

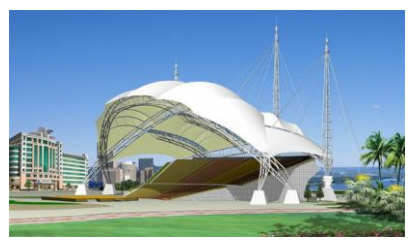


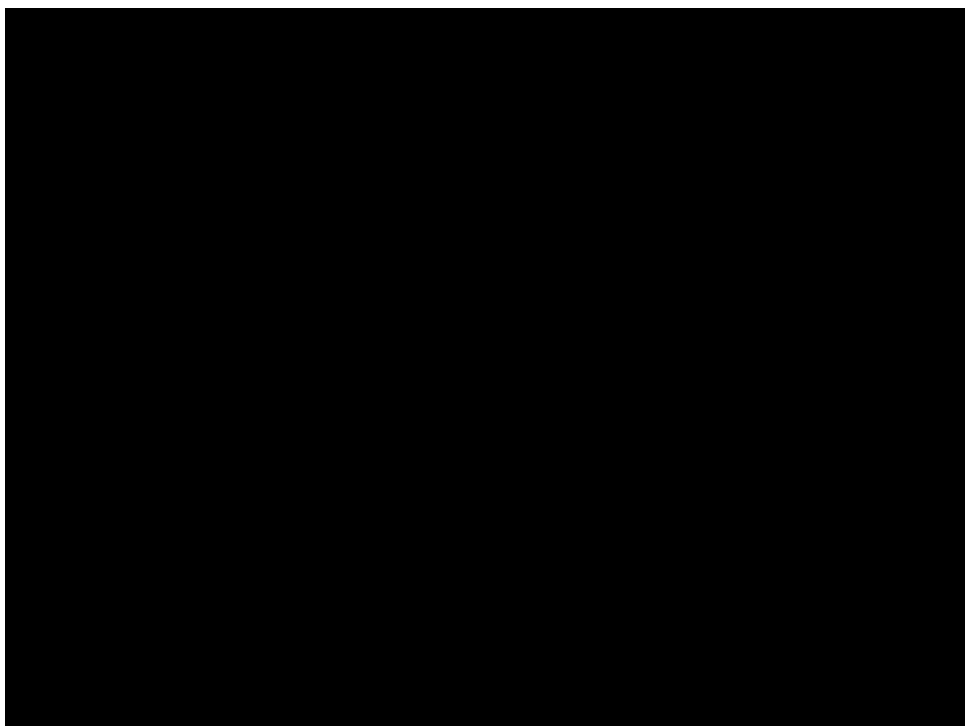
State of Connecticut
Department of Administrative Services
Division of Construction Services
Office of Education and Data Management

Tents and Temporary Structures

*Presented by
Michael Sinsigalli, DFM, West Hartford FD
for the*

*Office of Education and Data Management
Spring 2017 Career Development Series*





Learning Objective

The purpose of this presentation is to review the requirements of the 2016 Connecticut Fire Safety Code, 2016 Connecticut Building Code and, the 2015 Connecticut Fire Prevention Code as they apply to tents, temporary structures, and special construction.

Applicable Codes

- 2016 Connecticut State Building Code
 - Chapter 31
- 2016 Connecticut Fire Safety Code
 - Chapter 31
- 2015 Connecticut Fire Prevention Code
 - Chapter 25



*What happened to the
Connecticut Tent Regulations?*

Relationship of the Fire Prevention Code to
the Fire Safety Code (29-291a-2a)

- *The requirements of the CSFPC shall not supersede the requirements of either the CFSC or the SBC.*
- *Where the provisions of the CSFPC conflicts or duplicates any provision of the CFSC or the SBC, the CSFPC or the SBC shall prevail.*
- *Where the CFSC or the SBC are silent on an issue, the CSFPC shall apply.*

