

**A RESOLUTION OF THE DISTRICT BOARD OF THE SUNCITY FIRE  
DISTRICT TO ADOPT THE 2018 INTERNATIONAL CODES**

**WHEREAS**, The Sun City Fire District, in order to pass a resolution for the purpose of adopting the 2018 International Codes and current NFPA Codes and Standards prescribing regulations governing conditions hazardous to life and property from fire, hazardous materials and conditions or explosion, providing for the issuance of permits for hazardous uses or operations, and repealing Resolution No. 13-1022A for the 2012 International Codes adoption except for the 2009 International Residential Code which is to be left as adopted and,

**WHEREAS**, The Sun City Fire District, desires to and finds it necessary to adopt the following regulations to provide minimum fire safety and that a plan for inspections and maintenance will upgrade existing structures, thereby reducing hazards of fire, thus does hereby adopt the following regulations; and now, therefore,

**IT IS RESOLVED AS FOLLOWS:**

**TITLE AND FILING:**

The International Code Family of Codes, 2018 Edition, published by the International Code Council, is hereby declared to be public record by this Resolution No. 19-1119A. At least three (3) copies of code shall be filed in the Fire District's administrative office and kept available for public use and inspection.

**SCOPE:**

The purpose of the International Codes is to establish the 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 the public and to fire-fighters and emergency responders during emergency operations.

**BE IT FURTHER RESOLVED AS FOLLOWS:**

The following codes are hereby adopted by the Sun City Fire District. Those certain codes and standards known as:

- A. The **International Fire Code (IFC), 2018 Edition**, as published and copyrighted by the International Code Council including Appendixes B, C, D, F, G, H, I, J and any amendments as to the effective date of this resolution and subject to the changes listed below.
- B. The **International Building Code, 2018 Edition**, as published and copyrighted by the International Code Council including all appendices.
- C. The **International Mechanical Code, 2018 Edition**, as published and copyrighted by the International Code Council including all appendices.
- D. The **International Plumbing Code, 2018 Edition**, as published and copyrighted by the International Code Council including all appendices.
- E. The **International Fuel Gas Code, 2018 Edition**, as published and copyrighted by the International Code Council including all appendices.
- F. The most recent Edition of the National Fire Codes and Standards published by the National Fire Protection Association (NFPA), including the NFPA 70 - **2017 National Electric Code**, and all codes and standards referenced in Chapter 80 (Referenced Standards) of the International Fire Code, 2017 edition, and the most recent edition of the NFPA 101 Life Safety Code, together with all amendments and supplements to those codes adopted by the NFPA from time to time.

The International Residential Code, 2009 Edition, as previously adopted by RESOLUTION NO. 09-1117A on December 15, 2009, without any changes, hereby shall be retained in its present form.

**LOCAL AMENDMENTS TO THE INTERNATIONAL FIRE CODE 2018 EDITION:**

(Items shown in **RED** print are changes from previous amendments.)

**Section 104.10 Fire Investigations** is hereby **DELETED** and **REPLACED** with the following language:

**104.10 Fire Investigations.** The Fire District shall have the authority to investigate or cause to be investigated the origin, cause and circumstance of each and every fire, explosion or hazardous condition within the District and coming to the District's attention. If the fire or explosion appears to the Fire Investigator to be of suspicious origin, the Fire Investigator shall notify the appropriate law enforcement agency and shall secure the site until the law enforcement agency takes control of the site. Information relating to trade secrets or processes shall not be made part of the public record unless directed by a court of law.

**Section 106 Fees.** Is hereby **AMENDED** by **ADDING** the following paragraph:

**106.6 Operational Permit and Licensure Permit Fees.** The Fire Code Official or his or her designee shall charge an Operational Permit Fee for occupancies listed under Section 105.6, or a Licensure Permit Fee for each fire code compliance inspection relating to the issuance of the permit. The fee amount shall be in accordance with the fee schedule established by Board resolution. The type of permit will be based on the type of occupancy classification.

**Section 106.3 Work commencing before permit issuance.** Is hereby **AMENDED** by **ADDING** the following sentence at the end of the paragraph:

Such additional permit fee shall be triple the amount of the original permit fees, as established by Board resolution. All operations and/or work shall cease until the required permits are obtained.

