

ORANGE COUNTY FIRE AUTHORITY

Safety & Environmental Services Section

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Tents and Other Membrane Structures



Approved and Authorized by

Guideline F- 05

Fire Marshal / Assistant Chief

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Tents and Other Membrane Structures

PURPOSE

The following guidelines were created to ensure tents and other membrane structures are properly installed, furnished, and safe for public use. The guidelines are based on the requirements of the California Fire Code and California Code of Regulations, Title 19.

SCOPE

These guidelines address the temporary use of tents, awnings, or other fabric enclosures, including membrane (air-supported and air-inflated) structures and places of assemblage, in or under which 10 or more persons may gather for any lawful purpose.

Exceptions:

1. Tents, awnings, or other fabric enclosures used to cover or enclose private facilities on one- and two-unit family residential property.
2. Tents used to conduct committal services on the grounds of a cemetery.
3. Tents, awnings, or other fabric enclosures erected within a structural enclosure which is equipped with an overhead automatic sprinkler system.
4. Tensioned membrane roof materials supported by rigid frames or installed on a mast and cable system provided such structures conform to adopted construction requirements.
5. Fabric structures which are part of mobile homes, recreational vehicles, or commercial coaches.

Tents and other membrane structures erected for a period of more than 180 days within a 12-month period, on single premises, are considered to be permanent. Permanent use of tents, awnings, or other fabric enclosures, including membrane structures, shall be submitted to the appropriate building department for approval.

DEFINITIONS

The following definitions are provided to facilitate the consistent application of these guidelines:

Air-Inflated Structure: A building where the shape of the structure is maintained by air pressurization of cells or tubes to form a barrel vault over the usable area. Occupants of such a structure do not occupy the pressurized areas used to support the structure.

Air-Supported Structure: A structure wherein the shape of the structure is attained by air pressure and occupants of the structure are within the elevated pressure area.

Membrane Structure: An air-inflated, air-supported cable or frame covered structure as defined by the California Building Code and not otherwise defined as a tent.

Tent: A structure, enclosure, or shelter, with or without sidewalls or drops, constructed of fabric or pliable materials supported by any manner except by air of the contents that it protects.

Surge Tents: Temporary structures utilized by hospitals, health care facilities, and local health departments to accommodate a surgery on demand. Surge Tents shall comply with the regulatory requirements of the Office of Statewide Health Planning and Development (OSHPD).

Place of Assembly: Shall include a circus, carnival, tent show, theater, skating rink, dance hall, or other place of assembly in or under which persons gather for any purpose.

OPERATIONAL PERMIT REQUIREMENTS

Fire Prevention shall review site and floor plans and perform Fire Safety Inspections before issuing Tent and Membrane Structure Permits. A permit is required to operate a tent or an air-supported temporary membrane structure having an area in excess of 400 square feet.

Exceptions:

1. Tents used exclusively for recreational camping purposes
2. Tents open on all sides, which comply with all of the following:
 - a. Individual tents shall have a maximum size of 700 square feet.
 - b. The aggregate area of multiple tents (including Easy-Ups) placed side by side without a fire break clearance of not less than 12 feet shall not exceed 700 square feet total.
 - c. A minimum clearance of 12 feet to structures and other tents shall be provided.

Site and Floor Plans

A detailed site and floor plan for structures with occupant loads of 50 or more shall be provided with each application for approval. The site plan shall indicate the structure's location on the property and proximity to fire access roads and approved water supplies for fire protection. The floor plan shall indicate details of the means of egress facilities, seating capacity, seating arrangement, and location and type of heating and electrical equipment.

Fire Safety Inspection

A Fire Safety Inspection may be required after all structures have been erected (prior to the event).

- Inspection process shall begin a minimum of 2 business days prior to the day of the event.
- Building and planning department approval must be obtained prior to the date of the event.
- All permits shall be posted in an approved location on the premises.

SITE PLAN

Plans shall be submitted a minimum of 10 business days before the event to ensure adequate time to review plans, perform field inspections, and process permits. Plans shall be accurately scaled or dimensioned diagrams demonstrating compliance with all codes and regulations governing tents and other membrane structures.

Location

Tents or membrane structures shall not be located within 20 feet of property lines, buildings, other tents or membrane structures, parked vehicles, or internal combustion engines. For the purpose of determining required distances, support ropes and guy wires shall be considered as part of the temporary membrane structure or tent.