CFSC Chapter 31

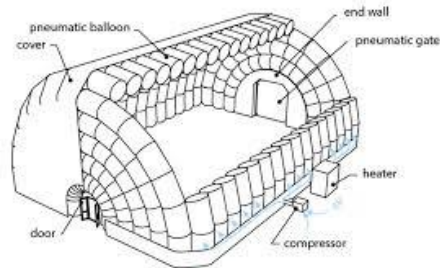
- 3101 – General
- 3102 – Definitions
- 3103 – Temporary Tents & Membrane Structures
- 3104 – Temporary & Permanent Tents and Membrane Structures

What is the difference between a tent and a membrane structure?

Definitions

Air-Inflated Structure:

A structure that uses air-pressurized membrane beams, arches or other elements to enclose space. Occupants do not occupy the air pressurized portions of the structure.



Air-Supported Structure:

A structure wherein the shape of the structure is attained by air pressure, and occupants within the structure are within the pressure area.

- *Single Skin*
- *Double Skin*



Membrane Structure:

An air-inflated, air-supported, cable or frame covered structure as defined by the CSBC.

- *Membrane covered cable structure*
- *Membrane covered frame structure*



Tent:

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



Conditions of Use

- *Temporary* (Amd CFSC Part III, 3103.5)
 - *Not more than 180 consecutive days out of any 365 consecutive calendar .*
 - *On a single premises.*
- *Permanent*
 - *More than permitted for temporary*

Note: CFPC 25.2.1.1 only permits tents on a temporary basis.

When is the approval of the Fire Marshal required?

Approval Required

(CFSC Part III, Section 3103.2)

- FM approval required when the tent or membrane structure exceeds 400 square feet.
 - Except:
 - Tent used exclusively for recreational camping
 - Tents is open on all sides with:
 - Maximum size of 700 square feet
 - Aggregate area of multiple tents placed side by side without a fire break clearance of 12', not exceeding 700 square feet in area
 - A minimum clearance of 12' to all structures and other tents.

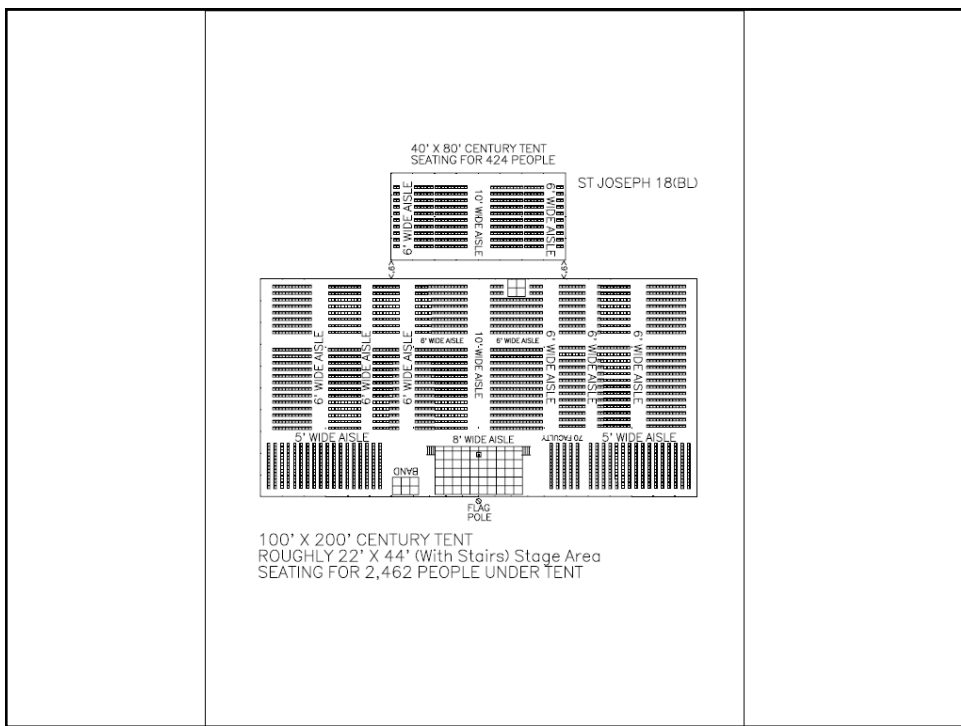
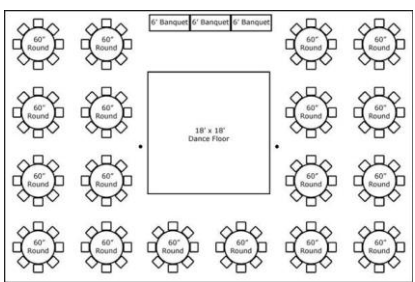
Caution: Section 3103.2 of the actual code is the appropriate section. The amendment identifies it as Section 3103.4