**Section 109 Board of Appeals.** Is hereby **REVISED** by **ADDING** the following section:

**Section 109 Administrative appeal.** Whenever a violation of this code has been found and the applicant wishes to appeal the decision of the staff because of code interpretation, or unreasonable hardship, an appeal may be filed to the fire code official or an authorized representative, within 14 calendar days of the determination of a violation as follows:

1. The appeal must be submitted in writing and will be heard by the fire code official or an authorized representative within 10 working days of the receipt of the appeal.
2. The fire code official, or an authorized representative, may use a Hearing Committee consisting of such staff as is deemed appropriate to provide advice on a particular appeal.
3. Adequate information shall be provided by the applicant on the Petition of Appeal to fully describe the condition(s) in question.
4. The applicant may, but is not required to, meet with the fire code official, or a designated representative, to discuss the appeal.
5. If the appeal is denied, the applicant shall comply with the requirement(s) of the fire code or file an appeal to the Board of Appeals as provided in Section 109.1 of this code within 30 days of the date the appeal is denied.

**Section 110.4 Violation Penalties.** Is hereby **DELETED** and **REPLACED** with the following language:

**110.4 Violation penalties.** Persons who shall violate a provision of this Code or shall fail to comply with any of the requirements thereof or who shall erect, install, alter, repair or do work in violation of this Code, or the approved construction documents, or directive of the fire code official, or of a permit or certificate used under provisions of

this Code, shall be guilty of a Class 1 misdemeanor punishable by a fine of not more than \$2,500.00 dollars or by imprisonment not exceeding six months, or both such fine and imprisonment. Such fine and imprisonment shall be at the discretion of the court. Each day that a violation continues after due notice has been served shall be deemed a separate offense.

**Section 112.4 Failure to comply.** Is hereby **DELETED** and **REPLACED** with the following language:

**112.4 Failure to comply.** Any person, who shall continue any work after having been served with a stop work order, except only such work that person was directed to perform to remove a violation or unsafe condition, shall be liable to a fine of not less than \$500.00 dollars or more than \$2,500.00 dollars.

**Section 308 OPEN FLAMES.** Is hereby **DELETED** and **REPLACED** with the following language:

**308.1.6.3 Sky Lanterns.** The lighting of, and the release of, sky lanterns shall be prohibited.

**Section 308.1.4 Open-flame decorative devices.** Is hereby **AMENDED** by **ADDING** the following Exception 4:

**308.3.1.2 Open-flame cooking devices.**

**Exceptions:**

4. Device is not located under any attached combustible covers or balconies.

**Section 308.3.1. Open-flame decorative devices.** Is hereby **AMENDED** by **ADDING** the following paragraph:

**Section 308.3.1.1. Use of Liquefied-petroleum-gas-fueled cooking devices.** No person shall use individual fixed or portable, LP-gas burners or barbecues on or under any attached covered patios, balconies, covered walkways, stairs, or roof overhangs and shall not be located within 10 feet (3048 mm) of combustible construction.

**Exceptions:** Detached one- and two-family dwellings.

**Section 313.2 Group R occupancies.** Is hereby **AMENDED** by **ADDING** the words:

“operated or repaired” after “...shall not be stored,”.

**Section 503.2.4 Turning Radius** Is hereby **DELETED** and **REPLACED** with the following language:

**503.2.4 Turning Radius.** The required minimum turning radius of a fire apparatus access road shall be per **WB-40 as published by AASHTO: 19.3 feet inside and 40 feet outside.**

**Section 503.2 Specifications.** Is hereby **AMENDED** by **ADDING** the following paragraph:

**503.2.1.1 Temporary fire department access.** Temporary fire department access roadway prior to and during construction of every facility, building or portion of a building shall install and maintain a roadway 16'-0" (4,877mm) wide, with minimum 0'-4" (101.6mm) thickness of aggregate base course or decomposed granite compacted to a 90% density where natural soil will not meet compaction requirements.

