2011 Ohio Fire Code

Based on the 2009

International Fire Code

with

Ohio Amendments

THE OHIO FIRE CODE

IN APRIL OF 1973, GOVERNOR JOHN J. GILLIGAN ANNOUNCED THAT OHIO HAD A STATE FIRE CODE FOR THE FIRST TIME.

HE SAID:

IT IS OUR FIRST ATTEMPT AND WE KNOW THAT IT WILL HAVE MANY SHORTCOMINGS.

HE FINISHED BY SAYING:

COMMON SENSE AND SOUND JUDGEMENT MUST BE USED IN THE ENFORCEMENT OF ANY RULES OF A TECHNICAL NATURE.

Preface

- The Ohio Fire Code establishes a minimum set of standards for safeguarding life and property from fire and explosion in Ohio.
- Designed to be compatible with portions of the Ohio Building Code based upon the International Building Code (2009 Edition)

Preface

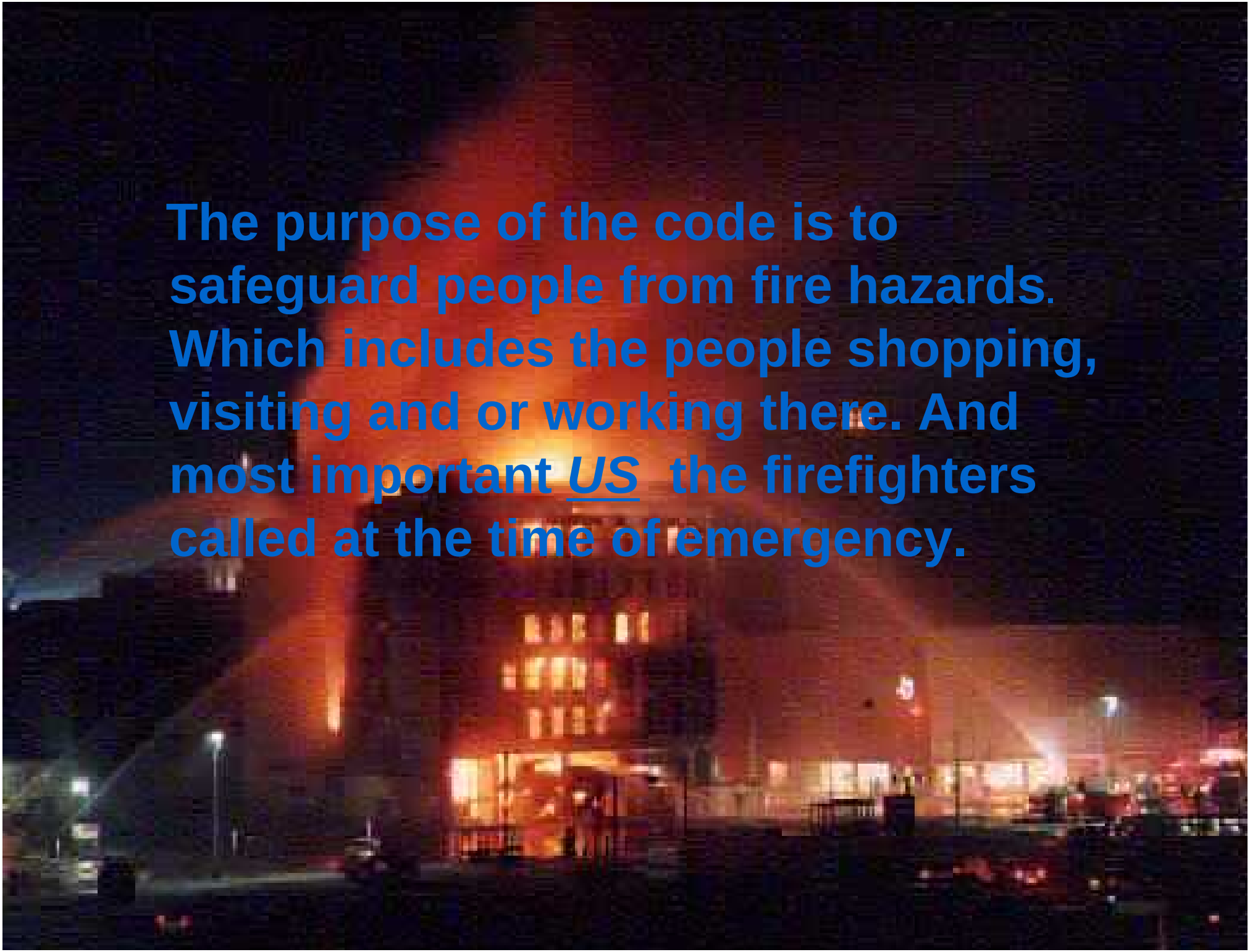
- **The *italicized* text is:**
  - **The law of Ohio and is given the same weight as nonitalicized text.**
  - **It is “Ohioized” language meaning it contains provisions written by the State Fire Marshal specifically for application in Ohio**

Table Of Contents

- One of the most used areas of code book along with the Index
- Most used Sections are: Rules 2, 3, 5, 6, 8, 9, 10, 22, and 34.
- Rule 47 lists all Referenced Standards which shall be incorporated and considered part of this code.
- Note: None of the Appendixes in the back of the Code are adopted in Ohio.

1301:7-7-01 Rule 1

Administration



The purpose of the code is to safeguard people from fire hazards. Which includes the people shopping, visiting and or working there. And most important *US* the firefighters called at the time of emergency.

ADMINISTRATION (1301:7-7-01)

- **101.1:** Set of Rules
- **101.2:** Administration and enforcement of ORC Chapters (3701, 3731, 3737, 3743, 3781, and 3791.
  - **101.2.1: <u>Appendices not adopted as part of this code</u>**
- **101.5:** Provisions of this code *shall* not nullify any provisions of state or federal law.
- **101.6:** Political subdivisions may adopt provisions that exceed the minimum standards

Title
Section 101.1

- (1) **101.1 Title.** *The rules as set forth in Chapter 1301:7-7- of the Administrative Code shall be known as the "Ohio Fire Code" abbreviated "OFC", and hereinafter may also be referred to as the "state fire code" or "this code".*.

Scope
Section 101.1

- (2) **101.2 Scope.** This code establishes *fire marshal rules for the administration and enforcement of authorities granted to the fire marshal and fire code officials…..*

Scope
Section 101.2.1

- (a) **101.2.1 Appendices.** Provisions in the appendices *of any "International Fire Code" are not adopted as part of this code.*

Scope
Section 101.2.2

- (b) **101.2.2** The topic plays into the intent & applicability as the code applies to fire safety (various buildings, vehicles, etc.). And, 101.2.2 indicates what the OFC doesn’t apply to.

Intent Section 101.3

- The purpose of this code is to establish minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises and to provide safety to fire fighters and emergency responders during emergency operations.

Minimum Standard 101.6

- (6) **101.6 *Minimum standard***. *This code shall constitute the minimum standards for safeguarding life and property from fire and explosion in this state. No political subdivision with the statutory authority to promulgate a fire code may enact a fire code, or parts thereof, that provide a lower threshold of such safeguards or violate accepted engineering practice involving public safety. Such political subdivision may promulgate fire code provisions that exceed the minimum safety requirements as set forth in this code.*

General Applicability 102.1

- The construction and design provisions of this code shall apply to:
  - Structures, facilities and conditions arising after the adoption of this code.
  - Existing structures, facilities and conditions not legally in existence at the time of adoption of this code.
  - *Existing structures, facilities and conditions not in strict compliance with the requirements of this code where the conditions constitute a distinct hazard to life or property in the opinion of the fire code official, including existing structures subject to rule 1301:7-7-46 of the Administrative Code.*

Agricultural Uses and Locations 102.1.2

- The construction and design provisions of this code shall not apply to structures:
  - Subject to section 3781.061 of the Revised Code, or
  - otherwise exempt from the building code as listed in 1301:7-7-47 of the Administrative Code: structures being used for agricultural purposes. (See Exceptions)

Administration, Operational & Maintenance Provisions 102.2

- Administrative, operational and maintenance provisions in the OFC are applicable to conditions and operations after the adoption of this code as well as existing conditions and operations.

Certificate of Occupancy 102.3.2

- Responsible person must maintain a copy of the Certificate of Occupancy (C of O) for a Fire Code Official (FCO) to review.
- Applies only to a C of O issued after the effective date of this code.

Change of Use 102.3.3

- The provisions of the fire code and building code shall apply to all buildings undergoing a change of occupancy classification.

Village Ice Cream Parlor

baskin BR robbins

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Village Ice Cream Parlor

American
Family Services Day Care
751

102.4 Application of Building Code

- The planning, design, and construction of new buildings and structures to provide egress, fire protection shall be controlled by the building code.
- Any alterations, additions or changes of occupancy shall be made through the building code.

102.5 Application of the Residential Code of Ohio

- Where structures are designed and constructed in accordance with the residential code, the provisions of this code shall apply as follows:
- The provisions of this code pertaining to the exterior of the structure shall apply including, but not limited to, premises identification, fire apparatus access and water supplies.

102.5 Application of the Residential Code of Ohio (Cont.)

- Where interior or exterior systems or devices are installed and such systems are not subject to the residential code of the provisions for plan review and, construction permits required by this code shall also apply.

102.7 Reference Codes and Standard

- Rule 1301:7-7-47 shall be incorporated by reference into and considered part of requirements of this code. Where differences occur between this code and the standards the provisions of this code shall prevail.

Conflicting Provisions Sections 102.7 and 102.8

- Where differences or conflicts occur between the OFC and a referenced code or standard, the OFC governs.
- Where there is a conflict between a general and a specific requirement within the OFC, the specific requirement governs.
- Conflicts are NOT resolved based on applying the most restrictive provision.

103 Fire Code Within a Political Subdivision

- Subdivisions may adopt and enforce a fire code per Ohio Law
- Local fire code does not modify, repeal, invalidate, or nullify any provisions of the OFC
- The OFC remains in effect and enforceable in all locations in Ohio

104.2.1 Plan Review

- The fire code official is authorized to conduct plan review of fire protection systems as regulated by the OBC (106.1.2)
  - May inspect premises as needed to do plan review
  - Must provide building official with written findings of the review which do not meet the fire code within the time frame per the building department

104.2.2 Construction Non-Compliance

- FCO must participate in a plan review process described in paragraph
- Find that construction is not according to OFC
- FCO may issue order directing construction per the OFC
- OFC may then issue a citation (3737.42 ORC) requiring submission

104.3 Right of Entry

- Whenever necessary to enforce the provisions of this code (entry per 3737.14 ORC)
- 104.3.1 If entry is denied every recourse by law shall be used to secure entry (warrant in accordance with 2933.21(F) ORC)

104.4 Identification

- Fire code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

104.8 Variances (Modifications) by the SFM

- Only the SFM can issue a variance to the OFC
- Variance request – submitted in writing by affected party, indicating:
  - Variance won't threaten public health, safety or welfare; AND
  - The party will provide measures that will protect public health, safety, and welfare by equivalent measures

104.8 Variances (Modifications) by the SFM (Cont.)

- SFM may request additional information from the party before issuing variance
- SFM variances will be in writing; will terminate after 1 year, some exceptions

104.11 Authority at Fires and Other Emergencies

- Fire Chief or officer of fire dept. may prohibit any person, vehicle or thing to enter or prevent the performance of their duties.
  - 104.11.1: May barricade or close any street or roadway
  - 104.11.4: Fire official may order evacuation any occupied building deemed unsafe

105 Permits

- Local fire official <u>may</u> require, the State Fire Marshal <u>shall</u> require permit and inspection fees.
  - Mandatory Permits: Explosive manufacture, processing or temporary storage(SFM); Flammable and Combustible liquids storage tanks; LP gas systems; standpipe system removal on state owned property; temporary membranes structures tents and canopies in excess of 400 sq. ft. on state property and or licensed premises..
- 105.1.1.2 Discretionary permits: Local fire official is authorized to establish a permit system to monitor hazardous operations.

Permit Types

- Generic Permits are located within each rule
- Specific Permits are located in 105.6 through 105.7.14
- Local permit fees per 105.8 – “authorized, but not required”

105.3.3 Occupancy

- Prior to issuance by the building official of any certificate of occupancy the responsible person shall notify the fire code official to be present to witness acceptance testing on all fire protection systems. The fire code official shall report any deficiencies of fire protection systems found to the building code official.

105.3.3.1 and 105.3.3.2 Occupancy

- Certificate **shall not** be issued unless such structures or buildings are in substantial compliance with the applicable provisions of this code
- The structure or building or any portion thereof does not constitute a distinct hazard to life and property.

105.3.4 Conditional Approvals

- The fire code official is authorized to issue a conditional approval or permit to engage in the permitted activity or use if it is safe and does not endanger life or property.

105.3.6.1 Issue of C of O by Building Official

- If a permit, plan approval, or certificate of occupancy is issued in accordance with the building code for a structure regulated by this code, the responsible person is not exempted from compliance with this code, including provisions for fire safety functions.
- If review of plans is not completed or a permit is not issued pursuant to this code, the absence of such review or permit does not prohibit construction from occurring in accordance with the building officials approval.

105.4.4 Approved documents

- Review and approval by the code official shall not relieve the applicant of the responsibility of compliance with this code

105.4.5 Corrected documents

- When field conditions necessitate and substantial changes, the fire code official shall have the authority to require drawings be submitted for approval.

106.3 Concealed work

- Whenever any installation subject to inspection as required by this code is covered or concealed without first being inspected, the responsible party must uncover the work for fire code official inspection.

107.1 Maintenance of Safeguards

- 107.1 through 107.3 provide general statements that the responsible party is required to maintain these required safeguards of the building, per the OFC

107.5 Owner/ Occupant responsibility

- Corrections and abatements of this code shall be the responsibility of the owner.
- If the occupant creates or allows to be created the occupant shall be held responsible for the correction of the hazardous condition

107.6 Overcrowding

- Overcrowding or admittance of any person beyond the approved capacity of a building shall not be allowed. The fire official shall be authorized to **STOP** the event until the condition is corrected.

108.0 Appeal of Orders

- Appeals of orders by the fire code official relative to the application of this code shall be in accordance with ORC Chapters 3737 and 3781.

109.0 Violations

- **SFM, Asst. SFM, CFSI:**
  - **109.1.1:** Shall issue citation in accordance with 3737.42 (ORC)
  - **109.1.1.1:** may issue notice in lieu of citation for de minimis violation (no direct or immediate relationship to safety or health)
  - **109.1.2:** Remedy to dangerous conditions according to 3737.41 (ORC)

109.2.1 Service of Notice

- Unattended or abandoned locations shall have notice of violation posted at or near the main entrance. Shall also be mailed to last known owner or occupant by return receipt certified mail.

109.3 Citations and Notice of Hearings

- Shall be in writing
- Every responsible person shall be give opportunity for a hearing.
- Penalties are specified in ORC 3737.51 and 3737.99

110 Unsafe Buildings - General

- May issue a citation in accordance with 3737.41 or 3737.42 of the ORC
- Notify the building department of any repairs, alterations, remodeling, removing, or demolition required

110.1.2 Structural Hazards

- When a structural hazard is caused by the faulty installation, operation, or maintenance; the fire code official shall notify the building code official immediately.

111.1 Stop Work Orders

- Whenever the fire code official finds any work contrary to the approved plans or to this rule he is authorized to issue a stop work order in accordance with ORC 3781.031.
- 111.2 Stop work order shall be in writing.
- 111.3 When an emergency exists the fire code official shall not be required to issue written notice prior to stopping the work.

112.0 State Fire Marshal Permits and Fees

- All permits issued by FM shall be $75.00 unless otherwise specified
- Inspection fees are in accordance with 112.2 and 112.3

113 Amendments to the Fire Code

- To adopt, amend, or rescind a provision of the OFC a person must file a petition with the state fire marshal – See 113.2 for petition requirements
- Petitions are reviewed prior to the existing OFC is updated

115 Recognized Testing Laboratories

- Contains a list of labs recognized as an “authoritative source” for testing of products to determine acceptability for use in Ohio.

117 Procedure in the Event of a Fire

- 117.1 Notification of a fire in buildings and;
- 117.2 Notification of fires at a premesis
  - shall be immediately and with all diligence to notify fire dept. by the “responsible person.”
- 117.3 Reporting: Unfriendly fires must be reported to fire department. Fire official is required to make a report and forward it to the Fire Marshal.(3737.24)

118 Hotel and SRO Facility License

- Transient hotel: 5 or more rooms; 30 days or less stay
- Extended stay hotel: 5 or more rooms, with 6 or more rooms as dwelling units
- SRO, single room occupancy: 5 or more rooms, primary residence for more than 30 days. Only 1 occupant per room
- Transient 270 day Stay Hotel: 5 or more rooms, with no more than 40% of the rooms where guests stay 270 days or less.
- Resident Hotel: More than 5 dwelling units, minimum stay is more than 30 days.

1301:7-7-02, Rule 2

Definitions

201.2 Interchangeability

- present includes future, masculine includes feminine and neuter; singular includes plural and vice-versa.

201.3 Terms Defined in Other Codes

- The building, plumbing, or mechanical code definition sections can also be used.(1301:7-7-47)
- Shall have same meanings ascribed to them as in those codes

201.4 Terms Not Defined

- Where terms are not defined, such terms shall have ordinary accepted meanings
- “Webster’s Collegiate Dictionary, 11th Edition” shall be considered to provide ordinary meanings

202 General Definitions

- Fire Hazard
- Fire watch
- Flammable Material
- Labeled
- Listed
- Occupancy Classifications
- Overcrowding
- Responsible Person
- Special Amusement Building

Occupancy Classification

- A-1 theatre
- A-2 restaurant
- A-3 general
- A-4 indoor sports
- A-5 outdoor sports
- B Business
- E Education
- F-1 moderate hazard factory
- F-2 low hazard factory
- H-1 detonation
- H-2 deflagration
- H-3 high fire hazard
- H-4 health hazard
- H-5 semiconductor
- I-1 rehab/group care
- I-2 hospital
- I-3 detention
- I-4 day care

1301:7-7-03 Rule 3

General Precautions Against Fire

301.1 Scope

- Provisions shall govern the occupancy and maintenance of all structures and premises for precautions against fire and the spread of fire

302 Definitions

- Bonfire: outdoor fire for ceremonial purpose
- Open burning where products do not pass through chimney or stack
- Recreational fire: 3 feet or less in diameter and 2 feet or less in height, for pleasure, religious, cooking, warmth or similar purposes.
- Portable Outdoor Fireplace: A solid-fuel burning fireplace. Constructed of steel, concrete, clay, or other noncombustible material. Usually open in design.

303 Asphalt Tar Kettles

- Shall not be transported while operating
- Shall be 20 feet from any combustible materials
- Fuel containers 10 feet from burner
- Must be attended, have extinguishers and tight lids
- Fuel containers under pressure not to exceed 20 gallons

304 Combustible Waste

- Waste creating a fire hazard in buildings or structures or upon premises.
- Space underneath bleachers and grandstands shall be clear of all combustibles unless I hour separation and shall not be occupied for anything other than egress

304.3 Containers

- Containers kept within a structure shall:
  - Material susceptible to spontaneous ignition in approved containers
  - Container greater than 40 gals. Shall be non combustible and have lids (see ASTM Standard)
  - Dumpsters 1.5 cu. yd. or larger shall not be in buildings or closer than 5 ft. to combustible walls, openings and combustible roof eaves. (Unless sprinklered or approved construction types)

307 Open Burning, Recreational Fires, and Portable Outdoor Fireplaces

- 307.1. Prohibited open burning – anything offensive or when atmospheric conditions make burning a hazard
- 307.4.1 Bonfires must not be within 50 ft. of a structure or combustibles
- 307.4.2 Recreational fires must not be within 25 ft. of a structure or combustibles
- 307.4.3 Portable Outdoor Fireplaces must not be with 15 ft. of a structure or combustibles
  - Exception: 1 & 2 Family Dwelling Units

308 Open Flames

- 308.1.4 Charcoal burners or other open-flame devices, not used on combustible balconies or within 10 feet of combustible construction
- Exceptions
  - 1 & 2 Family Dwellings
  - Buildings, balconies & decks protected by automatic sprinkler system
  - Charcoal burners byy approval of FCO (see stipulations)
  - LP Gas cooking devices – with LP containers weighing NO GREATER than 2.5 lbs.

308.1.4.1 Natural Gas Fired Open Flame Cooking Devices

- Must have written approval from local FCO
- Use on combustible balconies of multi-family dwellings (>2)
- Can use within 10 ft. of combustible construction (See stipulations)

Other Open Flame Issues

- 308.1.7 Religious ceremonies
- 308.1.8 Flaming food/beverages
- 308.2 Permits required
- 308.3 Group A Occupancies
- 308.4.1 Group R-2 Occupancies

311 Vacant Premises

- 311.1.1 If owner of abandoned premises cannot be located, AND is unprotected/unsecured, AND is occupied by unauthorized persons/used for illegal activity, OR presents danger for structural collapse or fire spread, shall be declared unsafe and demolished or rehabilitated in accordance with *1301:7-7-47 of the Administrative Code*
- 311.2 Temporarily unoccupied areas need to be secured

311.2.2 Fire Protection in Abandoned Premises

- Must be maintained in operable condition
  - Exceptions: All combustibles must be cleared, and the construction type and site security does not create a fire hazard
  - Buildings with no heat where fire protection systems will be exposed but the buildings must be cleared of combustibles and secured

311.5 Placarding Unsafe Buildings

- Must conform to certain location placement, size, color, date of application, and symbols
  - See 311.5.1-311.5.4
- Known hazards shall also be identified with a special letter system

313 Fueled Equipment

- No storage, operation, or repairing of fueled equipment inside buildings
  - Exceptions: Buildings or rooms constructed for such use in accordance with the *OBC as listed in rule 1301:7-7-47 of the Administrative Code*.
  - Where allowed by OFC Rule 314 Indoor Displays.
  - Storage of equipment utilized for maintenance purposes, in approved locations, as long as fuel tank does not exceed 10 gal. and the building has an automatic sprinkler system according to 903.3.1.1

314 Indoor Displays

- 314.2 Fixtures and displays need to be arranged so that means of egress will be ready for use
- 314.4 Vehicles on display indoors must meet criteria
  - Batteries are disconnected
  - Fuel in tanks does not exceed one-quarter tank or 5 gallons
  - Fuel tanks and fill openings are closed and sealed to prevent tampering
  - Fuel tanks are not defueled or fueled inside building

315 Misc. Combustible Materials Storage

- 315.2 Combustible storage in buildings must be orderly
- 315.2.1 Ceiling clearance: 2 feet or more below in non-sprinklered building or 18 inches below sprinkler head in sprinklered building
- 315.2.2 No storage in exits or exit enclosures
- 315.2.3 No storage in boiler, mechanical, electrical rooms

316 Hazards to Firefighters

- Sections 316.1 to 316.3 of the OFC are important for preventative measures for hazards to firefighters.
- The rules in this section assist in the proper labeling of shaftways, pitfalls, and keeping trapdoors of buildings closed.
- 316.5.2 Outdoor storage, limits the storage of materials underneath high voltage transmission lines to noncombustible

317 Laundry Carts

- Carts exceeding 1 cubic yard used in B, F-1, and R1 occupancies must be constructed of noncombustible material
  - Exceptions: Carts in areas protected by an automatic sprinkler system installed throughout
  - Carts at coin-operated laundries

1301:7-7-04 Rule 4

Emergency Planning and Preparedness

401 General

- **401.3.1** In the case of a unwanted fire on a property the owner or occupant shall immediately report it to the fire department
- **401.3.2** Upon activation of alarm employees or staff to immediately notify FD
- **401.4** Shall be unlawful to interfere with FD operation
- **401.5** Unlawful to make false report

403 Public Assemblages and Events

- When in the opinion of the fire code official due to the nature of assembly or number of people the owner or lessee shall provide a fire watch.
- In other than A or E Use groups where in the opinion of the fire code official an adverse impact on public safety a PUBLIC SAFETY PLAN may be ordered.
- Plan to include emergency vehicle access, fire protection, EMS etc. including law enforcement
- Crowd managers shall be provided for events where more than 1000 people will be in attendance. The ratio of crowd managers to attendees = 1:250 but the FCO can reduce the amount of managers if a sprinkler system is provided throughout building

404 Fire Safety and Evacuation Plans

- **Where required:**
  - Group **A**ssembly, other than occupancies for religious purposes that have a occupant load less than 2000 people
  - Group **B**, occupant load of 500 or more, 100 persons above or below the lowest level of exit discharge.
  - **E**ducational
  - Group **F** having occupant load of 500 or more or more than 100 above/below the lowest exit discharge
  - **H**azardous
  - **I**nstitutional
  - **R**esidential (Group 1,2 and 4)
  - High rise building
  - **M**ercantile, occupant load of 500 or more, more than 100 if above or below the level of exit discharge
  - Covered mall exceeding 50,000 sq. ft.
  - Underground buildings
  - Buildings with atriums in Groups **A**, **E** or **M**

Fire Safety & Evacuation Plans

- Must be maintained appropriately
- Must be made available to employees
- Must be distributed to tenants/building service employees

404.3.3 Lockdown Plans

- Must have:
  - An initiation notification process
  - Accountability for presence or absence
  - Prearranged recall signal to initiate a return to normal operations
  - An approved method of 2-way communications

404.5.2 Evacuation Plan for E Use Group

- An evacuation plan is required to be permanently posted in all rooms
- Must indicate Primary & Secondary evacuation routes
- Must not be obscured by other materials (artwork, posters, etc.)

405 Emergency Evacuation Drills

- Annual evacuation drills are required of all occupancies in 404.2
- Evacuation drills for occupancies listed in table 405.2
- Time of drills shall be varied
- Must keep records with specific information
- Recall and reentry by person in charge of drill, or during an incident, by the fire official in charge

Educational Use Group Fire Drills

- Required by ORC 3737.73 and OFC 405.2
- Educational use group with average daily attendance of 20 or more
- Required 9 drills per school year – once per month
- Drill records are required to be filed with the SFM
- “School year” means anytime average daily attendance is 20 or more – This includes summer school programs

408.3 Educational Occupancies and R-2 College Buildings

- First drill to be within the first ten days of classes beginning
- Fire code official shall have the right to modify the emergency evacuation drill frequency as stated in 405.2
- This includes R-2 college dormitories or residence halls

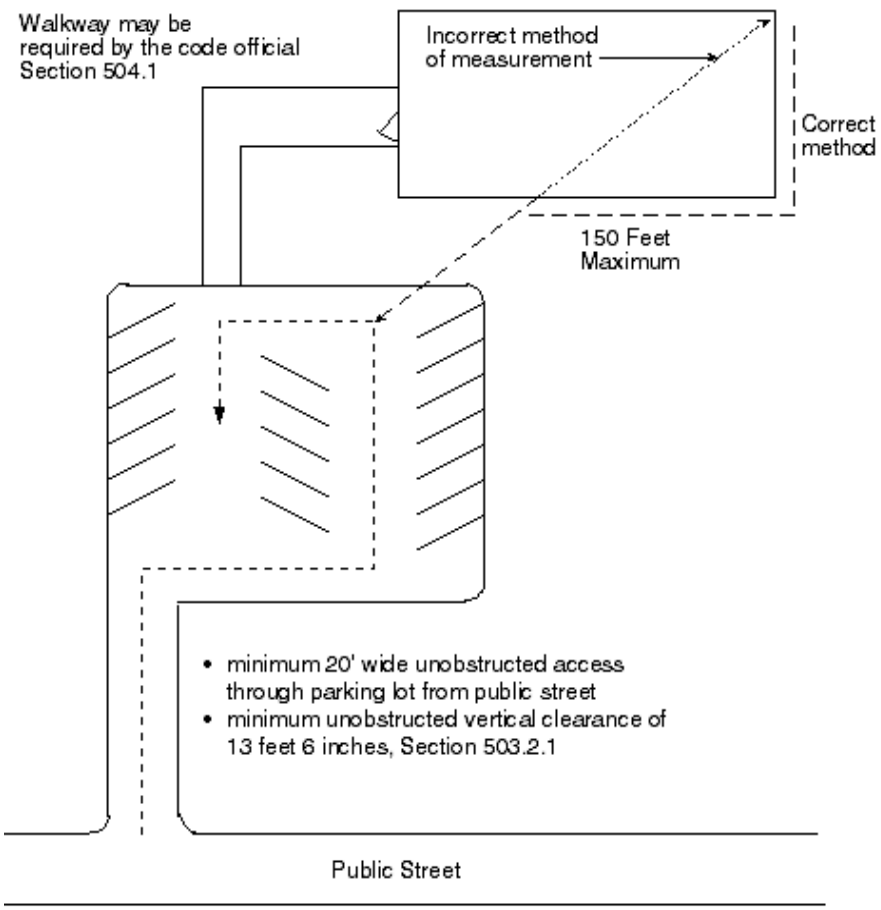
408 and 409 Overview

- 408 Covers general information on emergency preparedness for use & occupancy related requirements
- 409 deals with tornado shelters in schools
- ORC 3737.73 requires schools to designate appropriate locations for these shelters
- Drawings of shelter locations are to be submitted to FCO per the OFC
- Tornado drills are required to be conducted & recorded

1301:7-7-05 Rule 5

Fire Service Features

502.1 Definitions



Fire Apparatus Access Roads
(not to scale)

- "Fire apparatus access road" same as "Fire Lane"
- "Fire Lane" A road or passageway developed to allow the passage of fire apparatus
- "Key Box" A secure device with a lock operable only by a fire dept. master key, and containing building entry keys.

503.1.1 Buildings and facilities

- Approved fire access roads shall be provided when not accessible from a public road or street
- Shall extend to within 150 feet of all portions of the facility
- As measured by an approved route around the exterior walls
- Fire code can increase the 150 feet when certain criteria is met
- More than one road may be required

503.2 Fire Access Road Specifications

- Unobstructed **width of 20 feet**, except approved security gates
- Unobstructed vertical clearance of **13 feet 6 inches**
- Fire code official may increase widths to allow easier fire apparatus operation
- Shall be designed to support fire apparatus and be surfaced for all weather driving capabilities.

503.2 Fire Access Road Specifications

- Turning radius to be determined by fire code official
- Roads in excess of 150 feet shall have turn around for apparatus.
- (See Appendix D)

503.2.6 Bridges and Elevated Structures

- Constructed and maintained in accordance with AASHTO HB-17
- Shall be designed for imposed loads of fire apparatus
- Load limits to be posted at both entrances to bridge when required
- Grade of access roads shall be within limits established by fire code official

503.6 Security gates

- Installation across fire access roads shall be approved by the Fire Chief
- When installed shall have means of emergency operation
- Shall be maintained operational at all times

504 Access to Openings and Roofs

- Approved access walks to doors from access roads when required
- Doors on exterior which are not functional shall be posted with **“THIS DOOR IS BLOCKED”**
  - Letters shall be 6 inches high with ¾” strokes
- Required FD access doors shall not be obstructed
- Buildings four or more stories, except with roof slopes greater than 12:1(33.3% slope), shall be provided with a stairway to the roof and labeled to indicate it goes to roof.

505 Premises Identification

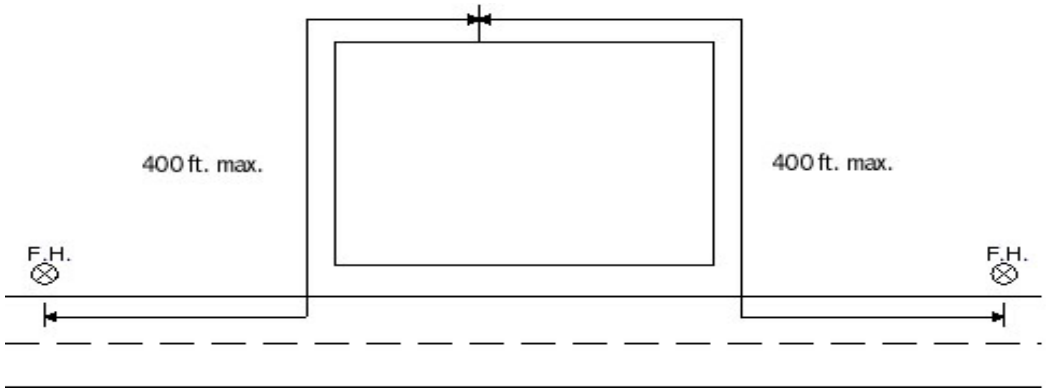
- New and existing buildings to have address numbers, building numbers etc.
- Shall be plainly legible and visible from street or road fronting property.
- Shall contrast with background
- Address shall be Arabic numerals a minimum of 4 inches high with a minimum stroke of ½”.
- Temporary street or road signs shall be installed if open to vehicles during construction.

506 Key Boxes

- Where access is restricted to or within a structure the fire code official is authorized to require a key box to be installed in an approved location when needed for life saving or firefighting purposes.
- The operator of a building shall immediately notify the fire code official and provide a new key whenever a lock is changed or rekeyed.

508 Fire Protection Water Supplies

- An approved water supply with adequate fire flow shall be provided to all premises.
- Water may consist of:
  - Private fire service mains (NFPA 24)
  - Water tanks (NFPA 22)
- Fire code official to be notified prior to water supply testing
- Structures more than 400 feet measured around the exterior shall have hydrants installed. (with exceptions)



508 Fire Protection Water Supplies

- Shall be maintained in accordance with NFPA 25.
- Fences, posts, vehicles, growth, trash etc.shall not be placed or kept near fire hydrants
- A three foot clear space shall be maintained around the circumference of all fire hydrants.
- Where hydrants are subject to impact, guard posts shall be installed in accordance with Rule 312.

509 Fire Dept. Access to Equipment

- Fire protection equipment shall be identified in an approved manner.
- Rooms containing sprinkler risers and valves, air conditioner systems or other detection equipment shall be identified for the use of the Fire Dept.
- Signs shall be posted, constructed of durable materials, permanently installed and readily visible.

Review Questions

1. Name four things fire watch personnel should do.
2. How many hours per day must a Use Group I-3 occupancy be staffed?
3. How many drills per year should be conducted in a Group R-4 occupancy?
4. Outside combustible storage shall be located how many feet from a property line?

Review Answers

1. Name four things fire watch personnel should do. **(202.0)**
   - **Keep diligent watch for fires**
   - **Watch for obstructions to means of egress and other hazards during the time such place is open**
   - **Take prompt action for remediation of hazards or extinguishment of fires**
   - **Assist in evacuation of public from structure.**
2. How many hours per day must a Use Group I-3 occupancy be staffed? **24 hrs. (408.7.2)**

Review Answers

3. How many drills per year should be conducted in a Group R-4 occupancy? **6 times per year, two times on each shift. Twelve drills during first year. (408.10.4)**

4. Outside combustible storage shall be located how many feet from a property line? **10 feet, unless less than 6 feet high can be reduced to 3 feet. The separation is also allowed to be reduced if the fire code official determines no hazard exist (315.3)**

1301:7-7-06 Rule 6

Building Services and Systems

601.1 Scope

- Applies to the installation, operation and maintenance of fuel-fired appliances and heating systems, emergency and standby power systems, electrical systems and equipment, mechanical refrigeration systems, elevator recall, stationary storage battery systems and commercial kitchen hoods.

602.1 Definitions

- “Commercial Cooking Appliance”, appliances used in a commercial food establishment for heating or cooking food and which produce grease vapors, steam, fumes, smoke or odors that are required to be removed through a local exhaust ventilation system.
- “Hood” Type 1, a kitchen hood for collecting and removing grease vapors and smoke.

603 Fuel Fired Appliances

- Waste crankcase only used in Use Groups F, M and S occupancies.
- Working clearances to electrical equipment to comply with NFPA 70.
- Clearances between oil fired and oil storage to comply with NFPA 31.
- Permit required for fuel oil storage system greater than 60 gallons
  - Exception: Fuel oil storage system with capacity of 1,100 gallons used for residential purposes
- Maximum of 660 gallons stored inside or outside above ground without additional requirements.

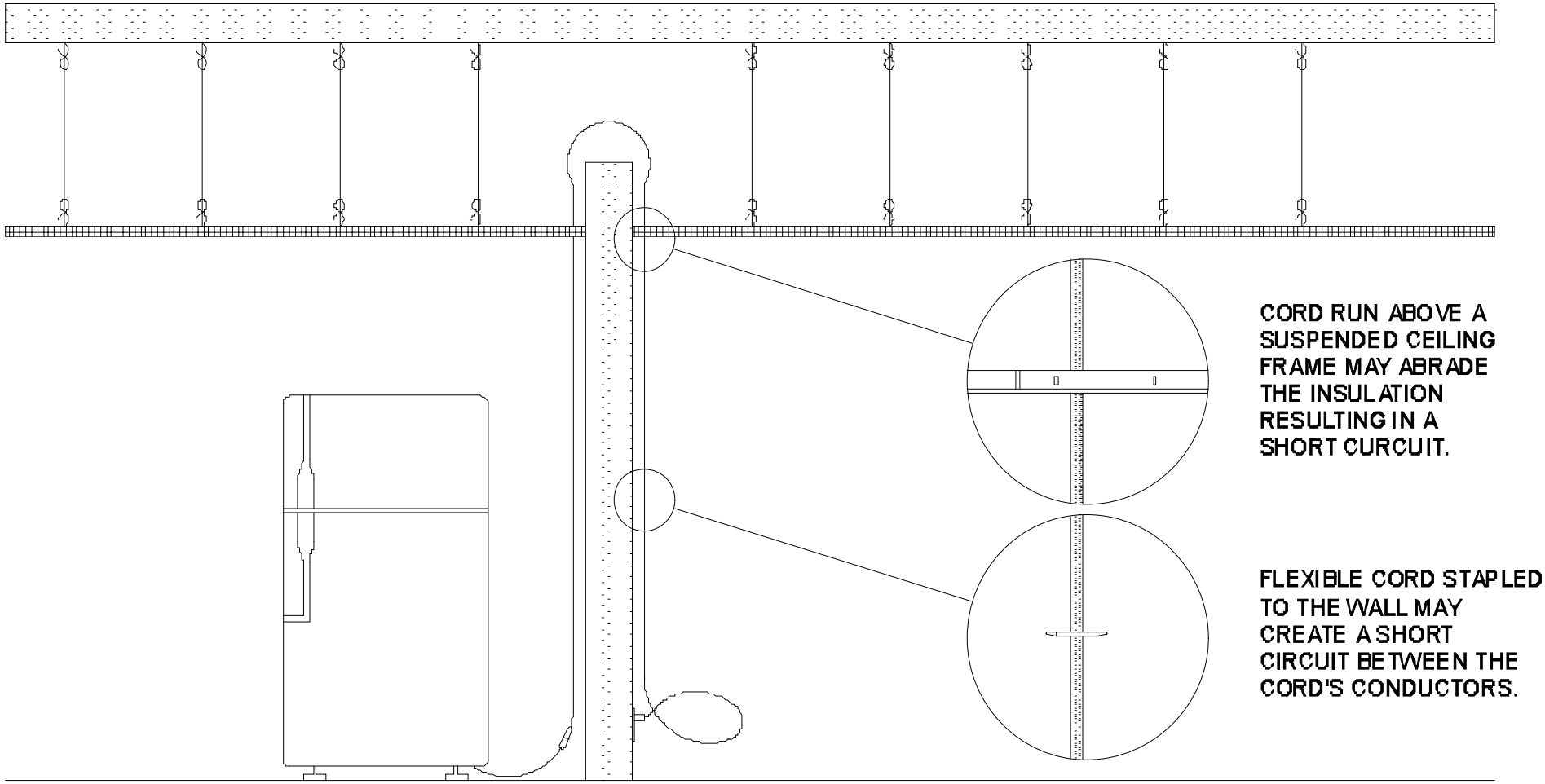
603 Fuel Fired Appliances Cont.

- Fuel oil storage inside buildings – some allowances to increase the gallonage
- Outside storage per 603.3.2 restricted to fuel oil-burning equipment or for generator equipment
- Additional protection required for security reasons

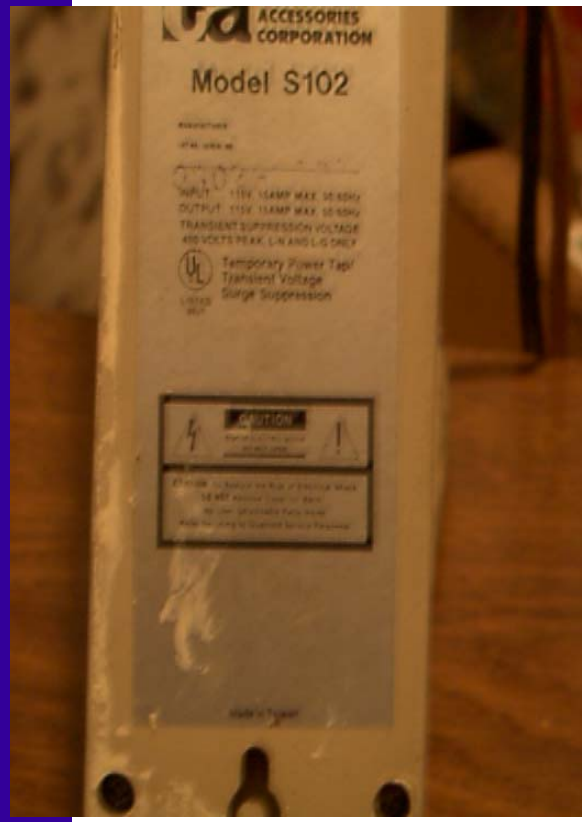
605 Electrical Hazards

- Abatement of electrical hazards shall be brought to the attention of the responsible code official
- 605.3 Working space/clearance: 30” wide, 36” deep, 78” height – NO STORAGE!
- Doors into electrical control panel rooms shall be labeled “Electrical Room”

Improper Use of Extension Cord or Relocatable Power Tap



605 Electrical Hazards



606 Mechanical Refrigeration

- Shall be installed in accordance to Mechanical Code.
- Approved signage required on systems containing 220 pounds of Group A1 or 30 pounds of any other group refrigerant.
- Machinery rooms shall have a refrigerant detector with an audible and visual alarm.