The permit applicant states that sides will not be used unless it rains. The tent is 20 X 30 (600 s.f.). Do I still need to review?

Construction Documents

(CFSC Part III, 3103.6)

- Detailed site and floor plan indicating:
 - Means of Egress details
 - Seating capacity
 - Seating arrangement and details
 - Location and type of heating and electrical equipment



Flammability Certification



(Part III, 3104.2 & 3104.4)

- Prior to the permit being granted, the owner or agent must file with the Fire Marshal:
 - Certificate executed by an approved testing laboratory certifying that the tent and appurtenances are composed of material meeting NFPA 701 (3104.2).
 - Affidavit attesting the following:
 - Name and address of owner
 - Date of the last flame-retardant treatment
 - Trade name of chemical used in treatment
 - Name of person of firm treating the material
 - Name of testing agency and standard by which the fabric was tested (3104.4)

Membrane and Interior Liner Material

(Add 3104.2.1)

- Non-combustible per Section 703.5 of the CSBC or,
- Meet flame propagation performance criteria of NFPA 701 and manufacturer's test protocol
 - Exception: Greenhouses not open to public with plastic less than 20 mil

CERTIFICATE OF TESTING

For The Account Of: **Carnegie**
 110 N. Centre Avenue
 Rockville Centre, NY 11570
 Contact: Nikki Rubakaba

DATE: March 24, 2004 CERTIFICATE (ORDER) NO.: 11447

CLIENT'S IDENTIFICATION: **Plazzetta**

Test Performed: **NFPA 701 - Standard Methods of Fire Tests for Flame Resistant Textiles and Films - 1999 Edition - Test #1**

CERTIFICATION: The textile sample named above was tested and **PASSED** the NFPA 701 Test #1 - 1999.

A.C.T. Standard: *Drapery - Mast Pass*

This laboratory test is not intended to reflect fabric performance under actual conditions. The certification procedure merely measures the performance of samples under the predetermined and specific test conditions prescribed by the standard specified. This certification applies only to the standards or procedures identified and to the random samples tested. The test results are representative of the analysis of the piece or lot only to the extent the sample tested is representative of the piece or lot. Our reports and letters are for the reference use of the customer to whom they are addressed and the certification names above or its trade or designs are not to be used under any circumstances without our prior written approval. Samples will not be returned unless specified by the customer. Retained samples will be kept a maximum time of one year unless a specific retention period is necessary.

CERTIFICATION: I certify that the above results were obtained after testing specimens in accordance with the procedures and equipment specified by NFPA 701 1999 Edition Test #1 Procedure.

Sallie Cotey - Laboratory Manager
Applied Textiles Lab Services

Jennifer Freund
Jennifer Freund
Lab Technician

DATA SHEET

Product Configuration: (X) Single Layer () Multi Layer

The NFPA 701 - 1999 Edition supersedes the NFPA 701 - 1996 Edition. The step-by-step test implementation and test failure criteria are the same for both the 1996 and 1999 Editions. Therefore, it is assumed that this 1999 Edition test report will also satisfy any building code which cites the 1996 Edition.