**Section 503.3 Marking.** Is hereby **AMENDED** by **ADDING** the following sentence(s) at the end of the paragraph:

All fire lanes shall be marked in the following manner:

1. Curb, street or driveway painted red to indicate fire lane and labeled “NO PARKING - FIRE LANE” in white block letters 4 inches (76.2mm) in height, 3/4 in. (19.5 mm) stroke, on the vertical face of the curb to indicate fire lane, or as required by the Fire Code Official.
2. Lettering sections shall not be greater than 50'-0" (15.24m) apart and shall be posted at the beginning and end of the fire lane.

3. Every fire apparatus access roadway required under the authority of this section, upon direction of the code official, shall be posted with signs installed at points not more than one-hundred (100) feet apart along the length of the required fire apparatus access roadway. The bottom of every such sign shall not be less than seven (7) feet or more than ten (10) feet from the ground surface level. Signs shall be posted to face the direction of travel. Construction, installation, and maintenance of the signs shall be done at Owner's expense. Materials and locations of each sign shall be indicated in the plans submitted to the fire department.

The required sign shall read "NO PARKING - FIRE LANE – BY ORDER OF FIRE MARSHAL" with a standard sign size (width and height) of 12 x 18 inches (300 x 450 mm), on a white reflective background.

It shall be unlawful for any vehicle, equipment or device to park in or block the fire lane. Any vehicle, equipment or device found parked in or blocking a fire lane shall be cited by the police or the fire department.



**Section 503.4 Obstruction of fire apparatus access roads.** Is hereby **AMENDED** by **ADDING** the following paragraph section:

**503.4 Obstruction of fire apparatus access roads.** *Excluding authorized emergency vehicles*, fire apparatus access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established by Section 503.2.1 shall be maintained at all times.

**Section 503.6 Security Gates.** Is hereby **AMENDED** by **ADDING** the following paragraph sections:

**503.6.1 Key switch and sensor pre-emption location.** A key switch and pre-emption sensor shall be required on all electric entry control gates. **Key switch shall be installed in a lock box in a location on the gate control panel that is readily visible and accessible. The pre-emption sensor shall be at or behind the gate. Manual override controls shall be located on the entrance side of gate in a SCFD lockbox. Automatic gates shall be provided with battery back-up - when utility power has failed, the gates(s) shall open and stay open until utility power is restored for normal operations. Fire Dept. Access signage required.**

**503.6.1.1 Single family residence.** A key switch shall be installed in a location on the gate control panel that is readily visible and accessible. A pre-emption sensor is optional.

**503.6.2 Manual gates.** An approved dual padlock locking system may be used on manual gates. **An approved Fire Department Lockbox for padlock keys shall installed on all emergency access manual gates. A Lockbox will be included with permit fees and issued as part of the permit for all required manual gates.**

**503.7 Retro-fit of security gates.** The installation of a key switch and pre-emption sensor shall be required on all existing electric entry controlled security gates across a fire apparatus access road. All gates shall be in compliance on or before July 1, 2014.

**EXCEPTION:** Single Family Residence: A pre-emption sensor is optional.

**Section 505.1 Address Identification.** Is hereby **AMENDED** by **ADDING** the following paragraph sections:

**505.1.1 Commercial Building and Tenant Addresses.** Commercial address numbers including separate Building numbers (any structure other than one and two family dwelling) shall be contrasting in color and sized according to the specifications listed in Table 1 below. Tenant space or letters shall be in contrasting color, 4 inches in height,

1 inch stroke and shall be displayed on or above the front *and* rear access doors so that the number is plainly legible from the front of the street or road fronting the property.

**Table 1**

0 to 50 feet from the roadway, numbers shall be 9 inches in height, 2 ½ inch stroke
51 to 100 feet from the roadway, numbers shall be 12 inches in height, 3 ½ inch stroke
101 feet or more from the roadway, numbers shall be 15 inches in height, 5 inch stroke

**505.1.2 Interior Room/Suite Numbers.** New and existing buildings shall have an approved room and/or suite numbers identification placed in positions that are plainly legible and visible. Numbers shall contrast with their background. Interior room and suite numbers shall be a minimum of 1.25 (1 ¼) inches (31.75 mm) high with a brush stroke width of 0.25 (1/4) inches (6.35 mm). These numbers must coordinate with the addressable locations on the FACP annunciator.