Exceptions:

1. Separation distance between tents not used for cooking is not required when the aggregate floor area does not exceed 15,000 square feet.
2. Tents need not be separated from buildings when all the following conditions are met:
 - a. The aggregate floor area of the membrane structure or tent shall not exceed 10,000 square feet.
 - b. The aggregate floor area of the building and tent shall not exceed the allowable floor area including creases as indicated in the California Building Code.
 - c. Required means of egress provisions are provided for the building and the tent including travel distances.
 - d. Fire apparatus access roads are provided.

Membrane structures having an area of 15,000 square feet or more shall be located not less than 50 feet from any other tent or structure as measured from the sidewall of the tent or membrane structure unless joined together by a corridor.

A site plan on 8 ½" x 11" paper shall be provided and include the following:

- A. Statement about the intended use of all structures and the permit dates
- B. Premise address
- C. Designated parking area for vehicles
 - Vehicles necessary to the operation shall be parked at least 20 feet from any tent. No other vehicles shall be parked less than 100 feet from any tent except vehicles on a public street.
- D. Dimensions for all tents and membrane structures
- E. Means of egress from tents to the public way
- F. Locations of emergency equipment such as fire hydrants or emergency power shutoffs
- G. Fire break passage way or emergency access road not less than 12 feet wide and free from guy ropes or other obstructions

FLOOR PLAN

The sidewalls, drops, tops, floor coverings, and decorative materials shall be composed of flame-resistant material or treated with a flame retardant material in an approved manner. All materials used within the structure shall comply with the flame propagation performance criteria of NFPA 701.

A floor plan on 8 ½" x 11" paper shall be provided and include the following:

- A. Seating arrangement in accordance with CFC Section 3103.11
 - B. Size and location of tables
 - C. Interior equipment and obstacles
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- D. Exits, including type, width, and height
- E. NO SMOKING signs
- F. Emergency lighting, including proposed power source(s)
- G. Portable fire extinguishers
- H. Specify floor surface material, if applicable

Means of Egress

Exits shall be spaced at approximately equal intervals around the perimeter of the tent or membrane structure, and shall be located such that all points are less than 100 feet from an exit.

Exit openings shall remain open unless covered by a flame-resistant curtain.

- Curtains shall be free sliding on a metal support that is a minimum of 80 inches above the floor.
- The curtains shall be arranged so that, when open, no part of the curtain obstructs the exit.
- Curtains shall be of a color, or colors, that contrast the color of the tent.

Exiting Requirement

| Occupant Load | Minimum Number of Exits | Minimum Width of Each Exit (inches) | |
|----------------|-------------------------|-------------------------------------|--------------------|
| | | Tent or Canopy | Membrane Structure |
| 10 to 199 | 2 | 72 | 36 |
| 200 to 499 | 3 | 72 | 72 |
| 500 to 999 | 4 | 96 | 72 |
| 1,000 to 1,999 | 5 | 120 | 96 |
| 2,000 to 2,999 | 6 | 120 | 96 |
| Over 3,000 | 7 | 120 | 96 |

Exit Signs

Exit signs shall be installed when occupant load is in excess of 50 people and be of an approved self-luminous type or internally or externally illuminated by luminaries supplied in the following manner:

- A. Two separate circuits, one of which shall be separated from all other circuits, for occupant loads of 300 or less; **or**
- B. Two separate sources of power, one of which shall be an approved emergency system, shall be provided when the occupant load exceeds 300. Emergency systems shall be supplied from storage batteries or from the on-site generator set and system shall be installed in accordance with the California Electrical Code.
- C. Obtain electrical permit from local building department prior to Fire Safety Inspection.

Means of Egress Illumination

Means of egress illumination shall be provided at 50 or more persons. Means of egress shall be illuminated with light having an intensity of not less than 1 foot-candle at floor level while the structure is occupied. Fixtures required for means of egress illumination shall be supplied from a separate circuit or source of power.

Seating Arrangement

Where seating rows have 14 or fewer seats, the minimum clear aisle access-way width shall not be less than 12 inches measured as the clear horizontal distance from the back of the row ahead and the nearest projection of the row behind. Where any chair in the row does not have an automatic or self-rising seat, the measurements shall be made with the seat in the down position.

Aisles

The width of aisles without fixed seating shall be in accordance with the following:

- A. In areas serving employees only, the minimum aisle width shall be 24 inches but not less than the width required by the number of employees served.
- B. In public areas, smooth-surfaced, unobstructed aisles having a minimum width of not less than 44 inches shall be provided from seating areas, and aisles shall be progressively increased in width to provide, at the points, not less than 1 foot of aisle width of each 50 persons served by such aisle at that point.

Dual Access

For rows of seating served by aisles or doorways at both ends, there shall not be more than 100 seats per row. The minimum clear width of 12 inches between rows shall be increased by 0.3 inch for every additional seat beyond 14 seats, but the minimum clear width is not required to exceed 22 inches.