607 Elevator Recall and Maintenance

- Existing elevators with travel distance of 25 feet or more above or below the main floor and is intended to serve emergency response personnel shall meet ASME A17.3 for emergency recall.
- New elevators shall be provided with Phase 1 emergency recall and Phase II emergency in=car operation.
- Elevator keys for the car doors and firefighter service keys shall be kept in an approved location for immediate use by the Fire department. (Knox Box???)

609 Commercial Kitchen Systems

- Kitchen exhaust systems to comply with Mechanical Code. (Ohio Mechanical Code)
- A Type 1 hood shall be installed at or above all commercial cooking appliances and domestic cooking appliances used for commercial purposes **that produce grease laden vapors**.
- 609.3.1 to 603.4 require the ventilation system to be operational
- Cleaning and inspection of hoods & exhaust system per Table 609.3.3.1
  - Records of cleaning shall be maintainted for 3 years

Kitchen Systems

1301:7-7-07 Rule 7

Fire-Resistance Rated Construction

701.2 Unsafe Conditions

- Components that are not maintained, do not function, or have a lack of fire resistance rating per the OFC
  - Shall be deemed unsafe per 110.1.1
  - Refer to a building official
  - If structural hazard is caused hy a component – notify the building offical

703.1 Maintenance

- Shall be maintained, repaired, restored or replaced when damaged, altered or penetrated.
- Required fireblocking and draftstopping in combustible concealed spaces shall be maintained.
- Required smoke barriers shall be maintained to prevent the passage of smoke

Barriers to Fire

- Fireblocking (formerly firestopping) for stopping fire spread.
- Draftstopping for stopping fire spread.

FIRE DAMPER TYPES

Examples Right or Wrong ?

703.2 Opening Protective

- “Opening protective” as defined in the building code is any fire damper, fire door, fire shutter or fire window.
- Door maintained in accordance with NFPA 80
- Shall be maintained in operable condition, doors shall not be blocked or obstructed

703.2 Opening Protectives

- Any fusible link whenever fused, painted, corroded, damaged or loaded with foreign materials shall be replaced
- Signage may be required:
  - **FIRE DOOR-DO NOT BLOCK**
  - **FIRE DOOR KEEP CLOSED**
  - **FIRE DOOR ASSEMBLIES SHALL NOT BE MODIFIED**

Fire Doors

- No stops or wedges
- Close & latch
- Tested annually depending on the type of door, and per applicable NFPA Standard
- Glazing per OBC

703.2 Opening Protectives

- Hold open and automatic door closers shall be maintained. If devices are inoperable door shall be closed.
- Swinging fire doors shall close from the full open or any partially open position and latch automatically.

Rated Enclosures

703.3 Ceilings

- Hanging and displaying of salable goods and other decorative material from acoustical ceiling systems that are a part of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be prohibited.

703.4 Testing

- Horizontal and vertical sliding and rolling fire doors shall be inspected and tested annually to confirm proper operation and full closure.
- Written record shall be maintained and be available to the fire code official

704 Floor Openings and Shafts

- Vertical shafts such as stairways, elevator hoistways, service and utility shafts, that connect two or more stories of a building shall be enclosed or protected
- When openings are needed they shall be protected by automatic or self closing by smoke detection.
- Existing fusible links type devices are permitted as if link rating does not exceed 135 degrees F.

1301:7-7-08 Rule 8

Interior Finish, Decorative Materials and Furnishings

801.1 Scope

- Existing buildings shall comply with paragraphs 803 through 808
- New buildings shall comply with paragraphs 804 through 808 and section 803 of the OBC

805 Acceptance Test and Criteria

- Where required to be flame resistant, materials to be tested by approved agency and must pass Test 1 or 2 as outlined in NFPA 701.
- Reports shall be as outlined in NFPA 701

805.5 Public Occupancies

- Upholstered furniture
- Exception: Sprinklered buildings exempted
- Must comply with California technical bulletin 133.
- SFM may request testing and or research reports

806.1 Natural Cut Trees

- Shall have trunk cut .5 inches from original cut
- Shall be prohibited in Use Groups A, E, I-1, 1-2, I-3, I-4, M, R-1, and R-4 with exceptions
  - Trees located in areas with automatic sprinkler protection in A, E, M, R-1
  - Trees shall be properly supported in upright position
  - Water level when full to cover tree stem by at least 2 inches

806.3 Obstruction Means of Egress

- Required width shall not be obstructed by decorative vegetation
- **806.4** Candles or open flames shall not be used on or near natural vegetation
- Natural cut trees shall be a minimum of the height of the tree away heat vents or other open flames
- **806.5** Any electrical fixtures shall be listed

807.1 Decorations and Trim

- In occupancies in use Groups A, E, I and R-1 and dorms in R-2, curtains, draperies, hangings, and other decorative materials suspended from walls or ceilings shall be flame resistant in accordance with NFPA 701.
- In I-1 and I-2 decorations such as pictures, photographs and paintings shall be limited
- Noncombustible materials are not limited
- Flame resistant materials shall not exceed 10 percent of the aggregate area of walls and ceilings

807.4 and 807.4.4 Use Group E and I-4 Day Care

- **807.4.3.1** Clothing and personal effects shall not be stored in corridors and lobbies
  - **Exception:**
  - **Protected by automatic sprinkler**
  - **Approved smoke detection system**
  - **Storage in metal lockers**
- **807.4.3.2** Artwork and teaching materials shall not exceed 20 percent of wall area

24 9 2003

24 9 2003

24 9 2003

807.4.3 Group E

- NO Storage in corridors and lobbies – see exceptions
- Artwork/Teaching materials – shall be limited on walls of corridors to not more then 20%

808.1 Wastebaskets and Lids in I-3

- Waste containers shall be noncombustible or other approved materials
- Containers with a capacity greater than 20 gallons shall be provided with noncombustible lids

1301:7-7-09 Rule 9

Fire Protection Systems

901 General

- 901.4- Fire protection systems shall be maintained in accordance with the original installation documents
- Required fire protection systems shall be extended, altered, or augmented when a building is added onto.
- 901.4.2 - Non-required systems are allowed
  - Partial coverage is permitted, but installed equipment must comply with appropriate standard
- 901.5 - Fire code official is responsible for inspection and acceptance of fire protection equipment and shall be notified 48 hours before test.

901 General

- 901.5.2 Shall be unlawful to occupy any portion of structure until required fire protection and detection have been inspected and approved by the FCO and the BCO.
- 901.6 Detection, alarm & extinguishing systems shall be maintained & operated at all times. They must also be repaired or replaced when defective.

901 General

- 901.6.2 Records of all system tests shall be kept for 3 years. Acceptance test for life of system.
- 901.6.3 Annual shall be attached near main control valve
  - Name of individual and SFM certification number
  - Date of test
  - Results of test
  - Deficiencies or impairments noted (yes or no)
  - When sprinkler or standpipe is O.O.S. an impairment tag shall be placed

901 General

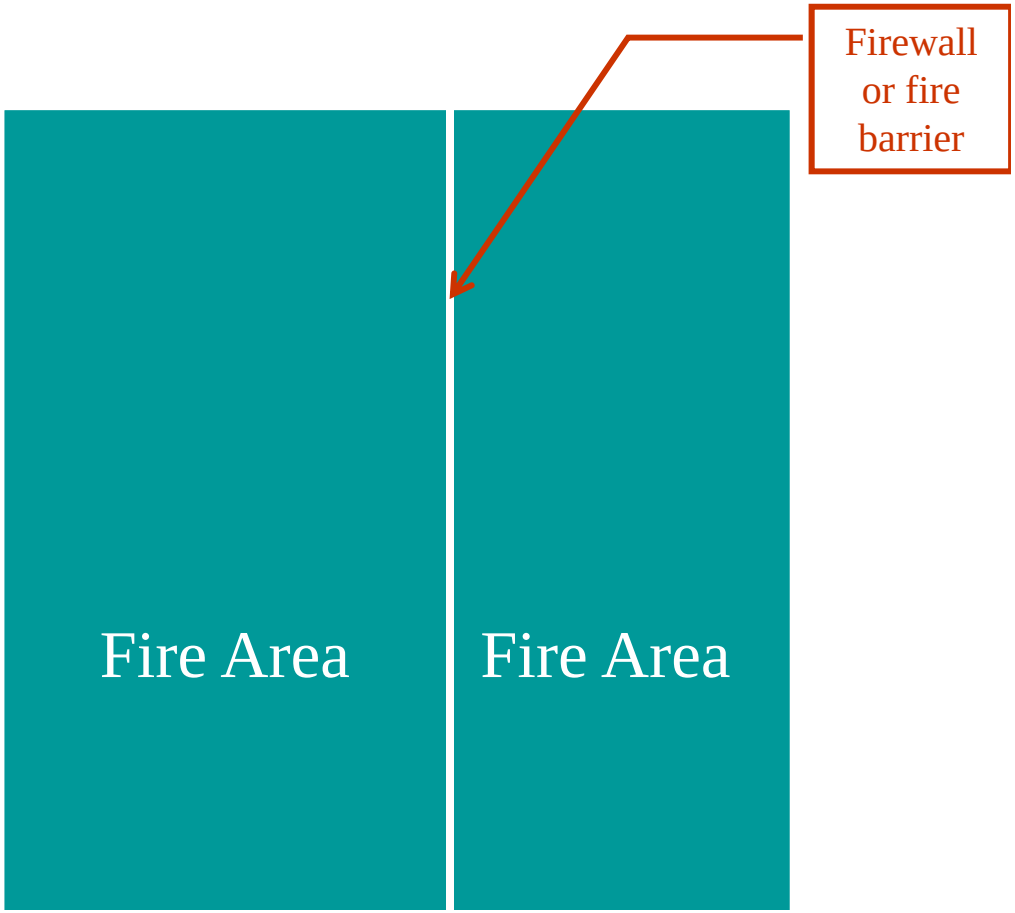
- 901.7 - Systems out of service
  - Fire department and the code official to be notified.
  - Fire watch personnel or building evacuation can be required.
  - Where fire watch personnel are used they shall have one approved means to contact FD
    - There only duty shall be to keep constant patrol of premise and watch for fires
  - Tag shall be placed stating portion of system out of service
    - At each FDC, control valve, fire alarm control unit, annunciator, etc. and where approved by code official

903 Automatic Sprinkler Systems

- Systems design standards vary depending on occupancy classification
  - NFPA 13
  - NFPA 13D
  - NFPA 13R
  - Special hazard regulations, such as NFPA 30
- 903.2 Approved systems to be provided in accordance with building code (with exceptions)

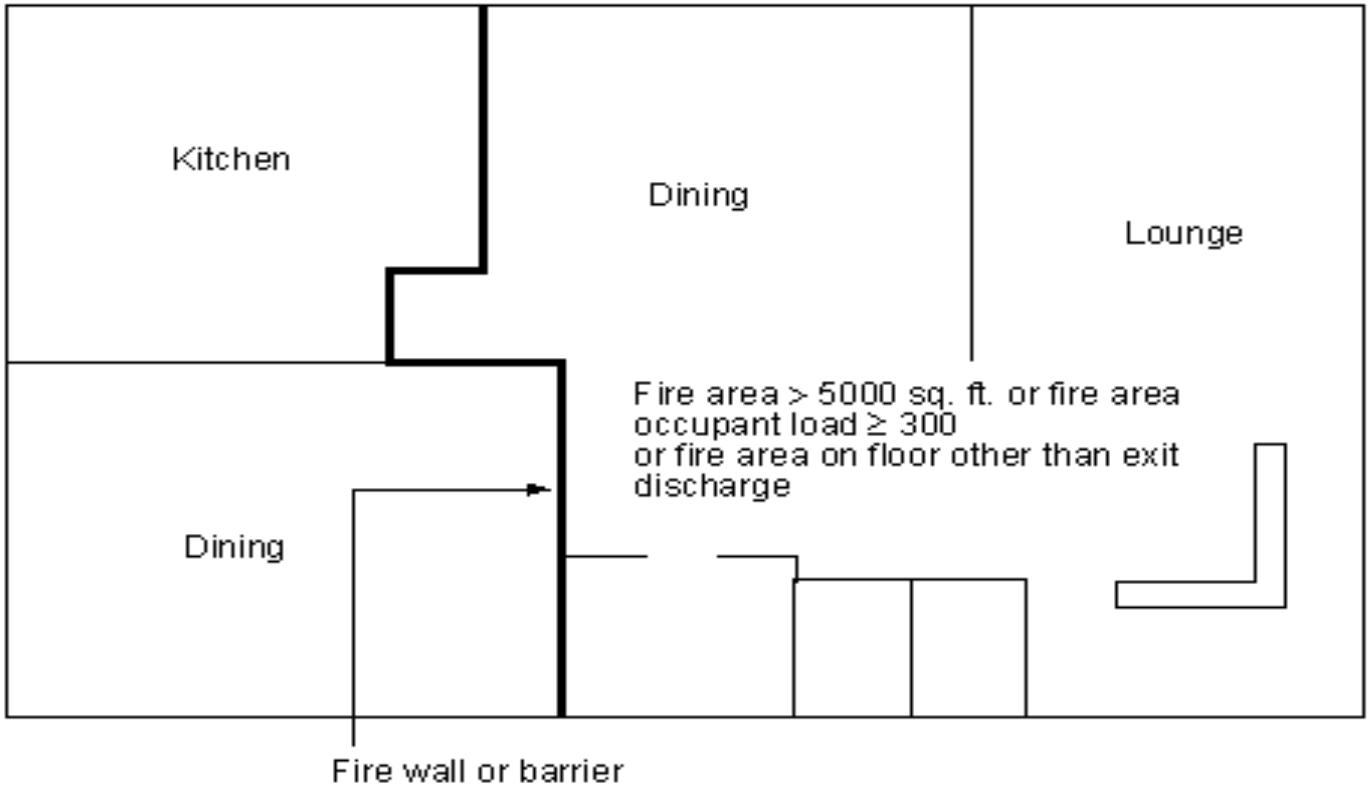
Group A 903.2.1.1, 903.2.1.3, 903.2.1.4

- Sprinklers required throughout the floor where the occupancy is located and on all floors below down to the level of exit discharge
  - Fire area greater than 12,000 sq. ft.
  - Fire area occupant load of 300 or more.
  - Fire area on a floor other than the level of exit discharge.
  - Fire area contains a multi-theater complex
- Exception for worship areas with fixed seating



903.2.1.2 A-2

A-2 Occupancies

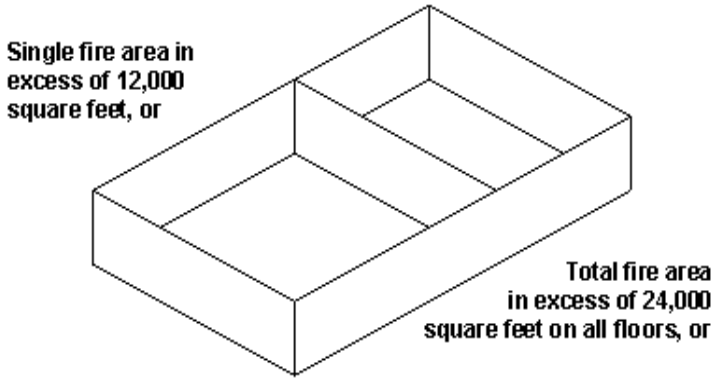


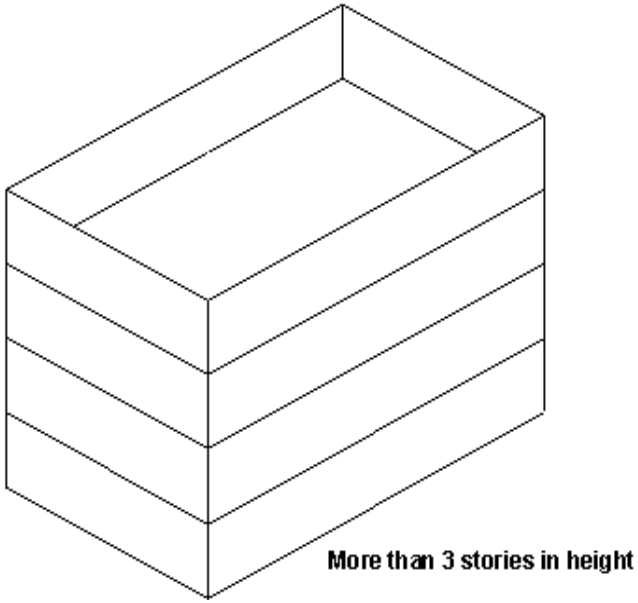
903.2.3 Group E

- Group E Occupancies
  - Fire area >20,000 square feet.
  - Every portion below the lowest level of exit discharge.
  - Exception for buildings with every classroom having at least one exterior exit door at ground level.

903.2.4 F-1, 903.2.7 M, 903.2.9 S-1

- **A single fire area exceeds 12,000 sq. ft.**
- **A single fire area is located more than three stories above grade.**
- **Total of all F-1/M/S-1 fire areas exceeds 24,000 sq. ft.**





903.2.4 F-1, 903.2.7 M, 903.2.9 S-1

- **Also when the following exists:**
  - **Woodworking uses > 2,500 sq.ft.**
  - **Storage of tires > 20,000 cu.ft.**
  - **Repair garages in a basement level.**
  - **Repair garages > 10,000 sq.ft. in buildings > one story height.**
  - **Repair garages > 12,000 sq.ft. in single story buildings.**

903.2.5 Group H, 903.2.6 Group I

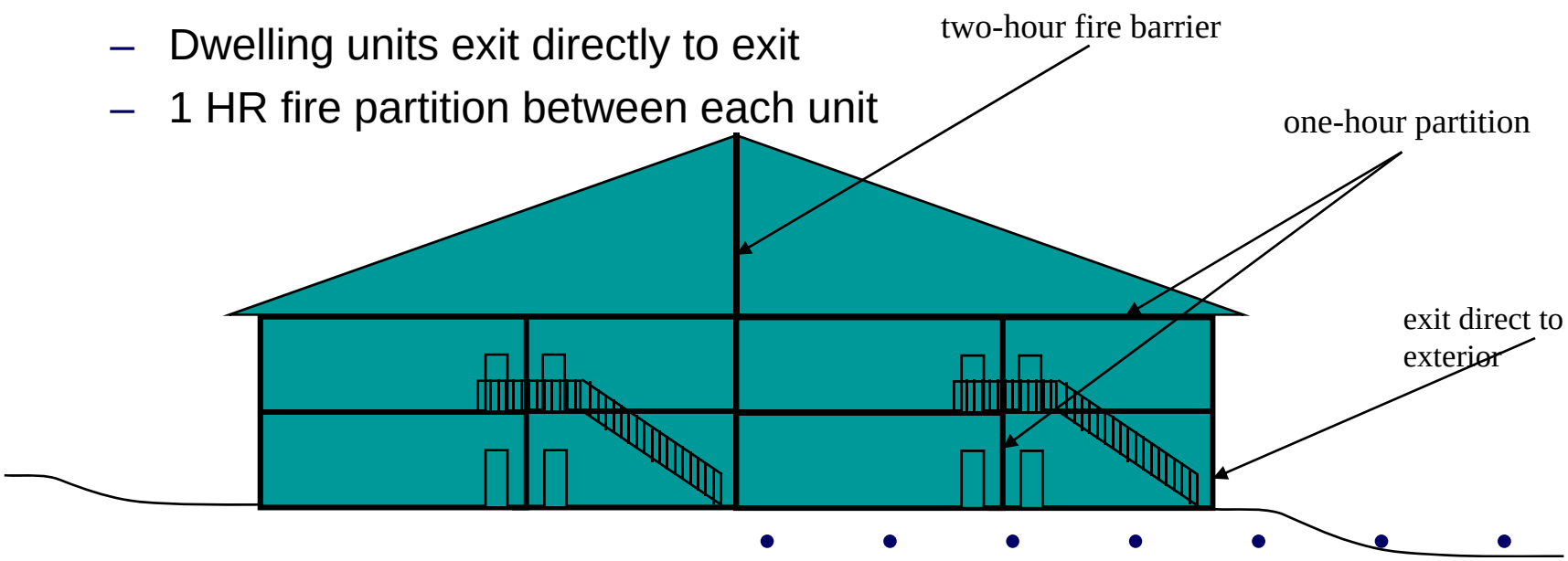
- Group H Occupancies
  - Throughout the occupancy.
- Group I Occupancies
  - Throughout the entire building containing a Group I fire area.

903.2.8 Group R

- Throughout all buildings with a Group R fire area
  - Not applicable to one-, two- and three-family dwellings and townhouses under Ohio Residential Code
  - Note the requirement in 903.3.1.2.1 to sprinkler balconies of NFPA 13R protected buildings, which exceeds NFPA 13R.

903.2.8 Group R

- Group R-2
  - Compartmentalized by 2 HR fire barriers
    - Max of 2 units per floor
    - Max of 6 units per compartment
  - Building must be capable of a single exit
    - Max 50’ travel distance
    - Max 2 stories
  - Dwelling units exit directly to exit
  - 1 HR fire partition between each unit



903.2.10 Group S-2

- Storage Class 2
  - Commercial truck and bus garage fire areas exceeding 5,000 sq. ft.
  - Enclosed parking garage buildings.
  - Enclosed parking garage areas located. beneath other use groups
    - Exception for garages beneath R-3.

Additional Sprinkler Requirements

- **903.2.11** - Basements and stories greater than 1,500 sq. ft. in area that don't have adequate openings to the outside.
- Rubbish and linen chutes
- Special hazards
  - See **Table 903.2.11.6** for special uses requiring sprinkler systems, such as
    - Spray finishing.
    - Special Amusement Buildings
- Retroactive requirements to sprinkler existing buildings storing pyroxylin plastics.

903.3.1.1.1 Automatic Sprinkler Systems

- Exempt locations when fire detection is installed
  - **Water creates a serious life or fire hazard.**
  - **Nature of room contents.**
  - **Generator and transformer rooms with 2-hour enclosure.**
  - **Rooms of noncombustible construction with wholly noncombustible contents.**
  - **Not merely because of dampness, enclosure in fire-rated construction or contains electrical equipment.**
  - **Still considered fully sprinklered for any sprinkler allowances**

903.3.1.2.1 Balconies and Decks

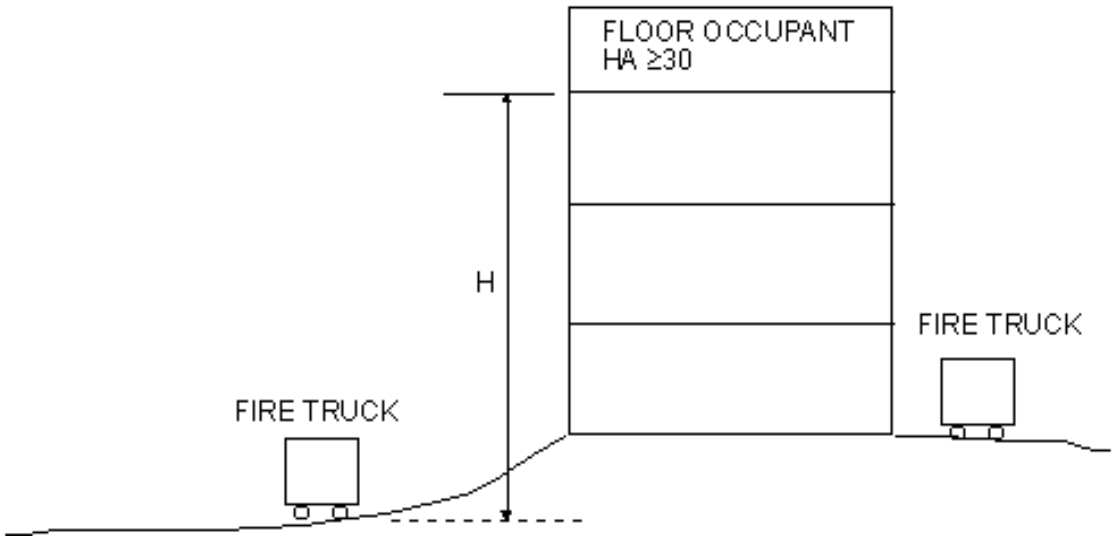
- Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units of Type 5 construction.
  - **Sidewall sprinklers deflectors 1” to 6” below structural members and a maximum of 14 inches below the deck of open wood joist construction.**

Additional Sprinkler Requirements

- **903.3.3** Not less than 3 feet clearance maintained from automatic sprinklers and tops of piles of combustible fibers
- **903.3.5** Potable water supply to be protected against backflow in accordance with plumbing code
- **903.3.5.1** Limited area systems may be tied to domestic systems if fewer than 20 sprinklers
  - Domestic shall be capable of supplying demand of both. Residential demand shall be added to sprinkler calcs

903.2.11.3 Buildings over 55 feet in Height

- Sprinklers required throughout most buildings having a floor with an occupant load of 30 or more located 55 feet or more above the lowest level of fire department vehicle access.



Exceptions:

1. Airport Control Towers
2. Open Parking Structures
3. Occupancies in Group F-2

903.3.7 Fire Department Connections

- Location shall be approved by fire code official
- Locking caps shall be provided where required by the fire department as long as criteria is met
- More specific and additional fire department connection rules are also located in OFC 912

F.D.C. Inspections

- **CAPS**
- **SWIVEL**
- **THREADS**
- **CONNECTION IS VISIBLE AND ACCESSIBLE**
- **CLAPPER VALVE**
- **IDENTIFICATION**

STORZ-LOK

FDC Threads

FDC ?????

903.4 Sprinkler system monitoring and alarms

- All valves controlling water supply shall be electrically supervised (with exceptions)
  - One and two family dwellings
  - Limited area systems with fewer than 20 heads
  - Where supply both domestic and fire and no shutoff on fire side
  - Sealed and locked jockey pump valves
  - Control valves to kitchen, paint booth or dip tanks that are sealed or locked in open position
  - Fuel supply valves which are sealed or locked on fire pumps
  - Trim valves

903.4.1 Monitoring

- Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an approved supervisory station or proprietary supervising station as outlined in NFPA 72
- Or a constantly attended location as approved by the fire code official prior to installation.
- Alarm devices shall be provided on exterior of building that shall activate with flow of one head, when building alarm is provided it shall also activate

Sprinkler Review

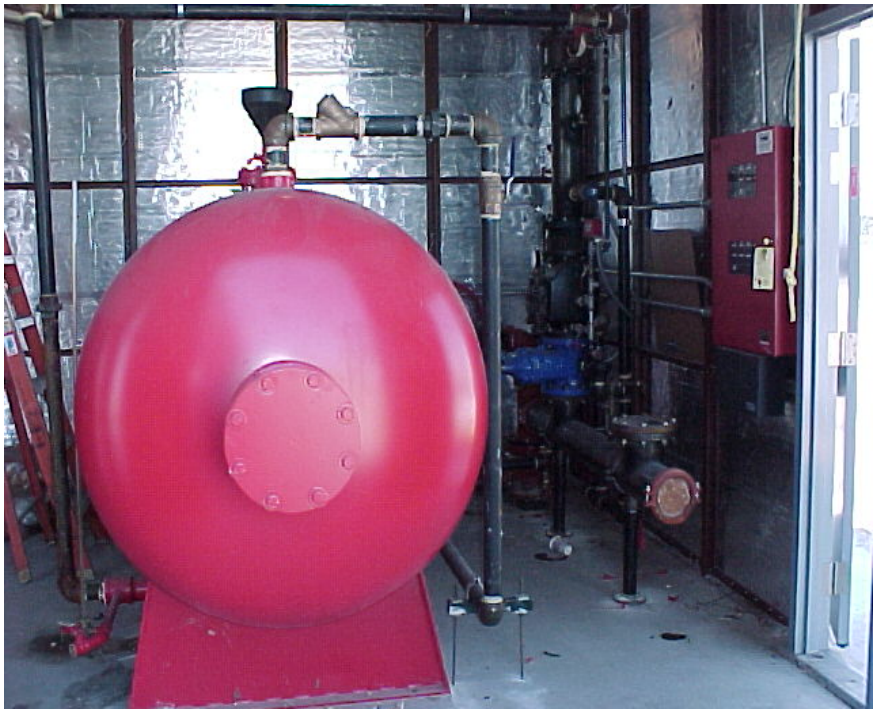
- A 4,500 square feet restaurant is to be built that will encompass a first floor structure, with ½ the restaurant located below grade level. Is an automatic fire sprinkler system required?
- A building owner has installed an indicating shut-off valve between the domestic water riser and the sprinklers for a limited-area fire sprinkler system. Is this permissible?

Sprinkler Review Answers

- Yes – 903.2.1.2, A-2 Use Group (c) Fire area is located on a floor other than a level of exit discharge.
- Yes – 903.3.5.1.1 Limited area sprinkler systems (1) Valves, exceptions

904 Alternative Systems

- Wet chemical (17A)
- Dry chemical (17)
- Foam 11, 11A and 16)
- Clean agent (2001)
- Carbon dioxide (12)



904.2.1 Hood System Suppression

- Automatic fire extinguishing system in Type I hoods
- Systems shall have automatic and manual activation
- Predischarge warning alarms for occupants
- Shall be acceptance tested and inspected
- Alarm testing for all devices and connection points

904.5 Wet Chemical

- Wet chemical systems installed, maintained and inspected in accordance with NFPA 17A month intervals
  - Cartridges to be weighed
  - Fixed temperature element (fusible link) maintained in accordance with manufacturer's recommendations

904.6 Dry Chemical

- Dry chemical systems installed, maintained and inspected in accordance with NFPA 17
- 6 month intervals
  - Cartridges to be weighed
  - Fixed temperature element (fusible link) maintained in accordance with manufacturer's recommendations

904.11 Commercial Cooking Systems

- Pre-engineered wet and dry systems must meet UL 300 standard
- Manual operation must be near means of egress from cooking area; min. 10 feet and max. 20 feet from kitchen exhaust system
- Interconnection: Actuation of extinguishing system shall automatically shut down fuel and electrical power supply to the exhaust system. Exhaust must remain running

904.11.1 Extinguishers for Commercial Cooking Equipment

- Must be within 30 feet of commercial cooking equipment
- K-Class extinguisher required for equipment using solid fuels, vegetable oils, animal fats, or animal oils
- K-Class for deep fat fryers

904.11.6 Operations & Maintenance

- Existing automatic extinguishing equipment – if changing in cooking medium, cooking equipment positions, or replacing existing cooking equipment
  - Must comply with applicable provisions
  - Service at 6 month intervals and if system has been activated
  - Replace fusible links/sprinkler heads annually

905 Standpipe Systems

- Requirements based on NFPA 14.
- Standpipe systems mainly for fire department use.
  - Sections 905.3.4 & 905.5.1 - Fire hose connected to standpipe system for occupant use required only in Group A containing stage areas.
- Retroactive requirement in Section 905.11 mandates standpipe installation in existing buildings having occupied floors more than 50 feet above or below with lowest level of fire department access.

905 Standpipe Systems

- Classes of Standpipe Systems
  - Class I- 2.5 inch hose connection for FD and individuals trained in large hose streams
  - Class II- 1.5 inch hose station to supply water primarily for building occupants and FD initial response
  - Class III- 1.5 and 2.5 inch connections

905 Standpipe Systems

- Types of Standpipe Systems
  - **Automatic Dry**- filled with air use dry type valve
  - **Automatic Wet**- auto supply capable of full demand
  - **Manual dry**- no permanent water supply, must hook up to
  - **Manual Wet**- water supply to keep pipe wet but not capable of demand
  - **Semi-automatic dry**- used through a device that allows water into the system upon activation of a remote device

905 Standpipe Inspections

Prob

Review Questions – Extinguishing and Standpipe Systems

- Wet & Dry Chemical extinguishing systems shall be inspected & tested at what intervals – 6 or 12 months?
- For a carbon-dioxide extinguishing system activation, the ventilation system for commercial cooking equipment shall remain operational – True or False?
- In buildings where more than 1 standpipe system is provided, the standpipes are required to be interconnected – True or False?

Answers to Extinguishing/Standpipe Questions

- Inspected and serviced every 6 months (see 904.5 or 904.6)
- Ventilation system must be shut down (904.11.3.1)
- Must be interconnected (see 905.4.2)

906 Portable Fire Extinguishers

- Required in most occupancies
- Extinguisher installed and maintained as per NFPA 10.
- Tables 906.1, 906.3(1) and 906.3(2) apply.
- Cabinets can not be locked with some exceptions.
- Specific heights required.

906.4 Cooking Grease Fires

- Shall be of approved type and compatible with extinguishing system agent
- Shall be within 30 feet of cooking equipment per 904.11.5

Other Extinguisher Requirements

- **906.5** Conspicuous location and unobstructed
- Not obstructed from view, if so shall be provided with other means to indicate location
- If weight does not exceed **40 lbs. 5 feet to handle**
- If exceeds **40 lbs. 42 inches to handle**
- Clearance between bottom and floor **shall be a minimum of 4 inches**

Letters Required?

907 Fire Alarm and Detection Systems

- Required based on occupancy classification
- Manual or automatic
- Full alarm notification not always required
- Level of exit discharge very important in applying code provisions governing required installations for some occupancy classes.
- Automatic fire extinguishing systems must be tied together if fire alarm is required

907 Fire Alarm and Detection Systems

- Installed in compliance with Fire Code and NFPA 72
- Maintained and tested regularly.
- Systems and components listed and approved.
- Automatic fire detectors must be smoke detectors
  - Exception: Areas such as boiler rooms.
- Heat detectors not required in sprinklered buildings.

Protection Maintenance

907.2.1 Group A

- Occupant load of 300 or more requires a manual system. If sprinklers are provided, manual boxes may be omitted.
- Occupant load of 1000 or more requires pre-recorded message. Emergency power source with approved emergency power.

907.2.2 Group B and 907.2.7 Group M

- Manual system in buildings where:
  - Occupant load of 500 or more.
  - More than 100 persons above or below the lowest level of exit discharge.
- If sprinklers are provided, manual boxes may be omitted.
- In Group M automatic activation may be manual during times building is occupied to activate alarm signals.

907.2.3 Group E

- Manual system required when occupant load is 50 or more.
- Where sprinklers or smoke detectors are provided, they must connect to the system.
- Manual boxes may be omitted when all of the following are provided
  - Corridors have smoke detection.
  - Assembly, shop and laboratory areas have heat detection (or sprinklers).
  - Off-premise monitoring
  - A central point for activating evacuation signal and two-way communication systems is provided.

Other Groups

Group F

- Manual system required where:
  - Total height is 2 or more stories <u>and</u> the occupant load is 500 or more above or below the lowest level of exit discharge.
- If sprinklers are provided, manual boxes may be omitted.

Group H

- Manual system required in H-5.
- Smoke detection systems required for some hazardous materials.

Group I

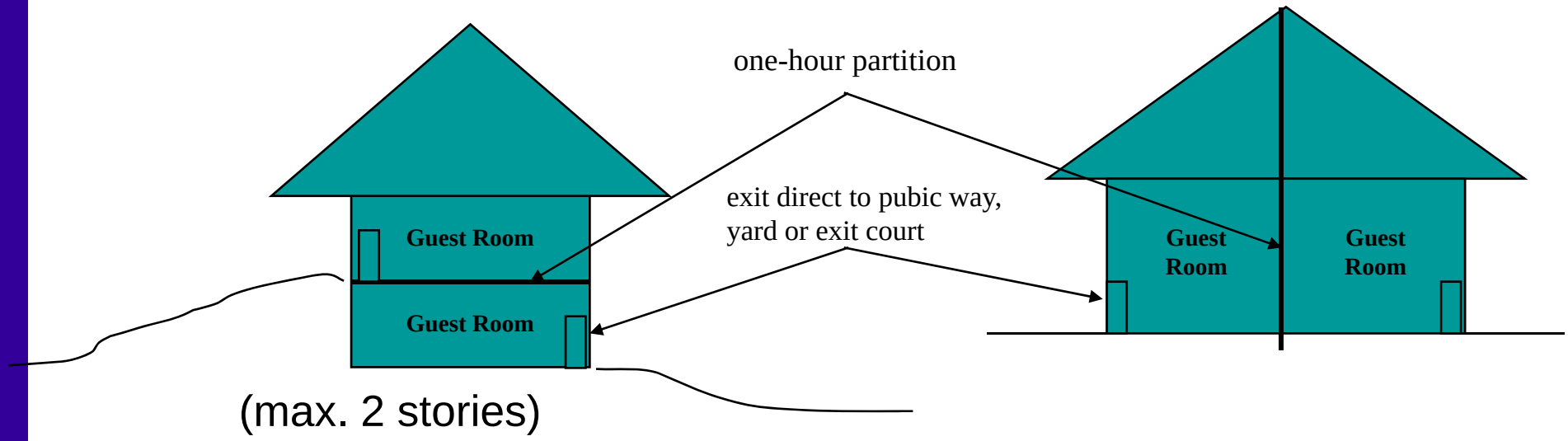
- Manual and automatic system required, with smoke detectors provided in specified areas (typically corridors).
  - Manual boxes may be omitted in some cases.

907.2.8 Group R-1

Manual system required

Exceptions:

1. Not more than two stories in height and all spaces separated by 1 hour fire partition and each sleeping area has own exit.



(max. 2 stories)

2. Manual boxes not required in sprinklered buildings when notification appliances are activated by water.

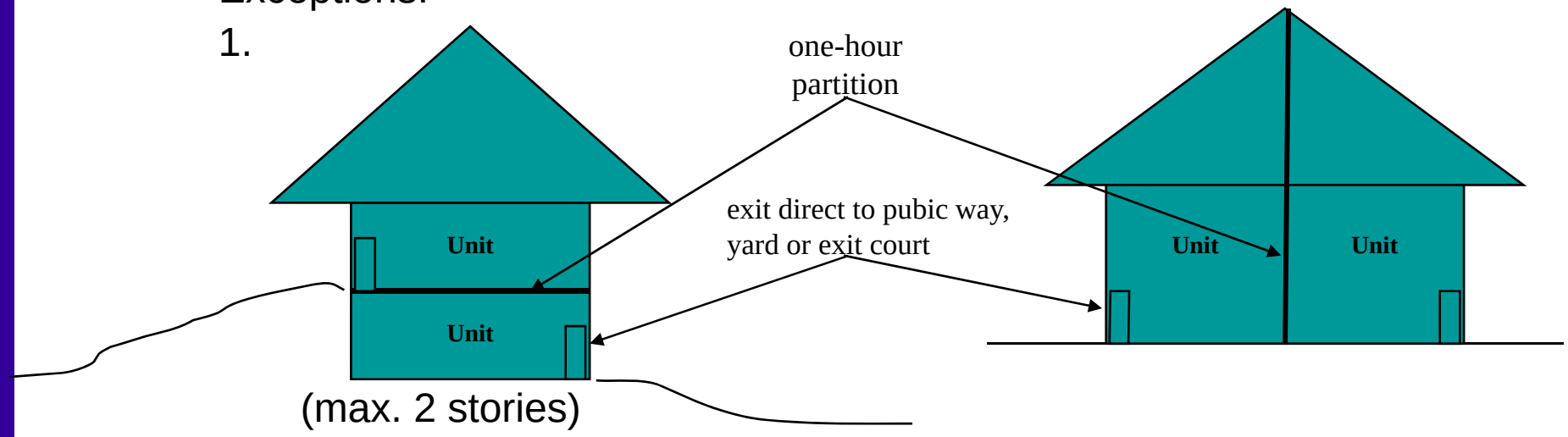
907.2.9 Group R-2

Manual system required when

- Any unit is located 3 or more stories above exit discharge.
- Any unit is located more than 1 story below exit discharge.
- Total number of units exceeds 16.

Exceptions:

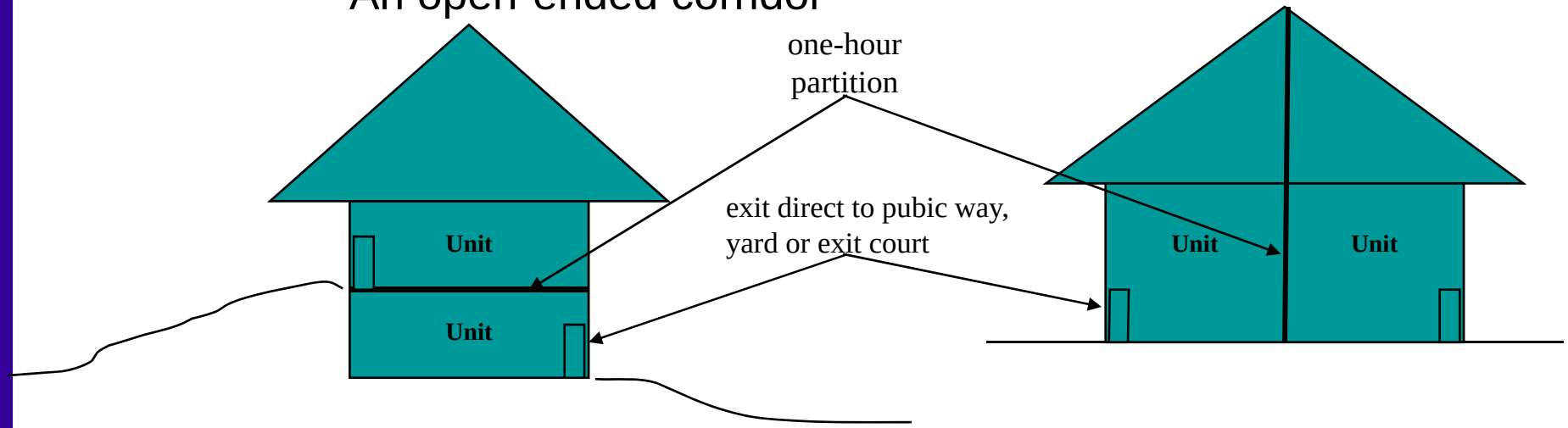
1.