**Section 506.1.3** Is hereby **AMENDED** by **ADDING** the following paragraph:

**506.1.3 Key Boxes.** Fire Chief or Fire Code Official is authorized to require a key box installed in an approved location. **The lock box must be an Approved model by the SCFD and be shall be installed 42" to 60" above finished grade.** Authorized SCFD lock box order forms are available at the Sun City Fire District Administrative Office, during normal business hours.

**Section 507.3** Is hereby **AMENDED** as follows:

**Section 507.3** Is hereby **AMENDED** by **DELETING** the words: "shall be determined by an *approved* method" and **ADDING** the words: "... shall be in accordance with Appendix B".

**Section 507.5 Fire hydrant systems.** Is hereby **AMENDED** as follows:

**507.5 Fire hydrant systems.** Fire hydrant systems shall comply with sections 507.5.1 through 507.5.8.

**Section 507.5 Fire hydrant systems.** Is hereby **AMENDED** by **ADDING** the following subsections:

**507.5.7. Fire hydrant color.** All **PUBLIC** fire hydrants shall have aboveground barrels painted with a primer coat plus two (2) coats of OSHA yellow paint. **All PRIVATE fire hydrants shall have aboveground barrels painted with a primer coat plus two (2) coats of OSHA Red paint.**

**507.5.8 Reflective markers.** All fire protection equipment and hydrants shall be clearly identified by installation of reflective blue markers **on the pavement centerline immediately in-line with the Fire Hydrant.** (Conform to MAG Uniform Standard Specifications, standard detail 2363.)

**Emergency Responder Radio Coverage is retroactively required in all buildings upon adoption of this ordinance in accordance with the following amendments:**

**Section 510 Emergency Responder Radio Coverage** is hereby amended as follows:

**Section 510.1 Emergency Responder Radio Communications** hereby **DELETED** and **REPLACED** with the following language:

**510.1 Emergency Responder Radio Communications.** Buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. The requirements of this Section 510 shall apply to all buildings and structure located within the Sun City Fire District that satisfy any of the following characteristics:

1. Buildings or structures that are more than 3 stories above ground level; or
2. Buildings or structures totaling forty-five thousand (45,000) square feet or more on any single floor; or
3. Buildings or structures that include a basement or other subterranean space totaling two hundred fifty (250) square feet or more; or
4. Buildings or structures that the fire code official has determined to have been constructed in a manner or with materials likely to limit the ability of emergency response personnel to effectively use radio communication while within that building or structure.

Exception:

1. The requirements set forth in this section 510.1 shall not apply to the following:
  - a. U occupancies and R-3 occupancies that are single family detached residences; or
  - b. Buildings or structures utilizing only wood framing; and
  - c. Buildings or structures that are less than thirty-five (35) feet above ground level and do not utilize any metal framing or metal roofing.
2. Where it is determined by the fire code official that the radio coverage system is not needed.
3. In facilities where emergency responder radio coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the fire code official shall have the authority to accept an automatically activated emergency responder radio coverage system.

**Section 1103.2 Emergency Responder Radio Coverage in existing buildings** hereby **DELETED** and **REPLACED** with the following language:

**1103.2 Emergency Responder Radio Coverage in existing buildings.** Existing buildings other than Group R-3 that do not have approved radio coverage for emergency responders in the building based on existing coverage levels of the public safety communications systems shall be equipped with such coverage as required in Section 510.1.

Exception:

1. Where approved by the fire code official, a wired communication system in accordance with Section 907.2.12.2 shall be permitted to be installed or maintained instead of an approved radio communication system.
2. Where it is determined by the fire code official that the radio coverage system is not needed.
3. In facilities where emergency responder radio coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the fire code official shall have the authority to accept an automatically activated emergency responder radio coverage system.

**Section 901.2 Construction Documents.** Is hereby **AMENDED** by **ADDING** the following subsection:

**901.2.2 Plan certification for all fire protection systems.** Plan certification for all fire protection systems (Fire Sprinkler, Fire Alarm and other Fire Protection systems) shall be accompanied by a certification of competence when required by the fire code official.