Specimen #	Initial Mass(g)	Final Mass(g)	% Weight Loss	Flaming Drip Seconds	Afterflame Seconds
1	13.0	9.8	25%	0	0
2	12.7	9.0	29%	0	0
3	12.7	10.2	20%	0	0
4	12.8	9.5	26%	0	0
5	12.9	9.8	24%	0	0
6	12.7	9.9	22%	0	0
7	12.8	9.3	27%	0	0
8	12.9	9.8	24%	0	0
9	12.7	9.5	25%	0	0
10	12.8	9.9	23%	0	0
Average	12.8	9.7	24%	0.0	0.0

Afterflame is required to be recorded; however, it is not factored into the Failure Criteria
 Approximate weight (oz./sq. yd): 6.075
 SD = Standard Deviation $3\text{ SD} = \text{Mean} + 3\text{ SD} = \text{g/m (divided)} \times .835 = \text{oz/yd}$

PERFORMANCE CRITERIA:

- Where fragments or residues of specimens that fall to the floor of the test chamber continue to burn for more than an average of 2 seconds per specimen for the sample of 10 specimens, the material shall be recorded as failing. (Flaming Drip)
- Where the average weight loss of the 10 specimens in a sample is greater than 40 percent, the material shall be recorded as failing.
- Individual specimens will be listed as a failure if it exceeds mean + 3 SD
- Where the specimens do not demonstrate performance in accordance with either of the conditions indicated above, the material shall be recorded as passing this test and shall be designated as flame resistant.

CONCLUSION: Based on the above Results and Performance Criteria, the item tested:

Passes
 Fails
 Testing of 10 additional specimens is required

Page 2 of 2

Certificate of Flame Resistance

REGISTERED FABRIC NUMBER

F-140.01

ISSUED BY
JOHNSON OUTDOORS INC.
 BINGHAMTON, NEW YORK 13902
 Manufacturers of the Finest
 Tent Products Described Herein

Date of Manufacture

OCTOBER 2007

This is to certify that the products herein have been manufactured from material inherently flame retardant as here after specified by the material supplier. Made in the USA.

NAME: DALLAS PARTY TENT AND EVENT
 CITY: ARLINGTON, TX


Certification is hereby made that:
 The articles described on this certificate have been manufactured with an approved flame retardant chemical in compliance with California State Fire Marshal Code, NFPA-701*, A-A-55308, FMVSS-302, CAN/ULC-S109-MB7, CPAI-84, Underwriters Laboratory of Canada, and have been tested in accordance with the Federal Test Method Specifications and meet or exceed the Military Flame Specifications of MIL-C-43008G.

Type, color, & weight of material: 14 OZ Vinyl: WHITE BLOCK OUT

Description of item certified: EVOLUTION 40X40

Flame Retardant Process Will Not Be Removed By Washing. Eureka! Tent tops that are designed to meet Temporary Building codes are supported with a Registered Architect Stamp. For that stamp to remain valid, the tent top must be installed with 100% Eureka! Manufactured fabric components.