2. Manual boxes not required in sprinklered buildings when notification appliances are activated by water flow.

907.2.9 Group R-2

3. Manual fire alarm system is not required in sprinklered buildings not having interior corridors where each dwelling unit either has a means of egress door opening directly to
   - An exterior exit access leading directly to exits
   - An open-ended corridor



907.2.10 Group R-4

- Manual alarm system is required.
- Exceptions
  - Buildings less than 2 stories where sleeping units, attics, and crawl spaces have 1 hour separation. Each sleeping space has to exit to a public way
  - Fully sprinklered
  - If manual pull stations are located at ALL nurses stations or control points

907.2.11 Single and Multiple-Station Smoke Alarms

- Shall be installed per the OFC & NFPA 72
  - In use groups R-1, R-2, R-3, R-4, and I-1
  - Must be interconnected in R-1 through R-4 Use Groups
  - In new construction must have a power source: either battery backup or emergency electrical

907 Special Uses and Conditions

- **907.2.12** Amusement buildings
  - On activation egress lights to come on
  - Any conflicting or confusing sounds to stop
  - Activate directional exit markings
  - There are other requirements
- **907.2.13** High-rise buildings (with exceptions)
- **907.2.14** Buildings with atriums over 2-stories in height

907 Special Uses and Conditions

- **907.2.14** Some high-piled storage buildings
- **907.4.2** Buildings having delayed egress locks
- **907.2.16** Aerosol storage areas
- **907.2.17** Lumber,wood structural panel and veneer mills
- **907.2.18** Underground buildings

Other Fire Alarm System Requirements

- 907.5 Initiating Devices
- 907.6 Occupant Notification Systems
- 907.6.2 Alarm Notification Appliances
- 907.6.2.2 Emergency Voice/Alarm Communications System

907.5.2 Manual Fire Alarm Boxes

- Located not more than 5 feet from entrance to each exit
- Travel distance not to exceed 200 feet
- Height is 42” to 48”
- Red in color
- Sign posted at manual station “When Alarm Sounds-Call Fire Department” if not monitored
- Code Official may require protective covers to prevent malicious false alarms

907.8 Acceptance Tests and Completion

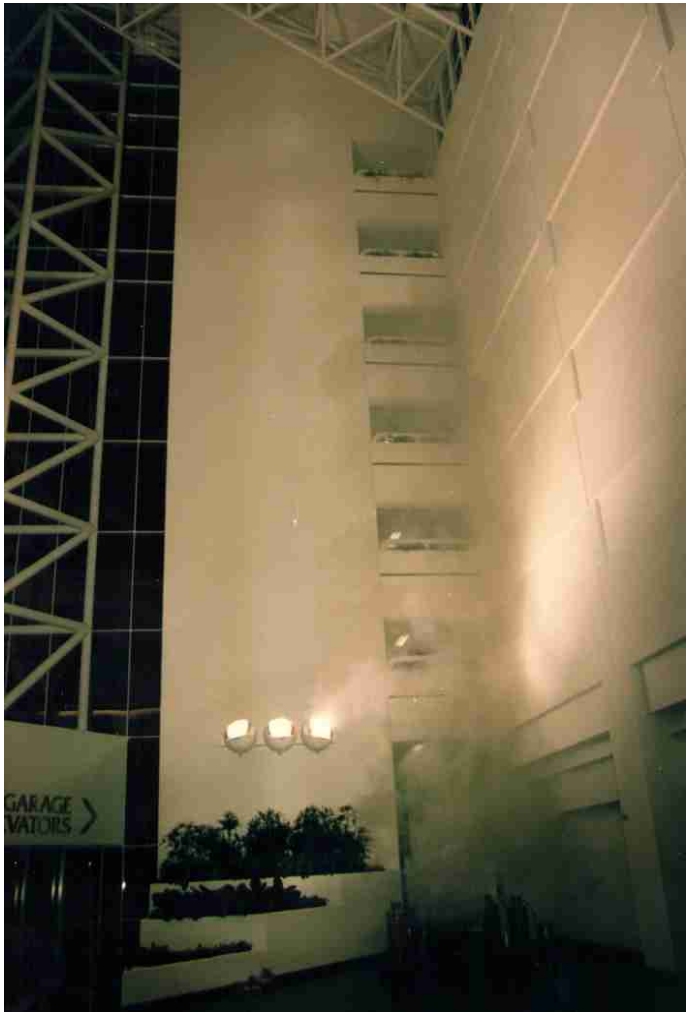
- Fire alarm system tested per NFPA 72
- When required by the FCO
  - Acceptance testing then to be completed in the presence of the FCO

Inspection/Testing/Maintenance

- 907.9.1 Maintenance IS required
- 907.9.5 Maintenance, inspection, and testing
  - The building owner is responsible for maintaining the fire and life safety systems at all times
  - Service personnel – must beet certification requirements of the OFC

909 Smoke Control Systems

- Two primary objectives for smoke control systems are:
  - Preventing migration of smoke
  - Minimizing smoke layer
- Section 909 based on need for smoke control when atrium-like condition exists.
- 20 minute run time



910 Smoke and Heat Venting

- One story F-1/S-1 having more than 50,000 sq. ft. in undivided area.
- High-piled storage buildings.
- Not less than 4 feet x 4 feet.
- Manual capability required.

912 Fire Department Connections

- Location of FDC as not to obstruct FD apparatus access to the building
- FDC location on a building is per the local FCO – must submit request to building department
- Shall be located on street side of the building
- On existing buildings, if not visible, can require a sign posted for the location
- FDC must be maintained for access

913 Fire Pumps

- Installed per NFPA 20
- Shall be protected against interruption of service
- Pump room to be 40 degrees or above
- All valves to be supervised, outlet valves (test header) in closed position
- Acceptance test in accordance with NFPA 20
- Shall be maintained in accordance with NFPA 25

915 Certification

- **915.2** Fire protection business *for profit*, requires certification.
- **915.11** Individuals must carry SFM certification in their person while working in the job site – be able to produce on request of FCO
- **915.12** A certified individual can only supervise <u>one</u> provisional individual. ORC-3737.65 (C) (2)
- There are currently 10 different categories for SFM certification in fire protection equipment

CHRISTOPHER BURKE SMITH
5062 ST RT 132
BATAVIA, OH 45103

NOTE: IF YOU MOVE, SEND THE CHANGE OF ADDRESS WITHIN 30 DAYS OF CHANGE TO:

BUREAU OF LICENSING AND CERTIFICATION
P.O. BOX 529
REYNOLDSBURG, OHIO 43068

LICENSE RENEWAL APPLICATIONS AND OTHER INFORMATION ARE MAILED TO THE ADDRESS PROVIDED BY THE LICENSEE.

Sample

STATE OF OHIO
DEPARTMENT OF COMMERCE
DIVISION OF STATE FIRE MARSHAL

THIS IS TO CERTIFY THAT:

51 13 0005
CHRISTOPHER BURKE SMITH

Sample

PROVISIONAL
HAS MET THE REQUIREMENTS OF THE LAW, IS DULY REGISTERED AND IS ENTITLED TO PRACTICE IN THE STATE OF OHIO UNTIL THE EXPIRATION DATE OF 7/01/2001.

FOLD HERE

CERTIFICATION CATEGORIES FOR SERVICING, TESTING, REPAIRING OR INSTALLING

SPRINKLER/STANDPIPE

Signature: _____ Date: _____

THIS CARD SHALL BE ON YOUR PERSON WHILE PERFORMING THE ABOVE ACTIVITIES.

COM 5103 (Rev. 3/99)

Review Questions

1. Within how many feet of commercial cooking equipment should a portable fire extinguisher be?
2. Name the Occupancies where UNVENTED KEROSENE heaters are prohibited.
3. Cabinets containing fire fighting equipment should be identified in an approved manner, attached signs with letters not less than ___ inches high that contrasts with background color.

Review Answers

1. Within how many feet of commercial cooking equipment should a portable fire extinguisher be? **30 ft. (906.1(b))**
2. Name the Occupancies where UNVENTED KEROSENE heaters are prohibited. **A, E, I, R-1, R-2, R-3, and R-4 (603.4)**
3. Cabinets containing fire fighting equipment should be identified in an approved manner, attached signs with letters not less than ___ inches high that contrasts with background color. **2 inches (905.7.1)**

Review Questions II

- Manual fire alarm pull station boxes are required in all Educational Use Group Occupancies, with only a few exceptions. True or False?
- After a single-family house fire, you determine there are no working smoke detectors in the home. Can you issue a citation to require the installation of detectors?

Answers – Review Questions II

- False (see 907.2.3 Exception #2)
- Yes, you can require the installation of the detectors in a single family residence (in this instance) (see 101.2.2; 4603.7 & 4603.7.1)

1301:7-7-10 Rule 10

Means of Egress

General Requirements

- The OFC primarily focuses on maintaining means of egress in accordance with the original design.
- Fire inspectors need to be able to identify cases where the means of egress has been modified and no longer complies.

Basic Concepts of Egress

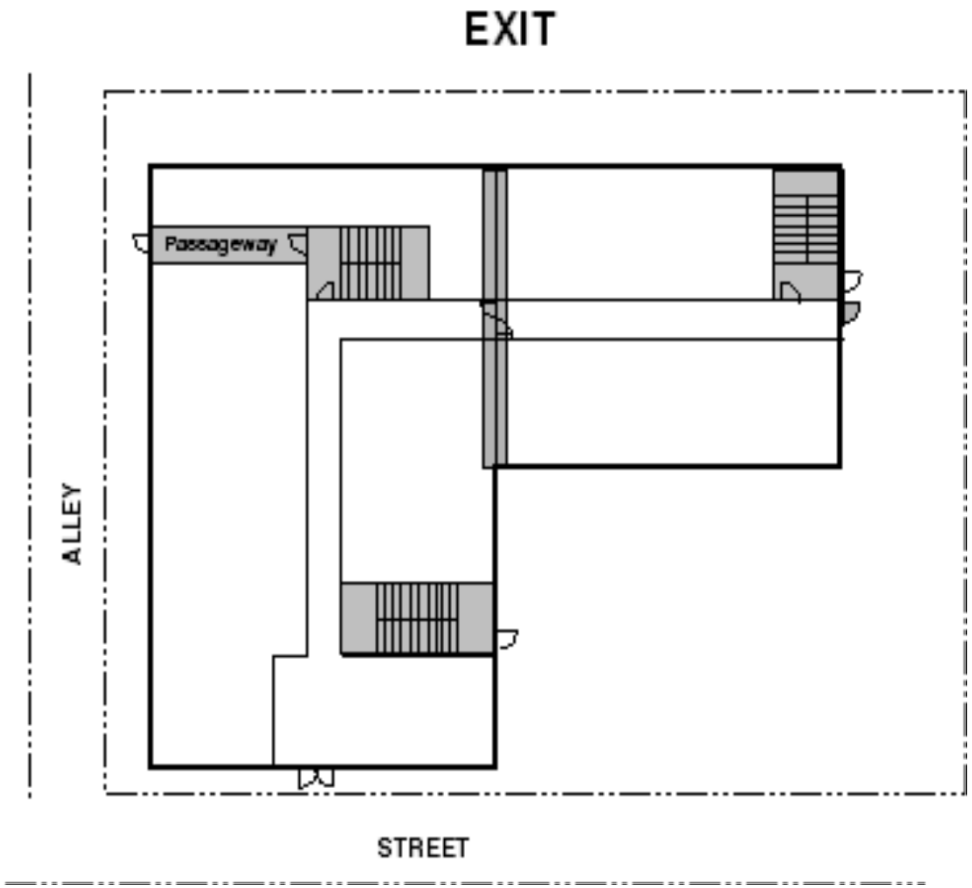
- Exits must be provided for all building occupants
- Occupants must have control of all elements of the exiting system
- Once minimum size and number have been established, they cannot be reduced
- Once minimum level or degree of fire safety has been established, it cannot be reduced
- The type & arrangement of exits depends on the floor plan.

Basic Concepts of Egress

- A means of egress has **three** components
  - **Exit access**
    - Portion of means of egress that leads from occupied portion of an exit
  - **Exit**
    - Portion on the means of egress separated from other interior spaces by fire-resistance rated construction or protected openings, providing protected path from exit access to the exit discharge
  - **Exit discharge**
    - The portion of the means of egress between the termination of an exit and a public way

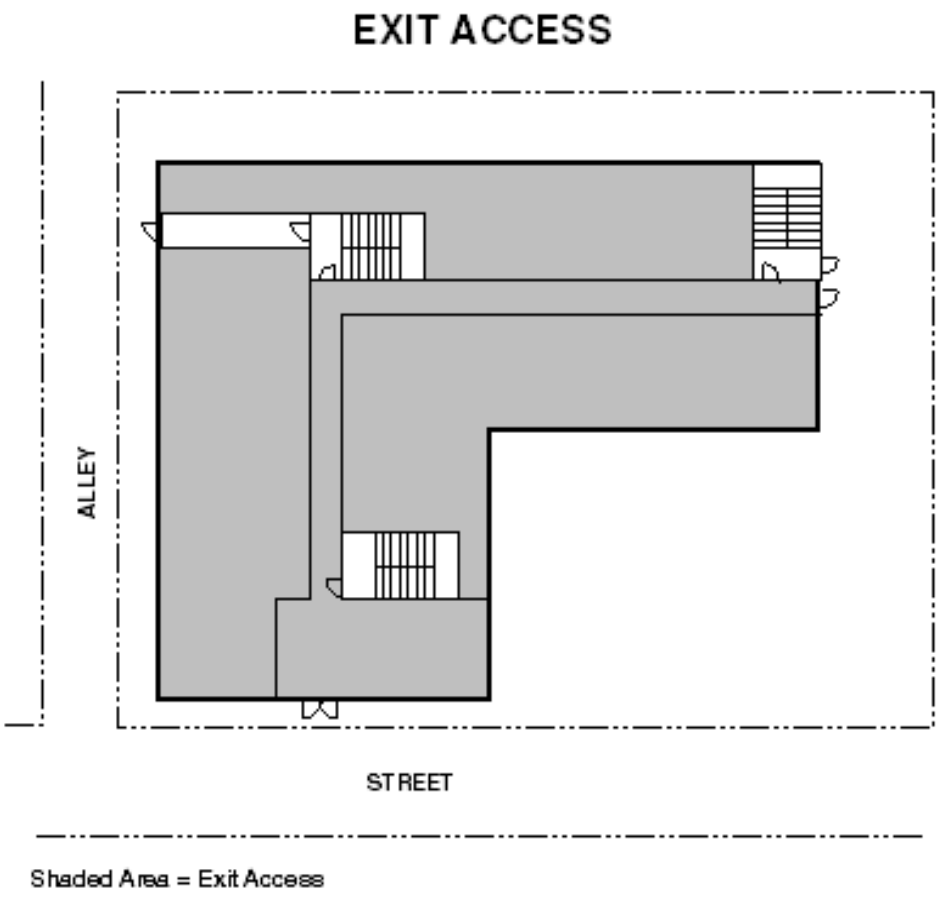
Basic Concepts of Egress

- Exit
  - Horizontal exit
  - Exterior door
  - Exit enclosure
  - Exterior exit stair
  - Exit passageway



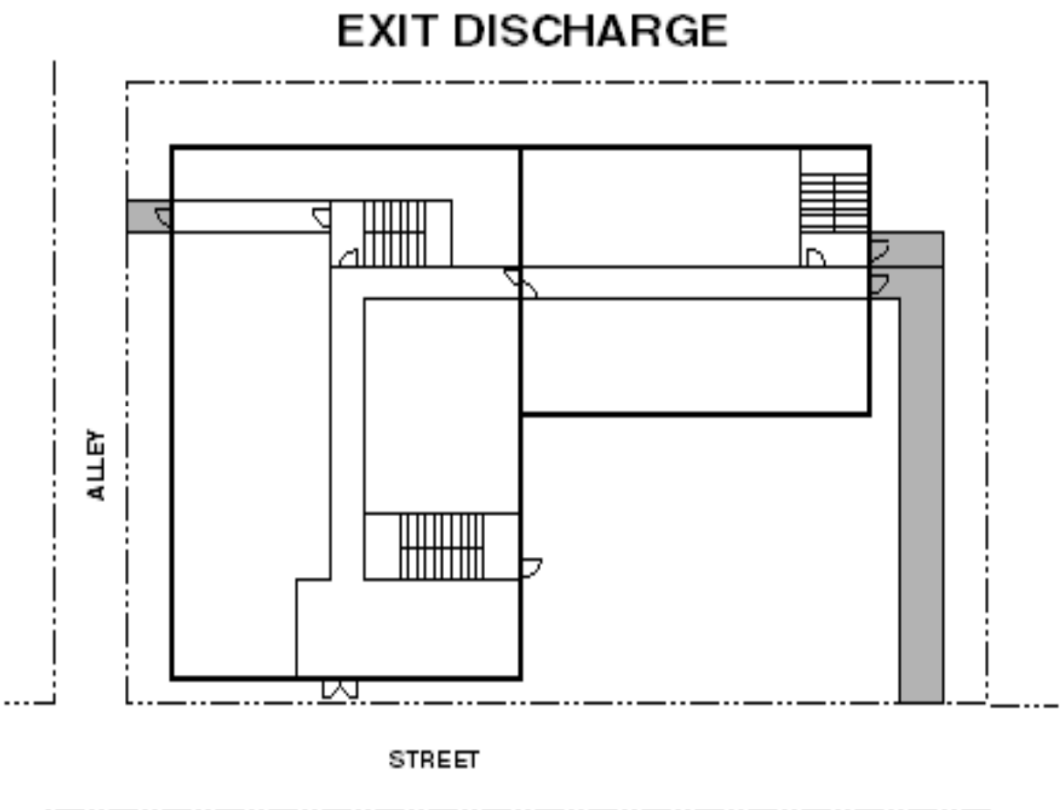
Basic Concepts of Egress

- Exit Access
  - Shaded area.
  - Travel distance is limite
  - May not be protected.



Basic Concepts of Egress

- Exit discharge
  - Links exit and public way
  - Travel distance is unlimited



Overview of 1001.1

- Buildings shall be provided with a means of egress
- Provisions of this rule control design, construction, and arrangement of the means of egress
- 1003 through 1029 apply to new construction

Overview of 1001.1 Cont.

- Any plan approval for the design, construction, etc. of a means of egress for new construction must be done in accordance with OFC 104.2.1
- This means that the process starts with and must also be done in accordance with OBC

1001.2 Minimum Requirements

- Shall be unlawful to alter a building in a manner that will reduce the number of exits or the capacity of the means of egress to less than required by this code

EFFECTIVE NOVEMBER 1ST, THESE
DOORS WILL BE CLOSED UNTIL
SPRING. PLEASE USE MAIN ENTRANCE
AT THE FRONT OF THE STORE.
21 11 2003

K YOU FOR SHOPPING
BIG K mart
EXIT
21 11 2003

21 11 2003

1003 General

- Ceiling height a minimum of 7 feet 6 inches (with exceptions)
- Headroom not less than 80 inches
- Door stops and wedges may not reduce below 78 inches
- Horizontal projections may not project more than 4 inches between 27 and 80 inches
- Floor surface to be slip resistant
- Elevation changes to comply with 1003.5
- Building elements or obstructions cannot reduce required width of the egress

1004 Occupant Load

- Actual number of occupants each room, space, floor or building is designed to have.
- Table 1004.1.1
- Occupant load may be increased, may never exceed one per 7 sq. ft.
- Every room or space that is an assembly occupancy shall have occupant load posted
- Occupancy sign posting shall be near the main exit or exit access doorway from the room or space

1005 Egress Width

- Total egress width shall not be less than what is allowed by 1005.1
- Doors opening into means of egress shall not reduce the width to more than half of required width during swing
- May not project more than 7 inches into width when fully open

1006 Means of Egress Illumination

- Means of egress including exit discharge to be illuminated at all time the building is occupied
- Minimum illumination of 1 foot candle at floor level
  - Theaters opera halls etc. may be .2 foot candle during performances but must activate fully upon fire alarm
  - Power shall be provided by building electrical system, in case of failure required components shall be illuminated
  - Emergency power system shall provide back-up power for means of egress illumination for no less than 90 minutes
  - See Rule 604 for records keeping for back-up power systems

Egress Items to Check

1007 Accessible Means of Egress

- Buildings with four or more stories above or below exit discharge shall have one elevator to meet requirements, shall comply with emergency operation
- All exit stairways shall be 48” min.
- Area of refuge accommodate one wheelchair 30”x48“
  - Area of refuge must have 2-way communication, signage, instructions on the area’s use

1008 Doors, Gates and Turnstiles

- Mirrors or others reflecting items shall not be on means of egress doors
- Curtains, drapes, decorations, or other materials shall not be on means of egress doors
- Minimum of 32” width and open 90 degrees
- Doors in I-2 shall be 41½” when used for movement of beds
- Egress doors shall be sided hinged swinging, unless occupants loads less than 10
- Doors to swing in direction of egress when occupant load of 50 or more, or an H use group

1008.1.4.1 Revolving Doors

- Revolving doors to collapse into bookfold position providing a minimum of 36”
- Shall not be located within 10 feet of foot or top of stairs
- Each revolving door to have a side-hinged door within 10 feet of the revolving door
- Shall not be given credit for more than 50% of required egress, no more than 50 person capacity
- Must collapse with a force of 130 lbs. when applied within 3” of outer edge of wing when in means of egress

1008.4.1.2 Power-Operated Doors

- If there is a power failure, power-operated doors must open and close manually
- The force to open the doors shall not be greater than 50 pounds of force

1008.1.4.3 Horizontal Doors

- Must be capable of manual operation in case of power failure
- Must fully open; specific force in pounds
- Must have an integrated standby power supply
- Minimum required opening time is within 10 seconds of operating the device

1008.1.4.4 Access-Controlled Egress Doors

- Entrance doors for A, B, E, I-2, M, R-1, or R-2, and entrance doors to tenant spaces in the same use groups
- Must meet ALL 6 criteria listed in the OFC
  - Special Note: Criteria 6 states that all entrance doors to A, B, E, or M occupancies shall NOT be secured from the EGRESS side while open to the public

1008.1.4.5 Security Grills

- Shall be openable from the inside without any special tools or knowledge in Groups B, F, M and S.
- When two or more egress means are required not more than half may be equipped with horizontal sliding or vertical security grilles.

1008.1.9 Door Operations

- Egress doors to be “readily openable” from the egress side without the use of a key or special knowledge or effort

1008.1.9.3 Locks and Latches

- In buildings of Group A having occupant load of 300 or less, Groups B, F, M and S and in churches the main egress doors may be equipped with key-operated devices from egress side.
  - Must be distinguishable as locked
  - Sign to be posted on door stating “THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED” in 1” letters
  - Fire official may revoke for just cause

1008.1.9.3 Locks and Latches

- Door pairs may have flush mount bolts provided the leaf having flush bolts have no hardware

Other Locking Issues

- 1008.1.9.4 Bolt Latches
  - Manually operated flush bolts or surface mounted bolts are prohibited
  - There are 6 exceptions to bolt latches
- 1008.1.9.5 Unlatching
  - Unlatching of any door OR leaf shall not require more than one operation
  - There are 4 exceptions

1008.1.9.6 Special Egress Locks for Group I-2

- Approved egress **controlled** or **delayed** egress locks are permitted for I-2 use group when clinical needs require suck locking/control
- 1008.1.9.6.1 Approved **controlled** egress locks in following locations
  - Where automatic sprinkler system is throughout
  - Or, automatic smoke or heat detection system is throughout
- Doors must meet 6 criteria

1008.1.9.6.2 Approved Delayed Egress Locks

- Permitted in Group I-2 where clinical needs require the locks
- Must meet same building fire protection requirement as 1008.1.9.6.1
- Doors must unlock according to 6 criteria
  - **Different from 1008.1.9.6.1**

1008.1.9.7 Delayed Egress Locks

- Can be used with any occupancy EXCEPT Groups A, E, and H
- Must meet the same building fire protection requirements as 1008.1.9.6.1
- Doors must unlock according to 6 criteria
  - **Different than 108.1.9.6.1**

1008.1.10 Panic Hardwar

- Is required for doors service H use group
- Required for A or E use group where occupant load is 50 or more; no latches or locks unless the hardware is panic hardware
  - 1 exception for A Use Group
- Required in electrical rooms with equipment rated at 1,200 amperes or more and wider than 6 feet

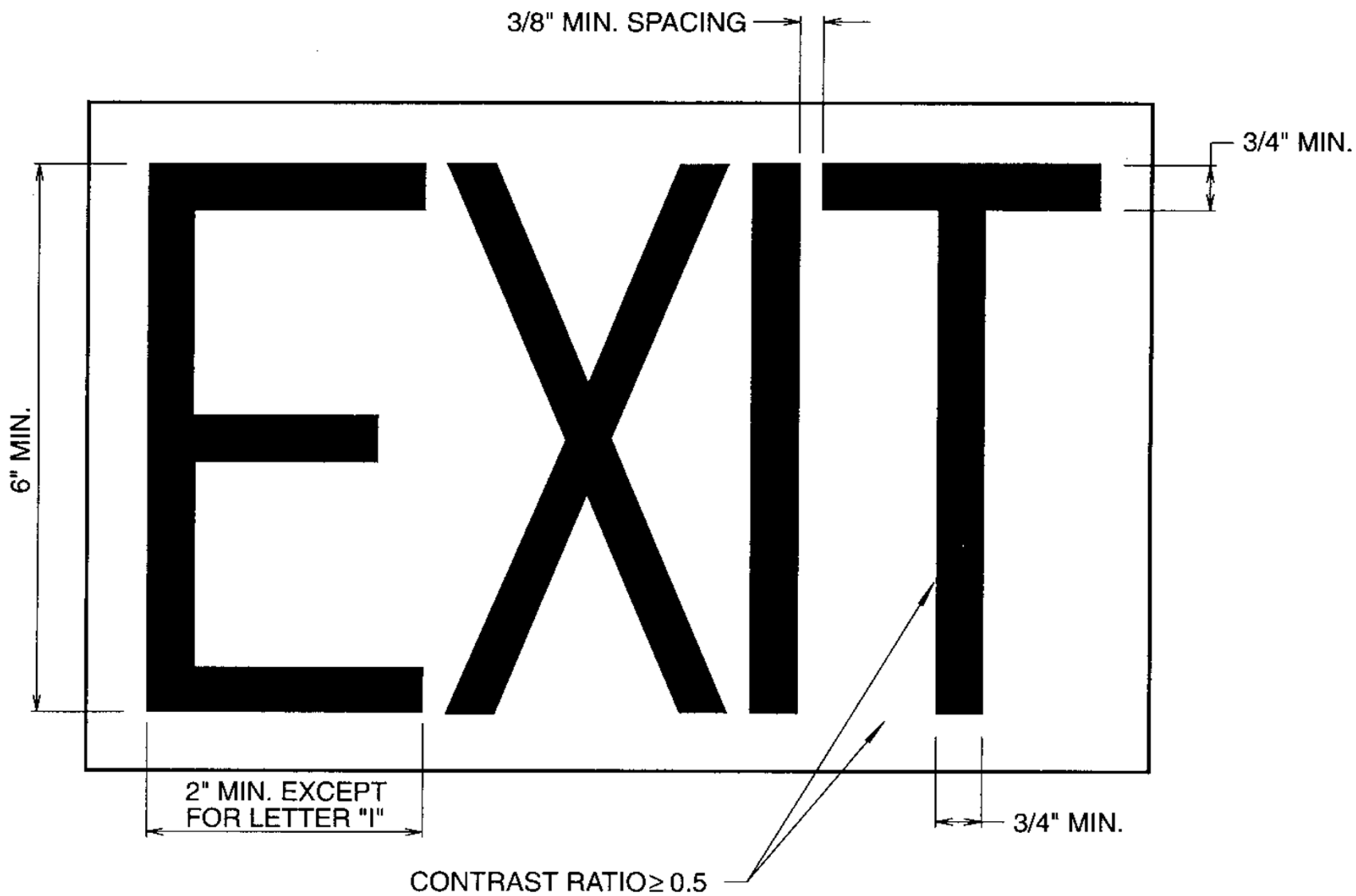
Electronic Egress Door

1009 Stairways

- Stairways serving an accessible means of egress shall have a minimum width of 44”
- Serving occupant load of 50 or less shall be a minimum of 36”
- Minimum headroom of 80”
- Riser height shall be 7” max. and 4” min.
- Treads to be 11” depth min.
- Landings shall not exceed 48” when in straight run
- Handrails 34” to 38” with 1.5” of clearance
  - Refer to section 1012

1011 Exit Signs

- Shall not be more than 100’ in a corridor from a exit sign
- Exit signs NOT REQUIRED in rooms or areas requiring one exit (1011.1)
- Main exterior doors when obviously identifiable as exits need not have exit signs where approved
- Exit signs to be illuminated either internally or externally
- Strokes to be 6” high ¾”strokes 2” wide and shall be in high contrast with background
- Shall stay illuminated for 90 minutes upon power failure



MINIMUM SIZES OF EXIT SIGNS

EXIT

1014 Exit Access

- Egress shall not pass through a kitchen, storage room, closets or other spaces used for similar purposes, nor through a room that can be locked to prevent egress

1015.1 Spaces with one Means of Egress

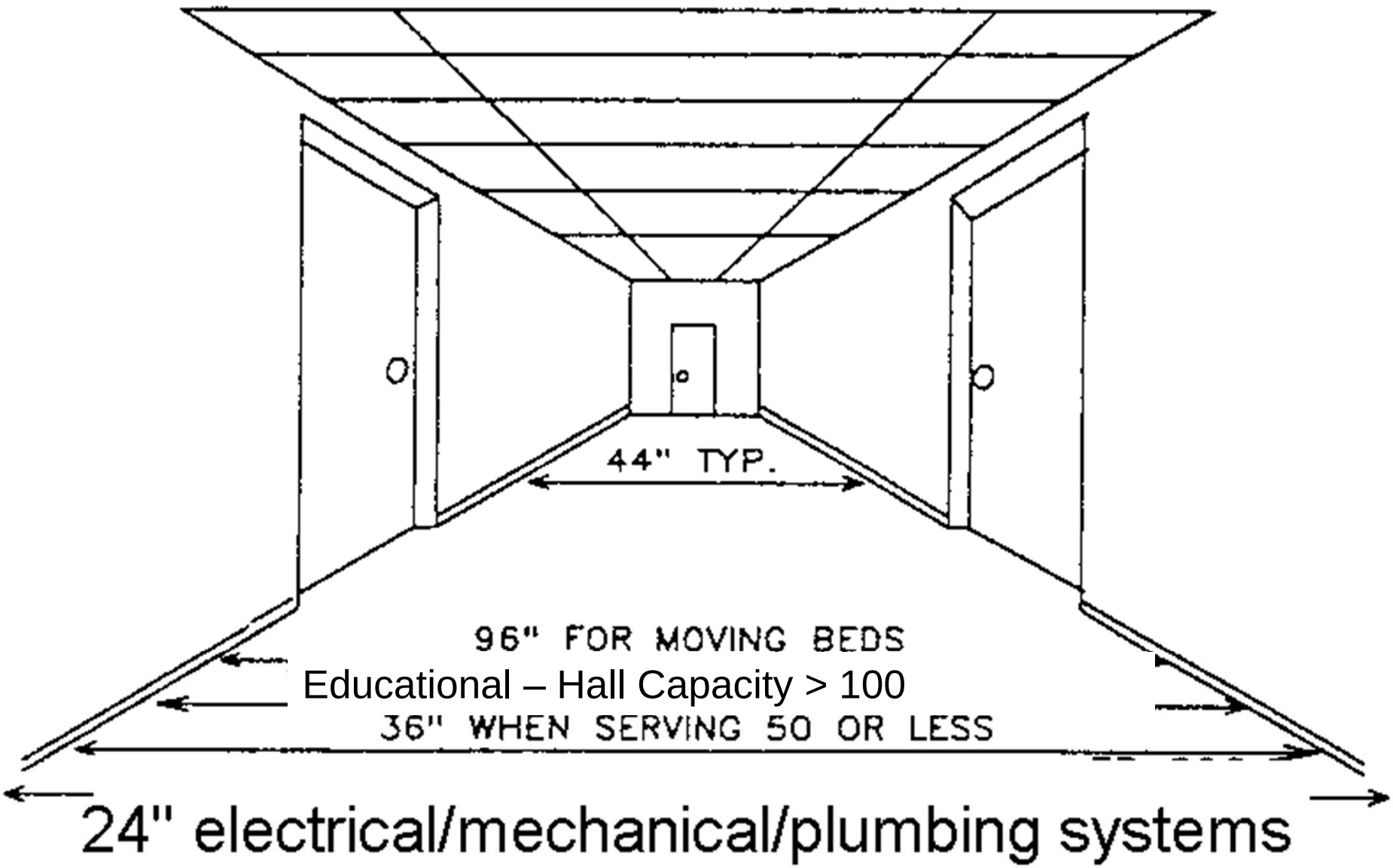
OCCUPANCY	Maximum Occupant Load
A, B, E, F, M,U	49
H-1, H-2, H-3	3
H-4, H-5, I-1, I-3, I-4, R	10
S	29

1016.1 Exit Access Travel Distance

Occupancy	W/O Sprinkler	With Sprinkler
A, E, F-1, M, R, S-1	200’	250’
I-1	NOT PERMITTED	250’
B	200	300
F-2, S-2, U	300	400
H-1	NOT PERMITTED	75
H-2	NOT PERMITTED	100’
H-3	NOT PERMITTED	150’
H-4	NOT PERMITTED	175’
H-5	NOT PERMITTED	200’
I-2, I-3, I-4	NOT PERMITTED	200’

1018 Corridors

- Corridor rating per Table 1018.1
- Corridor width 44” min. w/ exceptions (1018.2)
  - 24” for access to electrical, plumbing and mechanical
  - 36” for occupant load 50 or less
  - 36” within dwelling unit
  - 72” in Group E serving 100 or more
  - 72” in surgical units and other ambulatory patient areas
  - 96” in I-2 in areas for bed movement
- Dead ends shall not exceed 20’
  - Note the exceptions for the use group and sprinklered buildings



Educational – Hall Capacity > 100

1021 Number of Exits and Continuity

- A minimum of two means of egress required if:

  Common path limit is exceeded

  - 25 feet for H-1, H-2, H-3.
  - 100 feet for sprinklered B, F, S.
  - 75 feet for all others

Occupancy	Maximum Height Above Grade	Maximum Occupant Load
A, B, E, F, M, U	1	49/75’
H-2, H-3	1	3/25’
H-4 ,H-5, I, R	1	10/75’
S (parking garage)	1	29/100’
B, F, M, S	2	29/75’
R-2	2	4 dwelling units/50’

1024 Luminous Egress Path Markings

- Required in A, B, E, I, M, and R-1 Use Groups
- Markings are self-luminous for: steps, landings, handrails, perimeter demarcation lines in exit enclosures, and doors.
- Marking sizes are dependent upon items
- See 4601.1 Exception and 4604.1 & 4604.23

1030 Maintenance of Means of Egress

- Must be reliable
- Decorations, furnishings, etc. cannot impair visibility of exit signs
- See Rule 46 for Existing Means of Egress

Egress Storage

Inspecting Means of Egress

- Look for misleading or confusing conditions
- Look for locked (type), blocked or modified routes

Review Questions

1. A side hinged swinging door is required in addition to a turnstile when serving an occupant load greater than _____.
2. What is the maximum floor area per occupant for a Business area?
3. Exit sign placement shall be such that no point in an exit access corridor is more than _____ feet from the nearest visible required exit sign.

Review Answers

1. A side hinged swinging door is required in addition to a turnstile when serving an occupant load greater than _____. **300 (1008.3.2)**
2. What is the maximum floor area per occupant for a Business area? **100 gross (Table 1004.1.1)**
3. Exit sign placement shall be such that no point in an exit access corridor is more than _____ feet from the nearest visible required exit sign. **100 feet (1011.1)**

Rule 10 Review Story

- You receive a complaint about a tavern that has an outdoor patio that is only accessible by entering the tavern first. The patio has no exit gate. There is no exit sign at the door going into the patio. The occupancy limit for the interior of the tavern is posted at 150 persons. The patio has been calculated at 50 persons.

Rule 10 Review Story Cont.

- What is the correct occupancy load limit for this tavern?
- Is legal to have a tavern patio without an exit gate?
- Who is responsible for calculating the allowable occupant load for an assembly use group?

Rule 10 Review Story Answers

- What is the correct occupancy load limit for this tavern? **(Correct Occupancy is 150)**
- Is legal to have a tavern patio without an exit gate? **(Yes, it is legal. However, refer to OFC 1004.8)**
- Who is responsible for calculating the allowable occupant load for an assembly use group? **(The design occupant load needs to be received from the building official having jurisdiction. The actual calculations should be obtained by the owner through a registred architect for Ohio and then the architect submits the calculations and a requested design load to the building official)**

PART III

Occupancies and Processes

1301:7-7-11 Rule 11

Aviation Facilities

1103 General Requirements

- **1103.2** No Smoking in hangars, or within 50ft. of aircraft.
- **1103.4** Fire Dept. access shall be provided and maintained
- **1103.5** Dispensing of flammable and combustible liquids in compliance with Rule 34
- **1103.6** Comb. storage in approved locations and containers

1104 Aircraft Maintenance

- **Class 1A flammable liquids shall not be used to clean**
- **Aircraft engines shall not run in hangars except in approved areas**
- **Any open flame used to heat parts in excess of 500 degrees F shall be outside**

1105 Portable Fire Extinguisher

- **Shall be on welding carts, 2-A:20BC**
- **Shall be accessible at all times**
- **Cabinets and enclosed compartments shall be labeled with 2” letters**

1107 Helistops and Heliports

- Touchdown area to be surrounded on all sides by clear area with min. width average roof level of 15’, but no width shall be less than 5’
- Landing area to contain or drain away spills
- Minimum of 80-B:C extinguisher

1301:7-7-12 Rule 12

Dry Cleaning

1204 General Requirements

- Type I dry cleaning plants prohibited, limited quantities of Type I liquids may be used.
- Type II plants shall be heated by indirect means using steam, hot water, or hot oil only
- **1206.2** Maximum quantity of Type I solvents for spotting or pretreatment at any work station is 1 gallon
- **1208.4** Minimum of two 2-A:10-B:C shall be provided near the doors inside dry cleaning rooms

1301:7-7-13 Rule 13

Combustible Dust-producing Operations

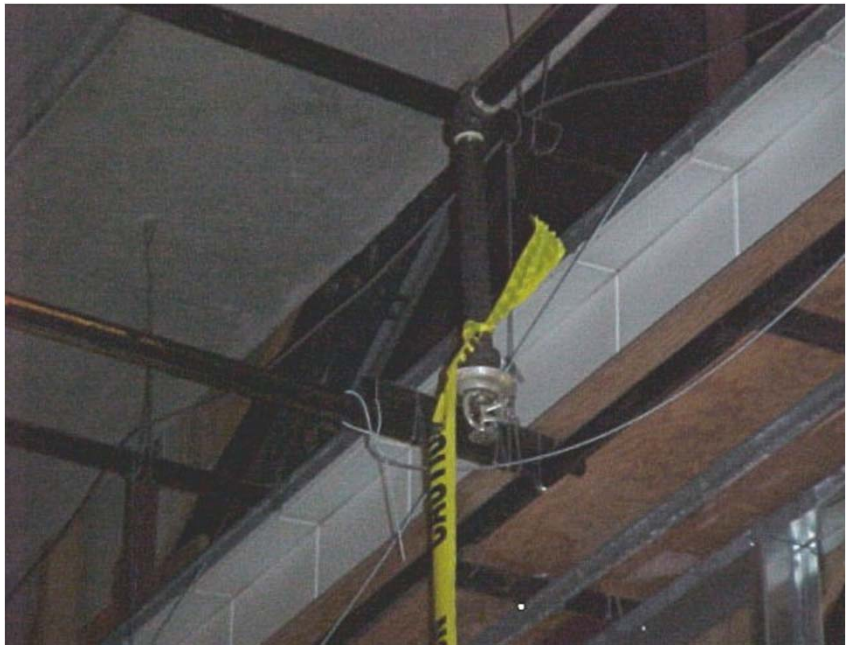
Rule 13 General

- Finely divided solid material which is 420 microns or less and when dispersed in air in proper mixture could be ignited flame, spark or other source. U.S. No. 40 standard sieve
- Accumulations shall be collected by vacuum cleaners so as not to put into suspension in the air
- Table 1304.1 list the NFPA explosion protection standards which apply.

1301:7-7-14 Rule 14

Fire Safety During Construction and Demolition

Rule 14 General



- **1409.1** Phone No. and address to be posted at phone
- **1410.1** Vehicle access shall be provided.
- **1411.1** Buildings above 50’ shall have 1 lighted temporary stairwell for means of egress

Rule 14 General

- **1413.2** Standpipes to be operable at least one floor below during demo
- **1414.1** Unlawful to occupy any portion of a building until the sprinkler installation has been tested and approved
- **1415.1** Fire extinguishers required in specific areas.
  - Each stairwell where combustibles are
  - Every storage and const. shed
  - Special hazards

1301:7-7-15 Rule 15

Flammable Finishes

1501 Scope

- Application of flammable or combustible paint, varnish, lacquer, stain, fiberglass resin and others by means of spray apparatus in continuous or intermittent process
- Dip Tanks
- Floor surfacing exceeding 350 sq. ft.
- Application of dual-component Class I and Class II liquids by brush or roller in excess of 1 gallon
- Spraying and dipping operations

1503 Protection of Operations

- Electrical wiring in spray spaces and vapor areas to be Class 1 Division 1 or Class 2 Division 1
- Areas within 5’ horizontally and 3’ vertically shall be Class 1 Division 2 or Class 2 Division 2
- Open flames and sparks shall not be within 20’
- Smoking shall be prohibited and signs shall be posted
- Welding or cutting shall not be done adjacent to spray operations. Signage shall be posted.