**Section 901.4.3.** is hereby **AMENDED** by **ADDING** the following Table:

**Section 901.4.3.1.** Table 901.4.3.1 Hazard Level

<b>HAZARD LEVEL</b>	<b>2018 IFC Occupancy Type</b>
1 (Highest)	H, I, A, R-1, R-2, R-4,
2	S-1, F-1
3	E, F-2, S-2
4 (Lowest)	B, M, U, R-3

**Section 901.4.4 Additional Fire Protection Systems.** Is hereby **AMENDED** by **ADDING** the following subsection:

**Section 901.4.4.1 Additional Horn and Strobe Device.** An additional weatherproof **electric** horn and strobe device shall be installed at an approved location on the front exterior of the building in addition to a water gong or electric bell at the riser. The horn and strobe shall be installed on the front, or address side of the building as approved by the Fire Code Official.

**Section 901.6.3 Records.** Is hereby **DELETED** and **REPLACED** with the following language:

**Section 901.6.2 Records.** Records of all system inspections, tests and maintenance required by the referenced standards shall be maintained on the premises for a minimum of three years. The fire protection contractor providing the inspection, test or maintenance shall forward one copy of the report to the Sun City Fire District within 30 days. If the initial inspection results in deficiencies that are subsequently repaired within the first 30 days, the initial and follow up reports may be submitted as one report.

**Section 901.11** Is hereby **AMENDED** by **ADDING** the following paragraph:

**901.11 Clearance around fire-protection systems and equipment.** A minimum 3-foot clear space, on a minimum of 2 sides, shall be maintained for access to fire protection equipment, including control valves and control panels.

**Section 903.2** This entire section is hereby **DELETED** and **REPLACED** with the following language:

**Section 903.2 Commercial Occupancies.** All New Commercial Occupancies, as defined by the International Building Code, for which a building or construction permit is obtained, shall be protected throughout the entire structure by a fully automatic sprinkler system, **or as required by the Fire Code Official.** Installation of the sprinkler system shall be in accordance with the requirements of NFPA 13, unless otherwise approved by the Fire Code Official. NFPA 13D and 13R systems **may be allowed at the discretion of the Fire Code Official; all systems will be subject to revisions deemed necessary during plan review.** All 13D and 13R systems shall require attic and concealed space protection where there is fuel-fired equipment present within that space.

Commercial Fire Sprinkler Risers shall be located in a dedicated room that has direct access from the exterior or located on the exterior secured with a fence and lockable gate. Riser rooms shall be a minimum of 5' by 5' and 8' ceiling height and be of 1-hour fire-rated construction.



**Section 903.2.11.2 through Section 903.2.12** shall remain in force as described in the 2018 IFC.

**Section 903.2.2** This entire section is hereby **DELETED** and **REPLACED** with the following language:

**Section 903.2.2 Residential Occupancies.** All new Residential-related Occupancies including I occupancies and R occupancies (excluding R-3 occupancies regulated by the 2009 International Residential Code) for which a building or construction permit is obtained shall be protected by a fully automatic sprinkler system. Installation of the sprinkler system shall be in accordance with the requirements of NFPA 13, 13D or 13R, as regulated and at the discretion of the Fire Code Official.

**Section 903.2.13.** Is hereby **AMENDED** by **ADDING** the following subsections:

**Section 903.2.13 Existing Buildings.** Existing buildings, structures and occupancies shall be retrofitted with fire sprinkler systems to meet current code standards when one or more of the following conditions exist:

1. 50% or more of the roof structure is replaced or repaired; or
2. Building fire resistance has decreased (removal of existing fire-rated assemblies results in an increase of the original basic fire area [The aggregate floor areas bounded by rated assemblies]); or
3. Building area has increased larger than 1500 sq. ft. of additional area from the original building footprint; or
4. Building Occupant Load has increased significantly; or
5. Building Occupancy Classification has changed:
  - a. Regardless of building area, undergoes a change of occupancy within Hazard Level 1. (Table 901.4.3.1); or
  - b. Change of occupancy over 1500 sq. ft.; or
  - c. Change of occupancy under 1500 sq. ft. to a higher Hazard Level (Table 901.4.3.1); or
6. Fire, damage or tenant improvements in buildings exceeds 50% of the square footage or 50% of the building valuation; or
7. As otherwise determined by the Fire Code Official.

