under construction. A suitable number of 'No Smoking' signs shall be posted to ensure that smoking is controlled. It is the General Contractor's responsibility to ensure compliance. Failure to control smoking may result in a Fire Watch being instituted.

Flammable and Combustible Liquids Storage Areas: The following requirements shall apply to storage areas for flammable and combustible liquids:

- Storage areas shall be kept clear of combustible vegetation and combustible waste materials.
- Storage areas shall not be used for the storage of combustible materials.
- Sources of ignition and smoking shall be prohibited in flammable and combustible liquid storage areas. Warning signs shall be posted as deemed necessary.
- Ventilation shall be provided for operations involving the application of materials containing flammable solvents.

Containers: Metal containers for Class I and II liquids shall be kept in an approved safety cabinet.

Secondary Containment: Secondary containment or a means of spill control, drainage control, and diking shall be required for containers and tanks. Leaking vessels shall be immediately repaired or taken out of service and spills shall be cleaned up and disposed of properly.

Marking: Tanks and containers shall be marked with the name of the product and "FLAMMABLE — KEEP FIRE AND FLAME AWAY." Tanks (i.e., containers in excess of 60 gallons) shall also be labeled "KEEP 50 FEET FROM BUILDINGS."

Tank Installation Plans/Permit: Plans for the installation/use of any aboveground storage tank (i.e., container greater than 60 gallons) shall be submitted to the CRRD for review and permit prior to the proposed tank arriving at the site.

Other Combustible Materials

Combustible Material Storage: Combustible construction materials shall be stored a minimum of 20 feet from buildings under construction or undergoing remodel.

Exceptions:

- Materials that are staged for installation on a floor level.
- When approved by the CRRD, materials may be stored in parking garages of Type I construction if the automatic fire sprinkler system is in service and vertical openings are protected.

Combustible Debris: Wood, cardboard, packing material, form lumber, and similar combustible debris shall not be accumulated within buildings. Such debris, rubbish, and waste material shall be removed from buildings on a daily basis.

Oily Rags: Oily rags and similar material shall be stored in metal or other approved metal containers equipped with tight-fitting covers.

Compressed Gas

Protection of Gas Containers: Gas containers/cylinders shall be protected as follows:

- Combustible materials shall be kept a minimum of 10 feet from gas containers.
- Cylinders shall be protected against physical damage.
- Cylinders shall be stored upright and secured to prevent falling.
- Cylinders shall not be placed near elevators, unprotected platform edges or other areas where they would drop more than 2 feet.
- Cylinders shall not be placed in areas where they may be damaged by falling objects.
- When cylinders are not in use, valve protective caps shall be in place.
- Ropes, chains, or slings shall not be used to suspend gas cylinders unless the cylinder was manufactured with appropriate lifting attachments.

Separation: When stored, gas cylinders shall be separated from each other based on their hazard classes.

Identification/Marking: Gas cylinders shall be marked with the name of the contents.

Liquid Petroleum Gas (LP Gas)

Use in Buildings: Propane containers may be used in buildings under construction or undergoing a major renovation as a fuel source for temporary heating for curing concrete, drying plaster, and similar applications in accordance with the following:

- Heating elements (other than integral heater-container units) shall be located at least 6 feet from any LPG as container.
- Integral heater-container units specifically designed for the attachment of the heater to the container, or to a supporting standard attached to the container, may be used provided they are designed and installed so as to prevent direct or radiant heat application to the LP-Gas container.
- Blower and radiant type units shall not be directed toward any LP-Gas container within 20 feet.
- Heat producing equipment shall be installed with clearance to the combustibles in accordance with the manufacturer's installation instructions.
- Cylinders shall comply with DOT cylinder specifications and shall be secured in an upright position.

- Regulators shall be approved for use with LP-Gas. Fittings shall be designed for at least 250 p.s.i.g. service pressure.
- Hose shall be designed for a working pressure of at least 350 p.s.i.g. (unless limited to 5 p.s.i.g.) and shall be a maximum of 6 feet in length.
- Portable heaters shall be equipped with an approved automatic device to shut off the flow of gas to the main burner and to the pilot in the event of flame extinguishment or combustion failure. Portable heaters with an input of more than 50,000 Btu/hr. shall be equipped with either a pilot that must be proved before the main burner can be turned on or an approved electronic ignition system.
- **Occupied Buildings:** In addition to the above, for LPG storage/use in buildings undergoing alteration and that are fully or partially occupied, the following shall also apply:
- Specific approval must be obtained from the CRRD prior to bringing LP-Gas containers on-site.
- The maximum water capacity of individual containers shall be 5-gallon water capacity and the number of containers in the building shall not exceed the number of workers assigned to using the LP-Gas.
- Containers having a water capacity greater than 2½ pounds (1 quart) shall not be left unattended.