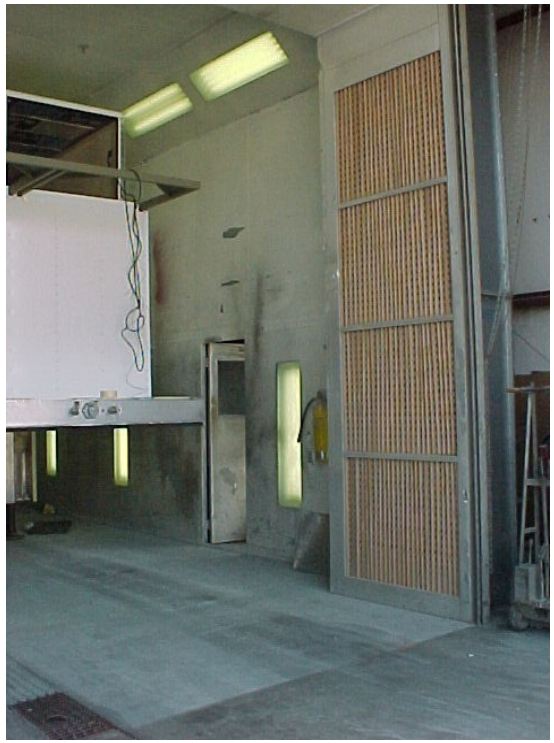
1503 Protection of Operations Cont.

- Containers supplying spraying operations must be closed
- Containers not in use must remain sealed and closed
- Waste cans must be equipped with self closing lids and must be emptied daily or at the end of each shift

1504.2 Location of Spray Finishing

Location of spray-finishing:

- Group A, E, I, or R occupancies: in spray room
  - Spray room:
    - Automatic sprinkler system
    - Separated from other areas in accordance with OBC
    - Non-combustible, non-sparking floor
- All other occupancies: spray room, spray booth or limited spray area



1504.3.2 Spray Booths

- NFPA 33
- Walls to be approved non-combustible material
  - Sheet metal on single skin no thinner than .0478 (18 gage), double skin .0359 (20 gage)
  - May be sealed with latex-based caulks or sealants

1504.3.2.1 Spray Booths

- Floors to be non-combustible
- Egress doors shall meet Rule 10 except pre manufactured booths 30” wide by 80” high.
- Clear space of 3 feet on all sides of spray booths, shall be free of any storage or combustible construction

1504.9 Limited spraying spaces

- Job size not to exceed 9 sq. ft.
- Operation shall not be continuous in nature
- Mechanical ventilation of 6 air changes per hour at all times when in use
- Explosion venting NOT required
- Electrical wiring within 10 feet of the floor and 20 feet horizontally of the spray space shall be Class 1 Division 2

1504.7 Ventilation

- Mechanical ventilation shall be in operation at all times when booth is in use
- Spraying equipment to be interlocked to ventilation
- Air exhausted shall not be recirculated unless in unmanned operations with stipulations

1504.7 Ventilation Cont.

- Air across open face shall be 100 linear feet per minute
- Articles being sprayed shall not obstruct ventilation
- Ducts to terminate 30 ft. from adjacent property line, 10 feet from building openings, etc.

1504.7.7 Filters

- Filters to be listed in accordance to UL900
- Automatic filter rolls shall be arranged so that if they fail to advance the spraying operation shuts down
- Filter pads to be disposed of in non-combustible containers with tight fitting lids

1504.6.2 Illumination

- Fixed lighting only through glass panels
- Galls panels to be heat treated, wired of hammered wired glass
- Fixtures which are integral part of booth shall have glass panels that are part of fixture
- Portable electric lamps shall not be used in spraying areas during operations. If used for cleaning shall be approved for hazardous locations.

1504.4 Fire Protection

- Spray booths and spray rooms shall be protected by an approved automatic extinguishing system
- Exhaust ducts, exhaust plenums, and both sides of dry filters shall be protected
- Dipping operations shall be protected with an automatic fire extinguishing system; fire extinguishers shall be provided in areas in the vicinity of the tank

1504.5.2 Fire Protection

- Automatic sprinklers when used shall be protected from spray residue by bags of .003 inch polyethylene or cellophane. May also be thin paper.
- Any sprinkler heads contaminated by overspray particles shall be replaced
- Air makeup and exhaust shall not be interlocked to shutdown upon activation of alarm unless required by the system type

1505 Dipping Operations

- If conveyor system is used, it shall shutdown in case of fire
- Dip tanks larger than 150 gallons in capacity or 10 square feet in surface area shall be protected by automatic fire suppression, smaller tanks may have either suppression of covers
- Dip tank covers shall be capable of manual operation and shall be automatic closing in the event of fire

1504.2 Automobile Undercoating Exceptions

- 1508.1 Undercoating operations are exempt from this code when using materials of Class IIIA or Class IIIB combustible liquid classifications.

1301:7-7-16 Rule 16

Fruit and Crop Ripening

Rule 16 General Requirements

- Ethylene gas shall only be discharged into rooms or enclosures designed for this purpose
- Electrical wiring and fixtures to be Class 1Division 2 Group C
- All piping and equipment shall be bonded and grounded
- Heating shall only be by indirect means unless approved for hazardous locations
- Warning signs to be posted on all doors indicating danger involved and necessary precautions

1301:7-7-17 Rule 17

Fumigation and Thermal Insecticidal Fogging

Rule 17 General Requirements

- All electricity shall be turned off except for circulating fans designed for hazardous atmospheres
- Fire code official and fire chief to be notified in writing 24 hours prior to process of toxic or flammable fumigant
- Notices shall be posted at all entrances with red letters on white background, letters to be at least 2” in height
- Persons doing work shall be provided with protective breathing apparatus
- Sufficient watchers shall be posted to prohibit entrance to room or area.

1301:7-7-18 Rule 18

Semiconductor Fabrication Facilities

1802 Definitions

- Hazardous Production Material (HPM): A solid, liquid or gas associated with semiconductor manufacturing that has a degree-of-hazard rating in health, flammability or instability of Class 3 or 4 as ranked by NFPA 704 *as listed in rule 1301:7-7-47 of the Administrative Code* and which is used directly in research, laboratory or production processes which have, as their end product, materials that are not hazardous.

Rule 18 General Requirements for HPM Facility

- **1803.1** Emergency control station required
- **1803.4** Emergency plan required
- **1803.7.2** Workstations shall not be energized without ventilation
- **1803.8** Hazardous material shall not be stored in exits
- **1803.10** Automatic sprinkler system required
  - Sprinkler to be installed in combustible exhaust duct from workstations
- **1803.10.5** All alarms must transmit to Emergency Control Station

Review Questions

1. _____ flammable liquids shall not be used to clean aircraft, aircraft parts or aircraft engines.
2. How many hours after the application of flammable or combustible liquids in a floor finishing operation can heating, ventilation and air-conditioning systems be operated?
3. The fire code official and fire chief shall be notified in writing at least _____hours before the structure is to be closed in connection with the utilization of any toxic or flammable fumigant.

Review Answers

1. _____ flammable liquids shall not be used to clean aircraft, aircraft parts or aircraft engines. **Class IA (1104.3)**
2. How many hours after the application of flammable or combustible liquids in a floor finishing operation can heating, ventilation and air-conditioning systems be operated? **4 hours (1510.2)**
3. The fire code official and fire chief shall be notified in writing at least _____hours before the structure is to be closed in connection with the utilization of any toxic or flammable fumigant. **24 hours (1703.3**)

1301:7-7-19 Rule 19

Lumberyards and
Woodworking Plants

Rule 19 General Requirements

- **1903.2** Equipment located inside of buildings shall have dust removal system
- **1903.3.1** Housekeeping must be accomplished both thoroughly and systematically to prevent hazards
- **1903.3.2** Provisions to be made to separate scrap metal to assure intdoes not get into wood handling system
- **1903.6** Fire apparatus access roads according to Rule 503 shall be provided
- **1904.3** Portable fire extinguishers for extra high hazards or standpipes and hose shall be provided within 50’ to any machine producing shavings or sawdust

Rule 19 General Requirements

- **1906.2** Cold decks shall not exceed 500’ in length, 300’ in width and 20’ in height, unless protected by special fire protection
- **1907.2** Piles of wood chips and hogged material shall not exceed 60’ in height, 300’ in width and 500’ in length unless approved
- **1908.3** Piles of sawdust or other recyclable products such as yard waste shall not exceed 25’ height, 150’ width and 250’ in length.
- **1908.4** Piles to be separated by fire access roads

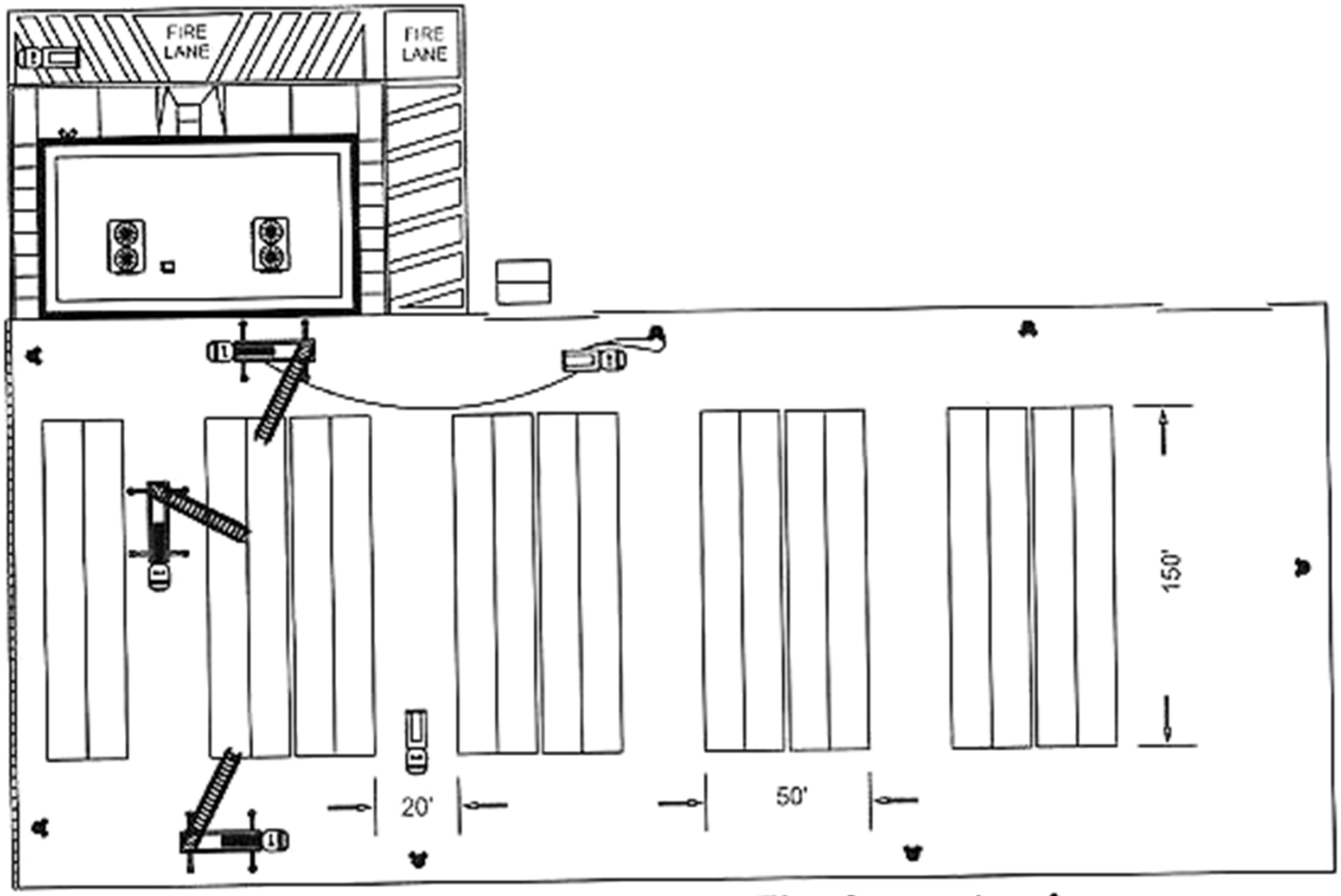
1909 Exterior Storage of Products

- Exterior finished lumber storage shall be arranged in stable piles, max. height is 20’. Piles shall not exceed 150,000 cubic feet in volume
- Fire Access roads required so the maximum grid created is 50’ x 150’
- Area shall be secured with a fence at least 6’ in height

1909 Exterior Storage of Products

- An approved yard hydrant and hose system in accordance with NFPA 24 shall be installed.
- Portable extinguishers shall be located so travel distance is not greater than 75’

Layout Example



Lumber Yard Driveways Permit Fire Apparatus Access

1301:7-7-20 Rule 20

Manufacture of Organic Coatings

Rule 20 General Requirements

- **2003.1** Buildings shall not have pits or basements
- **2003.9.2** Empty flammable or combustible containers shall be removed to a detached, outside location.
- **2005.2** Firefighting access shall be accessible from 1 side
- **2005.3** Drainage shall not constitute a fire hazard to another building
- **2005.4** Explosion control; shall be provided in accordance with NFPA 35
- **2008.1** Nitrocellulose in the operating area shall not exceed the amount needed for one shift

1301:7-7-21 Rule 21

Industrial Ovens

Rule 21 General Requirements

- **2102.1** Four different classes of furnaces
- **2103.4** Roof and floors temperatures of ovens shall not exceed 160 degrees F.
- **2104.2** Each furnace or oven shall have a manual fuel shutoff valve located not within 6 feet of the appliance served.
- **2106.1** Class A or B ovens which contain of process combustible products shall have a automatic fire protection system.
- **2106.2** Class C or D ovens shall have fixed fire extinguishing systems.
- **2106.3** Portable extinguishers shall be no closer than 15 feet and not further than 50 feet to oven or related equipment.

1301:7-7-22 Rule 22

Motor Fuel Dispensing Facilities
and Repair Garages

2201 Scope

- Provisions of this rule shall not apply to facilities, equipment, structures or installations or for construction prior to the effective date of this code, except where the fire code official can prove a distinct hazard to life or adjacent property exist.
- If permit not issued locally SFM must issue
- No permit required for a stationary flammable or combustible liquid storage tank with a capacity of 1100 gallons or less for agricultural purposes.

2203 Location of Dispensing Devices

- Ten ft. from lot lines
- 10 ft. or more from buildings with combustible construction, unless one-hour wall
- Located such that any portion of vehicle being fueled is on the property
- Nozzle when fully extended cannot reach to within 5 ft. of building openings
- Fixed sources of ignition shall be 20’ or more away

2204 Dispensing Operations

- Self serve location shall have one **QUALIFIED** individual on duty at all times when open for business
  - Primary function is to observe and control fuel dispensing
  - Stop fuel dispensing into non-compliant containers
  - Control sources of ignition
  - Give immediate attention to spills or releases
  - Be prepared to use fire extinguishers if needed

2204 Self-Service Dispensing Operations

- Attendant shall be able to communicate with customer
- Smoking is prohibited
- Dispensing devices shall be in clear view of attendant
- Sign with 4 inch block letters stating Self -Service Island
- Attendant shall be **TRAINED** in handling emergencies of the flammable fuel type.
- A telephone not requiring a coin shall be located per fire official
- Dispensing devices to be set to deliver a maximum 25 gal. uninterrupted flow and shall require a manual action to continue

SERVE
NO SMOKING
STOP ENGINE
WARNING:
UNLEADED
CERTIFIED

2204.3 Unattended Self-Service Operations

- Owner operator shall make daily site visits
- Operating instruction on each dispenser
- Emergency sign to be posted stating
- Spill containment by sloping or oil/fuel separator
- Additional fire protection to include fixed suppression, auto detection and alarm transmission off site.

2205 Operational Requirements

- **2205.4** Engines of vehicles being fueled shall be shutoff
- **2205.5** Fire extinguishers shall not be more than 75 feet from pumps, dispensers or storage tank fill pipe openings. Minimum rating 2-A:20-B:C
- **2205.7** Fenced and diked areas surrounding above ground tanks shall be kept free of vegetation and not less tan 10 feet from equipment

2205.6 Warning Signs

- Warning signs shall be conspicuously posted on each dispenser
- There are 7 criteria that must be posted
- Most important viewpoint is that persons fueling vehicles do not leave the refueling point

2206 Motor Fuel Dispensing Facilities

- **2206.2.1.1** Inventory control
- **2206.21.2** Above ground tanks inside of buildings
- **Table 2206.2.3** Minimum separation for above ground tanks
- **2206.2.5** Portable tanks may be approved with definite time limit
- **2206.3 AST** shall be safeguarded from the public and unauthorized use in accordance with NFPA 30
  - 6 ft. fence
  - 3 ft. from tank on all sides
  - Exceptions: Fueling facilities with perimeter fencing and tanks that are enclosed in vaults

2206.7 Fuel Dispensing for Flammable & Combustible Liquids

- Listed equipment; fixed pumps for product dispensing
- Outdoor dispensers must be mounted on 6” concrete island or protected in accordance with OFC 312
- Dispenser hoses must be no longer than 18 feet
- Dispenser nozzles must meet certain criteria

2206.7.8 Gravity & Pressure Dispensing

- Flammable liquids are not to be dispensed by gravity from tanks, barrels, drums, other other similar containers

2207 LPG Motor Fuel Dispensing

- **2207.4** Dispensing shall be 25 ft. from buildings with exceptions 1 hr. non comb.
- **2207.5.2** Hoses no longer than 18 feet
- **2207.5.3** Vehicle impact to be provided
- **2207.6** Self-service LP-gas dispensing systems shall not be open to the public
  - Shall be provided within 100 feet but not less than 20 feet

2210 Marine Motor Fuel Dispensing Facilities

- If Underground Storage Tanks are impractical, Aboveground Storage Tanks can be implemented
  - Must be special enclosures, vaults or protected AST's
  - Must provide physical protection & fire-resistance protection as a unit, but must be approved by FCO

2210 Marine Motor Fuel Dispensing Facilities

- Attendant must be on duty when facility is open
- Sources of ignition need controlled
- No Smoking within 50 feet of fueling operations
- Warning signs shall be posted for fueling operations
- Access for fire apparatus shall be provided to the shore end

2211 Repair Garages

- Cleaning of parts restricted to parts cleaning machines
- Waste oil must be stored in approved containers
- Drainage from garage floors must be to oil separators
- Disposal of oil soaked rags, etc. must be placed into self closing containers used for oily waste

2211 Repair Garages

- Sources of ignition shall not be located within 18” of the floor (follow NFPA 70)
- No smoking unless in approved locations in the facility
- Pits and service areas below grade must have adequate ventilation
- Repair garages for vehicles fueled by other types of fuels must follow the applicable OFC rule

Rule 22 Additional Sections

- **2208** Compressed Natural Gas Motor Fuel Dispensing Facilities
- **2209** Hydrogen Motor Fuel Dispensing
- **2212** Service Stations at a Bulk Plant Terminal (Ohio Language)
  - Min. 50 ft separation from bulk plant operations and storage and dispensing of motor fuel, shall be enclosed by fence

1301:7-7-23 Rule 23

High-piled Combustible Storage

2301.1 Scope

- Section 2301 - Other applicable chapters based on material stored:
  - Aerosols - Ch 28
  - Flammable/Combustible Liquids - Ch 34
  - Hazardous Materials - Ch 27
  - Combustible Record Storage - NFPA 13
  - Combustible Fibers - Ch 29
  - Miscellaneous Combustible Material - Ch 3

2303.1 and 2303.7 Combustible Storage

- Commodities classified as Class I, II, III, IV or high hazard
- Classification for plastics are: Group A, B, or C
- Engineering analysis can be used to designate the commodity class.

2306.2 General Fire Protection

Extent and type of protection

- Separation of high-piled storage areas
- Automatic sprinklers
- Fire detection
- Building access
- Smoke/heat removal
- Draft curtains
- Aisles
- Portable fire extinguishers

Various Storage Arrangements

- These storage arrangements require certain criteria for safety:
  - 2307 Solid Pile & Shelf Storage
  - 2308 Rack Storage
  - 2309 Automatic Storage
  - 2310 Specialty Storage

Table 2306.2

GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

COMMODITY CLASS	SIZE OF HIGH-PILED STORAGE AREA[a] (square feet) (see Sections 2306.2 and 2306.4)	ALL STORAGE AREAS (See Sections 2306, 2307 and 2308)[b]					SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 2307.3)		
		Automatic fire-extinguishing system (see Section 2306.4)	Fire detection system (see Section 2306.5)	Building access (see Section 2306.6)	Smoke and heat removal (see Section 2306.7)	Draft curtains (see Section 2306.7)	Maximum pile dimension[c] (feet)	Maximum permissible storage height[d] (feet)	Maximum pile volume (cubic feet)
I-IV	0-500	Not Required[h]	Not Required	Not Required[e]	Not Required	Not Required	Not Required	Not Required	Not Required
	501-2,500	Not Required[h]	Yes[i]	Not Required[e]	Not Required	Not Required	100	40	100,000
	2,501-12,000 Public accessible	Yes	Not Required	Not Required[e]	Not Required	Not Required	100	40	400,000
	2,501-12,000 Nonpublic accessible (Option 1)	Yes	Not Required	Not Required[e]	Not Required	Not Required	100	40	400,000
	2,501-12,000 Nonpublic accessible (Option 2)	Not Required[h]	Yes	Yes	Yes[j]	Yes[j]	100	30[f]	200,000
	12,001-20,000	Yes	Not Required	Yes	Yes[j]	Not Required	100	40	400,000
	20,001-500,000	Yes	Not Required	Yes	Yes[j]	Not Required	100	40	400,000
	Greater than 500,000[g]	Yes	Not Required	Yes	Yes[j]	Not Required	100	40	400,000
High hazard	0-500	Not Required[h]	Not Required	Not Required[e]	Not Required	Not Required	50	Not Required	Not Required
	501-2,500 Public accessible	Yes	Not Required	Not Required[e]	Not Required	Not Required	50	30	75,000
	501-2,500 Nonpublic accessible (Option 1)	Yes	Not Required	Not Required[e]	Not Required	Not Required	50	30	75,000
	501-2,500 Nonpublic accessible (Option 2)	Not Required[h]	Yes	Yes	Yes[j]	Yes[j]	50	20	50,000
	2,501-300,000	Yes	Not Required	Yes	Yes[j]	Not Required	50	30	75,000
	300,001-500,000[g,h]	Yes	Not Required	Yes	Yes[j]	Not Required	50	30	75,000

Review Questions

1. What Rule in the OFC regulates the storage of organic peroxides?
2. What OFC code section identifies the four distinct classes of industrial ovens?
3. Permanent exterior lumber storage areas shall be surrounded with an approved fence at least _____ in height.

Review Answers

1. What Rule in the OFC regulates the storage of organic peroxides? **Rule 39**
2. What OFC code section identifies the four distinct classes of industrial ovens? **2102.1**
3. Permanent exterior lumber storage areas shall be surrounded with an approved fence at least _____ in height. **6 feet (1909.4)**

1301:7-7-24 Rule 24

Tents and Other Membrane Supported Structures

Rule 2402.1 Definitions

- **Air-Inflated Structure –** Building where the shape of the structure is maintained by air pressure of cells or tubes to form a barrel vault over the usable area.
- **Air-Supported Structure –** Structure wherein the shape of the structure is attained by air pressure, and occupants are within the elevated pressure area.

Rule 2402.1 Definitions

- **Membrane Structure –** Air inflated, air supported, cable or frame covered structure not otherwise defined as a tent or canopy.
- **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.

Rule 2403 Approvals

- Tent and membrane structures in excess of 400 sq. ft.
- Exceptions:
  - Recreational camping
  - Tents open on all sides with stipulations noted in the OFC
- Temporary tents, air-supported, air-inflated or tensioned membrane structures can only be erected for no more than 18 days in a 12 month period
- Occupancy load greater than 50 shall submit site and floor plan

Rule 2403 Approvals

- Tents, canopies or membrane structures shall not be within 20 ft. of lot lines, buildings or other structures
  - Guy ropes and wires shall be considered part of tent or canopy
  - Separation distance shall not apply if not used for cooking and under 15,000 sq. ft.
- Documentation may be required supporting the anchorage of structures
- Air supported structures used as assembly shall have two (2) blowers
- Occupancy load greater than 200 requires auxiliary generator powering one blower for 4 hours min.

Table 2403.12.2
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)	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[a]	7	120	96

For SI: 1 inch = 25.4 mm.

a. When the occupant load exceeds 3,000, the total width of means of egress (in inches) shall not be less than the total occupant load multiplied by 0.2 inches per person.

Rule 2403.12 Means of Egress

- All points shall be within 100 ft. of exit
- Aisles without fixed seating 24 in. when serving employees
- Public areas 44 in. and increased to provide at least 1 ft. of aisle width per 50 persons
- All exits shall be clearly marked with exit signs when occupant load of 50 or more
  - 300 occupants or less 2 separate circuits
  - More than 300 requires two separate power sources, one shall be emergency power

Rule 2403.12 Means of Egress

- Means of egress illumination shall be provided with not less than 1 foot candle (11 lux) at floor level when structure is occupied. Shall be separate circuit or power source
- Exit, aisles and passageways shall be maintained at all times to a PUBLIC WAY.
- Guy wires, ropes etc. shall not cross means of egress at a height of less than 8 ft.

2404.2 Flame Resistant Requirements

- All parts of tents and membrane structures shall comply with NFPA 701 for flame resistance
- Certificate shall be provided to fire code official and one copy kept on premise
- Permanently affixed label is required
- No combustible materials inside of, except for normal daily animal feeding

2404.5 Flame resistant requirements

- Sawdust and shavings may be used for public performances if kept damp
- NO combustible materials shall be under seats
- Comb. Material which create a fire hazard to be clear for 20 ft.
- All combustible trash to be removed daily.

General Safety Precautions

- No smoking, approved signs shall be posted
- Open flame or other devices such as cooking shall not be within 20 ft. when open to the public unless approved by fire code official
- No fireworks within 100 ft.
- Effect lighting shall be electric and if within 6 ft. of comb. Shall be protected by non-comb insulation at least 9 ¼” thick
- Shall be 3 ft. clearance from fabric envelope and all contents

General Safety Precautions

- Extinguishers to be provided
- Occupant load to be determined
- Cooking tents to be separated by min. of 20 ft.
- Cooking producing sparks or grease laden vapors shall not be within 20 ft.
- Vehicles in tents shall have batteries disconnected, fuel not to exceed ¼ tank or 5 gallons whichever is less
- Fuel tank openings to be sealed and locked

LP, Flammable & Combustible Liquids & Tents

- Portable LP-gas containers
  - 500 gallons or less shall be located a minimum of 10 feet away from the structure
  - More than 500 gallons shall be a minimum or 25 feet away from the structure
  - LP shall be secured from tipping or tampering
- Flammable liquid fueled equipment
  - Not used in tents
  - Storage shall be a minimum of 50 feet away from the structure

General Safety Precautions

- If CNG or LPG shutoff valve to be closed and engine operated until it quits
- Hot lead on battery disconnected
- All combustible vegetation within 30 ft. shall be removed
- Standby personnel as deemed necessary by the FCO

1301:7-7-25 Rule 25

Tire Rebuilding and Tire Storage

Rule 25 General Requirements

- **2503.2** Tire rebuilding or recapping shall be housed in areas with 1 hr. fire barrier w/ exceptions.
- **2504.2** Welding, cutting or heating shall not be operated in tire storage yards.
- **2506.1** FD access shall be provided
- **2504.4** Storage piles shall not be located beneath electrical wires of greater than 750 volts or that supply power to fire emergency systems.

Rule 25 General Requirements

- **2505.1** Individual piles not to exceed 2500 sq. ft.
- **2505.2** Individual piles to be separated by **56 ft.,** unless less than 500 tires than 25 feet.
- **2507.1** If bulk volume exceeds 20,000 cubic ft. fencing to be provided
- **2507.2** Fences shall be 6 ft. high with 20 ft. gates
- **2508.1** Public or private water supply for fire suppression must be available within 500 feet of hose lay.

1301:7-7-26 Rule 26

Welding and Other Hot Work

2601 & 2602 General Definitions

- **2601.3 Restricted Areas –** Hot Work shall not be conducted unless approved by the FCO
- **2602.1 Hot Work Permits –** Issued by responsible manager at the facility, pre-permitted by local FCO

General Requirements/Fire Safety

- Hot work shall not be done near combustibles, on tanks, or equipment that does or has contained flammables.
- Proper partitions or guard shall be in place when performing hot work.
- Sprinkler system not to be shut down during hot work operations.

Rule 26 General Requirements

- **2604.2.1** Fire watch shall be posted and shall continue for a minimum of 30 minutes after the conclusion of work.
- **2604.2.4** Individuals to be trained in fire extinguisher use
- **2604.2.6** One 2-A:20 B:C shall be within 30 ft.
- **2605.6** Torch valve to be closed and gas supply shut off when operations are discontinued for 1 hour or more.
- **2606.3** Electrodes to be removed when discontinued for more than 1 hour.

1301:7-7-27 Rule 27

Hazardous Materials- General Provisions

2701 Scope

- This *rule* shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that when specific requirements, *exceptions or exemptions* are provided in other *rules*, those SPECIFIC requirements *shall take precedence over the similar requirements in this rule*

2701.1 General

- Exceptions: When regulated by DOT, liquor in containers 1 gal or less, flamm. & comb. liquids that comply with Rule 34, and fireworks that are covered in Rule 33.

2701.2.2 Hazard Categories

- Physical hazards
- Health hazards

- **2701.3.2** Performance based design alternatives allowed
  - Reduces the probability of unsafe conditions
  - Minimize consequences of unsafe conditions
  - Summarized as “prevention and control”

2701.5.1 Hazardous Materials Management Plan (HMMP)

- Access to storage/use areas
- Emergency equipment location
- Location of management point of liaison & emergency responders
- Facility evacuation meeting point locations
- General purpose of other areas in the facility
- Location of all UST's and SAST's and related appurtenances
- Hazard classes in EACH building
- Locations of all control areas and H use groups
- Emergency Exits

2701.5.2 Hazardous Materials Inventory Statement (HMIS)

- Product Name
- Component
- Chemical Abstract Service (CAS) number
- Location of storage and use
- Container size
- Hazard classification
- Amount in storage
- Amount in use – closed systems
- Amount in use – open systems

2701.6 Facility Closure

- Temporary closure – will continue to be monitored and inspected
- Permanent closure – FCO will be notified for approval and apply to FCO for possible Facility Closure Plan (FCP)
- FCP must be submitted 30 days prior to closure
- RP must indicate that facility will be remedied of haz-mat

2702 Definitions

- Ceiling limits
- Deflagration
- IDLH
- LEL LFL MSDS
- PEL
- Safety Can
- Tank, portable
- Tank, stationary
- **2702.2 Ohio language**

Maximum Allowable Quantities

- **MAQs** are the maximum quantities of hazardous materials that may be stored or used in an area before the area must be designated as an H occupancy
- **MAQ** quantities are exempt from Group H occupancy requirements, not all code requirements
- **2703.1.2** Where quantities are indicated in pounds and weight per gallon is not given a conversion of 10 lbs. Per gallon shall be used

Maximum Allowable Quantity per Control Area

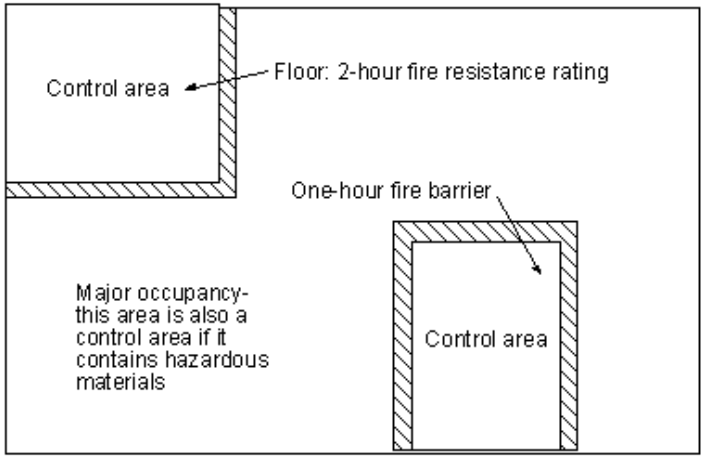
- MAQs provided
  - Tables 2703.1.1(1)-(4)

TABLE 2703.1.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas cubic feet	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas cubic feet	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible liquid[c, i]	II IIIA IIIB	H-2 or H-3 H-2 or H-3	Not Applicable	120[d, e] 330[d, e] 13,200[e, f]	Not Applicable	Not Applicable	120[d] 330[d] 13,200[f]	Not Applicable	Not Applicable	30[d] 80[d] 3,300[f]
Combustible fiber	Loose Baled	H-3	(100) (1,000)	Not Applicable	Not Applicable	(100) (1,000)	Not Applicable	Not Applicable	(20) (200)	Not Applicable
Cryogenic, Flammable	Not Applicable	H-2	Not Applicable	45[d]	Not Applicable	Not Applicable	45[d]	Not Applicable	Not Applicable	10[d]
Consumer Fireworks (Class C Common)	1.4G	H-3	125[d, e, l]	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Cryogenic Oxidizing	Not Applicable	H-3	Not Applicable	45[d]	Not Applicable	Not Applicable	45[d]	Not Applicable	Not Applicable	10[d]

Control Areas

- Table 2703.8.3.2 provides:
  - Number
  - Location
  - Separation requirements



- Useful in increasing MAQs
- M and S occupancies limited to two control areas per floor (special increases apply).

TABLE 2703.8.3.2

TABLE 2703.8.3.2 DESIGN AND NUMBER OF CONTROL AREAS				
FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA[a]	NUMBER OF CONTROL AREAS PER FLOOR[b]	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS[c]
Above grade	Higher than 9	5	1	2
	7-9	5	2	2
	6	12.5	2	2
	5	12.5	2	2
	4	12.5	2	2
	3	50	2	1
	2	75	3	1
	1	100	4	1
Below grade	1	75	3	1
	2	50	2	1
	Lower than 2	Not Applicable	Not Applicable	Not Applicable

a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 2703.1.1(1) and 2703.1.1(2), with all increases allowed in the footnotes of those tables.

b. There shall be a maximum of two control areas per floor in Group M occupancies and in buildings or portions of buildings having Group S occupancies with storage conditions and quantities in accordance with Section 2703.11.

c. Fire barriers shall include walls and floors as necessary to provide separation from other portions of the building.

2703.2.1 System, equipment and process controls including tank and container construction and installation requirements

2703.2 Equipment & Machinery Requirements

2703.2.2.1 Design and Construction

2703.4 Material Safety Data Sheets (MSDS)

- Shall be readily available
- Must have sheets for even hazardous materials not requiring a permit
- MSDS paperwork contains valuable information for FD

2703.6 Signage Requirements

2703.9.8 Separation of Incompatible Materials

2703.10 Carts and Trucks Required

- Liquids in containers exceeding 5 gallons, materials having a hazard rating of 3 or 4 shall be transported in a corridor or exit by cart or truck. (with exceptions)
- Shall have means to restrain containers
- Shall have speed reduction devices
- Shall not be left unattended in any part of a means of egress
- Incompatible materials cannot be transported on same cart or truck

2703.11 Group M Storage and Display and Group S Storage

- Quantity increases allowed, but restrictions on storage methods
  - 6’ high
  - 4’ aisles
  - 5 gallons or 25 lbs on shelves
  - 10 gallons or 100 lbs on floor
  - Separation of incompatibles
  - See Table 2703.11.1

TABLE 2703.11.1

TABLE 2703.11.1 MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M AND S OCCUPANCIES NONFLAMMABLE SOLIDS, NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS [d,e,f]			
CONDITION		MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
Material[a]	Class	Solids (pounds)	Liquids gallons (pounds)
A. HEALTH-HAZARD MATERIALS—NONFLAMMABLE AND NONCOMBUSTIBLE SOLIDS AND LIQUIDS			
1. Corrosives [b,c]	Not Applicable	9,750	975
2. Highly Toxics	Not Applicable	20 [b,c]	2 [b,c]
3. Toxics [b,c]	Not Applicable	1,000	100
B. PHYSICAL-HAZARD MATERIALS—NONFLAMMABLE AND NONCOMBUSTIBLE SOLIDS AND LIQUIDS			
1. Oxidizers [b,c]	4	Not Allowed	Not Allowed
	3	1,150	115
	2	2,250	225
	1	18,000	1,800
2. Unstable (Reactives) [b,c]	4	Not Allowed	Not Allowed
	3	550	55
	2	1,150	115
	1	Not Limited	Not Limited
3. Water (Reactives)	3 [b,c]	550	55
	2 [b,c]	1,150	115
	1	Not Limited	Not Limited

NFPA 704
Hazardous Material Identification System

The purpose of the NFPA 704 labeling system is to provide a way of quickly identifying the various fire related hazards associated with a particular material. The NFPA 704 "diamond" is commonly found on bulk storage containers, but is also widely used on chemical containers and MSDS sheets.

NFPA 704

- **Diamond shape broken into 4 sections**
- **Intended for use by firefighters**
- **Identifies four factors.**

Health	**Blue**
Flammability	**Red**
Reactivity	**Yellow**
Special Haz.	**White**

Flammability Hazards

4 Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or that are readily dispersed in air and that will burn readily. Liquids with a flashpoint below 73ºF and a boiling point below 100ºF.

3 Liquids and solid that can be ignited under almost all ambient temperature conditions. Liquids with a flashpoint below 73ºF and a boiling point above 100ºF or liquids with a flashpoint above 73ºF but not exceeding 100ºF and a boiling point below 100ºF.

2 Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Liquids with flashpoint above 100ºF but not exceeding 200ºF.

1 Materials that must be preheated before ignition can occur. Liquids that have a flashpoint above 200ºF.

0 Materials that will not burn.

Health Hazards

4 Materials that on very short exposure could cause death or major residual injury.

3 Materials that on short exposure could cause serious temporary or residual injury.

2 Materials that on intense or continued, but not chronic exposure could cause incapacitation or possible residual injury.

1 Materials that on exposure would cause irritation but only minor residual injury.

0 Materials that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible material.

Reactivity Hazards

4 Materials that in themselves are readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.

3 Materials that in themselves are capable of detonation or explosive decomposition or reaction but require a strong initiating source or which must be heated under confinement before initiation or which react explosively with water.

2 Materials that readily undergo violent chemical change at elevated temperatures and pressures or which react violently with water or which may form explosive mixtures with water.

1 Materials that in themselves are normally stable, but which can become unstable at elevated temperatures and pressures.

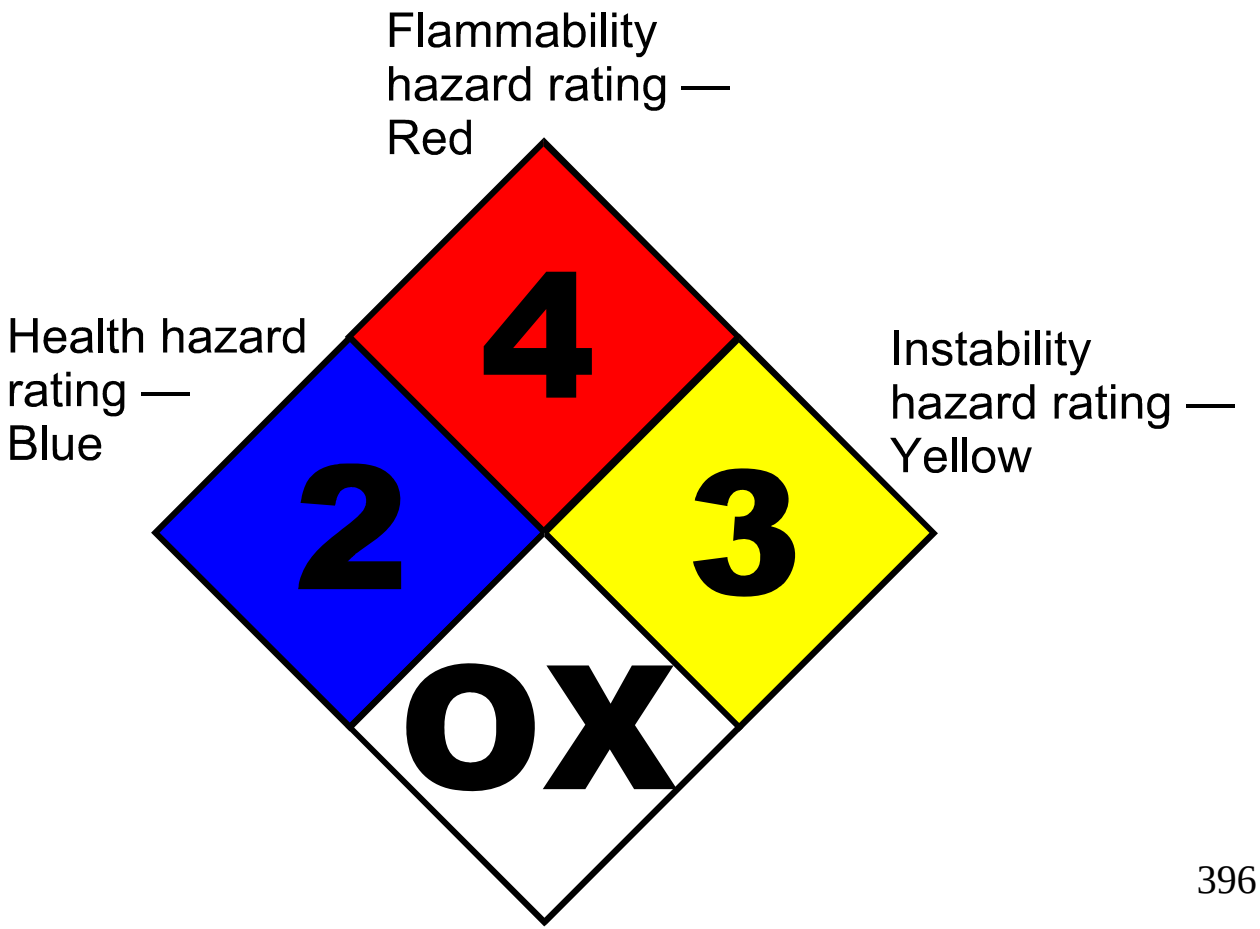
0 Materials that in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.