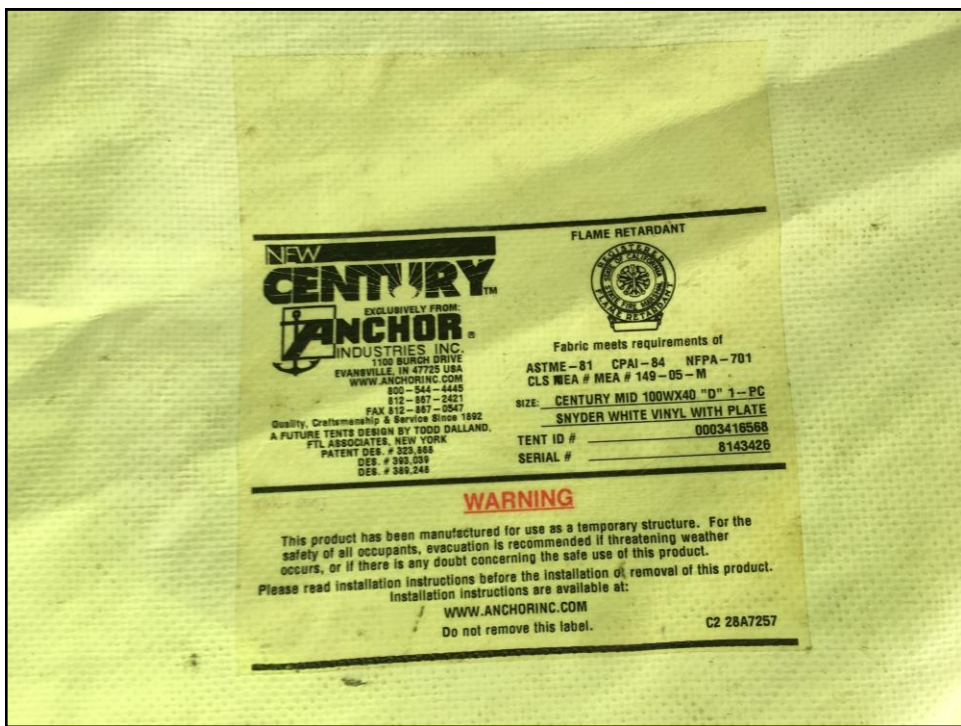
Snyder Manufacturing, Inc.
Manufacturer of Flame Retardant Vinyl Laminates

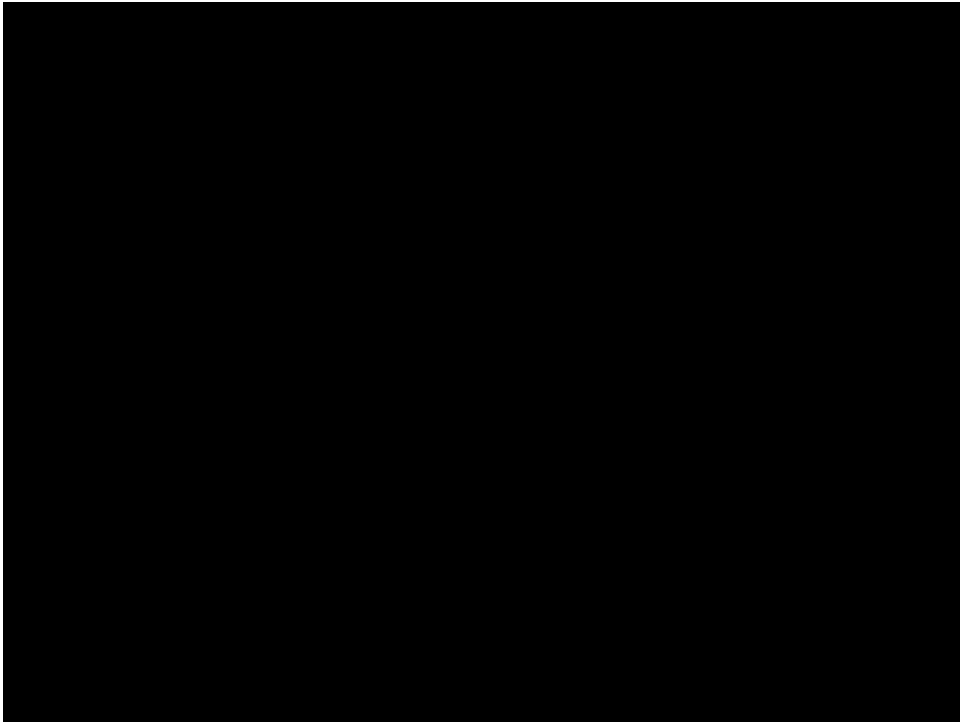

 TENT DEPARTMENT, JOHNSON OUTDOORS INC.
*Large Seal

Label

(3104.3)

Membrane structures or tents shall have a permanently affixed label bearing the identification of the size and fabric or material type.