**Section 905.3 Required Installations** shall be amended as follows:

All Standpipes required in the Sun City Fire District shall be Class I Standpipes and any reference to a Class II or Class III standpipes shall not be utilized. Standpipe systems are allowed to be combined with automatic sprinkler systems. Sections 905.3.2 through 905.3.8 are hereby deleted.

**Section 905.3.1.** Is hereby **DELETED** and **REPLACED** with the following language:

**905.3.1 Height.** Class I standpipe systems, as defined in section 902.1 of the International Fire Code, 2018 edition, "Standpipe System, Classes of" shall be installed throughout buildings where there are multiple floors above or below the first floor and protected Exit Enclosures are in-place.

Clarifications:

1. Class I Standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 as directed by the Fire Code Official.
2. Class I standpipes are allowed in basements and underground parking garages equipped throughout with an automatic sprinkler system as directed by the Fire Code Official.
3. Buildings equipped with a rooftop helistop or heliport shall be equipped with a Type I standpipe system extended to the roof level as directed by the Fire Code Official.
4. Buildings that have rooftop gardens and landscaped roofs and that are equipped with a standpipe system shall have a standpipe system extended to the roof level as directed by the Fire Code Official.



**Section 907.2. Where required – New buildings and structures.** Is hereby **DELETED** and **REPLACED** with the following language:

**Section 907.2 Where required – New buildings and structures.** (Sections 907.2.1 – 907.2.23 still apply where it is more restrictive than the following amendments):

**Fire Alarm system:** All new *commercial* occupancies (any structure other than one and two family dwellings) for which a building or construction permit is obtained where the occupant load exceeds 49, shall be protected by a *fully automatic fire alarm system*. Installation of the fire alarm system shall be in accordance with the requirements of NFPA 72, unless otherwise approved by the Fire Code Official. The Main Alarm Panel location shall be approved by the Fire Code Official. All fire alarms shall be addressable systems with Class “A” wiring. **If the FACP is in a remote location of the building, a remote annunciator shall be installed inside the front entrance of the building or other location as required by the Fire Code Official.**

**Fire Detection/Notification Devices:** IFC Sections 907.3 through 907.10 apply entirely. **As outlined above, an approved fully automatic fire detection/notification system shall be installed in accordance with the provisions of this code and with NFPA 72.** Monitoring shall be by a central station as defined by NFPA 72 Section 3.3.193.1. Devices, combinations of devices, appliances and equipment shall comply with Section 907.1.1 through Section 907.1.3. The automatic fire detectors shall be smoke detectors, except by approval of the Fire Code Official, an approved alternative type of detectors shall be installed in spaces such as boiler rooms, utility rooms and janitor closets with water heater and sink, where during normal operation, products of combustion are not present in sufficient quantity to actuate a smoke detector. **Notification systems shall initiate the occupant notification system upon activation of automatic fire detectors, automatic sprinkler system waterflow devices, manual fire alarm boxes, or automatic fire-extinguishing systems.**

All existing **Fire Alarm Control Panels** were to have been converted to an addressable type by December 5, 2010 by prior Resolution Adoption. Alarm panels that serve a single business shall be allowed to be within that business **location.**

**Section 912.2 Location.** Is hereby **DELETED** and **REPLACED** with the following language:

**912.2 Location.** With respect to hydrants, driveways, buildings and landscaping, fire department connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for other fire apparatus. **The location of the fire department connections shall be remote from the building and 36” above grade with a working space of not less than 36 inches around the FDC. Additionally, the fire department connection shall be located no closer than 20 feet or not further than 90 feet from a hydrant.**

**Section 912.2 Location.** Is hereby **AMENDED** by **ADDING** the following subsections:

**912.2.3 Remote Fire Department Connections.** Remote fire department connections shall be located within four (4) feet (1219.2mm) to eight (8) feet (2438.4mm) of the curb line of an access road or public street, or as otherwise specified. **All Fire Department connections shall be signed with address numbers as to the building it connects.** The fire department connection line shall be a wet line with the check valve at the hose connection above grade.