Symbols/Special Hazards

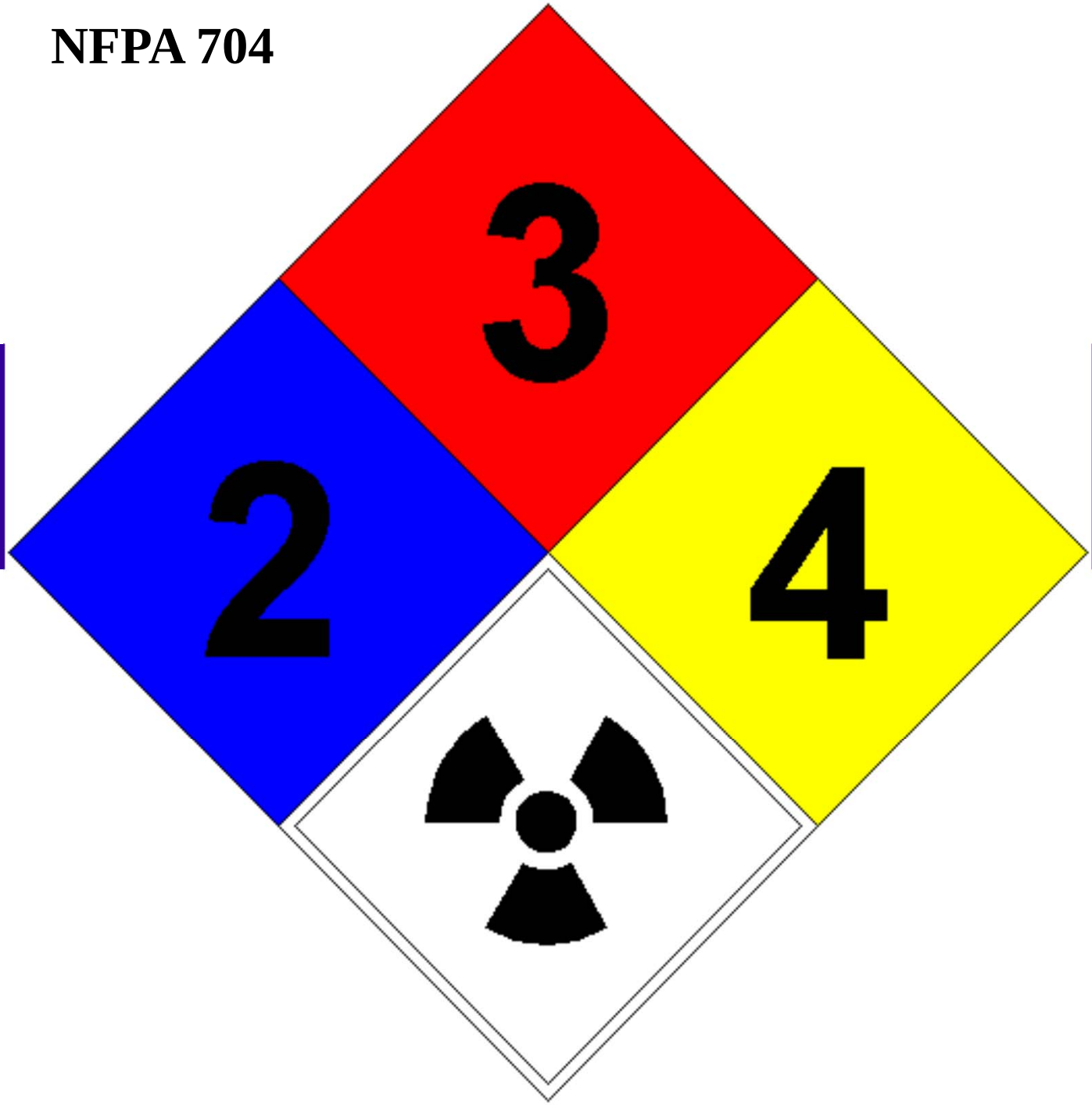
- **No water**
- **Radioactive**
- **Oxidizer**
- **Poison polymerizer**

2703.5 Identification Signs

- Identification of hazards – placarding
- Appendix F



NFPA 704



NFPA 704

Amounts Exceeding MAQs

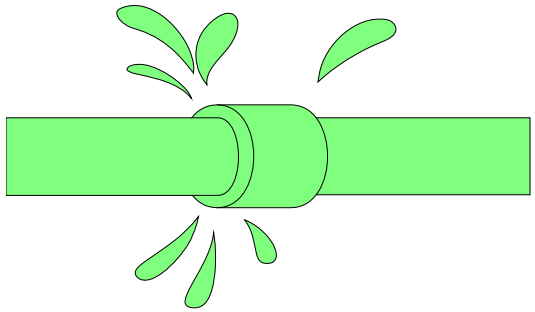
- Building code classifies as Group H
  - H1 – Detonation Hazards
  - H2 – Deflagration hazards
  - H3 – Conflagration/Highly Combustible
  - H4 – Health Hazard
- 2704 Storage
- 2705 Use, dispensing and Handling apply
- Chapters 28 – 44 may have more specific requirements

2703.9 General Safety Precautions

- Must be cooperation between the FD and the company involved with the hazardous materials
- Various issues need accounted for:
  - Security, electrical wiring, etc.
  - Shelf storage, safety cans

2704 Storage

- Spill control and secondary containment
  - Table 2704.2.2



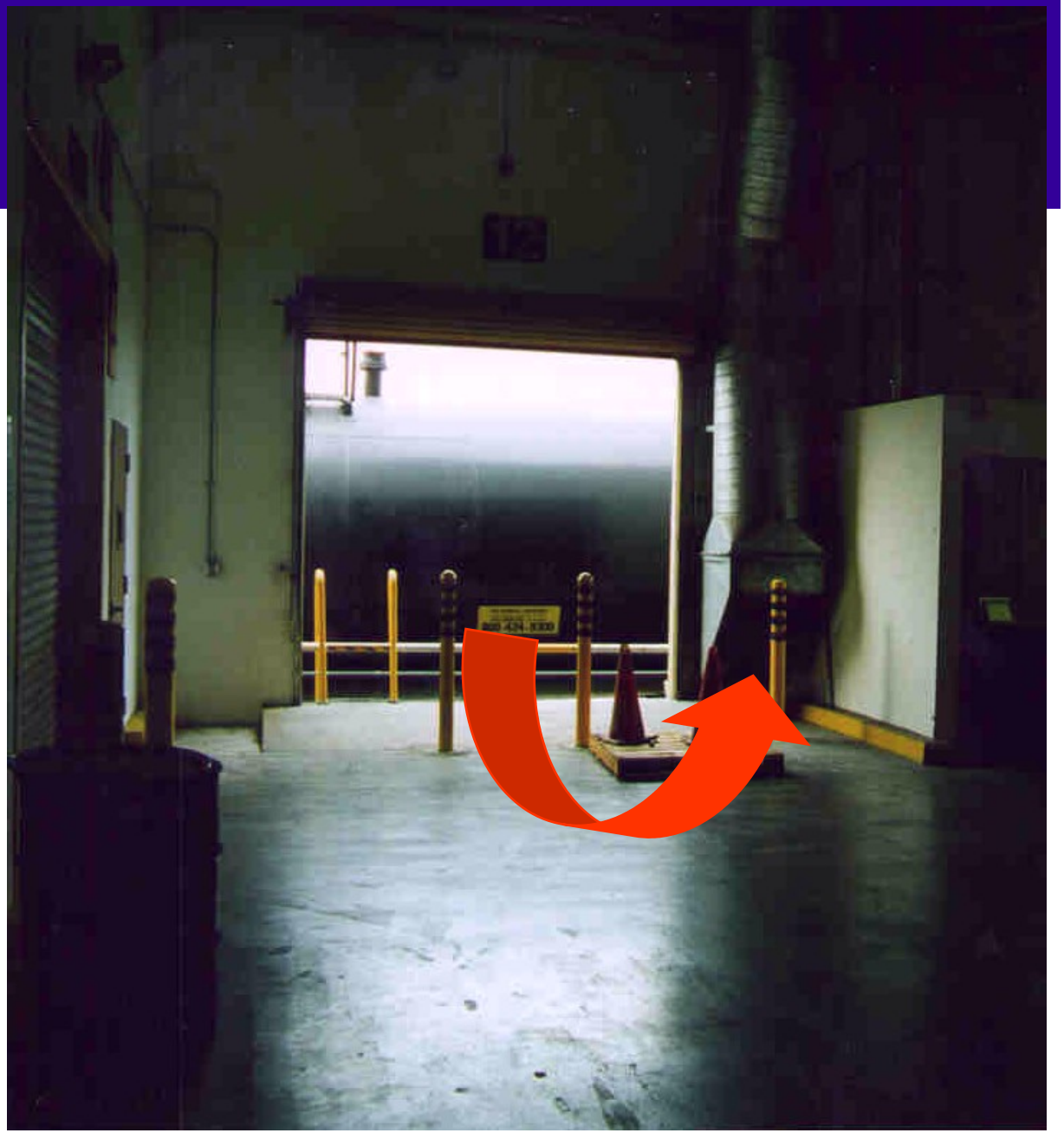
- **2704.3** Ventilation
- **2704.5** Sprinkler criteria
  - Ordinary Hazard Group 2; 3000 sq ft design area
- **2704.9** Emergency alarms and supervision requirements
- **2704.8** Limit controls
- **2704.6** Explosion controls

2704.2.2.1 Drainage Methods

2705 Use, Dispensing and Handling

- Many requirements simply reference 2704, but in some cases more restrictive
  - Spill control & secondary containment
  - Ventilation
  - Dispensing of Hazard level 3 or 4
  - Liquid limit controls

Ventilation -



SAFETY
SHOWER

2703.9.8 Separation of Incompatible Materials

1301:7-7-28 Rule 28

Aerosols

2801 General

- 2801.1 In accordance with Building Code and NFPA 30B (2007)
- MSDS’s shall be kept on premise
- Classified by three different levels Table 2803.1

2802 Definitions

- Level 1 aerosol- total heat of combustion that <u>is less than</u> or equal to 8600 British thermal units per pound (Btu/lb)
- Level 2- total heat of combustion that <u>is greater than</u> 8600 British thermal units per pound (Btu/lb), but less than 13,000 Btu/lb
- Level 3- total heat of combustion that <u>is greater than</u> 13,000 British thermal units per pound (Btu/lb)
- Refer to Table 2803.1

2804 Inside Storage

- Use Groups-A, B, E, F, I and R

  Maximum quantities:

  – (a) 1,000lbs--level 2
  – (b) 500lbs--level 3
  – (c) 1,000lbs--levels 2 & 3 combined
  – May be increased 100% if in approved cabinets

2804 Warehouse Storage

TABLE 2804.3.1
NONSEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS IN GENERAL PURPOSE WAREHOUSES[b]

AEROSOL LEVEL	MAXIMUM NET WEIGHT PER FLOOR (pounds)[b]			
	Palletized or solid-pile storage		Rack storage	
	Unprotected	Protected[a]	Unprotected	Protected[a]
2	2,500	12,000	2,500	24,000
3	1,000	12,000	1,000	24,000
Combination 2 and 3	2,500	12,000	2,500	24,000

TABLE 2804.3.2.2
SEGREGATED STORAGE AISLE WIDTHS AND DISTANCE TO AISLES IN GENERAL PURPOSE WAREHOUSES

STORAGE CONDITION	MINIMUM AISLE WIDTH (feet)	MAXIMUM DISTANCE FROM STORAGE TO AISLE (feet)
Solid pile or palletized[a]	4 feet between piles	25
Racks with ESFR sprinklers[a]	4 feet between racks and adjacent Level 2 and 3 aerosol product storage	25
Racks without ESFR sprinklers[a]	8 feet between racks and adjacent Level 2 and 3 aerosol product storage	25

For SI: 1 foot = 304.8 mm.

a. Sprinklers shall comply with NFPA 30B *as listed in rule 1301:7-7-45 of the Administrative Code.*

- Table 2804.3.1 By amount-either protected or unprotected.
- Table 2804.3.2 Maximum allowable area by percent of building and square feet.
- Table 2804.3.2.2 Aisles required

2804.3.2.1 Chain-Link Fence Enclosures

- Chain-link fence enclosures are an important aspect of fire & life safety in relation to storage of aerosols
- Fencing must meet certain criteria for installation/egress

Important Criteria for Aerosol Storage

- Proper segregation of aerosols
- Proper storage management (racked, solid piles, etc.)
- Automatic sprinkler system, if required
- Chain-link fencing, if required

2806 Retail Display

- 2806.2 Level 2 and 3 retail display
  - maximum 1,000lbs in any 10ft x 10ft area.
- Areas adjacent to retail displays,Table 2806.3

Maximum net weight per floor (pounds)[b]			
Floor	**Unprotected[a]**	**Protected in accordance with *paragraph* (F)(2)(2806.2)[a,c] *of this rule***	**Protected in accordance with *paragraph* (F)(3)(2806.3)[c] *of this rule***
Basement	Not allowed	500	500
Ground	2,500	10,000	10,000
Upper	500	2,000	Not allowed

1301:7-7-29 Rule 29

Combustible Fibers

2902, 2903, and 2904

- **2902.1 Combustible Fibers –** Readily ignitable and free-burning materials in a fiberous or shredded form
- **2903.3** Minimum clearance of 3 feet between bottom of sprinklers and top of fiber piles.
- **2903.4** Hay, straw or similar agricultural products shall not be stored next to combustible structures unless separation as wide as the height of pile is maintained.
  - Stacks limited to 100 tons each
  - Minimum 20 ft. separation
- **2904 Loose Fiber Storage –** Storage quantities limited to fire protective rating and protection provided

1301:7-7-30 Rule 30

Compressed Gases

3003.5.3 Securing Cylinders

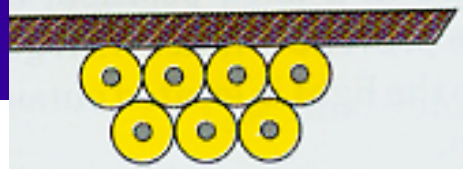
- Secured to prevent falling or being knocked over, except when being examined, serviced or refilled. And at locations where cylinders are frequently moved, ***nesting*** is permitted.

Definition

- ***Nesting*:** A method of securing flat-bottomed compressed gas cylinders upright in a tight mass utilizing a contiguous three-point contact system …..

PROPER CYLINDER NESTING

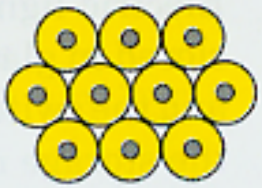
Wall Supported



Three Point Contact System

All cylinders are in contact on three points—either with other cylinders or wall

Nested Unsupported

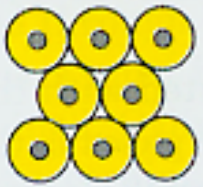


Three Point Contact System

All cylinders are in contact with other cylinders on three points

IMPROPERLY NESTED CYLINDERS

Improperly Nested Cylinders

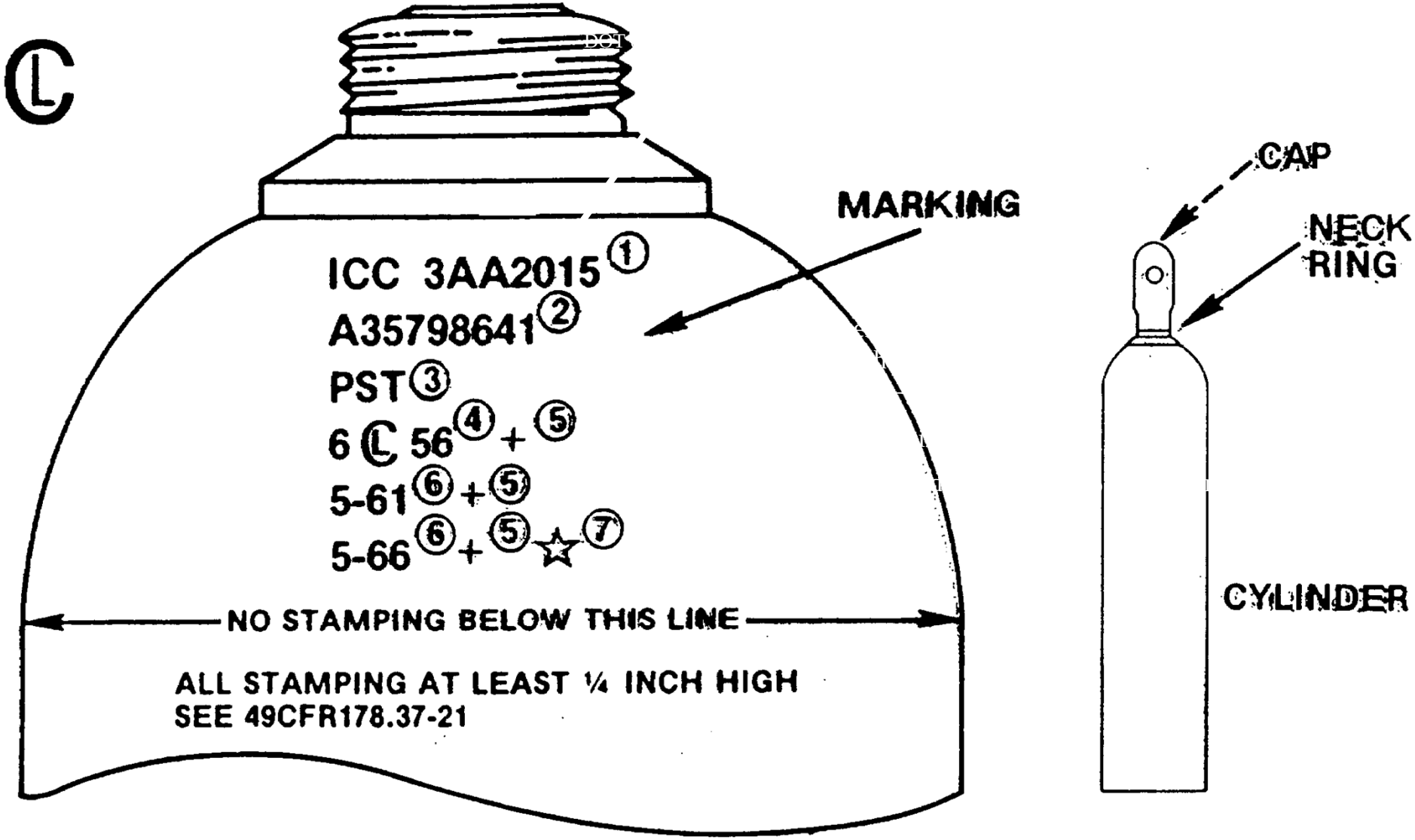


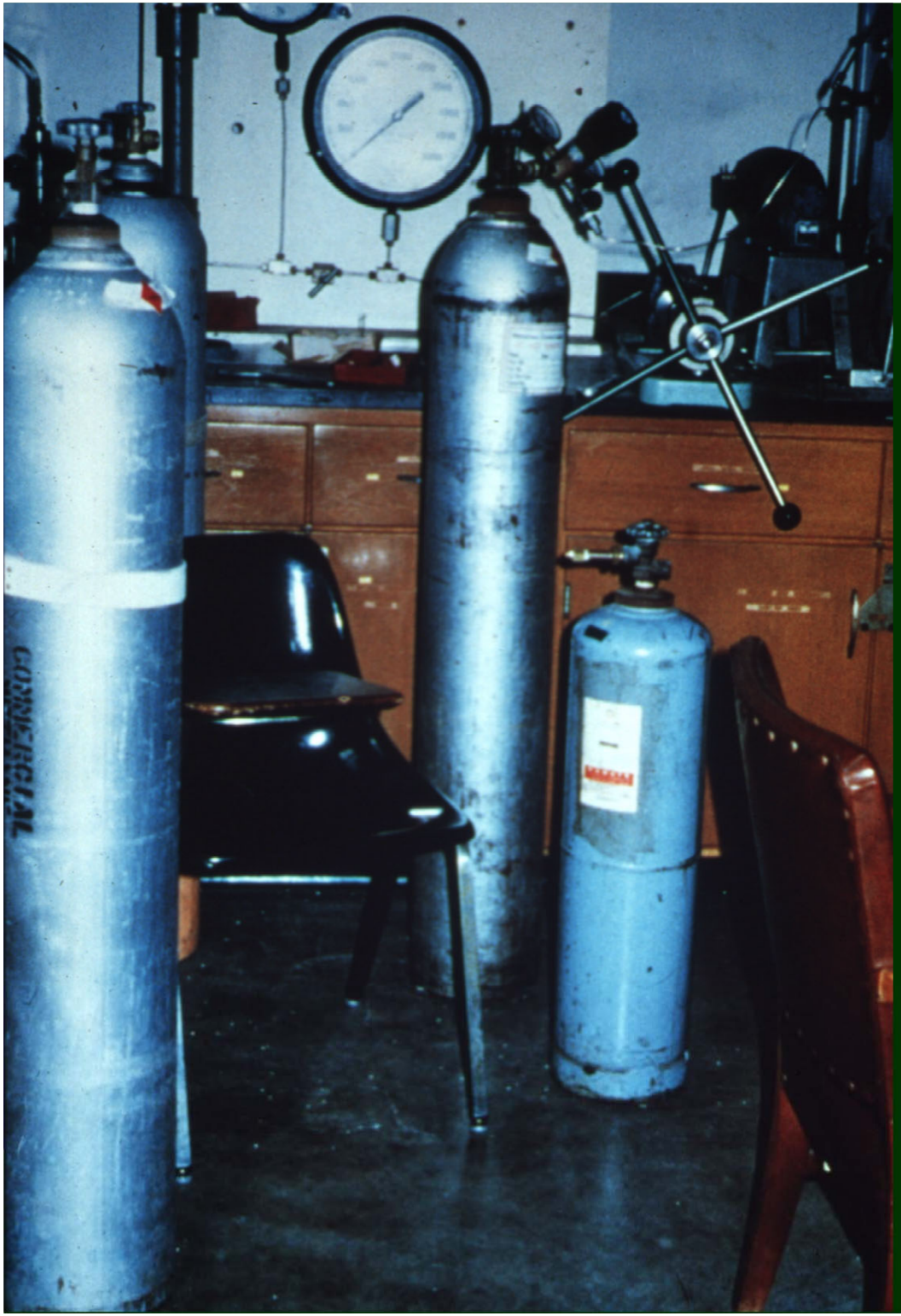
End cylinders in contact with other cylinders on only two points

Improperly Nested Cylinders

End cylinders not in contact with other cylinders on three points

178.36 to 178.68 Subpart C Specifications for Cylinders.




COMMERCIAL

DU PONT
FREON 12

3003 General

- **3003.6** Valves to be protected by caps, collars or other devices
- **3003.7.2** Minimum of 10 ft. separation from containers and combustible waste, vegetation, etc.
- **3003.14** When extreme temps prevail covers shall be installed
- **3003.15** Approved natural or artificial lighting shall be provided

3006 Medical Gas Systems

- Interior storage of medical gasses must be for medical gasses only
- 1 hour exterior room – fire separated by 1 hour and 1 hour opening protective
- Must have 1 exterior wall with 1 vent each at top & bottom of room and must have an automatic fire sprinkler
- 1 hour interior room; if no exterior wall, must have automatic sprinkler
  - Room must exhaust to the exterior; supply & exhaust in a shaft with 1 hour rating
  - Must have mechanical ventilation

1301:7-7-31 Rule 31

Corrosive Materials

3100 General

- 3101 Scope – note the 3 exceptions to compliance
- Definition: A chemical that causes visible destruction of, or irreversible alterations, in living tissue by chemical action at the point of contact.
- See Table 2703.1 for maximum quantities
- Floors to be of liquid tight construction
- AST over 1000 gals. Shall have secondary containment.
- Distance to exposure must be met from buildings not associated with the manufacture of distance of the corrosives, also from lot lines, public utilities, etc.

1301:7-7-32 Rule 32

Cryogenic Fluids

3200 General

TABLE 3203.6.1
SEPARATION OF STATIONARY CONTAINERS FROM EXPOSURE HAZARDS

EXPOSURE	MINIMUM DISTANCE (feet)
Buildings, regardless of construction type	1
Wall openings	1
Air intakes	10
Lot lines	5
Places of public assembly	50
Nonambulatory patient areas	50
Combustible materials such as paper, leaves, weeds, dry grass or debris	15
Other hazardous materials	In accordance with *rule 1301:7-7-27 of the Administrative Code*

For SI: 1 foot = 304.8 mm.

- Definition: A fluid having a boiling point lower than –130 degrees F at 14.7 psi.
- Containers and piping systems shall be labeled
- Nesting is acceptable means of securing cylinders
- Piping systems shall be tested

Other General Information

- Pressure relief and venting devices are important
- Markings – NFPA 704 signage on portable containers per Rule 27
- Piping and adjunct piping systems must be labeled
- Emergency shut-off valves must be labeled

Review Questions

1. EXIT signs are required in tents, when the exit serves an occupant load of ____ or more.
2. The torch valve shall be closed and the gas supply to the torch completely shut off when gas cutting or welding operations are discontinued for a period of _____ or more.
3. Manufacturing facilities of aerosols shall be in accordance with NFPA _____ _____.

Review Answers

1. EXIT signs are required in tents, when the exit serves an occupant load of ____ or more. **50 (2403.12.6)**
2. The torch valve shall be closed and the gas supply to the torch completely shut off when gas cutting or welding operations are discontinued for a period of _____ or more. **1 hour (2605.6)**
3. Manufacturing facilities of aerosols shall be in accordance with NFPA _____ _____. **30B 1997 Edition (2807.1)**

1301:7-7-33 Rule 33

Explosives and Fireworks

3301 General

3301.1 **Exemptions:**

- Military & government.
- When used in medicines.
- 1 lb. black powder, 20 lbs. smokeless powder, 10,000 rounds of small arms primers.
- Explosive materials used by government agencies in performance of duties
- Special industrial devices with less than 50 lbs. of material

3301.1 Exemptions - Continued

- **Transportation IAW DOTn 49 CFR Parts 100-185 *as listed in rule 1301:7-7-47*.**

What is 1301:7-7-47 ?

- What is DOTn ?
- What is DOTy ?

Also look at: *3309 Shipping and Transportation*

3301.1.3 Fireworks Prohibited

- Possession, manufacture, storage, sale, handling, exhibition & use of fireworks is PROHIBITED – except as permitted in 3743 of the ORC

3301.2 Permit Required

3301.2 Permits required for explosive storage, manufacturing, storage, and processing

3301.2.2 No storage within 100 ft. of habitable dwellings

3301.2.5 Financial responsibility:

- Explosives manufacturing/processing $1,000,000
- Blasting must have a bond to cover all damages
- Fireworks $1,000,000 bond or insurance

3301 Continued

3301.4 Persons in charge of magazines, blasting, fireworks exhibitions, or pyrotechnic special effects shall be at least 21 years of age

3301.7 Seizure. (ORC 3743.6)

- 3301.7.1 Fire marshal to be notified within 3 days of seizure of fireworks
- 3301.7.2 Fireworks shall be disposed of in accordance with rules set forth by state fire marshal

3302 Definitions

- UN/DOTn Class 1 Explosives:

3302 Definitions

- Black match- fuse made by impregnating thread with black powder, used to ignite pyrotechnic devices
- Fireworks
  - 1.1G Fireworks – Display fireworks (UN0333)
  - 1.2G Fireworks – Display fireworks (UN0334)
  - **1.3G Fireworks - Display fireworks (UN0335)**
  - **1.4G Fireworks – Consumer Fireworks (UN0336)**
  - **1.4G Special Effects Fireworks – Indoor use (UN0431)**
  - **1.4S Fireworks – Pyrotechnic devices for professional use**
  - **1.4S Special Effects Fireworks – Indoor use (UN0432)**

1.4G Fireworks

1.4G Fireworks that are exempt (legal) under ORC 3743.80.

Trick & Novelty 1.4G

Legal in Ohio

SMOKE SPARKLERS SNAP SNAKES

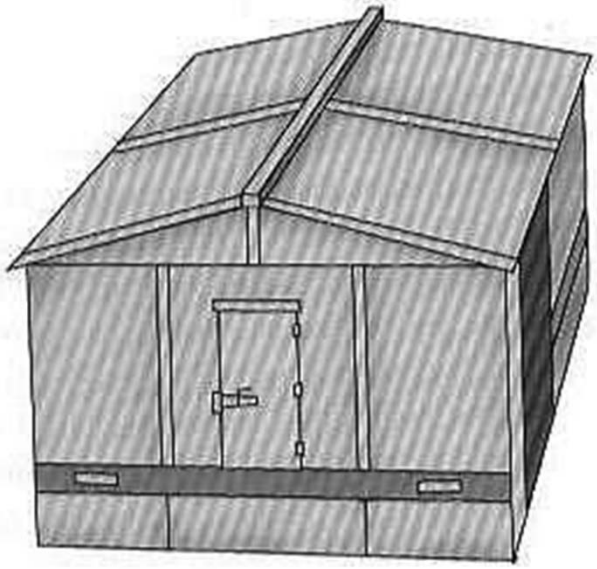
Trick and Novelty fireworks are sold everywhere.

Trick and Novelty

3302 Definitions

- Explosive magazines:
  - Type 1-Permanent structure
  - Type 2-Portable or mobile
  - Type 3-Portable (“day box”)
  - Type 4-Portable or mobile
  - Type 5-Portable or mobile

TYPE 1

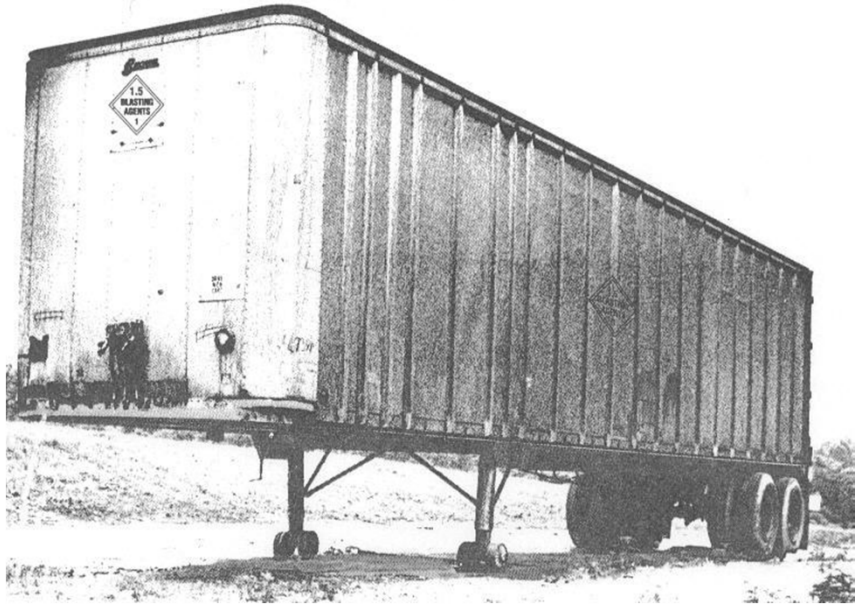


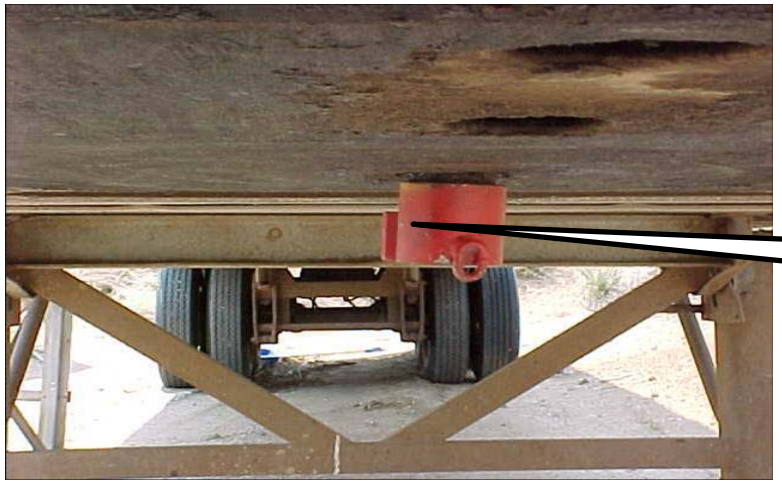
Type 2

TYPE 3

Type 4 (Permanent, Portable, or Mobile)

TYPE 5





Theft resistant

3303 Record Keeping & Reporting

- Transaction record keeping length varies for explosives/fireworks
- Loss/theft of explosives or fireworks must be reported to the FCO, local law enforcement, and to BATF within 24 hours
- Local FCO must cooperate with SFM in joint investigation

3303 Record Keeping & Reporting

- 3303.4.1 When accidents involving explosives or fireworks occur the local FCO must immediately make a report to the SFM and hold the scene until released by the SFM

3304 Storage of Explosives

TABLE 3304.3
STORAGE AMOUNTS AND MAGAZINE REQUIREMENTS FOR EXPLOSIVES, EXPLOSIVE MATERIALS AND FIREWORKS 1.3G MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA

New UN/DOTn division	Old DOTn class	ATF/OSHA class	INDOOR[a] (pounds)				OUTDOOR (pounds)	MAGAZINE TYPE REQUIRED				
			Unprotected	Cabinet	Sprinklers	Sprinklers & cabinet		1	2	3	4	5
1.1[b]	A	High	0	0	1	2	1	X	X	X	—	—
1.2	A	High	0	0	1	2	1	X	X	X	—	—
1.2	B	Low	0	0	1	2	1	X	X	X	X	—
1.3	B	Low	0	0	5	10	1	X	X	X	X	—
1.4	B	Low	0	0	50	100	1	X	X	X	X	—
1.5	C	Low	0	0	1	2	1	X	X	X	X	—
1.5	Blasting Agent	Blasting Agent	0	0	1	2	1	X	X	X	X	X
1.6	N/A	N/A	0	0	1	2	1	X	X	X	X	X

For SI: 1 pound = 0.454 kg, 1 pound per gallon = 0.12 kg per liter, 1 ounce = 28.35 g.

a. A factor of 10 pounds per gallon shall be used for converting pounds (solid) to gallons (liquid) in accordance with *paragraph (C)(1)(b)(2703.1.2) of rule 1301:7-7-27 of the Administrative Code.*

b. Black powder shall be stored in a Type 1, 2, 3 or 4 magazine as provided for in *paragraph (D)(3)(a)(3304.3.1) of this rule.*

3304.5.1 Indoor Magazines

3304.5.1.1 Limited to Use Groups F, H, M, or S.

- Construction requirements:
  - Fire and theft resistant
  - Painted Red
  - Fitted with wheels so can be moved in emergency
  - Marked with 3 in letters “EXPLOSIVES-KEEP FIRE AWAY”
  - Least horizontal dimension shall not be more than entrance door. (So it can be moved in and out)

3304.5 Indoor Magazines

3304.5.1.3 Limit of 50 lbs. of explosives in magazine

3304.5.1.4 Shall not be used in Use Group R

3304.5.1.5 Shall be located within 10 feet of entrance

3304.5.1.6 No more than 2 in same building separated by a min. of 10 ft.

3304 Continued

3304.6.5 Properties with Type 1 and outdoor types 2, 4, & 5 shall have signs reading, **EXPLOSIVES-KEEP OFF.**

3304.9 Magazines with explosives are to be inspected every 7 days.

- Inspections shall be documented and kept for a min. of one year.

3304.10. Disposal of Explosive Materials

3304.10.2 Contact the manufacturer to obtain disposal and handling instructions.

3304.10.3 Only qualified people to dispose of.

3304.10.4 Misfires from fireworks or blasting operations shall be stored in a magazine until disposal.

3305 Manufacture, Assembly & Testing of Explosives and Fireworks

- 3305.2.1 Hazardous Materials Management Plan (HMMP) and Hazardous Materials Inventory Statements (HMIS) are required.
  - Must comply with rule 1307:7-7-04

Examples of Explosive Materials

- The following slides show a variety of different explosive materials.

Various Types of Explosives

APEX ULTRA 60
Explosives
APEX ULTRA

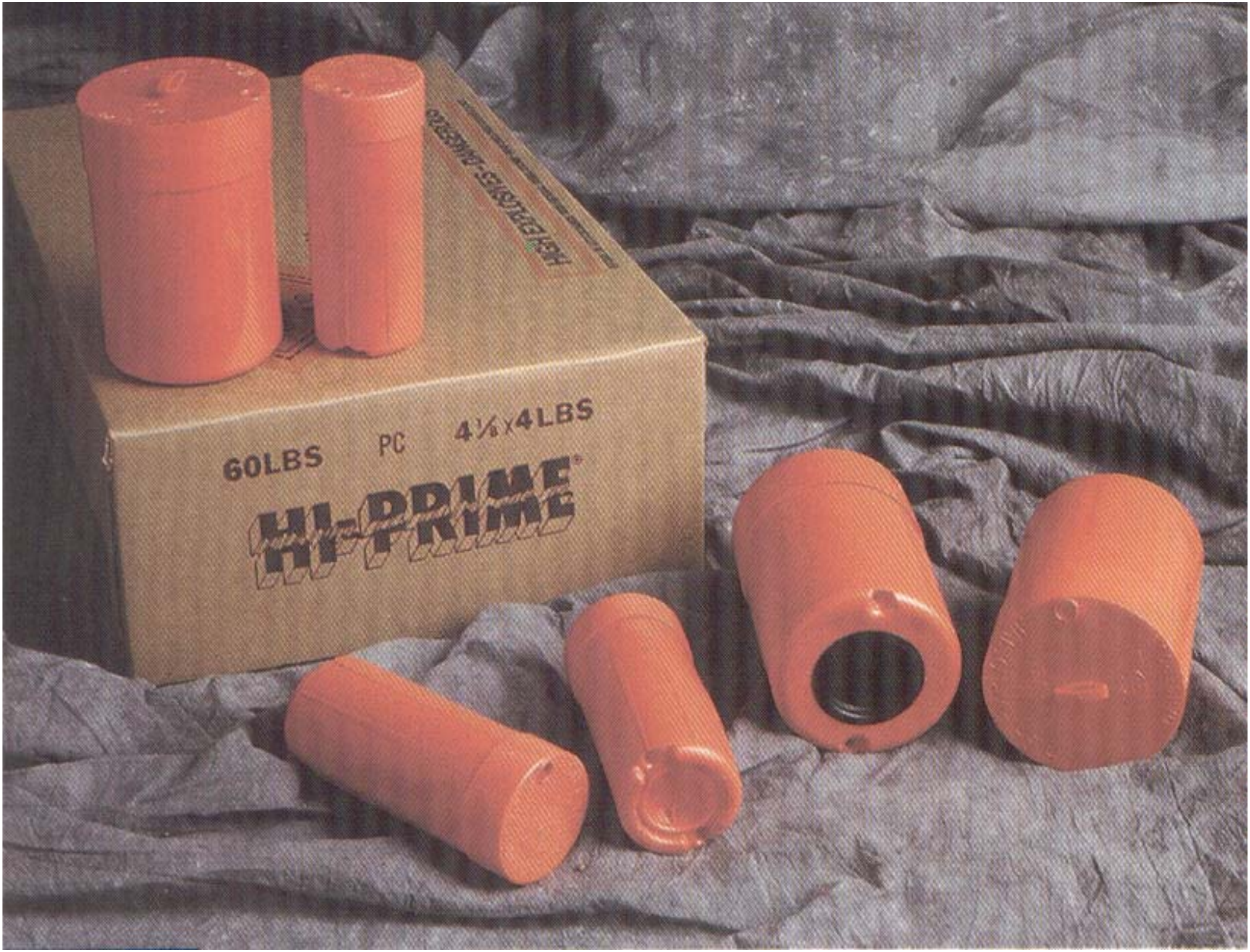
SEISPRIME E
ICI
Explosives

SUPERFRAC
8000
ICI
Explosives
25 kg
55 #

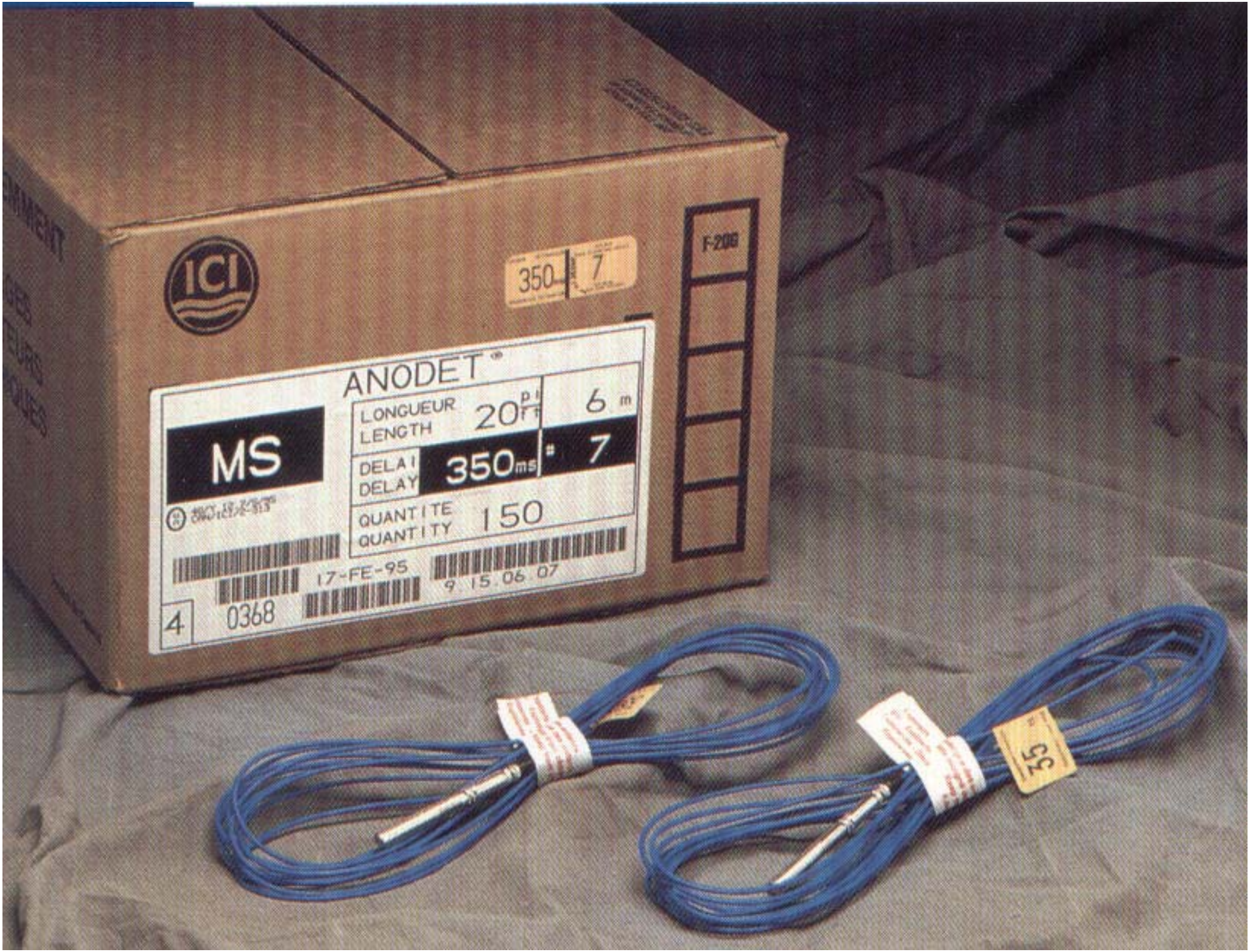
45-400
1¼"x16" sw
SUPERFRAC
6100p
25 kg
55 #
ICI
Explosives