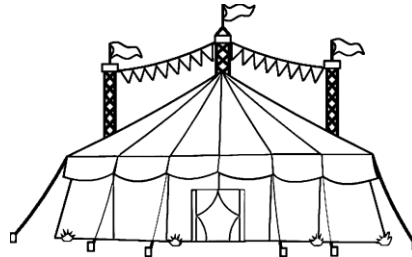
Caution

Section 3103.8.1 regarding access for fire apparatus refers to Section 503 which was deleted by Connecticut amendments.

Location

(3103.8.2)

- 20 foot clearance to:
 - Lot Lines
 - Buildings
 - Other Tents or Membrane Structures
 - Parked Vehicles
 - Internal Combustion Engines



Distance measured from guy wires or support ropes.

- Separation not required when:
 - Tent or Membrane Structure is not used for cooking and less than 15,000 s.f.

- Separation not required when all following conditions are met:
 - Aggregate floor area does not exceed 10,000 s.f.
 - Aggregate area of building and tent or membrane structure does not exceed the allowable area of the CSBC.
 - Means of egress provided for both the building and tent or membrane structure.

Caution

Section 3103.8.2, Exception 2.4 regarding access for fire apparatus refers to Section 503 which was deleted by Connecticut amendments.

Locations, Greater than 15,000 s.f.

(3103.8.3)

- 50 foot separation required from any other tent or membrane structure as measured from the sidewall of the tent or membrane structure, unless joined together by a corridor.

Membrane Structure on a Building (3103.8.4)

Membrane structures that are erected on buildings, balconies, decks or other structures shall be regulated as *permanent membrane structures per Section 3102 of the CSBC.*



Fire Break

(3103.8.6)

- Fire break or fire road, 12' unobstructed width.
 - Measured per 3103.8.2
 - Space provides:
 - Apparatus Access
 - Open space for flaming embers



Anchors

(3103.9)

- Must be adequately braced against weather and collapsing.
- FM may request documentation of structural stability.



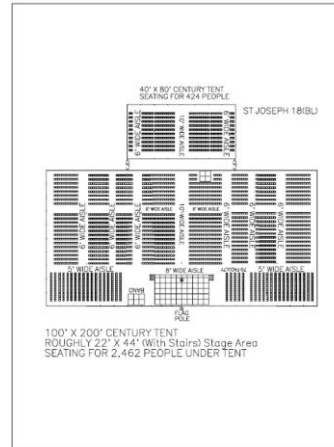
Air Supported or Inflated Structures (3103.10)

- Door operation during high winds (3103.10.1)
- Air supported structure used as Public Assembly must be provided with at least 2 blowers, each able to maintain full inflation pressure with normal leakage (3103.10.3).
- Auxiliary power capable of powering one blower continuously for 4 hours when occupied by more than 200 people (3103.10.4).

Seating Arrangements

(3103.11)

- Seating arrangements shall comply with Chapter 10.
- Aisle widths are modified by 3103.12.5



Aisles

(3103.12.5)

- Employee Only Areas:
 - 24 inches but not less than the width required for the number of people served.
- Public Areas:
 - 44 inch minimum
 - Progressively increased in width 1 foot for each 50 persons served at that point.



Arrangement & Maintenance

(3103.12.5.1)

- Aisle arrangement is subject to Fire Marshal approval.
- Aisles shall be maintained CLEAR at all times during occupancy.



Means of Egress

(3103.12)

- Exits spaced at equal intervals around perimeter
- Max travel distance 100'
- See Table 3103.12.2 for number and width.