**Section 1103.8 Single-and Multiple-station Smoke Alarms.** Is hereby **AMENDED** by **ADDING** the following subsections:

**1103.8.1.2 Records and Maintenance.** The landlord or owner of any rental property shall inspect all smoke detection devices as required under NFPA 72 annually and a record of all inspections and maintenance activities shall be kept by the landlord or owner and available for inspection upon request by Fire Code Official.

## Chapter 12 of the IFC has significant amendments to the entire Chapter 12 as outlined below:

Entire Chapter 12 – Energy Systems is hereby DELETED and REPLACED with the following:

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Colored text is as follows: **BLACK:** 2018 IFC CHAPTER 12; **GREEN:** PHOENIX FIRE AMENDMENTS; **BLUE:** SUN CITY FIRE DISTRICT AMENDMENTS; **ORANGE:** REVISED PHOENIX FIRE AMENDMENTS.

### SECTION 1201 GENERAL

**1201.1 Scope.** The provisions of this chapter shall apply to the installation, operation and maintenance of energy systems used for generating or storing energy. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency.

**1201.2 Electrical wiring and equipment.** Electrical wiring and equipment used in connection with energy systems shall be installed and maintained in accordance with Chapter 12 and NFPA 70.

**1201.3 Mixed system installation.** Where approved, the aggregate kWh energy in a fire area shall not exceed the maximum quantity specified for any of the energy systems in this chapter. Where required by the *fire code official*, a hazard mitigation analysis shall be provided and approved in accordance with Section 104.7.2 to evaluate any potential adverse interaction between the various energy systems and technologies.

### SECTION 1202 DEFINITIONS

**1202.1 Definitions.** The following terms are defined in Chapter 2:

BATTERY SYSTEM, STATIONARY STORAGE.

BATTERY TYPES.

LEAD-ACID BATTERY.

CAPACITOR ARRAY.

CAPACITOR ENERGY STORAGE SYSTEM.

CRITICAL CIRCUIT.

EMERGENCY POWER SYSTEM.

ENERGY MANAGEMENT SYSTEM.

FUEL CELL POWER SYSTEM, STATIONARY.

STANDBY POWER SYSTEM.

STATIONARY BATTERY ARRAY.

STATIONARY FUEL CELL POWER SYSTEM.

### SECTION 1203 EMERGENCY AND STANDBY POWER SYSTEMS

**1203.1 General.** Emergency power systems and standby power systems required by this code or the International Building Code shall comply with Sections 1203.1.1 through 1203.1.9.

**1203.1.1 Stationary generators.** Stationary emergency and standby power generators required by this code shall be listed in accordance with UL 2200. **Associated Flammable or Combustible Liquid Tanks shall also comply with Chapters 50 and 57.**

**1203.1.2 Fuel line piping protection.** Fuel lines supplying a generator set inside a high-rise building shall be separated from areas of the building other than the room the generator is located in by an approved method, or an assembly that has a fire-resistance rating of not less than 2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the required fire-resistance rating shall be reduced to 1 hour.

**1203.1.3 Installation.** Emergency power systems and standby power systems shall be installed in accordance with the International Building Code, NFPA 70, NFPA 110 and NFPA 111.

**1203.1.4 Load transfer.** Emergency power systems shall automatically provide secondary power within 10 seconds after primary power is lost, unless specified otherwise in this code. Standby power systems shall automatically provide secondary power within 60 seconds after primary power is lost, unless specified otherwise in this code.

**1203.1.5 Load duration.** Emergency power systems and standby power systems shall be designed to provide the required power for a minimum duration of 2 hours without being refueled or recharged, unless specified otherwise in this code.

**1203.1.6 Uninterruptable power source.** An uninterrupted source of power shall be provided for equipment where required by the manufacturer's instructions, the listing, this code or applicable referenced standards.

**1203.1.7 Interchangeability.** Emergency power systems shall be an acceptable alternative for installations that require standby power systems.

**1203.1.8 Group I-2 occupancies.** In Group I-2 occupancies located in flood hazard areas established in Section 1612.3 of the International Building Code and where new or replacement essential electrical systems are installed and where new essential electrical system generators are installed, the systems and generators shall be located and installed in accordance with ASCE 24. Where connections for hook up of temporary generators are provided, the connections shall be located at or above the elevation required in ASCE 24.