High Explosives-Dangerous
Explosifs-Dangereux
This side up
POWERSPLIT
7/8X 16L1
81 2 92
100#

50 x 200
2" x 8" SRS
POWER PRIMER
ICI
Explosives
25 kg
55 #


60LBS
PC
4⅛x4LBS
HI-PRIME

ICI
Explosives
Explosifs
NITROPEL®
(Trinitrotoluène)
(High Explosives)
Explosives – Dangerous
Explosifs – Dangereux
Special permission required for underground use.
Obtenir la permission pour toute utilisation souterraine.
25 kg
EXPLOSIVE A
1.1D
UN 0209
ICI Canada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PRODUCT OF CANADA
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POWERCORD™ 100
cordeau détonant
detonating cord
300m / 984'
ICI Explosifs
06-FE-95

EXPLOSIVE
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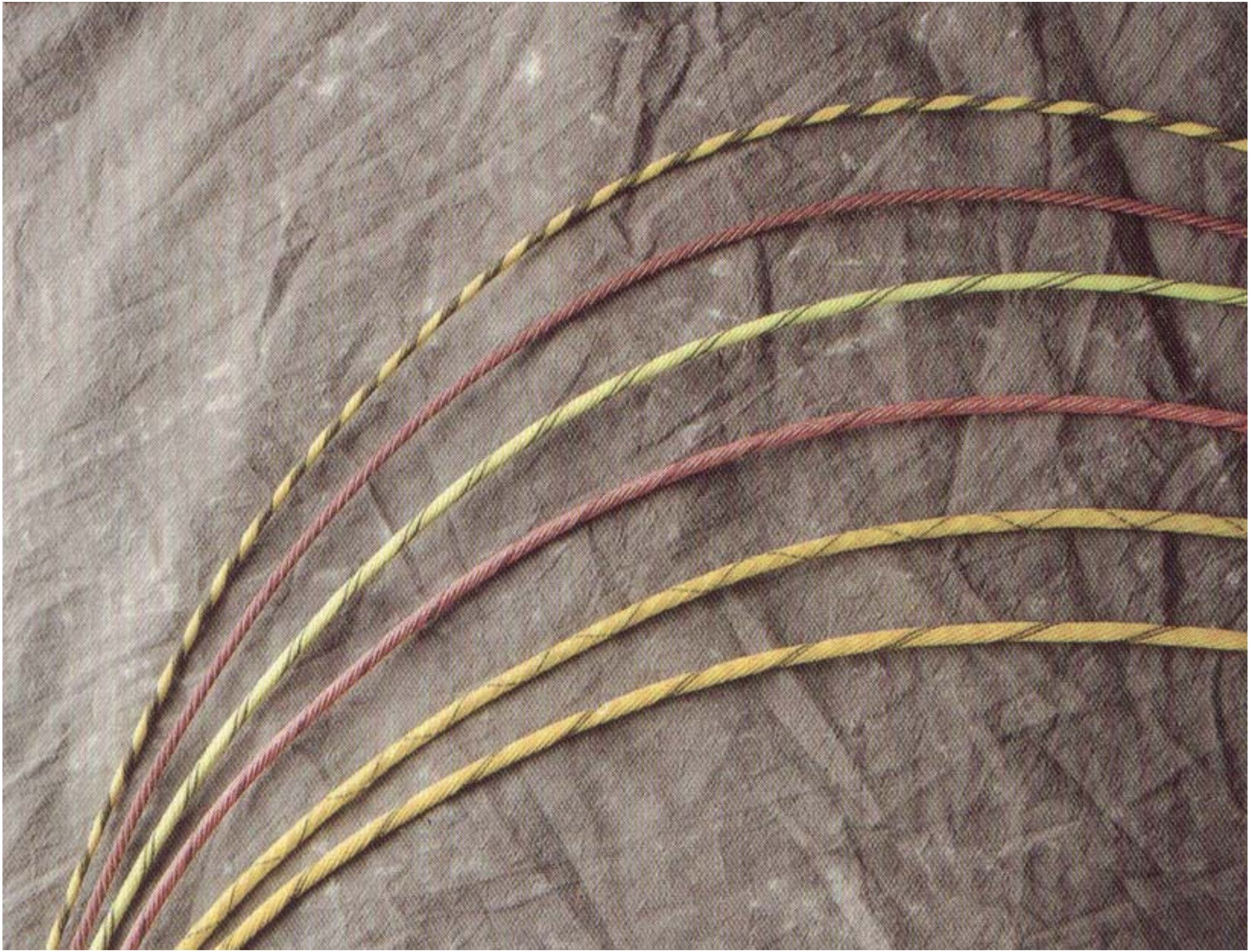
ICI Explosifs
17-MA-92



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ATLAS
POWDER COMPANY
DANGEROUS
EXPLOSIVES
KEEP FROM CHILDREN
LOCK UP
AFTER USE
STATICMASTER
12 3.5
50

PENTEX™ 16
ICI Explosives
60 units
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27.2 kg
EXPLOSIVE
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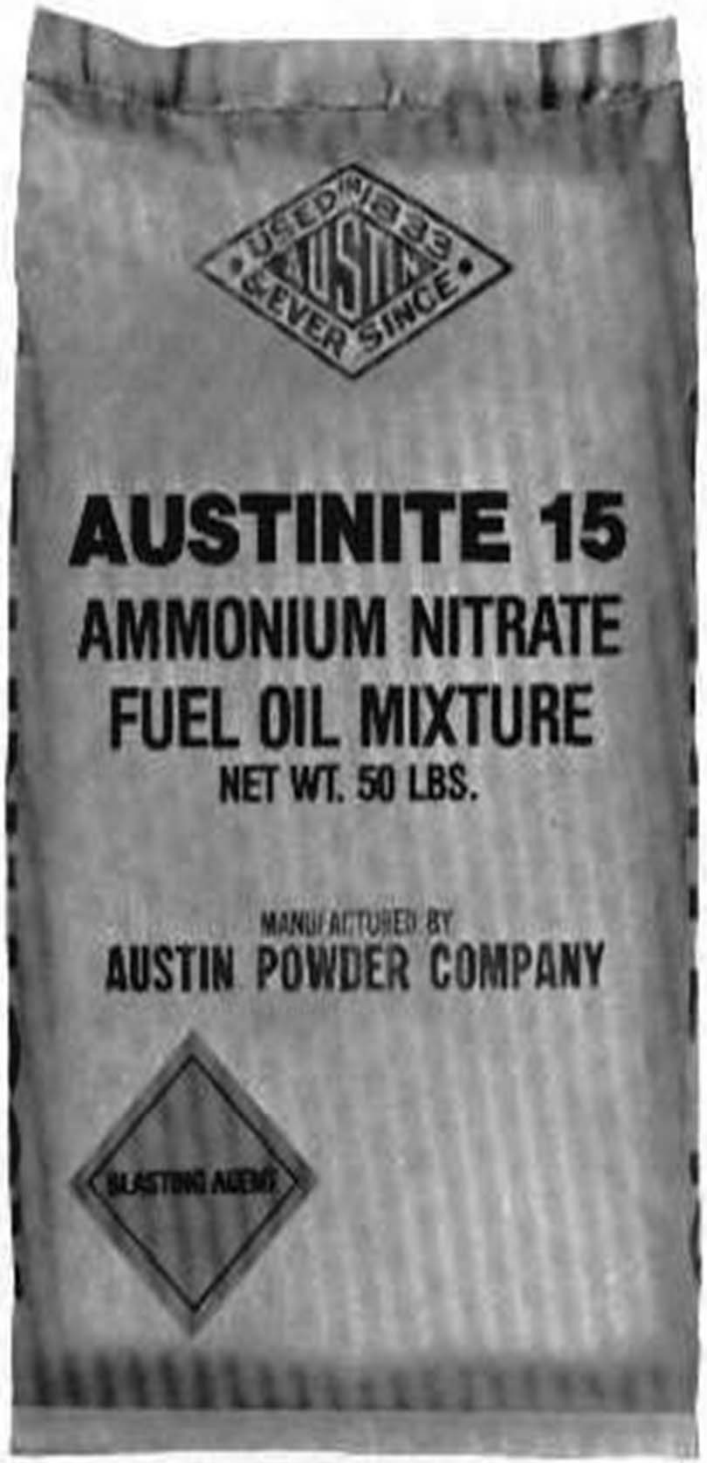
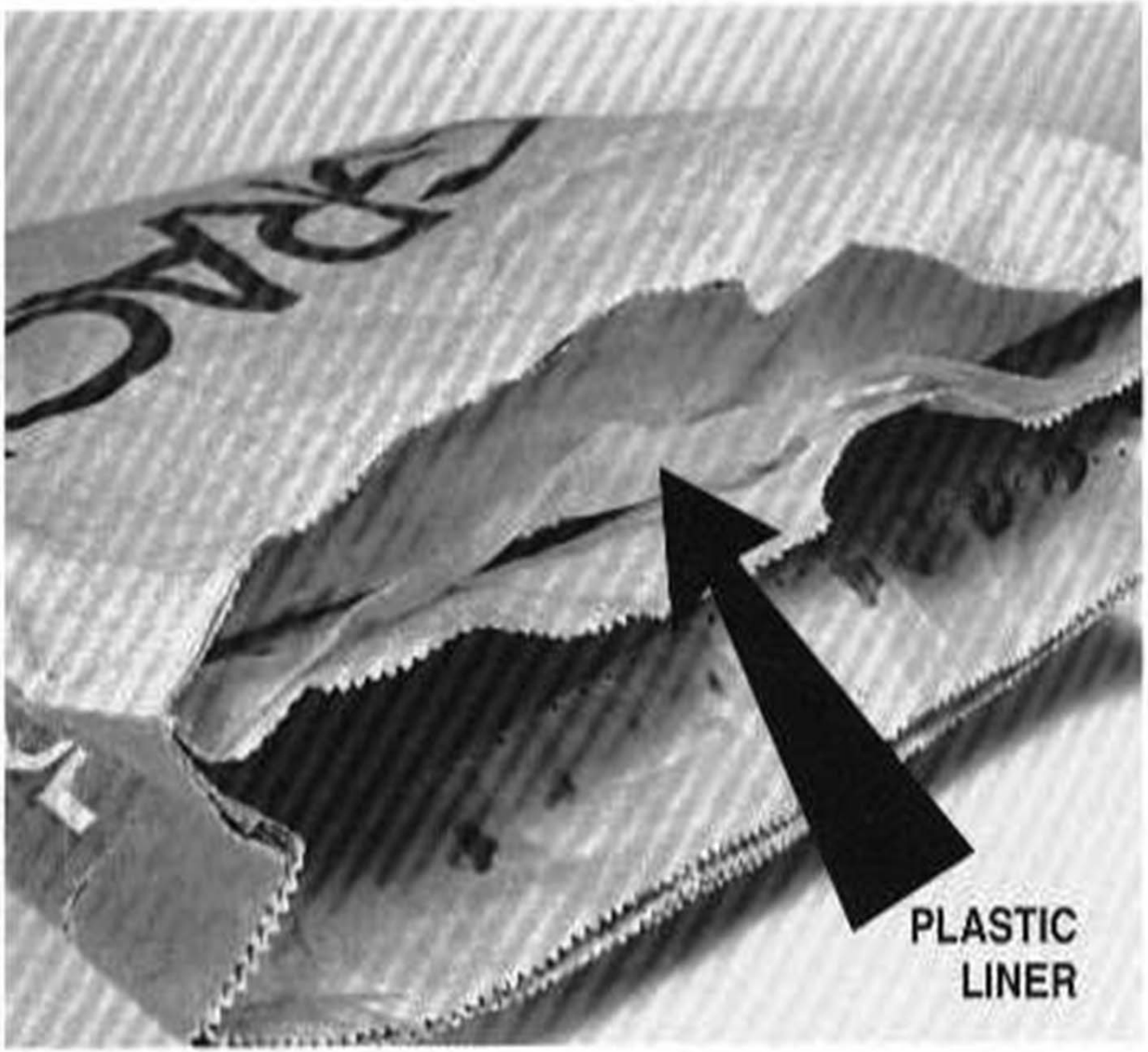
16

FFg
GOEX
EXPRESS
BLACK POWDER
DANGER!
EXPLOSIVE!
EXTREMELY FLAMMABLE AND EXPLOSIVE!
FIRE OR EXPLOSION CAN CAUSE SERIOUS
BODILY INJURY OR DEATH!
KEEP OUT OF REACH OF CHILDREN!
KEEP AWAY FROM HEAT, SPARKS
AND OPEN FLAME!
AVOID IMPACT AND FRICTION!
You must read warnings on side and back of can!
NEW WT. 10 OZ. (454 G.)


USED IN 1833
AUSTIN
EVER SINCE
AUSTINITE 15
AMMONIUM NITRATE
FUEL OIL MIXTURE
NET WT. 50 LBS.
MANUFACTURED BY
AUSTIN POWDER COMPANY
BLASTING AGENT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3308 Fireworks Exhibition

3308 Fireworks Exhibition

- This section covers both the outdoor fireworks exhibits and the Indoor/Outdoor Pyrotechnic fireworks exhibits.
- NFPA 1123
  - Outdoor exhibits
- NFPA 1126
  - Pyrotechnic exhibits before a close audience
  - Outdoor or indoor

3308 Fireworks Exhibition

3308.1 - 1.1G, 1.2G, 1.3G & 1.4G cannot be displayed indoors

-A permit shall be obtained from the local fire official and law enforcement officer of the jurisdiction for a fireworks exhibition

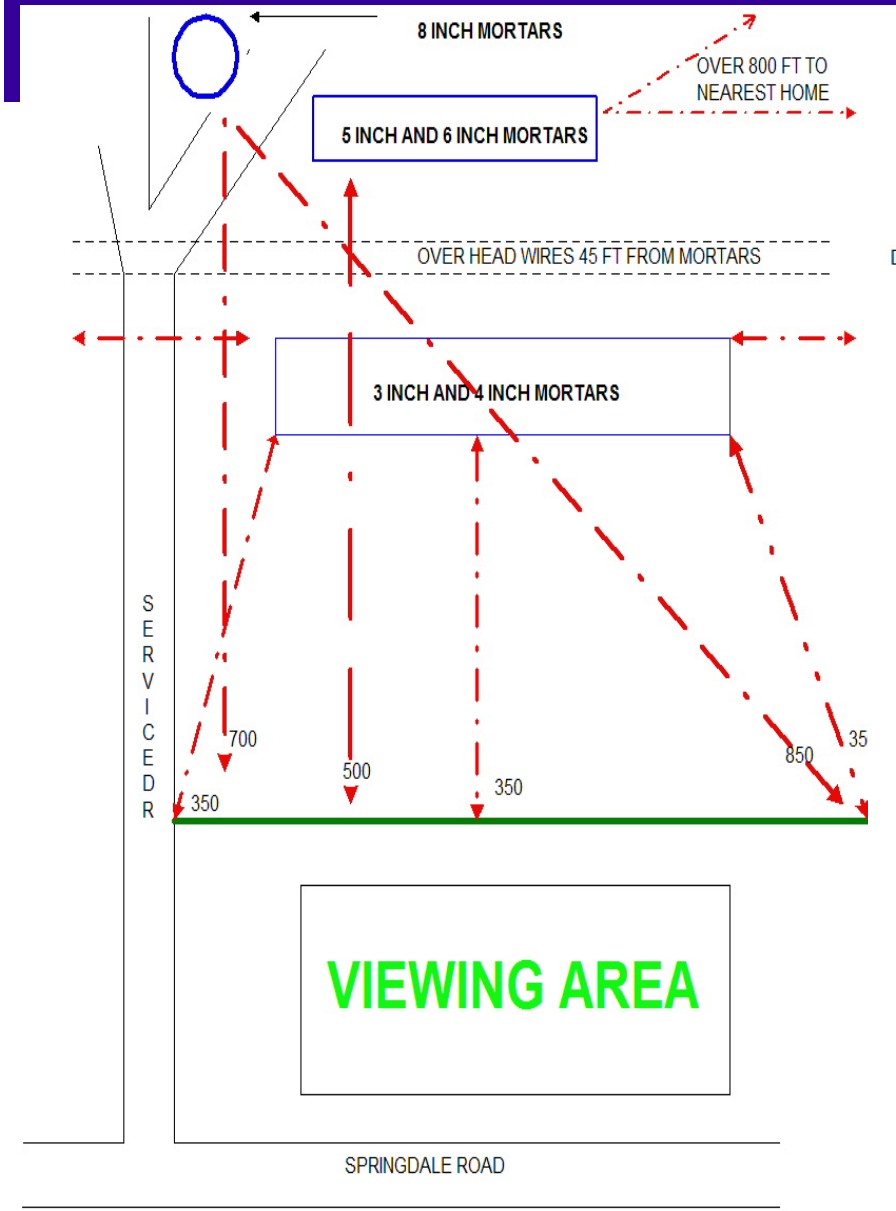
3308 Fireworks Exhibition Cont.

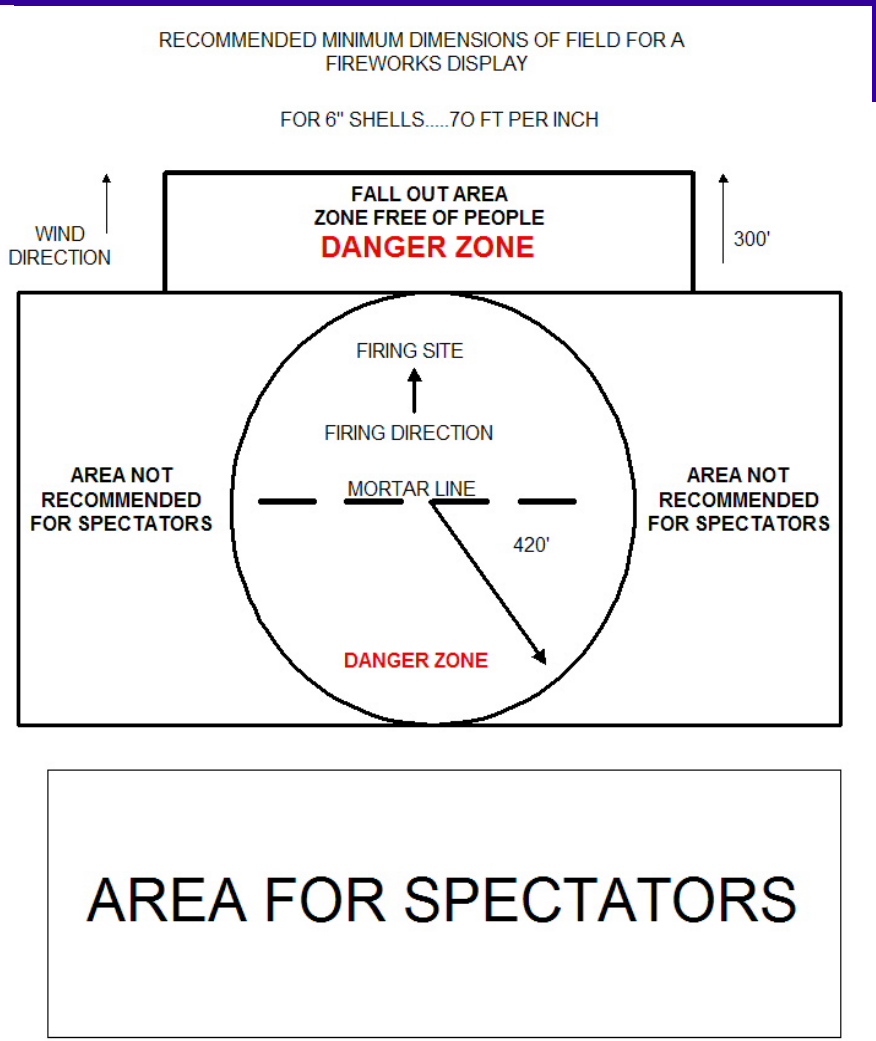
3308.2 Issued 5 days prior to exhibition.

3308.3 Local political subdivisions may charge a permit fee, not required.

3308.4 Site to be inspected to determine compliance with ORC 3743, NFPA 1123 & 1126 prior to issuing permit

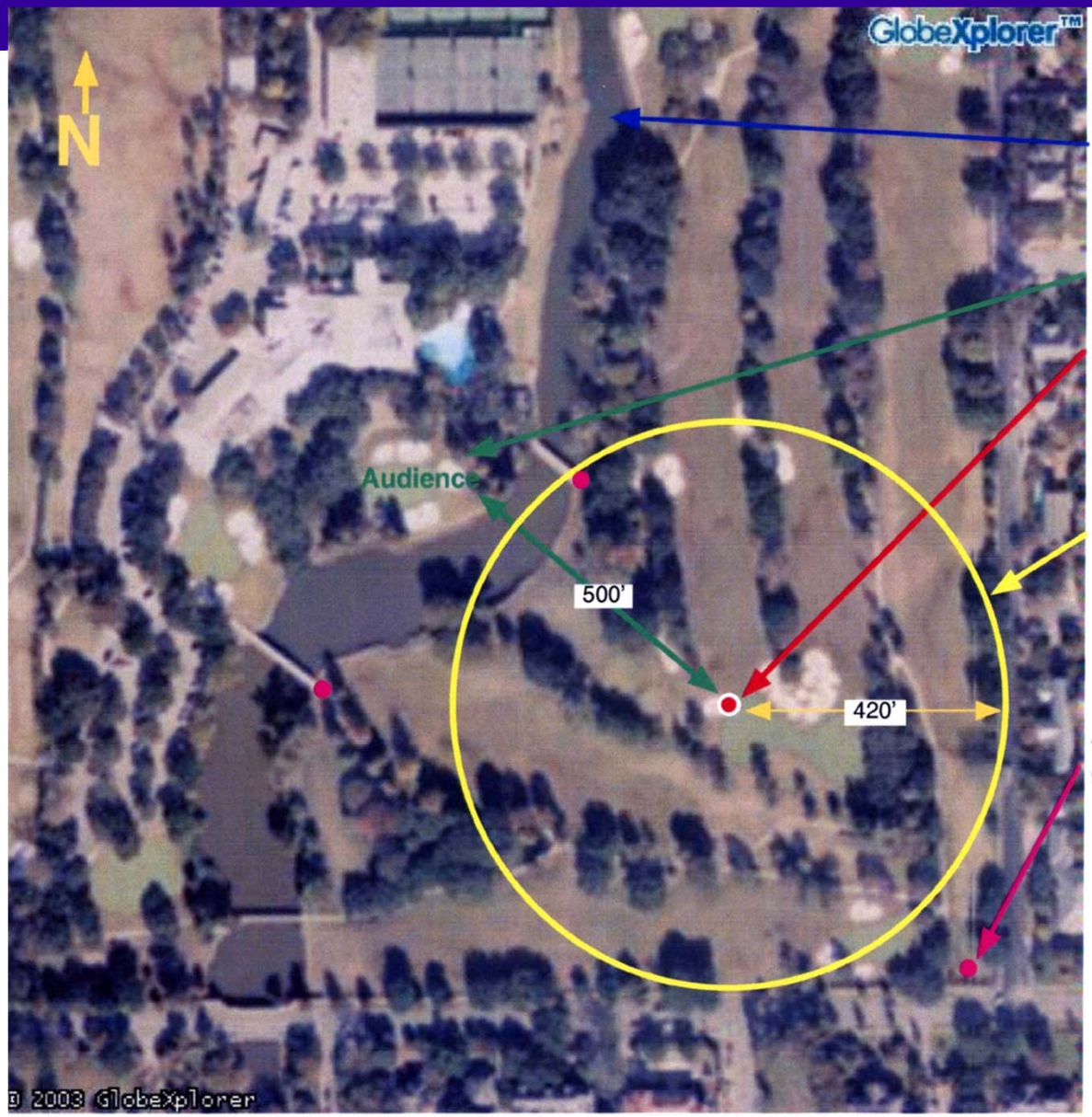
3308.4 Site Inspection Diagram





IN SELECTING A FIREWORKS FIRING SITE, THE FIRST AND MOST IMPORTANT CONSIDERATION IS THE SEPARATION DISTANCE BETWEEN THE DISCHARGE AREA SPECTATORS, BUILDINGS, EQUIPMENT, AND VEHICLES

Distances: 3308.4



Dallas Country Club
4100 Beverly Drive
Dallas, Texas

There are no boats in the pond.

This is private property with limited public access.

The audience is located in the grass by the club house.

Firing Site is located in the middle of an open golf course.

The safety perimeter is a circle with a radius of 420 feet, centered on the firing site. The safety perimeter encompasses the fallout area.

There are three (3) security guards for the firing site (•).

© Copyright 2004 - Pyrotex, Inc.

3308 Fireworks Exhibition

- **3308.5** Inspection Checklist to be completed prior to show. Permit & Checklists are in the Appendix

3308.5 Inspection Checklist

Department of Commerce
Division of State Fire Marshal
8895 East Main Street, Reynoldsburg, Ohio 43068
(614) 752-7126 Fax (614) 995-4206
TTY/TDD 800-750-0750
www.com.ohio.gov

Checklist for Outdoor Fireworks Or Proximate Audience Exhibition

Permit # _____

Date & Time of Exhibition	**Exhibitor's Name**
County & City of Exhibition	**Exhibitor's License #**
FD Name & FDID #	**Exhibitor's Phone**
Exact Location of Event:	

**** Initialing each step indicates that step has been completed ****	Fire Official Initial	Exhibitor Initial
1. Was insurance or bond of $1,000,000.00 or more verified?		
2. Was product purchase verified to be from a licensed Ohio Wholesaler, Ohio Manufacturer, or Out-of-State Shipper with a shipping permit? License # _____		
3. Has exhibitor identified names of all assistants who will be present? Has exhibitor provided copies of all licenses and permits?		
4. Was the site inspection conducted prior to issuing permit? Date of site inspection: _____		
5. Have locations, distances, and details of the site plan been verified for accuracy?		
6. Does the proposed location for temporary storage (up to 14 days) of fireworks comply with this rule?		
7. Is adequate fire protection available?		
8. Does distance to spectator area comply with a minimum of 70 feet per inch of largest shell, and/or close proximity separation distances for audiences in accordance with NFPA 1126?		
9. Is the display site selection in accordance with of NFPA 1123 (Chapter 5, site selection) and/or NFPA 1126 as listed in rule 1301:7-7-45 of the Administrative Code?		
10. When the fireworks arrived at the site, were they in a properly placarded vehicle/trailer?		
11. If the show requires reloading of fireworks, are the extra fireworks properly secured in a ready box, 25 feet upwind of the mortars?		
12. Was the condition of mortars checked for damage, dents, broken plugs, etc?		
13. Are all shells greater than or equal to 8" in diameter provided with electronic ignition?		

3308.5 Inspection Checklist

Department of Commerce
Division of State Fire Marshal
8895 East Main Street, Reynoldsburg, Ohio 43068
(614) 752-7126 Fax (614) 995-4206
TTY/TDD 800-750-0750
www.com.ohio.gov

Checklist for Indoor Fireworks Or Flame Effects Exhibition

Permit # _____

Date & Time of Exhibition	**Exhibitor's Name**
County & City of Exhibition	**Exhibitor's License #**
FD Name & FDID #	**Exhibitor's Phone**
Exact Location of Event:	

**** Initialing each step indicates that step has been completed ****	**Fire Official Initials**	**Exhibitor Initials**
1. Was insurance or bond of $1,000,000.00 or more verified?		
2. Was product purchase verified to be from a licensed Ohio Wholesaler, Ohio Manufacturer, or Out-of-State Shipper with a shipping permit? License # _____		
3. Has exhibitor provided the number, names and ages of all assistants who will be present?		
4. Was the site inspection conducted prior to issuing permit? Date of Site Inspection: _____		
5. Has all planning and use of pyrotechnics and flame effects been coordinated with the venue owner, manager, or producer?		
6. Was a written plan submitted to AHJ identifying firing and fallout area for each device, location of the audience, number & types of devices to be fired, and a description of each effect?		
7. Have locations, distances, and details of the site plan been verified for accuracy?		
8. Was certification provided that the set, scenery, rigging materials, and all materials worn by performers in the fallout area are inherently flame retardant or have been treated to be so?		
9. Was a walk through and demonstration provided and approved?		
10. Was a MSDS sheet provided for all pyrotechnic materials and fuels to be used in the effects?		

Exhibitor’s License Requirement

3308.6 - No permit issued unless exhibitor is licensed by SFM

- Applicants for permits must show their exhibitor’s license upon the request of the FCO or law enforcement officer

3308.6 Exhibitors License

New License are coming:

There are three types of fireworks exhibitors license.

Type 1-Outdoor/indoor fireworks
NFPA 1123
Type 2-Indoor fireworks
NFPA 1126
Type 3-Flame effects
NFPA 160

3308.7 Exhibition Permit Details

- Name of organization sponsoring show
- Date and time of show
- Exact location of show
- Name and license number of exhibitor who will supervise the show and personnel assisting with show
- Class of fireworks and number of pieces
- Manner and location of storage of all fireworks, not to exceed 72 hrs.
- Diagram of grounds on where show to be held
- Bond or insurance with min. 1 million dollars coverage
- Copy of all license and assistant's registration
- Name and license number of manufacture or wholesaler and shipper

3308.7 Permit

Department of Commerce
Division of State Fire Marshal
8895 East Main Street, Reynoldsburg, Ohio 43068
(614) 752-7126 Fax (614) 995-4206 TTY/TDD 800-750-0750
www.com.ohio.gov

Permit # XXXX

- ☐ **Fireworks 1.1G, 1.3G, 1.4G**
- ☐ **Pyrotechnics 1.4S**
- ☐ **Flame Effects**

Application for Exhibition Permit

Permit applications must be accompanied by all support documents required by Ohio Revised Code 3743.54 and Ohio Administrative Code 1301:7-7-33. This signed document is preliminary authorization for a fireworks exhibition to take place.

Exhibition

Location of Exhibition Site/Event: _____

Address _____ City _____ County _____

Date of Exhibition _____ Time of Exhibition _____ Rain Date _____

Sponsor _____ Sponsor Contact _____ Phone Number _____

Product

Company Supplying Fireworks _____

Phone Number _____ Ohio Manufacturer/Wholesaler/Out-of State Shipper ID _____

Address _____ City _____ State _____

r

Licensed Exhibitor Required? ☐ **Yes** ☐ **No** Ohio Exhibitor ID(s) _____

Please mark license catagory ☐ Fireworks NFPA 1123 / NFPA 1124 ☐ Special Effects NFPA 1126 ☐ Flame NFPA 160

Exhibitor Name _____ Phone Number _____

Address City State

3308.7 Exhibition Permit Cont.

- Indoor exhibition
  - Requirements for pyrotechnic product per chapter 7 of NFPA 1126
- Site diagram must include:
  - Interior of the structure & where devices will be located
  - Description of direction devices are to be fired at
  - Lines indicating where audience will be located behind

3308.8 Permit Revocation

- No valid exhibitor's license
- Site fails to conform to rules
- Failure to pay permit fee/submit required information
- Fail to provide insurance bond
- Fail to postpone fireworks show when ordered due to unsafe conditions
- Failure to store/use fireworks in approved manner
- The license exhibitor on site is not the same as on permit

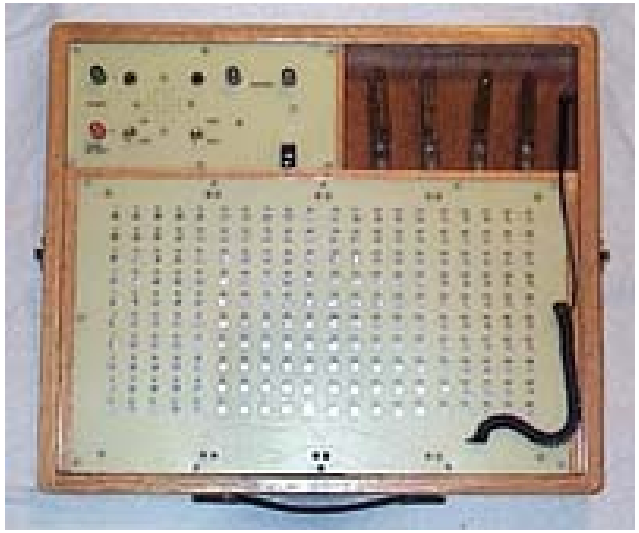
3308.9 Ceasing Operations

- Operations shall immediately cease and the fireworks exhibition shall be postponed when so ordered by the authority having jurisdiction or the licensed exhibitor due to unsafe conditions or operations, inclement weather, wind conditions, unsafe spectator conditions, or any other condition in violation of this rule.

- This order may be communicated **VERBALLY**.

3308.10.1

Mortars eight inches or larger shall be fired electronically.



NFPA 1123 (3308.10.1)

SHELL SIZE	MINIMUM RADIUS OF OUTDOOR DISPLAY SITE
2 IN (50 MM)	140 FT. (43M)
3 IN (76 MM)	210 FT. (64M)
4 IN (102 MM)	280 FT. (85M)
5 IN (127 MM)	350 FT. (107M)
6 IN (152 MM)	420 FT. (128M)
7 IN (178 MM)	490 FT. (149M)
8 IN (203 MM)	560 FT. (171M)
10 IN (254 MM)	700 FT. (213M)
12 IN (305 MM)	840 FT. (256M)
>12 IN (305 MM)	APPROVE OF AHJ

Aerial shells greater than 6" must be fired with electronic ignition equipment.

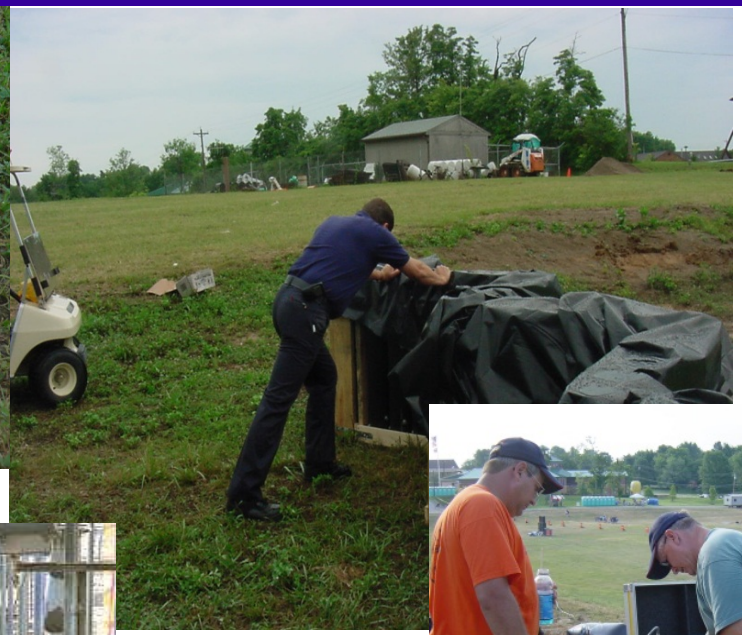
NOTE: OFC 3308.10.1 says…mortars equal to or greater than 8" must be fired with electronic ignition equipment.

Various Shell Sizes

3308.10 Safety Requirements

- All mortars and mortar racks shall conform to NFPA 1123
  - Shall not use plastic ties, string, twine tape, etc.
  - Shall be inherently stable, cannot create stability by using other mortar racks
  - Approved methods include steel stakes, sturdy wood stakes, or spikes, sandbags, A-frame braces etc.
  - Stability **shall be checked prior to show** by exhibitor and the fire official

3308.10.2.4 - The Inspection of Mortar Racks

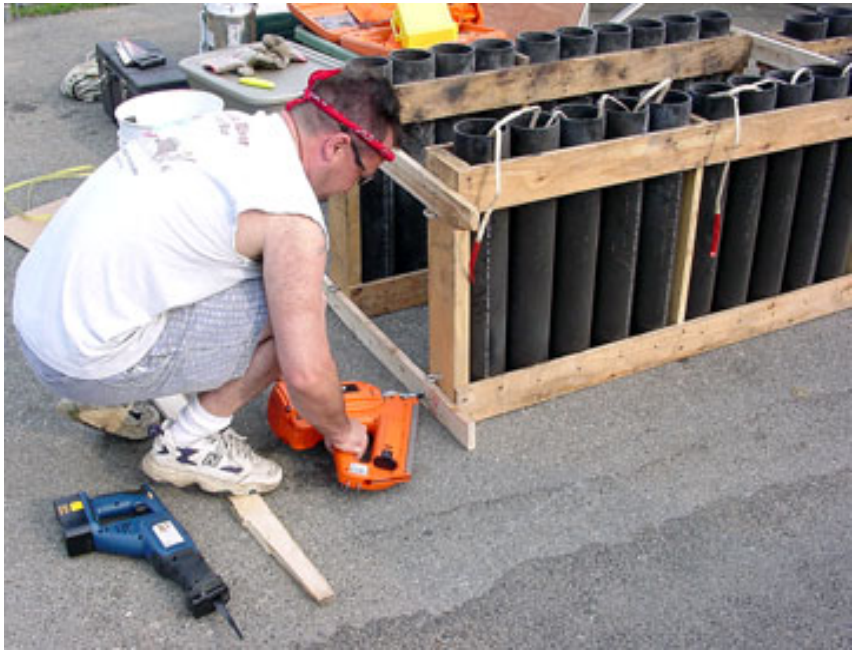


Mortar Racks

- **NFPA 1123**
- **OFC 3308.10**

Racks must be constructed and installed to be inherently stable and secure.