TABLE 3103.12.2
 MINIMUM NUMBER OF MEANS OF EGRESS AND MEANS OF
 EGRESS WIDTHS FROM TEMPORARY MEMBRANE STRUCTURES AND TENTS

OCCUPANT LOAD	MINIMUM NUMBER OF MEANS OF EGRESS	MINIMUM WIDTH OF EACH MEANS OF EGRESS (inches)	
		Tent	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

Egress capacity calculated at .2

Exit Openings from Tents

(3103.12.3)

- Exit openings must remain open unless covered by a flame-resistant curtain that meets the following:
 - Curtain must be free sliding on metal support which is a minimum of 80 inches above the floor level at the exit. When open, no part of the curtain will obstruct the exit.
 - The curtains shall be of a color that contrasts with those of the tent.

Doors

(3103.12.4)

- Swing in the direction of exit travel
- In air-supported membrane structures, must be automatic closing against operating pressure.
 - Opening force not to exceed 5 lbs.

Exit Signs

(3103.12.6)

- Exit signs required at exit doorways and as required to mark egress path.
- Internally illuminated or,
- Externally illuminated



Means of Egress Illumination

(3103.12.7)

- Illumination is required to at least 1 footcandle while the structure is occupied.
- Separate power supply required.
- Emergency power required.

MOE Maintenance (3103.12.8)

- Exits, aisles, passageways shall be maintained to the public way.
- Guy wires, ropes or other structural supports shall not cross a means of egress at a height less than 8 feet.
- Floor surface shall be maintained.
- Tent stakes must be fenced off, capped, or covered
(CSFPC 25.1.3.3)

Inspections

(3103.7)

- Tents, membrane structures, air-supported structures erected for more than 30 days must be inspected at least twice per period to insure maintenance and code compliance.
- Inspection by the permit holder, owner or owner's agent. Inspections must include anchors, maintenance, and fabric.
- Fire Marshal may require reports to be submitted.

Combustible Materials

(3104.5)

- Hay, straw, sawdust, etc are not permitted within membrane structure used for assembly.
 - Except
 - Animal Care
 - Damp sawdust and shavings in public exhibition areas
 - Not permitted under stands or seats.



Smoking

(3104.6)



Smoking is not permitted on these premises








Open Flame

(3104.7)

Open flame or other devices that emit flame, fire, heat, or any flammable or combustibles liquids, gas, charcoal, or other cooking device or any other unapproved devices shall not be permitted inside or with 20 feet of a tent or membrane structure when open to the public unless approved by the Fire Marshal.



Fireworks

(3104.8)

May not be used within 100' of a tent or membrane structure.



Spot Lighting

(3104.9)

- Only electric power permitted.
- Combustible construction located within 6 feet shall be protected with 9 ½ inches of non-combustible insulation.



Clearances

(3104.11)

- Minimum 36 inch clearance between the fabric envelope and all contents located within the membrane structure.



Fire Protection

- Fire Extinguishers (3104.12): Per Section 906
 - 906 refers to the CFPC
 - CFPC 25.2.5 (Tents) requires fire extinguishers at the direction of the AHJ
 - CFPC 25.6.3 (Temp Membrane Structures) requires fire extinguishers at the direction of the AHJ
 - Employees must be trained (CSFPC 25.1.6.5)
- Fire Protection Equipment (3104.13)
 - Fire Marshal has the authority to establish reasonable equipment requirements such as fire hoses and other auxiliary firefighting equipment.
- Occupant load established in accordance with Chapter 10 (3104.14)

Heating & Cooking Equipment

(3104.15)

- Heating or cooking equipment, tanks, piping, hoses, fittings, vents, etc. installed in accordance with the Mechanical Code and NFPA 54 or NFPA 58

(3104.15.1)

- Vents may require spark arresters



Location of Cooking and Heating Appliances

(3104.15.3)