Single Access

For rows of seating served by an aisle or doorway at only one end of the row, the minimum clear width of 12 inches between rows shall be increased by 0.6 inch for every additional seat beyond seven seats, but the minimum clear width is not required to exceed 22 inches. Distance is measured as the clear horizontal distance from the back of the row ahead and the nearest projection of the row behind.

Areas Without Fixed Seating

The number of occupants shall be computed at the rate of one occupant per unit of area. For areas without fixed seating, the occupant load shall not be less than the number determined by dividing the floor area by the occupancy. Where an intended use is not listed, the building official shall establish a use based on listed use most nearly resembling the intended use.

Assembly without fixed seating – Floor Area in Sq Ft per Person

| | |
|---------------------------------------|--------|
| Concentrated (chairs only- not fixed) | 7 net |
| Standing space | 5 net |
| Un-concentrated (tables and chairs) | 15 net |

Doors

Exit doors shall swing in the direction of exit travel. To avoid hazardous air and pressure loss in air-supported membrane structures, such doors shall be automatic closing against operating pressures. Openings force at the door edge shall not exceed 15 pounds.

Maintenance of Means of Egress

The required width of exits, aisles, and passageways shall be maintained at all times to a public way. Guy wires, guy ropes, and other support members shall not cross a means of egress at a height of less than 8 feet. The surface of means of egress shall be maintained in an approved manner.

Posting of Occupant Load

Every room or space classified as assembly occupancy shall have the occupant load of the room posted in a conspicuous place.

Heating/Cooking Equipment and/or Open Flame Devices

Heating/cooking equipment and/or or open flame devices shall be specified in conjunction with the event. *Additional conditions and permits may be required.*

AIR-SUPPORTED AND AIR-INFLATED MEMBRANE STRUCTURE

Temporary Air-supported and Air-inflated Membrane Structures

Door Operation

During high winds 50 miles per hour or in snow conditions, the use of doors in air supported structures shall be controlled to avoid excessive air loss. Doors shall not be left open.

Fabric Envelope Design and Construction

Air supported and air-inflated structures shall have the design and construction of the fabric envelope and the method of anchoring in accordance with Architectural Fabric Structures Institute ASI 77.

Blowers

An air-supported structure used as a place of assembly shall be furnished with not less than 2 blowers, each of which has adequate capacity to maintain full inflation pressure with normal leakage. The design of the blower shall be so as to provide integral limiting pressure at the design pressure specified by the manufacturer.

GENERAL FIRE SAFETY REQUIREMENTS

Standby Personnel

A Firewatch may be required when, in the opinion of the fire code official, it is essential for public safety in a tent or membrane structure used as a place of assembly or any other use where people congregate.

Vegetation Removal

Combustible vegetation shall be removed from the area occupied by a tent or membrane structure and from areas within 30 feet of such structure.

Waste Material

The floor surface inside tents or membrane structures and the ground outside and within a 30 foot perimeter shall be kept clear of combustible waste. Such waste shall be stored in approved containers until removed from the premises.

Combustible Materials

Hay, straw, shavings, or similar combustible materials shall not be located within the tent or membrane structure containing an assembly occupancy, except the materials necessary for the daily feeding and care of animals. Sawdust and shavings utilized for the public performance or exhibit shall not be prohibited provided the sawdust and shavings are kept damp. Combustible materials shall not be permitted under stands of seats at anytime.

Smoking

Smoking shall not be permitted in tents or membrane structures. Approved "NO SMOKING" signs shall be conspicuously posted throughout the structure.

Portable Fire Extinguishers

One minimum 2A:10BC fire extinguisher shall be provided every 75 feet of travel distance. The top portion of the portable fire extinguisher shall be mounted between 3 and 5 feet above the floor.

Open to Exposed Flame

Open flame or other devices emitting flame, fire, or heat or any flammable or combustible liquids, gas, charcoal, or other cooking device or any other unapproved devices shall not be permitted inside or located within 20 feet of the tent or membrane structure while open to the public.

Fireworks

Fireworks shall not be used within 100 feet of tents or membrane structures.

Spot Lighting

Spot or effect lighting shall only be by electricity, and all combustible construction located within 6 feet of such equipment shall be protected with approved noncombustible insulation not less than 9.25 inches thick.

Safety Film

Motion pictures shall not be displayed in structures unless the motion picture film is safety film.

Clearance

There shall be a minimum clearance of at least 3 feet between the fabric envelope and all contents located inside the tent or membrane structure.