Stability – apply pressure and determine that it cannot fall over



MORTARS

NFPA 1123 CHAPTER 4

REQUIREMENTS FOR DISPLAY FIREWORKS AERIAL SHELLS AND EQUIPMENT

- **4.3.2 MORTARS SHALL BE POSITIONED SO THAT SHELLS ARE PROPELLED AWAY FROM SPECTATORS & OVER FALLOUT AREA.**

Examples of Mortar Racks:

Examples of Mortar Racks:

Examples of Mortar Racks:

Examples of Mortar Racks:

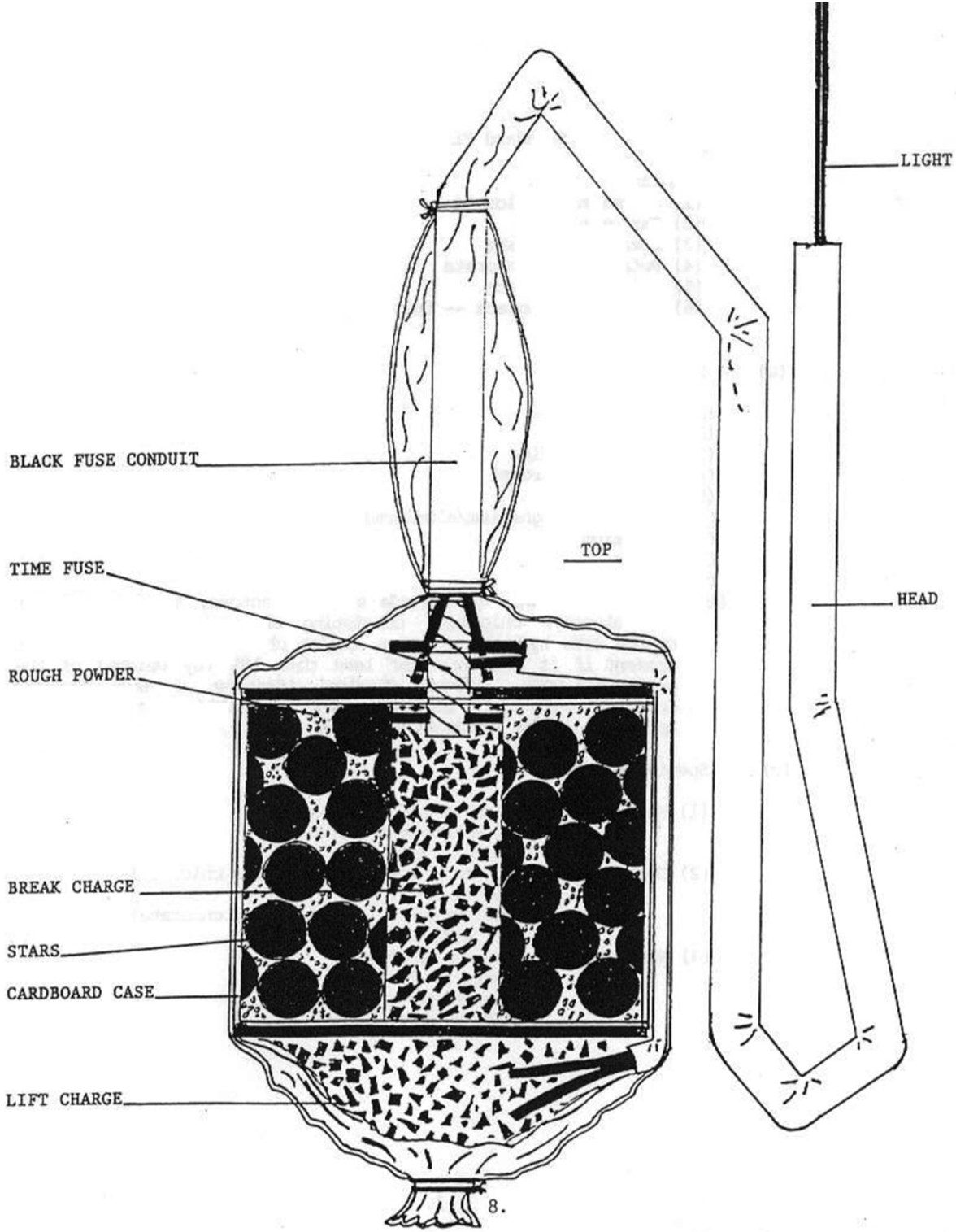
Examples of Mortar Racks:

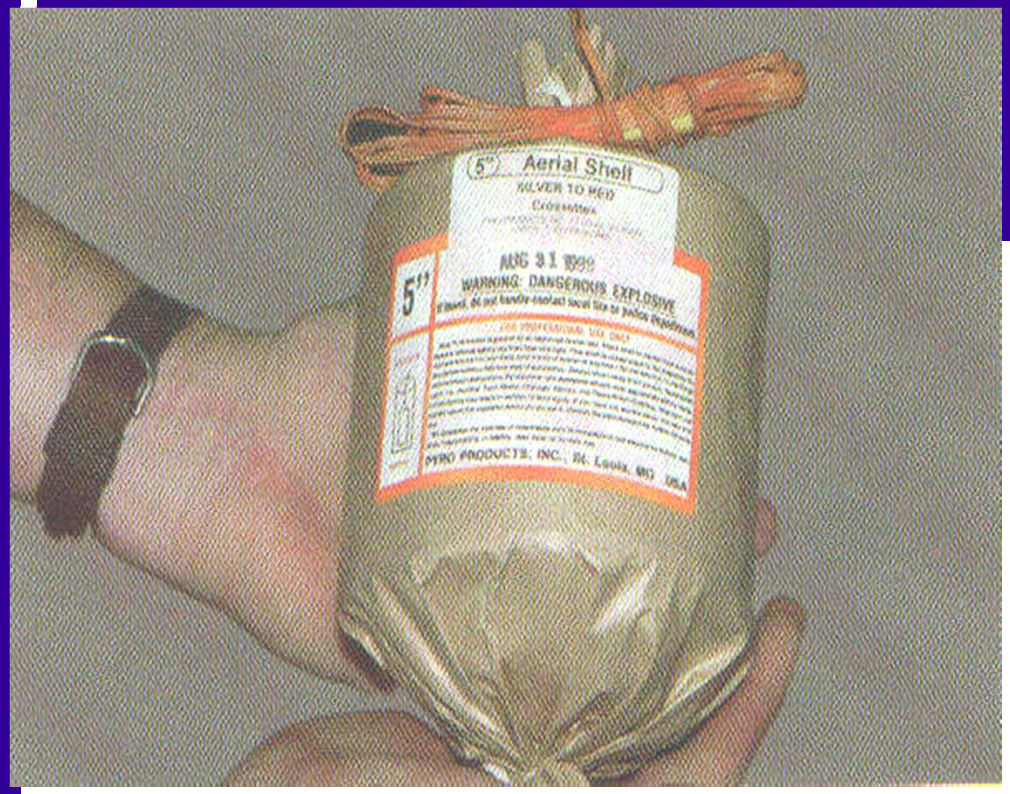
Examples of Mortar Racks:

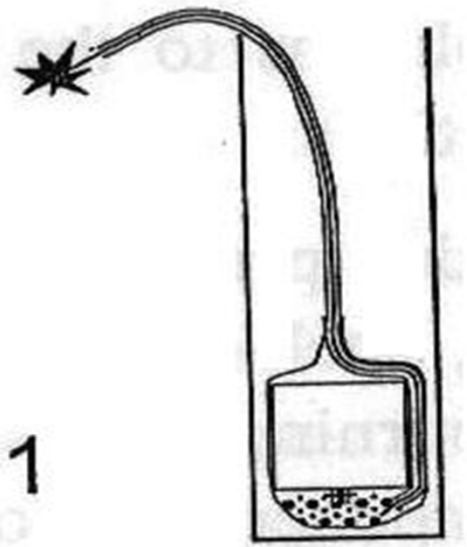
Examples of Mortar Racks:

Examples of Mortar Racks:

Examples of Mortar Racks:


LIGHT
BLACK FUSE CONDUIT
TOP
TIME FUSE
HEAD
ROUGH POWDER
BREAK CHARGE
STARS
CARDBOARD CASE
LIFT CHARGE
8.


5" Aerial Shell
SILVER TO RED
Crossettes
5"
WARNING: DANGEROUS EXPLOSIVE
MYRO PRODUCTS, INC., St. Louis, MO USA



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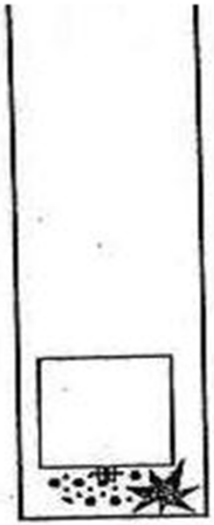

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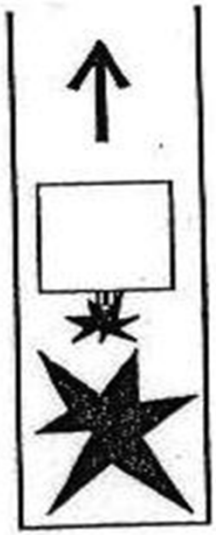


4

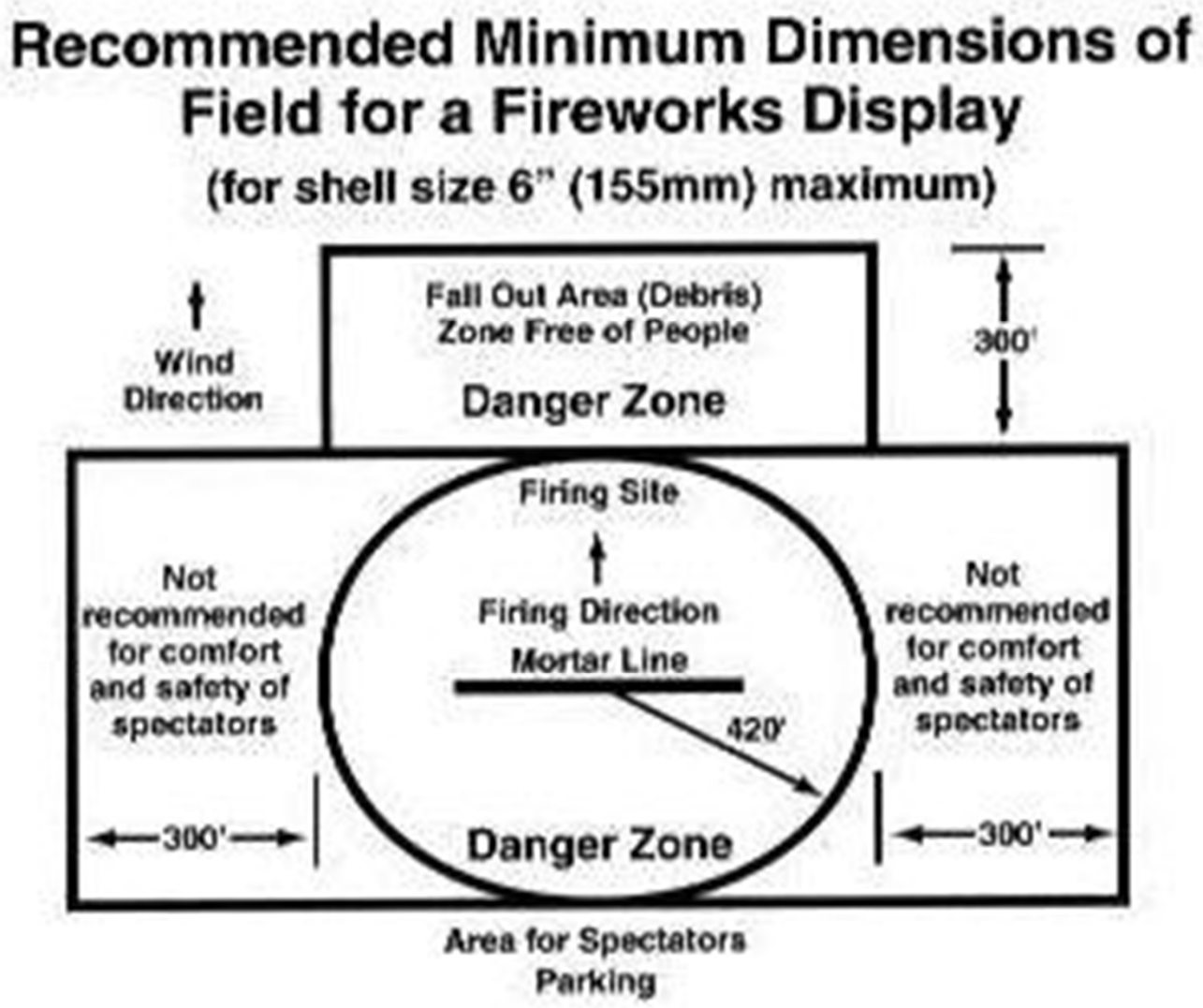
3308.10 Safety Requirements

- 3308.10.3 - Exhibitors shall display upon their person any visible identification required by the fire official at all times when inside the discharge perimeter.

- 3308.10.3.1 - Only fire officials, licensed fireworks exhibitors and registered employees shall be in the discharge area during the show

  (also see 3310.2)

3308.10.3.1 Discharge Perimeter



Firing Site Plan
Lake
Firing
Site
Audience
Building
Safety Perimeter

MORE ON DISTANCES - NFPA 1123

- **NFPA 5-1.4.5** NO SPECTATOR OR SPECTATORS PARKING AREAS SHALL BE LOCATED WITH-IN THE DISPLAY SITE

- **5-1.4.6** DWELLING, BUILDINGS AND STRUCTORS SHALL BE PERMITTED WITHIN THE DISPLAY SITE WITH APPROVAL OF AHJ AND OTHER CONDINTIONS.

- **5-1.4.7** THE AREAS SELECTED FOR THE DISCHARGE OF AERIAL SHELLS BE LOCATED SO THAT THE TRAJECTORY OF THE SHELLS SHALL NOT COME WITHIN **25FT** OF ANY OVERHEAD OBJECTS.

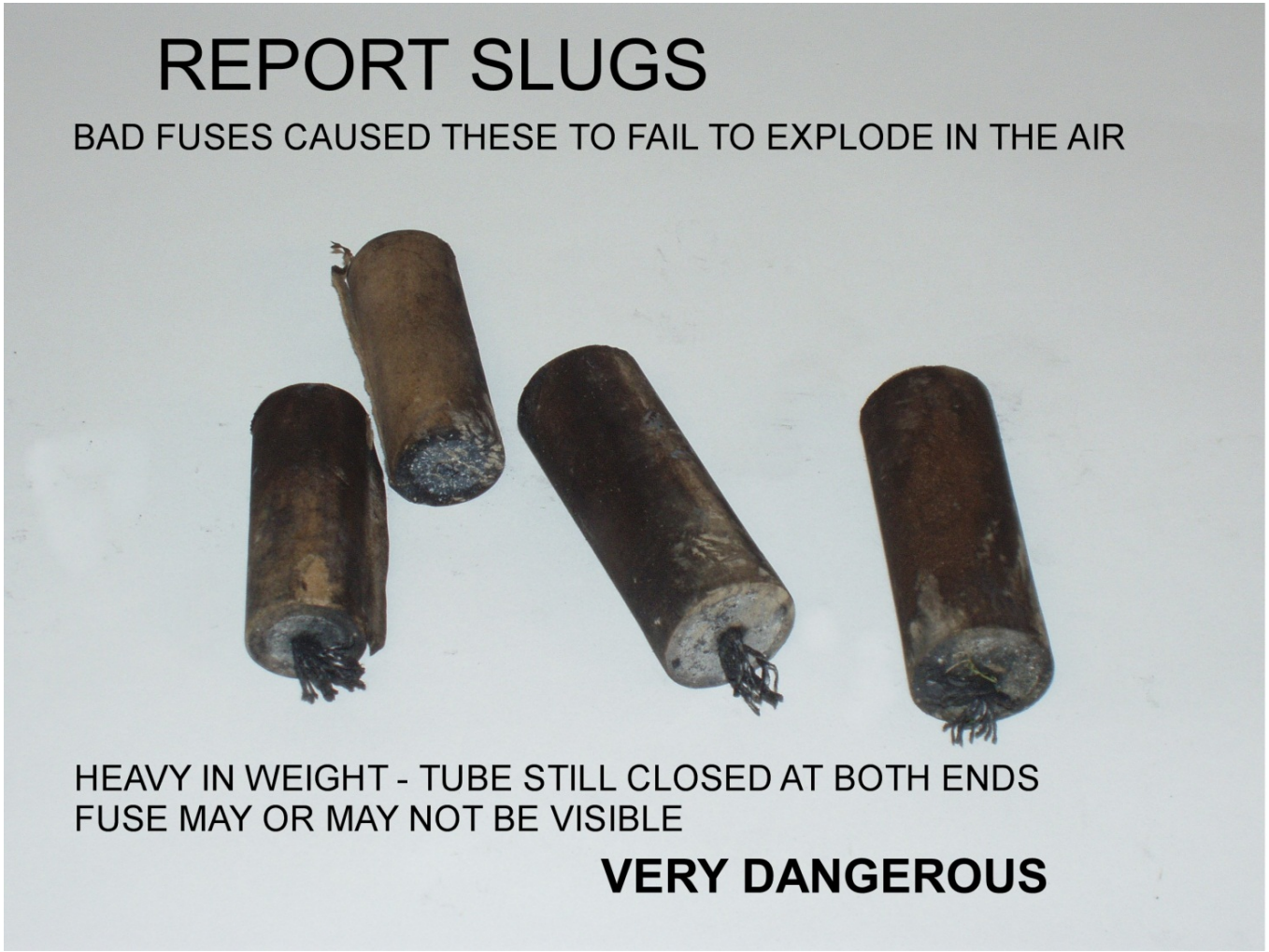
3308.10.4 Inspection

- An inspection of all affected areas shall be conducted immediately following a fireworks show to locate and dispose of defective or unexploded shells.

- If exhibition is at night an inspection shall be conducted at sunrise the following morning.

3308.10.4 Inspection

3308.10.4 Inspection



3308.10.5 Fire Official

- **Certified fire safety inspector, fire chief, or fire prevention officer shall be present before, during and after the firework exhibition.**

3309 Shipping and Transportation

3309.1

- Shall be transported in accordance with DOTn regulations, NFPA 1123, 1124, and 1126
- Any sale over 1000 lbs. Shall be assumed to be a commercial or wholesale sale.

3310 Storage of Fireworks at Exhibition Site

- 3310.1 - Stored in accordance with NFPA 1123 and 1126.

  Storage not to exceed 72 days, unless stipulations apply

3310.2 – Fireworks shall not be left unattended

3310.3 - Shall be kept dry

3310 Storage at Exhibition Site

3310.4

- Shall be inspected for tears, leaks, broken fuses etc. by the operator or assistants.
  - Including proper fit

3310.5

- Shall be sorted by size if other than electrically fired.

3310.6

- Ready boxes to be upwind and at least 25 ft. from mortars.

Shells & Equipment; fit easily in mortar, stability

Ready box, at least 25 ft. from mortars & separated by size.

Examples of Pyrotechnics & Special Effects

Example: Pyrotechnic Fountain

Example: Pyrotechnic Exhibit Gerbs, suspended and upright

Example: Pyrotechnic Air Bursts

Example: Pyrotechnic Exhibition

Pyrotechnics Permit

Department of Commerce
Division of State Fire Marshal
8895 East Main Street, Reynoldsburg, Ohio 43068
(614) 752-7126 Fax (614) 995-4206 TTY/TDD 800-750-0750
www.com.ohio.gov

Permit # XXXX

- ☐ **Fireworks 1.1G, 1.3G, 1.4G**
- ☐ **Pyrotechnics 1.4S**
- ☐ **Flame Effects**

Application for Exhibition Permit

Permit applications must be accompanied by all support documents required by Ohio Revised Code 3743.54 and Ohio Administrative Code 1301:7-7-33. This signed document is preliminary authorization for a fireworks exhibition to take place.

Exhibition

Location of Exhibition Site/Event: _____

Address _____ City _____ County _____

Date of Exhibition _____ Time of Exhibition _____ Rain Date _____

Sponsor _____ Sponsor Contact _____ Phone Number _____

Product

Company Supplying Fireworks _____

Phone Number _____ Ohio Manufacturer/Wholesaler/Out-of State Shipper ID _____

Address _____ City _____ State _____

Exhibitor

Licensed Exhibitor Required? ☐ **Yes** ☐ **No** Ohio Exhibitor ID(s) _____

Please mark license catagory ☐ Fireworks NFPA 1123 / NFPA 1124 ☐ Special Effects NFPA 1126 ☐ Flame NFPA 160

Exhibitor Name _____ Phone Number _____

Address _____ City _____ State _____

3308.6 Exhibitors License

New License are coming:

There are three types of fireworks exhibitors license.

Type 1-Outdoor/indoor fireworks
NFPA 1123
Type 2-Indoor fireworks
NFPA 1126
Type 3-Flame effects
NFPA 160

Requirements: NFPA 1126 Standard for the Use of Pyrotechnics before a Proximate Audience

Firing the Show:

Power sources used for firing pyrotechnic devices shall be restricted to batteries or isolated power supplies used for firing purposes only. 8.3.2.1.

Remote firing, line of sight.

Note: Fixed fan gerbs next to firing device.

Requirements: NFPA 1126 Standard for the Use of Pyrotechnics before a Proximate Audience

- Firing Prerequisites 8.2:

  Pyrotechnic devices shall be mounted and secure.

- Mortars and Flash Pots 8.2.5

  Shall be constructed so that they do not fragment when the pyrotechnic material is fired.

Requirements: NFPA 1126 Standard for the Use of Pyrotechnics before a Proximate Audience

- Rockets 8.2.8

  Shall be secured with a guide wire or cable.

  Guide wire or cable shall be of sufficient strength and flame resistant.

  Flares shall be placed so that debris falls into a safe area.

Requirements: NFPA 1126 Standard for the Use of Pyrotechnics before a Proximate Audience

- Smoke Control 8.6.6.

  When pyrotechnics are fired, the quantity of smoke developed shall be controlled so as not to obscure the visibility of exit signs or paths of egress.

  All Exits should be clear, unobstructed, and unlocked.

“The Station Fire”

Gerbs caught “egg crate style” polyurethane foam on fire; 450 people in club (over capacity); bouncers blocked exits; lights went out; in less than 2 minutes the front windows broke; at 6 minutes the last survivor ran from the building (on fire); 100 dead and many survivors had severe burns.

Distances are Paramount. Interior finishes, set, scenery, & rigging materials should be flame retardant.

February 20th: Singer Jack Russell (onstage left) and drummer Eric Powers (in gold shirt) exit the stage. The box at front is labeled DANGER and EXPLOSIVE. Behind it stands tour manager Dan Blechele (holding flashlight).

Flame Effects: 3311

Standard for Flame Effects Before An Audience:

NFPA 160; 2006.

For Use in <u>indoor</u> or <u>outdoor</u> flame effects before an audience.

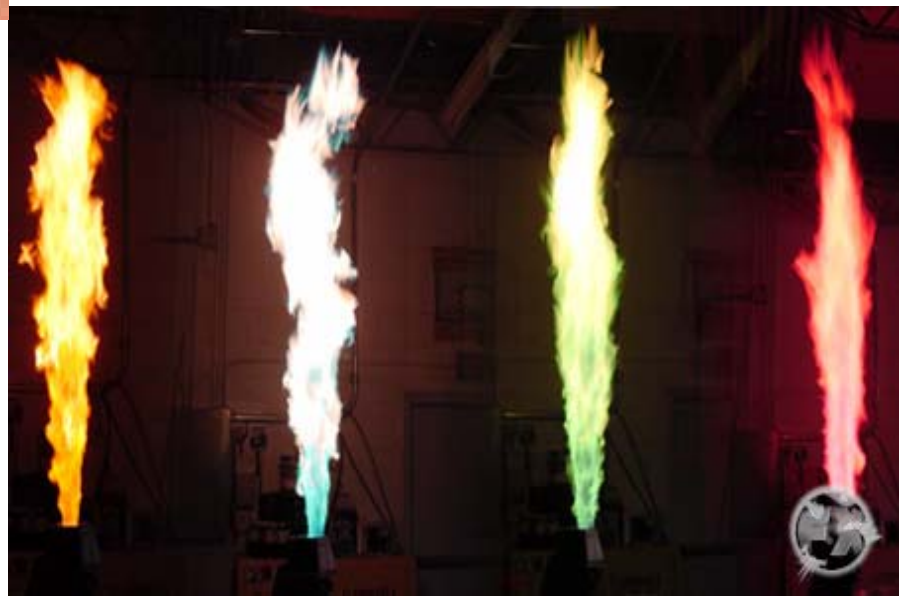
Flame Effects

- What is a flame effect?

The combustion of flammable solids, liquids, or gases to produce thermal, physical, visual, or audible phenomena before an audience.

In other words; a visual flame produced by a fuel other than a pyrotechnic.

Flame Effects



Flame Effects

Flame Effects Permit

Department of Commerce
Division of State Fire Marshal
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Permit # XXXX

- ☐ **Fireworks 1.1G, 1.3G, 1.4G**
- ☐ **Pyrotechnics 1.4S**
- ☐ **Flame Effects**

Application for Exhibition Permit

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Exhibition

Location of Exhibition Site/Event: _____

Address _____ City _____ County _____

Date of Exhibition _____ Time of Exhibition _____ Rain Date _____

Sponsor _____ Sponsor Contact _____ Phone Number _____

Product

Company Supplying Fireworks _____

Phone Number _____ Ohio Manufacturer/Wholesaler/Out-of State Shipper ID _____

Address _____ City _____ State _____

Licensed Exhibitor Required? ☐ **Yes** ☐ **No** Ohio Exhibitor ID(s) _____

Please mark license catagory ☐ Fireworks NFPA 1123 / NFPA 1124 ☐ Special Effects NFPA 1126 ☐ Flame NFPA 160

Exhibitor Name _____ Phone Number _____

Address _____ City _____ State _____

3311.2 Flame Effects Permit

- Obtain 5 days prior
- Name of organization sponsoring show
- Date and time of show
- Exact location of show
- Names, number and ages who will supervise the show and personnel assisting with show
- Classification and design criteria and NFPA 160 compliance
- Diagram of site where show is to be held showing distance to audience etc. and ventilation for each effect
- Narrative describing the flame effect including emergency procedures
- MSDS's for each fuel used
- Documentation that the set, scenery and rigging are flame retardant

3311.2 Permit (Flame Effects)

- Fire Protection & Life Safety Systems
  - Any portion of a fire protection system is interrupted
    - Must have approval from the local FCO
    - Local FCO must be present when system is interrupted

Flame Effects NFPA 160 / Ohio Fire Code Section 3311

- Exhibitor shall advise all performers & support personnel that they are exposed to a potentially hazardous situation. They are permitted in the area, but only voluntarily in performance of their duties.

3311.6 and 7 Inspection

- FCO shall inspect site prior to issuing a permit
- FCO complete a detailed checklist

3311.8 Requirements

Must have a valid flame effects license

Type 3-Flame effects

3314 Fireworks Categories & Labeling

- The sections in this rule specify certain categories, etc.
- Manufacturing, sales, acquisition of fireworks
- Shipping into Ohio requires out of state shippers license

3319.1 Categories of License

New License are coming:

Type 1-Outdoor/indoor fireworks
Type 2-Indoor fireworks
Type 3-Flame effects

3320 Fire Safety Requirements in Buildings

3320.4

- Fireworks buildings shall have fire protection/life safety equipment maintained
- No new construction, remodeling, etc. can occur without written approval from the SFM & BCO having jurisdiction. SFM authorizes final go-ahead
- Separation distances shall comply with NFPA 1124

3320 Fire Safety in Buildings

- 3320.5 Safety Requirements – Each structure on a licensed premises shall have the following posted:
  - Occupancy Load Limits, internal circulation, & egress patterns
  - The above 3 items must be approved by SFM & superintendent of the Division of Industrial Compliance
- 3320.6 No smoking or carrying of smoking materials on the premises. "**NO SMOKING**" signs shall be posted
- 3320.7 All exit doors shall swing outward.

3321 Fireworks Storage

- 3321.2 1.3G (Class B) Stored in magazines.
- 3321.3 Trailers can be used if properly secured, separated & grounded. Can only be close to a building for 48hrs. Only 2 at a time
  - NO sales from trailers
  - Public is not allowed inside the trailer used for storage
  - Fireworks facilities must be secured with SFM approved fencing

3322 Fireworks Showroom

- Only 1 licensed sales structure on the premises
- Public access only to approved retail sales; representative sample showroom
- No persons under 18 years of age are allowed to:
  - Purchase fireworks
  - Be allowed into structure without an adult

3322 Fireworks Showroom

- 3322.1.6 - Safety officer is required 14 days before and 2 days after July 4th.
  - Deputy Sheriff
  - Law enforcement officer
  - Private uniformed security guard registered under ORC §4749.06

3322 Continued

- Construction and Maintenance
  - Awnings and Tents – No fireworks sales from these on premises
  - Fire Protection Systems:
    - Inspected, tested, & maintained as required
    - If O.O.S. no public access except using an approved SFM fire watch
    - If system is “off” during winter months – SFM must approve in advance, and local FCO and insurance notified

3322 Continued

3322.2.1.3 Showroom separated by distance, or an appropriately rated fire wall from the storeroom.

3322.3.1.1 Shall have wet sprinkler, interlinked fire detection, smoke exhaust, smoke evac., 5000 sq. ft. max., occupant load of 60 sq. ft. per person, all exits open toward outside

3322.4 Representative Sample Showroom

- Occupancy would be for mercantile sales
- Prior to construction or remodeling – Owner must notify SFM/DIC
- Representative sample showroom cannot contain ANY
  - Pyrotechnics, fireworks, explosives, etc. of any type
  - Only used for public viewing
  - Delivery of the actual product to the public would occur on the licensed premises, but not inside any building or trailer

3325 Sale of Fireworks

3325.1 Purchaser form shall be made available upon request by state fire marshal

FIREWORKS PURCHASER FORM
As prescribed by the Ohio Division of State Fire Marshal

Section 1 - Seller Information

Company

Address

City & Zip

License #

Section 2 - Purchaser Requirements

KNOWINGLY MAKING A FALSE STATEMENT ON THIS FORM IS FALSIFICATION UNDER SECTION 2921.13 OF THE OHIO REVISED CODE AND IS PUNISHABLE AS A MISDEMEANOR OF THE FIRST DEGREE.

Sections 3743.44 & 3743.45 of the Ohio Revised Code state that each purchaser of fireworks shall transport the fireworks directly out of the state within 48 hours after the time of their purchase. In accordance with section 1301:7-7-33(Z)(2) of the Ohio Administrative Code (Ohio Fire Code Section 3326.2), the purchaser's copy of the completed purchaser form must accompany the purchased fireworks and must be attached to an invoice that itemizes the quantity of fireworks purchased and lists the amount of the sales transaction. The purchaser's copy of this form must be provided by the purchaser to any law enforcement officer or fire authority upon request.

Section 3 - Purchaser Information

Sale Type: Retail ☐ Wholesale ☐

Name _____

Address _____

City _____

State _____ Zip _____

Date of Birth _____

Driver's license No. _____

Fireworks License # _____

(wholesale purchases only)

I understand that as the purchaser of fireworks, I am responsible for any illegal use of the purchased fireworks, including any damages caused by improper use.

Purchaser's Signature **Date** / /

3322.5.2 Sales from Motor Vehicles

- The sale of fireworks from motor vehicles is **prohibited**.

Questions ???

1301:7-7-34 Rule 34

Flammable and Combustible Liquids

3401.1.1 Scope – Special Note

- Existing facilities, equipment, structures, installations – this rule does not apply unless FCO demonstrates a preponderance of evidence that there is a distinct hazard to life/property

3401.4 Permits & Exception

- Permits are required if:
  - Installation, alteration to tanks, piping or appurtenances, abandonment, removal or temporarily out of service
- Permits are obtained from SFM if not issued by another officer

3401.5 Material Classification

- When mixed with lower flash point liquids, Class II or Class III liquids are capable of assuming the characteristics of the lower flash point liquid. When classify the mixed liquid you shall use the actual flash point of the mixed liquid. If when heated Class II or Class III liquids assume Class I characteristics that is the classification in applying this rule.

3402 Definitions

- *Flammable Liquids*
  - *1A, 1B, and 1C*
- *Combustible Liquids*
  - *Class II , IIIA and IIIB*
- *Solvent or Liquid Classifications*
  - *Class I, II, IIIA, IIIB, and IV*
- *Flash point*
- *Fire point*

Flammable Liquid

- A liquid having a closed cup flash point below 100 degrees F (38C).
- Flammable liquids are further categorized into a group know as Class I liquids
  - Class I liquids are subdivided

Flammable Liquid

- Class **IA.** Liquids with a flash point below 73 F (23 C) and with a boiling point below 100 F (38 C).
- **Class IB.** Liquids with flash points below 73 F (23 C) and having a boiling point at or above 100 F (38 C).
- Class **IC.** Liquids with a flash point at or above 73F (23 C) and below 100 F (38 C).

Combustible Liquids

- Any liquid with a flash point at or above 100 f (38 C) shall be known as a Class II or Ill liquid. Combustible liquids shall be divided into the following classifications:

Combustible Liquids

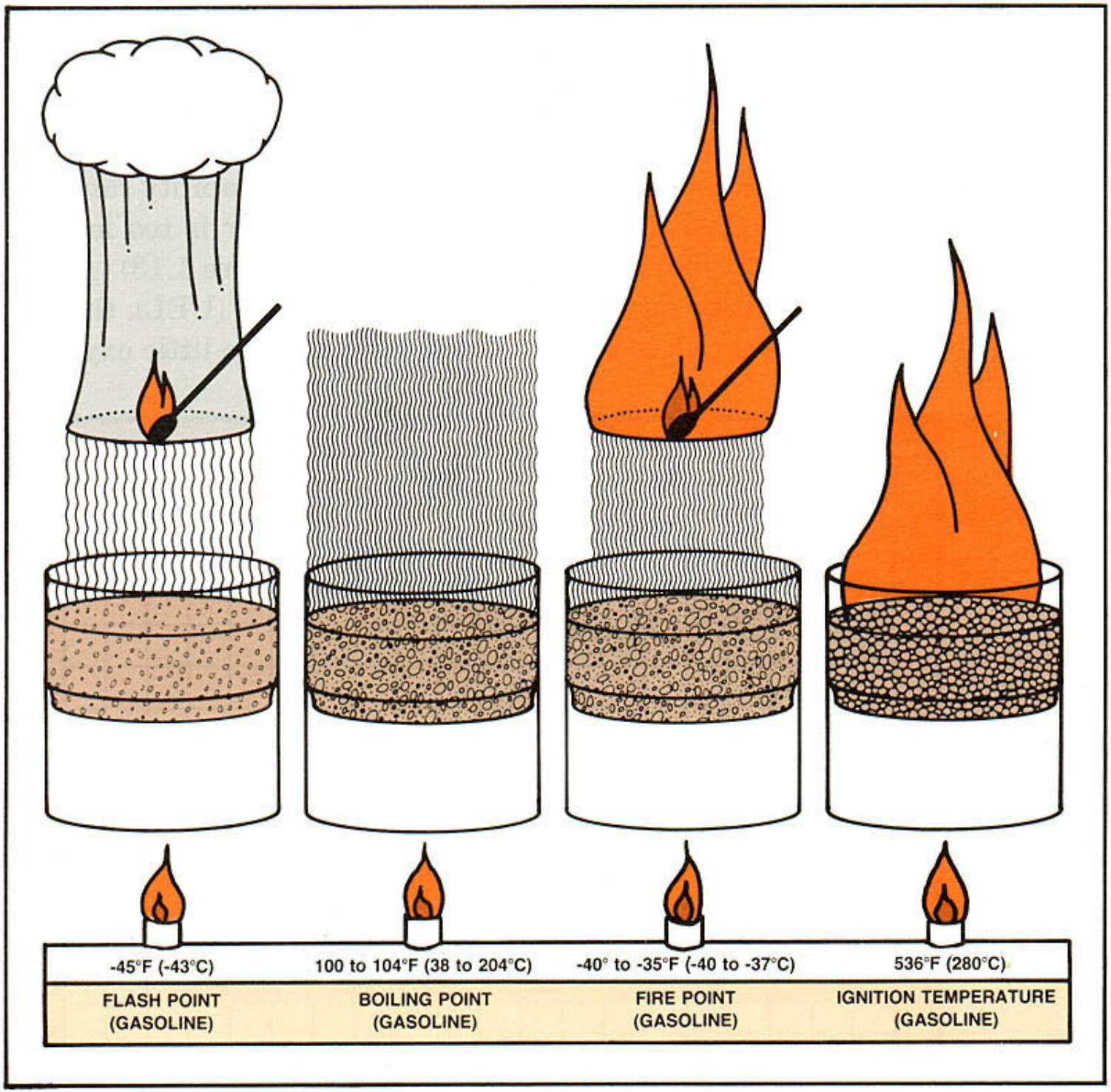
- Class **II.** Liquids having a flash point at or above 100 F (38 C) and below 140 F (60-C).
- Class **III A.** Liquids with a flash point at or above 140 F (60 C) and below 200 F (93 C).
- Class **III B.** Liquids having a flash point at or above 200 F (93 C).

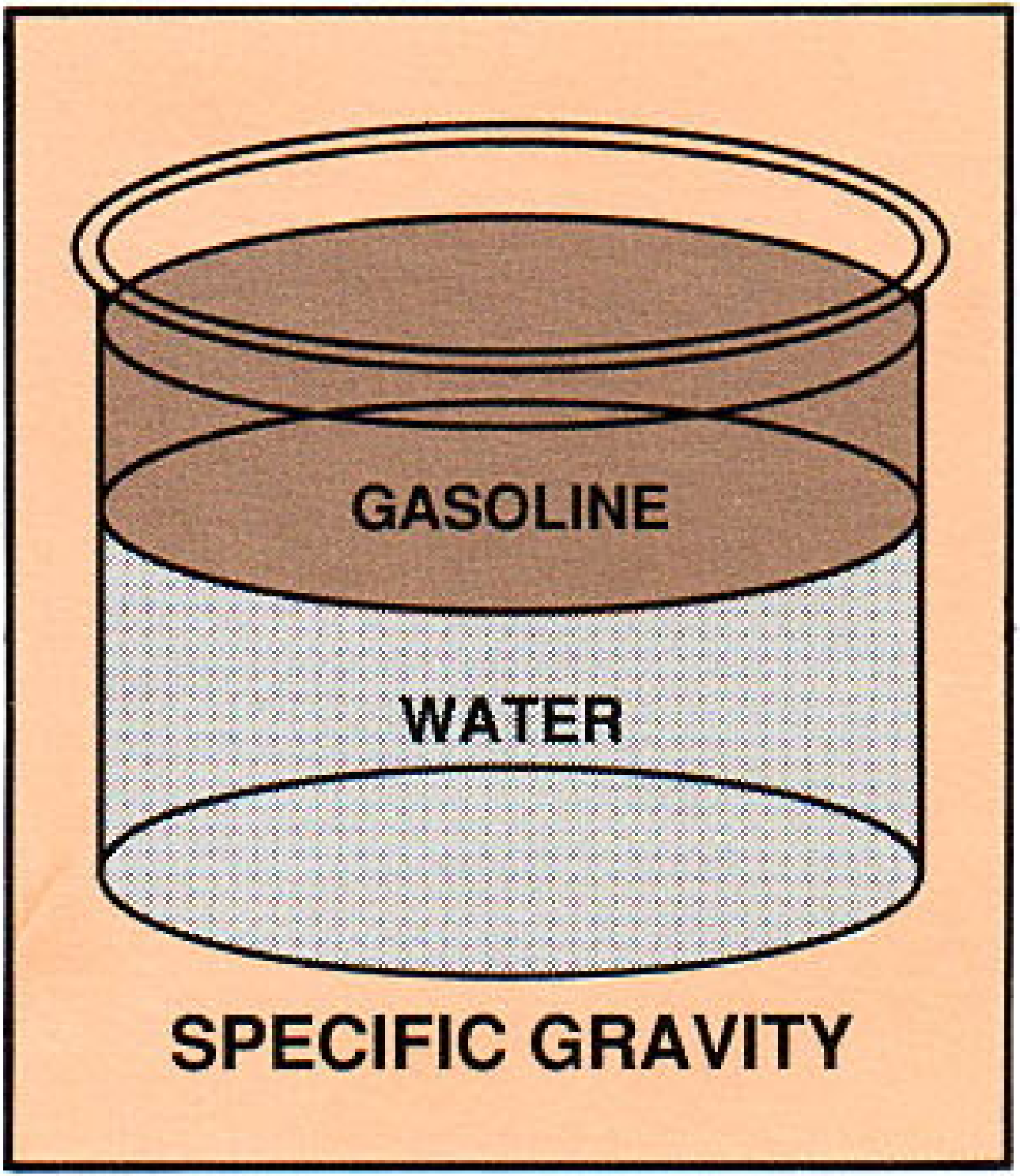
Flash Point

- The minimum temperature at which a **liquid** gives off sufficient vapors to form an ignitable mixture with the air near the surface, or in the container, but will not sustain combustion.

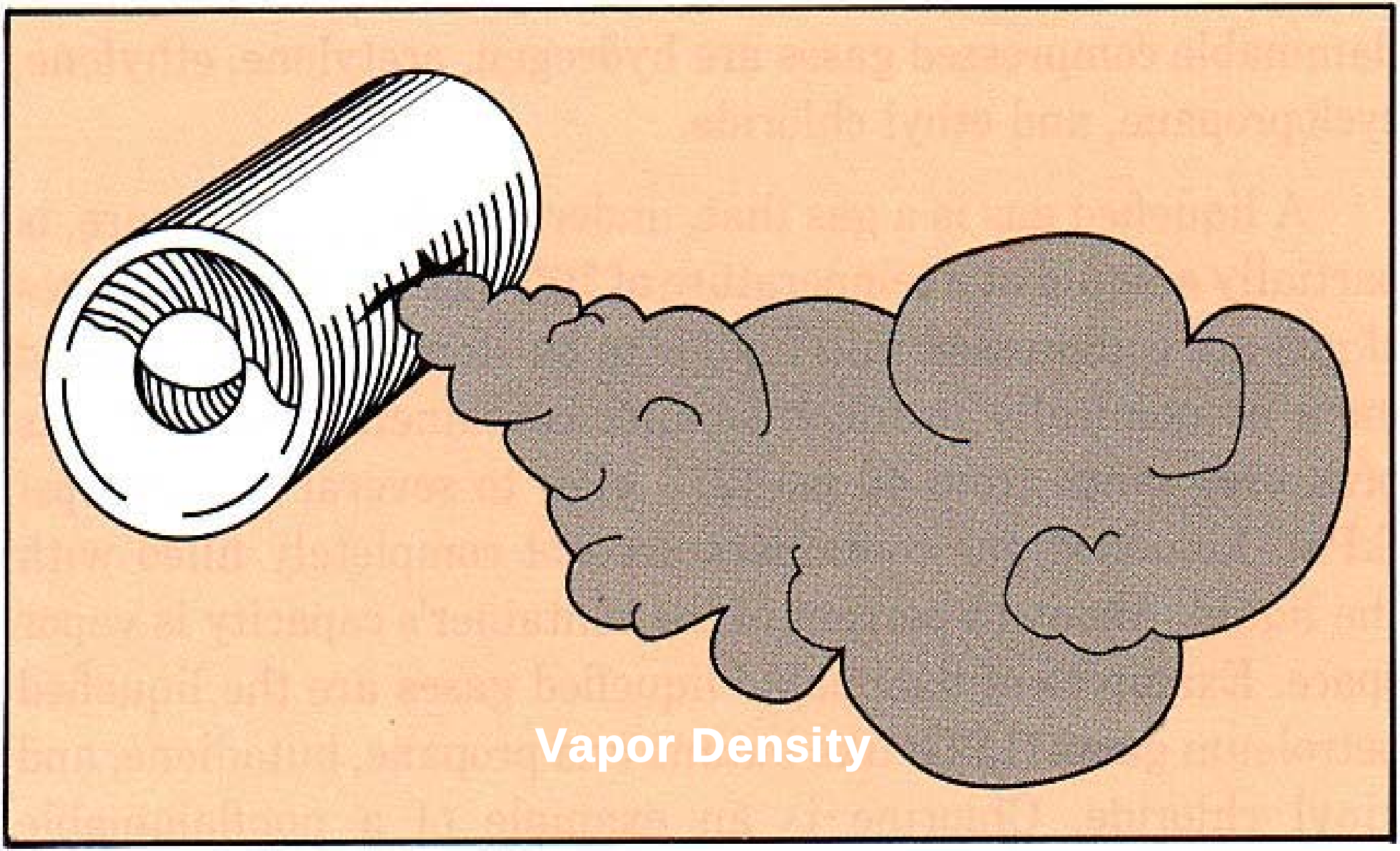
Fire Point

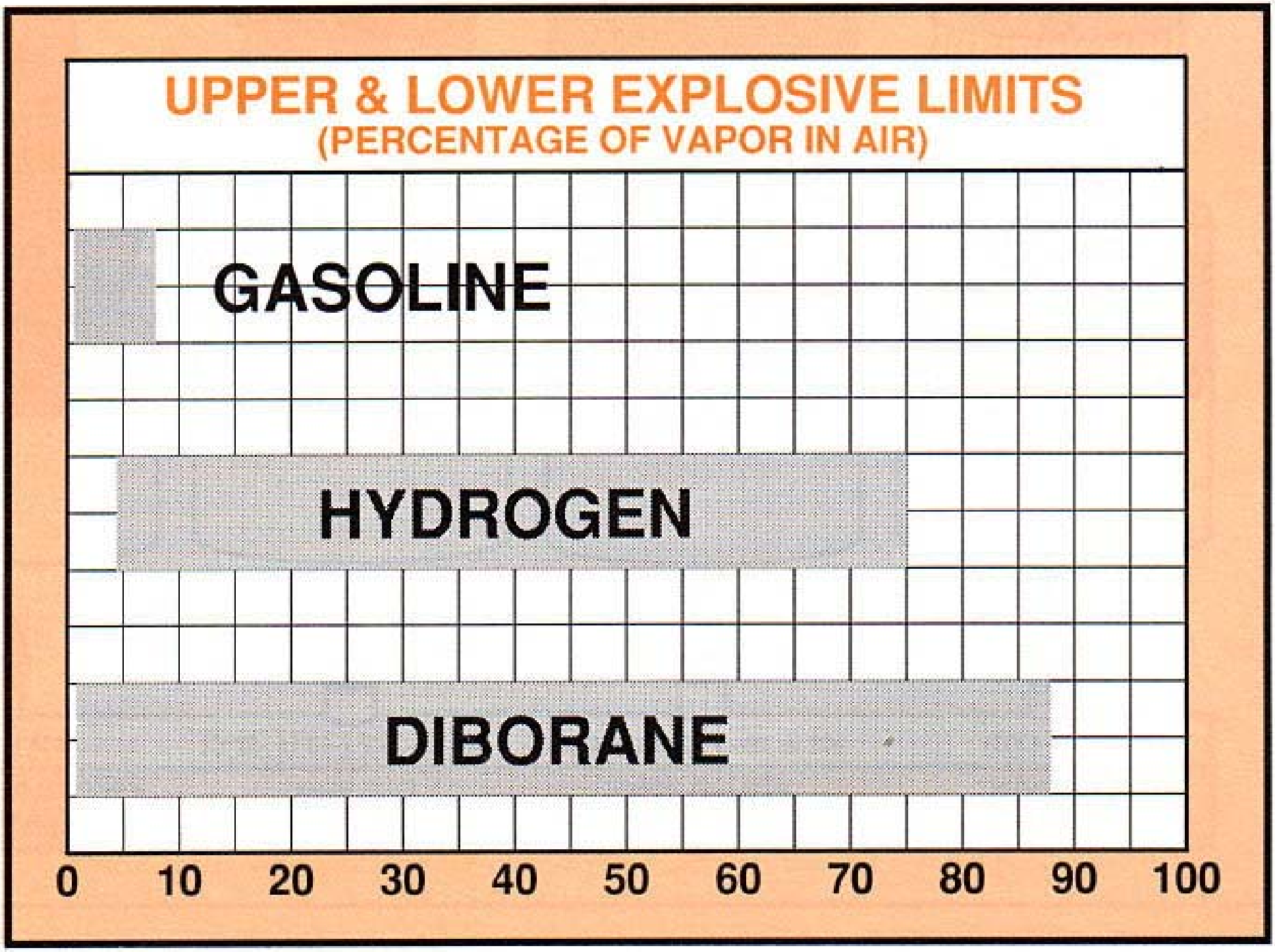
- The lowest temperature at which a **liquid** will ignite and achieve sustained burning.