- 10 foot clearance required from cooking or heating appliances to combustibles (3104.15.3)
- Warming of foods, cooking demonstrations, etc using solid flammables or butane are permitted (3104.15.4)



- Cooking tents with sidewalls or drops shall be separated from other tents or membrane structures by a minimum of 20 feet. (3104.15.5).
- Outdoor cooking that produces sparks shall not be performed within 20 feet (Amd 3104.15.6)



LP-Gas

(3104.16)

- Container Location
 - Outside of structure
 - Safety Release valve pointed away (3104.16.2)
- Min. separation LPG containers:
 - Less than 500 gallons: 10 feet (3104.16.2.1)
 - More than 500 gallons: 25 feet (3104.16.2.2)



Protection and Security

(3104.16.3)

- Portable LP-Gas containers, piping, valves, and fittings which are located outside and are being used to fuel equipment inside a tent or membrane structure shall be adequately protected to prevent tampering, damage by vehicles or other hazards.
- Location approved by the Fire Marshal
- Portable containers must be securely fastened in place to prevent unauthorized movement.

Flammable & Combustible Liquids

(3104.17)

- **Flammable liquids shall not be used in tents or membrane structures** (3104.17.1).
- Flammable liquid must be stored at least 50 feet from the tent or membrane structure (3104.17.2).
- Refueling at least 20 feet from tent or membrane structure in an approved location (3104.17.3)

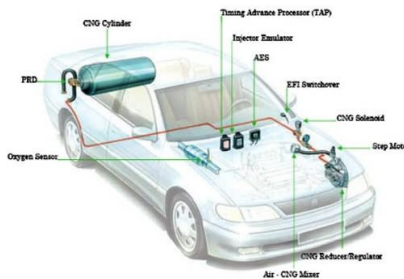
Display of Motor Vehicles

(3104.18)

- Batteries disconnected
- Fueling or defueling prohibited
- 5 gallon fuel quantity limit
- Fuel system to be inspected for leaks
- Fuel tank openings locked and sealed
- Location that does not obstruct MOE



- CNG or LPG powered vehicles:
 - Container valve to be fully closed
 - Hot lead from battery disconnected
 - Dual-fueled vehicles must also comply with 3104.18.1 through 3104.18.5.3



Competitions & Demonstrations


(3104.18.5)

- Fuel storage in approved containers and location outside
- Refueling performed outside
- Spills immediately cleaned-up



- Generators and other internal combustion power sources located minimum of 20 feet from tent or membrane structure (3104.19).
 - Also must be isolated from public by fencing, enclosure or other approved means.
- Standby personnel (3104.20) deleted by amendment
- Trained crowd managers required at 1 per 250 occupants.

Crowd Control Manager Training



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Crowd Manager Training


All national fire code standards require trained crowd managers in public assemblies such as large nightclubs, auditoriums, ballrooms and arenas. Learn what to do in case of emergency BEFORE one occurs.

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Combustible Materials


- **Vegetation (3104.21)**
 - Combustible vegetation that could create a fire hazard.
 - Removed from within 30 feet
- **Waste Material (3104.22)**
 - The floor surface inside tents and membrane structures, and the grounds outside and within 30 shall be kept free from combustible waste.
 - Wastes shall be stored in approved containers and removed daily.

Summary

- Regulate tent materials and structure.
- Manage exposures
- Manage Hazards
- Manage occupants



ques·tion

/ˈkwɛʃən/ 

noun

plural noun: questions

1. a sentence worded or expressed so as to elicit information.
"we hope this leaflet has been helpful in answering your questions"
synonyms: [inquiry](#), [query](#), [interrogation](#)
"please answer my question"

verb

3rd person present: questions

1. ask questions of (someone), especially in an official context.
"four men were being questioned about the killings"
synonyms: [interrogate](#), [cross-examine](#), [cross-question](#), [quiz](#), [catechize](#); [More](#)