Motorized Equipment

Internal-combustion-powered construction equipment shall be used in accordance with all the following conditions:

- Equipment shall be located so that exhaust does not discharge against combustible material.
- Exhausts shall be piped to the outside of the building.
- Equipment shall not be refueled while in operation.
- Fuel for equipment shall be stored in an approved area outside of the building.

Welding and Other Hot Work

The use of hot work equipment shall be in accordance with the following requirements, including a pre-site inspection, fire watch, and post-inspection procedures.

Pre-Site Inspection: An inspection of the hot work site shall be conducted by the General Contractor or his/her designee prior to hot work operations to ensure that:

- The hot work site is clear of combustibles or combustibles are protected in an approved manner.
- Exposed construction is of noncombustible materials or that combustible materials are protected.
- Openings are protected.

- There are no exposed combustibles on the opposite side of partitions, walls, ceilings, floors, etc.
- Fire extinguishers are available, fully charged, and operable.
- Fire watch personnel are assigned, equipped, and trained.

Fire Watch: The sole duty of fire watch personnel shall be to watch for the occurrence of fire during and after hot work operations. Individuals designated to fire watch duty shall have fire extinguishing equipment readily available and shall be trained in the use of such equipment. Personnel assigned to fire watch shall be responsible for extinguishing spot fires and communicating an alarm. Hot work conducted in areas with vertical and horizontal fire exposures that cannot be observed by a single individual shall have additional personnel assigned to fire watches to ensure that all exposed areas are monitored.

Post-Work Inspection: The fire watch shall be maintained a minimum of 30 minutes after the conclusion of the work to look out for leftover sparks, slag, or smoldering combustibles.

Smoking: "No Smoking" signs shall be posted in a conspicuous location in each structure or in which smoking shall be prohibited except in approved areas. In approved areas where smoking is permitted, approved ashtrays shall be provided.

Waste disposal: Combustible debris shall not be accumulated within buildings. Combustible debris, rubbish, and waste material shall be removed from buildings at the end of each shift of work. Combustible debris, rubbish, and waste material shall not be disposed of by burning on the site unless approved.

Spontaneous ignition: Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container.

Cutting and welding: Operations involving the use of cutting and welding shall be done in accordance with the California Fire Code, Chapter 35.

Electrical

Temporary wiring for electrical power and lighting installations used in connection with the construction, alteration, or demolition of buildings, structures, equipment, or similar activities shall comply with California Fire and Electrical Codes.

Special Equipment

Motorized Equipment: Motorized equipment, including internal-combustion-powered construction equipment, shall be used in accordance with the following:

- Fuel for equipment shall be stored in an approved area outside of the building.
- Equipment shall not be refueled while in operation.
- Equipment shall be located so that exhausts do not discharge against combustible materials.

- When possible, exhausts should be piped to the outside of the building.
- **Temporary Heating Equipment:** The use of temporary heating devices shall be supervised and maintained only by competent personnel. Temporary heaters, such as those that are LPG fueled, shall be listed, and shall be installed, used, and maintained in accordance with the manufacturer's instructions (see LPG storage and use requirements above). Heating devices shall be secured properly and kept clear from combustible materials. Temporary heating devices shall be listed and labeled in accordance with the California Mechanical Code. Installation, maintenance, and use of temporary heating devices shall be in accordance with the terms of the listing.


- **Installation:** Clearance to combustibles from temporary heating devices shall be maintained in accordance with the labeled equipment. When in operation, temporary heating devices shall be fixed in place and protected from damage, dislodgement, or overturning in accordance with the manufacturer's instructions.
- **Asphalt and Tar Kettles:** Asphalt kettles shall not be located within 20 feet of any combustible material, combustible building surface, or building opening. Except for thermostatically controlled kettles, an attendant shall be within 100 feet of a kettle when the heat source is operating. Ladders or similar obstacles shall not form a part of the route between the attendance and the kettle. Kettles shall be equipped with tight-fitting covers. A minimum 40-B:C rated portable fire extinguisher shall be located within 25 feet of each asphalt kettle when the heat source is operating. There shall be not less than one multipurpose portable fire extinguisher with a minimum 3-A:40-B:C rating on the roof being covered or repaired.


Combustible Trash Chutes

Combustible trash chutes shall not be used in non-sprinkled buildings.

An approved fire safety plan, as applicable to this section, shall address the following:

- A continuous fire watch (during working hours) stationed at all drop boxes with a continuous means of water application and a means of communication (radio or cell phone).
- Water application shall be provided at each chute access opening or an approved barrier shall be provided at each opening. The approved barrier shall extend 3 feet to each side of the chute.
- Where water application is provided at the chute access opening, a trained person shall be continuously assigned (during working hours) with an approved means of communication.
- Signage shall be posted at each chute access to read as follows: NO SMOKING, OPEN FLAME, WELDING, OR CUTTING WITHIN 20 FEET OF CHUTE ACCESS.

Explosive Materials

The storage and/or use of explosive materials at a construction site are expressly prohibited without an Operational Fire Permit issued from the CRRD.