-45°F (-43°C)
FLASH POINT (GASOLINE)
100 to 104°F (38 to 204°C)
BOILING POINT (GASOLINE)
-40° to -35°F (-40 to -37°C)
FIRE POINT (GASOLINE)
536°F (280°C)
IGNITION TEMPERATURE (GASOLINE)


GASOLINE
WATER
SPECIFIC GRAVITY

Vapor Density




UPPER & LOWER EXPLOSIVE LIMITS
(PERCENTAGE OF VAPOR IN AIR)
GASOLINE
HYDROGEN
DIBORANE
0
10
20
30
40
50
60
70
80
90
100

3403 General Requirements

- Areas where flammable liquids are stored, handled, dispensed or mixed shall be in accordance with Table 3403.1.1 of the rule.
- Extent of classified area – can be reduced or eliminated by FCO with sufficient technical justification if concentration in the area does not exceed 25% of LFL.

Table 3403.1.1 Class I Electrical Equipment Locations

Location	Group D Division	Extent of classified area
Underground tank fill opening	1	Pits, boxes or spaces below grade level, any part of which is within the Division 1 or 2 classified area.
	2	Up to 18 inches above grade level within a horizontal radius of 10 feet from a loose-fill connection and within a horizontal radius of 5 feet from a tight-fill connection.
Vent-discharging upward	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 5 feet of open end of vent, extending in all directions.
Drum and container filling		
Outdoor or indoor with adequate ventilation	1	Within 3 feet of vent and fill opening, extending in all directions.
	2	Area between 3 feet and 5 feet from vent of fill opening, extending in all directions. Also up to 18 inches above floor or grade level within a horizontal radius of 10 feet from vent or fill opening.
Pumps, bleeders, withdrawal fittings, meters and similar devices		
Indoor	2	Within 5 feet of any edge of such devices, extending in all directions. Also up to 3 feet above floor or grade level within 25 feet horizontally from any edge of such devices.
Outdoor	2	Within 3 feet of any edge of such devices, extending in all directions. Also up to 18 inches horizontally from an edge of such devices.
Pits		
Without mechanical ventilation	1	Entire area within pit if any part is within a Division 1 or 2 classified area.
With mechanical ventilation	2	Entire area within pit if any part is within a Division 1 or 2 classified area.
Containing valves, fittings or piping, and not within Division 1 or 2 classified area	2	Entire pit.

Table 3403.1.1 Class I Electrical Equipment Locations Cont.

Location	Group D Division	Extent of classified area
Drainage ditches, separators, impounding basins		
Indoor	1 or 2	Same as pits.
Outdoor	2	Area up to 18 inches above ditch, separator or basin. Also up to 18 inches above grade within 15 feet horizontal from any edge.
Tank vehicle and tank car[b]		
Loading through open dome	1 2	Within 3 feet of edge of dome, extending in all directions. Area between 3 feet and 15 feet from edge of dome, extending in all directions.
Loading through bottom connections with atmospheric venting	1 2	Within 3 feet of point of venting to atmosphere, extending in all directions. Area between 3 feet and 15 feet from point of venting to atmosphere, extending in all directions. Also up to 18 inches above grade within a horizontal radius of 10 feet from point of loading connection.
Office and restrooms	Ordinary	Where there is an opening to these rooms within the extent of an indoor classified location, the room shall be classified the same as if the wall, curb or partition did not exist.
Loading through closed dome with atmospheric venting	1 2	Within 3 feet of open end of vent, extending in all directions. Area between 3 feet and 15 feet from open end of vent, extending in all directions. Also within 3 feet of edge of dome, extending in all directions.
Loading through closed dome with vapor control	2	Within 3 feet of point of connection of both fill and vapor lines, extending in all directions.
Bottom loading with vapor control or any bottom unloading	2	Within 3 feet of point of connection, extending in all directions. Also up to 18 inches above grade within a horizontal radius of 10 feet from point of connection.
Storage and repair garage for tank vehicles	1 2	Pits or spaces below floor level. Area up to 18 inches above floor or grade level for entire storage or repair garage.

3403.4/3403.5 Spill Control and Secondary Containment/Labeling

- Where the maximum allowable quantity per control area is exceeded the areas shall be provided with spill control and secondary containment.
- FCO authorized to require warning signs for purpose of identifying the hazards of storing or using flammable liquids
- Rule 3403.5 includes:
  - Lettering style, location, labeling & identification

3404.1.1 Aboveground Storage

- The aboveground tank storage of flammable and combustible liquids shall be prohibited on premises which the public has access to.(Note: Exceptions)
- **3404.2.2** Tank cars and tank vehicles shall not be used as fixed storage tanks.
- **3404.2.3** Labeling and signage for certain tanks.
- ***3404.2.7.3.3*** *Vents shall be outside and above adjacent ground level at least 12 feet and five feet from building openings.*

3404.2.7.4 Emergency Venting

- Stationary AST – Must be equipped with additional venting
- This venting is for emergencies, in case of fire exposure to the tank
- Emergency vents for Class I, II, IIIA liquids – can't be discharged inside a building
  - See 1 exception to this rule

3404.2.9 Aboveground Tanks

- Existing AST's, even if previously approved, if determined to be a hazard by the FCO, shall not continue to be in-service
- Unsafe tanks – must be brought into compliance or removed per FCO

3404.2.9.4 AST's Inside of Buildings

- Class I, II, and IIIA liquids – Permissible inside, must be equipped with device for overflow prevention
- AST's with class IIIB liquids & connected to fuel-burning equipment must be provided with a device to prevent overflow INTO the building per 3404.2.7.5.8

AST's Outside of Buildings

- AST's prohibited on the premises where the public has access with 2 exceptions
  - 3404.2.9.5.1 through 3404.2.9.5.3 provide the location and separation criteria
  - 3404.2.9.6 through 3404.2.10.4 have additional requirements for outside AST's

3404.2.12 Testing

- 3404.2.12.1 Acceptance testing required on all tanks before be place in service in accordance with Section 21.5 of NFPA 30
- 3404.2.12.2 Underground tanks and piping to be tested for tightness before being covered and witnessed by fire code official. System shall not be covered until approved.

3404.2.13 Abandonment and Status of Tanks (Underground)

- Temporarily out of service (less than 90 days), secure fill line, gauge opening, vapor return and pump connection against tampering. Vent lines to remain open
- Out of Service 90 days but less than 1 year, flammable and combustible liquids to be removed to within one inch of bottom of tank, all piping to be capped and plugged and secured from tampering
- Vent lines to remain open and maintained

3404.2.13 Abandonment and Status of Tanks (Underground)

- Tanks out of service for 1 year shall be removed from the ground, unless granted a one year extension is granted by the STATE FIRE MARSHAL.

3404.2.13.1.4 Tanks Abandoned in Place (Underground)

- Remove all flammable and combustible Liquids
- Disconnect all lines
- Tank shall be filled with an approved inert solid material
- All remaining underground piping shall be capped or plugged
- A record of tank size, location and date of abandonment shall be retained.
- All exterior above-grade piping must be permanently removed

3403.3 Container and Portable Tank Storage

- Containers shall be designed in accordance with Section 9.4 of NFPA 30
  - Containers- do not exceed 60 gallons
  - Portable tanks- do not exceed 660 gallons
- Where cabinets are required shall meet UL 1275
  - Unlisted metal cabinets shall have a thickness of not less than .044 in. (18 Gage), double walled with 1.5” in. air space. Joints to be riveted or welded.
  - Unlisted wood cabinets shall be 1 inch exterior grade plywood. Joints to be rabbeted and fastened in two directions with screws. Hinges shall be steel or brass. Cabinet shall be painted with **intumescent-type** paint.

3404.3 Container and Portable Tank Storage

- Cabinets to be provide with conspicuous labels red in color on a contrasting background which reads “FLAMMABLE-KEEP FIRE AWAY”
- Bottom of cabinet to be liquid tight to a height of 2 inches.
- Total quantity in cabinet shall not exceed 120 gallons

3404.3.4.2 Occupancy Quantity Limits - Overview

- Most occupancy's are allowed certain amounts for purposes of the normal, day-to-day operations of the occupancy
- Example: Group E – "Shall not exceed that are necessary for demo, treatment, lab work, or maintenance & operation of equipment – however, must not exceed quantities of table 2703.1 (1)

3404.3.4.4 Liquids for Maintenance & Operations of Equipment

- In ALL occupancies anything greater than 10 gallons used for maintenance & operations shall be stored in a liquid storage cabinet according to 3404.3.2
  - 10 gallons or less need to be in approved containers but may be stored in private garages or other approved locations

3404.3.6 Wholesale and Retail Sales

- Containers shall be metal
  - There is an exception for sprinklered buildings
- Containers with Class I liquids shall not exceed 5 gallons
- Storage on shelves shall not exceed 6 feet.

3404.3.7 to 3404.4.8 Overview of Storage Rules

- 3404.3.7 – Liquid storage ROOMS
- 3404.3.8 – Liquid storage WAREHOUSES
- 3404.4 – OUTDOOR storage of containers/portable tanks

3405 Dispensing, Mixing, or Handling of Flammable/Combustible Liquids

- 3405.3 – Use, dispensing, mixing, and handling INSIDE a building
  - Includes certain quantity limits/occupancy
  - Includes cleaning with flammable and combustible liquids
  - Quantities exceeding may play space/building into H use group

3405.3.8 Use, Dispensing, and Handling OUTSIDE a building

- This section does not cover motor fuel dispensing
  - Refer to Rule 22
- Includes 3405.3.8 through 3405.4.9

3405.5 Alcohol-Based Hand Rubs

- Classified as a Class I or II liquid
  - Rules evolve around wall mounted dispenser
  - Corridor Installations – different rule section than room installations

3406 Special Operations

- This section includes:
  - Storage/dispensing of flammable/combustible liquids on farm and construction sites
  - Bulk plants or terminals
  - Bulk transfer or process transfer operations
  - Tank vehicles and tank vehicle operations
  - Refineries
  - Vapor recovery & vapor processing systems

3406.6 Tank Vehicle & Vehicle Operations

- This section is specific to such operations as tank vehicle operations at petroleum (gasoline) stations
  - Tank driver must be outside of vehicle durning deliveries
  - Tank vehicle hoses – protected by tank./truck parking method or other methods (traffic cones)
  - Parking of tank vehicles – vehicles near residences (including homes, apartments, hotels, etc.), educational and institutional use groups is PROHIBITED

Rue 34 Review Story Questions

- You receive a complaint regarding an AST located at an abandoned factory. You find a 660 gallon AST that is rusted, has no hazard labeling, is placarded as “Gasoline”, and is an elevated, gravity-fed tank. It is also possible there is about a foot of product in the tank, but you are unsure of this. No paperwork has been located on this tank. There is no emergecny venting and the tank is not secured from the possibility of being tampered with. The tank is situated against the property line to an adjoining property. There is a hose & nozzle present on the tank. There appears to be a vent at the top of the tank.

Rule 34 – Review Questions

- Is this tank in violation of the OFC? Locate the OFC associated rules.
- Is this tank a distinct hazard to life or adjacent property?

Rule 34 – Review Questions Answers

- Yes, OFC Sections: 3404.1.1; 3404.9; 3404.1.2; 3404.2.3; 3404.2.3.1; 3404.2.3.2; 3404..2.3.4; 3404.2.9.6.4; 3404.2.9.6.5; 3404.2.9.6.6; 3404.2.15; 3404.2.13.2.3; 312.1; 312.2; 312.3. Various NFPA 30 Standards
- Yes, it is a distinct hazard. Issue a citation

1301:7-7-35 Rule 35

Flammable Gases & Flammable Cryogenic Fluids

3501.1 Scope

- The scoping section for Rule 35 finely divides the rule into specific categories as to where certain conditions, products, etc. are located if NOT covered in this rule.
  - Example – Where would you look up bulk hydrogen gas systems?

Rule 35 General

- Maximum allowable quantities per control area shall be in accordance with Rule 27.
- Indoor storage and use is prohibited in use groups A, E, I, or R or in the office of B use. Exceptions:
  - Cylinders of non-liquefied compressed gasses & liquefied gasses (each of a certain allowable amounts approved for patient care, maintenance & operation of equipment
  - Food service operations per Rule 38
- Compressed gas systems conveying flammable gases shall be provided with emergency shutoffs.
- Static producing equipment located in flammable gas storage areas shall be grounded
- “No Smoking” signs shall be posted

3504 Storage

- Maximum allowable storage INDOORS of flammable gases – Use table 2703.1.1(3)
- Sheltering of outdoor flammable gas areas – Refer to 2704.13
  - Lot lines, public streets, etc. must be taken into consideration

Flammable Cryogenic Fluids

- This section of Rule 35 covers specifics for these fluids:
  - AST construction (vacuum jacket, etc.)
  - UST construction (piping, venting, etc.)

3507 Metal Hydride Storage Systems

- Metal hydride storage and use – Refer to Rule 35
- For the hydrogen used in association with the metal hydrides, refer to Rules 27 and 30

1301:7-7-36 Rule 36

Flammable Solids

Rule 36 General

- Does not include blasting agents or explosives
- Quantities of flammable solids shall be stored indoors, outdoors, and used in accordance with OFC Rule 27 and appropriate tables in Rule 27
- Maximum pile size shall not exceed 1000 cubic ft.
- Aisle widths shall not be less than height of pile or 4 feet whichever is greater
- Flammable solids shall not be stored in basements

3606 Magnesium

- The OFC Rule 36, specifically 3605, pays special attention to the storage, use, handling, and processing of magnesium.
- Magnesium has its own OFC section due to it's inherent characteristics for being a fire hazard and extinguishing problem
- 3606.3.1
  - Pig – A mass of magnesium that has been run into a mold while molten
  - Ingot – A mass of magnesium cast into a convenient form
  - Billet – A bar of magnesium formed from an ingot

3606 Continued

- Magnesium is allowed to be stored in various size piles
  - Outdoor vs. indoor storage
  - Storage includes weight/pile size
- The use of magnesium is recognized in 3606.5
- Section 3606 also includes electrical, extinguishment needs

1301:7-7-37 Rule 37

Highly Toxic and Toxic Materials

Rule 37 General

- 3701.1 General – There are exceptions to the storage & use of highly toxic and toxic materials
  - Display & storage in Group M and S (See Rule 27)
  - Conditions involving pesticides or agricultural products
  - Transportation of pesticides (federal requirement)
  - Storage in private dwellings, garages, etc. (home use)
- Indoor storage and use to comply with **3703.1**
- Storage and use of highly toxic and toxic compressed gases shall comply with **3704.1**
- Ozone gas generators to comply with **3705.1**

1301:7-7-38 Rule 38

Liquefied Petroleum Gases

(LPG)

Rule 38 General

- Storage, handling, and transportation to comply with NFPA 58 and this rule.
- A permit is required for:
  - Stationary installs with containers over 2,00 gallons;
  - Or all rooftop installs of ASTM containers;
  - Or multiple containers exceeding 4,000 gallons aggregate capacity
- Construction documents must be submitted if a single container is greater than 2,000 gallons, or LP containers are greater than 4,000 gallons

3802 Definitions

- LP-Gas Container – Any vessel, including cylinders, tanks, portable tanks, and cargo tanks, used for transporting or storing LP-gases
  - Note that this definition of a container specifies LP
- LP gas property for converting
  - LP is 4.24 lbs./gallon water weight

3803 Installation of Equipment

- Portable LP containers can be used for construction and temporary heating purposes, but must follow NFPA 58 sections 6.17.4;6.17.5; and 6.17.8
- Group F shall not exceed 735 lbs. Water capacity where manifolded
- Group E and I, containers shall not be used in classrooms, Containers shall not exceed 50 lbs. water capacity in educational uses and 12 lbs. water capacity in institutional. When more than one container is present shall be separated by 20 feet.
- When used temporarily for demonstration and public exhibitions shall not exceed 12 lbs. water capacity.

3803.2.1.7 Used for Food Preparation

- Cylinders and appliances shall be listed
- Commercial food service appliances shall not have more than two 10 ounce non-refillable butane gas cylinders.
- Cylinders shall comply with UL147B
- Cylinders to be directly connected to appliance and shall not be manifolded.
- Cylinders to be integral part of appliance and shall not be connected by a rubber hose.
- Storage shall comply with 3809.

3804 Location of LP Containers

- In heavily populated/congested areas – aggregate capacity cannot exceed 2,000 gallons
  - See Exceptions
- Refer to Table 3804.3 and NFPA 58 6.4.5 (special hazards)
- Multiple containers must also meet distances/NFPA Standard 58

3805 Prohibited Use of LP-Gas

- Non-approved equipment
  - Example: water heater with a natural gas regulator and connected to an LP tank
- LP gas shall not be released into the atmosphere

3806 Dispensing & Overfilling

- Attendants must be qualified
  - Example: filling portable containers where the public can rent a truck
- LP containers are not allowed to be refilled if they do not have an Overfill Protection Device (OPD) installed

3807 Safety Precautions and Devices

- Safety devices on cylinders shall not be tampered with
- “No Smoking” signs to be posted. Smoking within 25 feet of transfer point shall be prohibited.
- Weeds, grass, brush and other combustibles shall be kept a min. of 10 feet from LP tanks or containers.
- Vehicular protection shall be provided in areas exposed to vehicular damage in accordance with 1301:7-7-03.

3809 Storage of Portable LP-Gas Containers Awaiting Resale

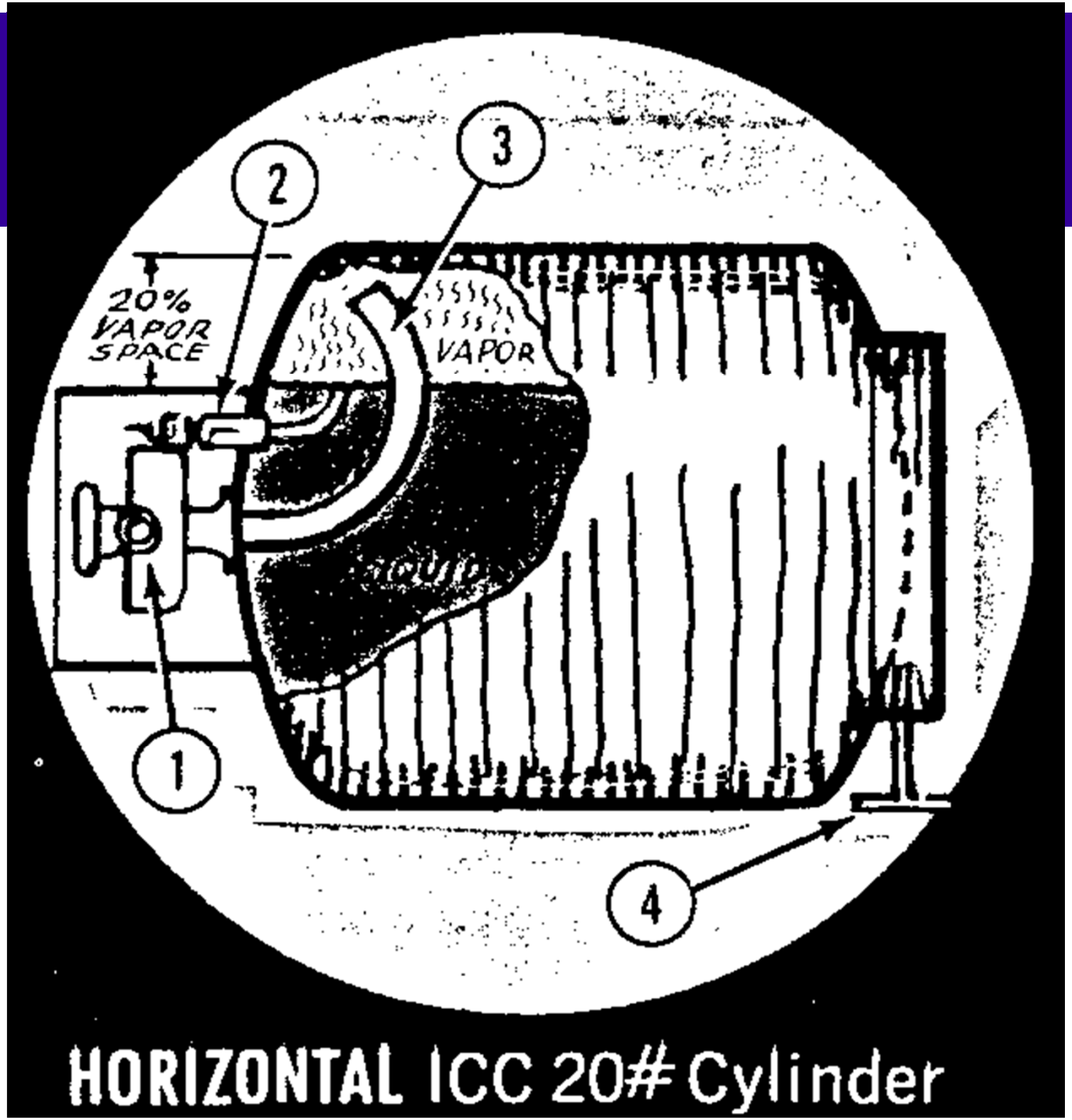
- Containers of 1,000 pounds water capacity or less whether filled, partially filled or empty shall comply.
- Containers with individual water capacity greater than 2.5 lbs. Shall have pressure relief valve in direct communication with vapor space.
- Empty containers which have been in service shall be considered full for determining the maximum quantities allowed.
- Containers which are not connected shall not be stored on roofs

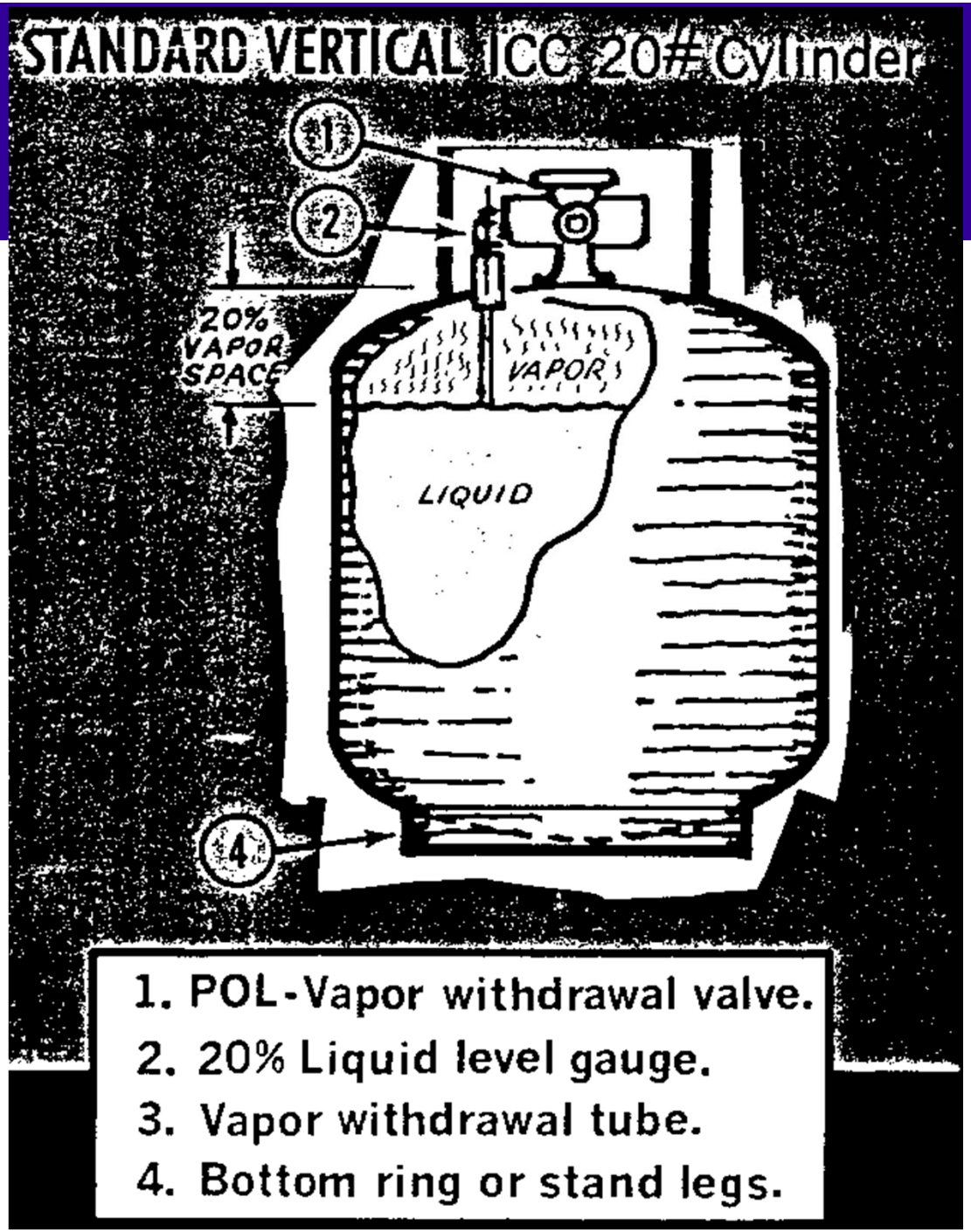
3809 Cont.

- LP gas containers cannot be stored in basements, pits, etc.
- The exception to this section allows for DOTn type cylinders, but they are limited to 2 ½ gallon capacity, and no more than 20 pounds

3809 Cont.

- Storage INSIDE: No more than 300 pounds in an industrial setting
  - Food service – no more than 24 butane containers
  - Storage within residential buildings – Limited to maximum of 2.7 lbs. and maximum 5.4 lbs. for smaller cylinders per each living space unit
- Storage OUTSIDE: Awaiting use, resale, or exchange program
  - Vehicle protection as required by FCO
  - Enclosure per NFPA 58 – 6.18.4.1
  - Lockable vented metal locker
- Refer to Table 3809.12 for proper distances


3
2
20%
VAPOR
SPACE
VAPOR
1
4
HORIZONTAL ICC 20# Cylinder


STANDARD VERTICAL ICC 20# Cylinder
1
2
20% VAPOR SPACE
VAPOR
LIQUID
4
1. POL-Vapor withdrawal valve.
2. 20% Liquid level gauge.
3. Vapor withdrawal tube.
4. Bottom ring or stand legs.

3811.2 Unattended Parking

- LP gas vehicles shall not be left unattended at anytime on residential streets or within 500 feet of a residential area, apartment or hotel complex, educational facility, hospital or care facility. Or any other location that in the opinion of the code official would pose an extreme life hazard.
- When vehicles are parked longer than 1 hour they shall be located off public streets, highways, alleys etc.

Rule 38 Review Question

- While inspecting the local high school, you locate two (2) 20 lb. LP gas portable containers within the science lab. Are these containers allowed to be stored within the classroom?

Rule 38 Review Question

- You are inspecting a local gas station that also rents 20 lb. LP gas portable containers for customers. You note the locked, vented metal cabinet sitting 2 feet from the only exit from inside the gas station. You also observe that the locker is in such a position that it is up 6” off the vehicle pavement on a step. The locker is positioned so that vehicles have the possibility of impacting the locker. Are there violations of the OFC?

Rule 38 Review Answers

- No. Refer to OFC 3803.2.1.4
- Refer to OFC 3809.4 and Table 3809.12 (10 feet away)
  - The locker needs vehicle protection from impact. Refer to OFC 3807.4 (refers to Rule 3, 312) and 3809.13

1301:7-7-39 Rule 39

Organic Peroxides

3902 Definitions

- Class I- Capable of deflagration but not detonation
- Class II- Burn very rapidly and pose a moderate reactivity hazard
- Class III- Burn rapidly and pose a moderate reactivity hazard
- Class IV- Burn is same manner as ordinary combustibles and pose minimal reactivity hazard
- Class V- burn with less intensity than ordinary combustibles and do not sustain combustion and that pose no reactivity hazard.

3903 General Requirements

- Unclassified detonable and Class I organic peroxides shall not be stored in Use Group R
- Unclassified detonable and Class I organic peroxides shall not be stored or used in offices, or retail sales areas of Group B, F, M or S.
- Storage shall be in accordance with Tables 3904.1.2 and 3904.1.7.

Table 3904.1.2

Organic peroxide class	Maximum storage quantity (pounds) at minimum separation distance					
	Distance to buildings, lot lines, public streets, public alleys, public ways or means of egress			Distance between individual detached storage buildings or individual outdoor storage areas		
	50 feet	100 feet	150 feet	20 feet	75 feet	100 feet
I	2,000	20,000	175,000	2,000	20,000	175,000
II	100,000	200,000	No limit	100,000[a]	No limit	No limit
III	200,000	No limit	No limit	200,000[a]	No limit	No limit
IV	No limit	No limit	No limit	No limit	No limit	No limit
V	No limit	No limit	No limit	No limit	No limit	No limit

Table 3904.1.7

Organic peroxide class	Pile configuration				Maximum quantity per building
	Maximum width (feet)	Maximum height (feet)	Minimum distance to next pile (feet)	Minimum distance to walls (feet)	
I	6	8	4[a]	4[b]	Note c
II	10	8	4[a]	4[b]	Note c
III	10	8	4[a]	4[b]	Note c
IV	16	10	3[a,d]	4[b]	No requirement
V	No requirement	No requirement	No requirement	No requirement	No requirement

1301:7-7-40 Rule 40

Oxidizers

4001 Overview and General Requirements

- Note the 3 exceptions to the scope of the Rule; Liquid oxygen stored or used in home health care in Occupancy Groups I-1, I-4, and R
- Storage and use of oxidizers which do not exceed the maximum allowable quantities shall be in accordance with 2701 and 2703.
- Class 4 liquid and solid oxidizers shall be stored in hazardous materials storage cabinets when in Use Groups A, E, I or U. These cabinets may not contain any other storage.
- Class 4 oxidizers shall not be stored or used in Use Group R.

4004 Storage

- Detached storage buildings shall comply with Table 4004.1.2 of this rule
- The maximum quantity of oxidizers per building in detached buildings shall not exceed the quantities set forth in Tables 4004.1.7 (1) to (4).
- Liquid and solid oxidizers shall not be stored against combustible surfaces.

4006 Liquid Oxygen in Home Health Care

- Information & instructions must be provided to user
- Storage is limited; containers must be secured & safely located
- Storage in I-4 Occupancies – Refer to Table 2703.1.1(1)
- Smoking is prohibited in rooms or areas where liquid oxygen is in use
- Fire department may require liquid oxygen seller to inform them of the location of oxygen home health care containers

1301:7-7-41 Rule 41

Pyrophoric Materials

4102 Definitions

- Pyrophoric - A chemical with a autoignition temperature in air , at or below a temperature of 130 degrees F.
  - Pyrophoric materials are subject to spontaneous ignition
  - Regardless of their state many of these materials will ignite spontaneously when exposed to air or slight moisture
  - The storage & use of pyrophoric materials must be followed
  - Refer to Table 4104.2.1 for gas storage & proximity to exposures

1301:7-7-42 Rule 42

Pyroxylin (Cellulose Nitrate) Plastics

4203 General

- Generally used in industrial applications such as shoe heels, house wares and lacquers. Originated for use in ammo in WW I, reacts readily when exposed to light and heat. This product was use extensively in the early film making industry
- Displays may be placed on tables no more than 3 feet wide and 10 feet long.
- No combustible storage under tables
- Lighting shall not be directly over material unless provided with suitable guards to prevent heated particles from falling.

4204 Capacity Limitations

- 1000 lbs. In cabinets of raw materials
- 500 lbs. Per cabinet
- Each compartment not more than 250 lbs.
- **4204.1.4** Cellulose nitrate shall not be stored within 2 feet of any heat producing appliances

1301:7-7-43 Rule 43

Unstable (Reactive) Materials

4301 General

- May react spontaneously with themselves or other chemicals when exposed to light, heat, cold moisture, air or physical shock. Used in a variety of industrial processes such as plastic, fireworks, rocket propellants and others.
- For unstable (reactive) materials there are 4 classes
  - There are certain storage restrictions for these classes
- 4301.1 Shall comply with this rule in addition to Chapter 30

1301:7-7-44 Rule 44

Water-Reactive Solids and Liquids

4402 Definitions

- A material that explodes; violently reacts; produces flammable, toxic or other hazardous gases; or evolves enough heat to cause self-ignition of nearby combustibles upon exposure to water or moisture
  - **Class 3**- reacts explosively with water without requiring heat or confinement
  - **Class 2**- may form potentially explosive mixtures with water
  - **Class 1**- may react with water with some release of energy, but not violently

4403 & 4404 General Requirements & Storage

- The storage quantities of the 3 listed classes of Water-Reactive solids & liquids must be followed
  - Storage and quantity rules are specific to certain classes

1301:7-7-45 Rule 45

Marinas

Rule 45 - Marinas

- 4501.2 Plans & Approvals
  - Fire protection plans for marinas need pre-installation and post-installation approvals.
- 4502.1 Definition – Marina –

Any portion of the ocean or inland water, either naturally or artificially protected – for mooring, servicing or safety of vessels.

4503 – General Precautions

- This section covers overall fire safety conditions at marinas.
- Flammable & combustible liquids spills on the water need reported immediately to the local FCO or AHJ.
- Electrical equipment – per OFC 605 & chapter 7 of NFPA 303.
- Slip Identification – slips must be numbered via numerically or alphabetically; identified individually.

4504.2 Fire Protection/Standpipes

- Marinas/boatyards – must be equipped throughout with standpipe systems per NFPA 303
- Hose connection – no point > than 150 ft. exceeding from the SP hose connection. Must be identified for ease of visibility.
- 4504.3 – Access & water supply

  - Fire apparatus roads & water supply systems with on-site hydrants – per local FCO approval.

- 4504.4 – Fire extinguisher – must provide 1 port. Fire extinguisher at each standpipe connection (2-A:10-B-C)

4504.5 & 4504.6

- 4504.5 - A telephone that is not coin-operated must be provided at a location approved by the local FCO.
- 4504.6 – Emergency Operations Staging Areas (EOSA):
  - Minimum area shall be 4ft. By 10 ft. long; exclusive of walkways, and be located at standpipe connections for emergency equipment staging.
  - Staging area to have a 4” min. high curb/barrier to keep equipment from rolling into the water. A 2” space between the barrier and the ledge shall be used for water run-off of pavement.
  - Signage: “Fire Equipment Staging Area Keep Clear” req’d.

4505 – Marine Motor Fueling

- The Rules marine motor fuel-dispensing facilities are located within Rule 22 of the Ohio Fire Code.

1301:7-7-46 Rule 46

Construction Requirements for Existing Buildings

4601 - Overview

- Applies to existing buildings prior to adoption of the current Ohio Fire Code.
- Rule 46 will not apply unless the existing building conditions constitute a distinct hazard to life and property.
- Note exception to the Scoping rule – 4604 applies to all existing buildings – but the exception does NOT include 4604.22 or 4604.23.
- The bldg. owner must be notified by the FCO of the noncompliance.

4603 – Fire Safety Requirements for Existing Buildings

- Req'd Construction – REFER to Table 4603.1 – specifies minimum construction provisions for existing bldgs.

  - This rule should NOT be construed to allow for elimination of existing fire protection or life safety systems, or for reduction of said systems.

- 4603.2 _Elevator operation – if travel distance is > 25 ft. above or below main floor – and used for firefighting or emergency rescue, shall have emergency operations per ASTM A17.3

4603.3 TO 4603.3.7 – Vertical Openings

- These sections highlight vertical openings of various types in existing buildings, must have:
  - 1 hour fire-resistance rated construction OR
  - auto. fire sprinkler system

- The protection is based upon # of stories & type of occupancy.

4603.4 Sprinkler Systems

- Provides for automatic fire sprinkler systems for 2 specific buildings/uses:

  - Pyroxylin plastics (includes storage vaults)

  - Group I-2 – sets specifics as to level of floor protection where required.

4605 Standpipes

- Existing structures with occupied floors greater than 50 ft. above or below lowest level of FD vehicle access – standpipe required.

- A “manual standpipe system can be used per approval of FCO.

4603.6 Fire Alarm Systems

- Fire alarm systems, of either manual or automatic, or for smoke detection are required in the following use groups:
  - E, I-1, I-2, I-3, certain R-1, R-2, and R-4 use groups
  - See exceptions to the required installations for some for the above use groups

4603.7 Single and Multiple Station Smoke Detectors

- Single or multiple station smoke detectors are required to be installed into existing R use groups & dwellings NOT classified as R
  - Refer to 907.2.11
  - This does not require these detection devices to be installed into 1-2-3 family units NOT more than 3 stories – These residences are covered under the IRC or RCO

4604 Means of Egress for Existing Buildings

- Section 4604.1 – General – Refer to and review table 4603.1
- If existing buildings were not required to comply with building code at time of construction, they now shall comply with the minimum EGRESS requirements AND have a life safety evaluation completed.

4604 Means of Egress for Existing Buildings Cont.

- Key factor in 4604: Exit signs & their illumination
  - Emergency egress illumination for occupancies with 2 or more means of egress: Assembly (greater than 50 persons) with 1 exception
  - Certain B use groups
  - E use groups
  - F use groups (1 exception)
  - I use groups
  - M use groups (1 exception)
  - R use groups (Each has own exception)

4604 Means of Egress for Existing Buildings Cont.

- Refer to Table 4604.7 – Egress width per occupant load
- 4604 also covers: size of doors, opening force, stairs & ramps
- 4604.17 – Fire escape stairs, aspects of fire escapes, and maintenance of fire escapes
- 4604.18 – Corridors service occupant load greater than 30 persons and corridor openings shall have effective barriers against movement of smoke.

4604 Means of Egress for Existing Buildings Cont.

- 4604 – Also covers
  - Dead end corridors
  - Exit access travel distance (Refer to Table 4604.18.2)
  - Stairway discharge ID. This covers stairways in exit enclosures located below level of exit discharge
- Exterior stairway protection – there are 4 major exceptions to this paragraph. This section also covers minimum aisle width as it relates to certain stairways

4604 Means of Egress for Existing Buildings Cont.

- 4604.22 and 4604.23 – These two rule are not included in the “General” section of 4604.1
  - Even though the provisions of paragraph 4604 apply to all existing buildings

Rule 46 Review Question

- You are called on a complaint of a 3 story, occupied office building with no emergency egress lighting in the stairway of the building. Is this a violation of an existing building?

Rule 46 Review Answer

- Yes, it is a violation of an existing building, only if you declare the stairways as a distinct hazard to life. Refer to OFC 4604.5 - #2 B Use Group, 3 or more stories in height, etc.

1301:7-7-47 Rule 47

Referenced Standards

Rule 47 Referenced Standards

- “The standards listed herein shall be considered part of the requirements of the Ohio Fire Code.

NFPA Standards

- Double-underlining the edition and year indicates the standard has been added. Example 160-98 “Flame Effects Before an Audience” has been added to the 1998 edition.