**1203.1.9 Maintenance.** Existing installations shall be maintained in accordance with the original approval and Section 1203.4.

**1203.2 Where required.** Emergency and standby power systems shall be provided where required by Sections 1203.2.1 through 1203.2.18.

**1203.2.1 Ambulatory care facilities.** Essential electrical systems for ambulatory care facilities shall be in accordance with Section 422.6 of the International Building Code.

**1203.2.2 Elevators and platform lifts.** Standby power shall be provided for elevators and platform lifts as required in Sections 606.2, 1009.4.1, and 1009.5.

**1203.2.3 Emergency responder radio coverage systems.** Standby power shall be provided for emergency responder radio coverage systems as required in Section 510.4.2.3. The standby power supply shall be capable of operating the emergency responder radio coverage system for a duration of not less than 24 hours.

**1203.2.4 Emergency voice/alarm communication systems.** Emergency power shall be provided for emergency voice/alarm communication systems as required in Section 907.5.2.2.5. The system shall be capable of powering the required load for a duration of not less than 24 hours, as required in NFPA 72.

**1203.2.5 Exit signs.** Emergency power shall be provided for exit signs as required in Section 1013.6.3. The system shall be capable of powering the required load for a duration of not less than 90 minutes.

**1203.2.6 Gas detection systems.** Emergency power shall be provided for gas detection systems where required by Sections 1203.2.9 and 1203.2.16. Standby power shall be provided for gas detection systems where required by Section 916.5.

**1203.2.7 Group I-2 occupancies.** Essential electrical systems for Group I-2 occupancies shall be in accordance with Section 407.11 of the International Building Code.

**1203.2.8 Group I-3 occupancies.** Power-operated sliding doors or power-operated locks for swinging doors in Group I3 occupancies shall be operable by a manual release mechanism at the door. Emergency power shall be provided for the doors and locks.

**Exceptions:**

1. Emergency power is not required in facilities where provisions for remote locking and unlocking of occupied rooms in Occupancy Condition 4 are not required as set forth in the International Building Code.
2. Emergency power is not required where remote mechanical operating releases are provided.

**1203.2.9 Hazardous materials.** Emergency and standby power shall be provided in occupancies with hazardous materials as required in the following sections: 1. Sections 5004.7 and 5005.1.5 for hazardous materials. 2. Sections 6004.2.2.8 and 6004.3.4.2 for highly toxic and toxic gases. 3. Section 6204.1.11 for organic peroxides.

**1203.2.10 High-rise buildings.** Standby power and emergency power shall be provided for high-rise buildings as required in Section 403 of the International Building Code, and shall be in accordance with Section 1203.

**1203.2.11 Horizontal sliding doors.** Standby power shall be provided for horizontal sliding doors as required in Section 1010.1.4.3. The standby power supply shall have a capacity to operate not fewer than 50 closing cycles of the door.

**1203.2.12 Hydrogen fuel gas rooms.** Standby power shall be provided for hydrogen fuel gas rooms as required by Section 5808.7.

**1203.2.13 Laboratory suites.** Standby or emergency power shall be provided in accordance with Section 5004.7 where laboratory suites are located above the sixth story above grade plane or located in a story below grade plane.

**1203.2.14 Means of egress illumination.** Emergency power shall be provided for means of egress illumination in accordance with Sections 1008.3 and 1104.5.1.

**1203.2.15 Membrane structures.** Standby power shall be provided for auxiliary inflation systems in permanent membrane structures in accordance with Section 2702 of the International Building Code. Auxiliary inflation systems shall be provided in temporary air-supported and air-inflated membrane structures in accordance with Section 3103.10.4.

**1203.2.16 Semiconductor fabrication facilities.** Emergency power shall be provided for semiconductor fabrication facilities as required in Section 2703.15.

**1203.2.17 Smoke control systems.** Standby power shall be provided for smoke control systems as required in Section 909.11.

**1203.2.18 Underground buildings.** Emergency and standby power shall be provided in underground buildings as required in Section 405 of the International Building Code and shall be in accordance with Section 1203.

**1203.2.19 Connected facilities.** Power and lighting facilities or the *fire command center* and elevators specified in Sections 403.4.8.2 and 403.6 of the *International Building Code*, as applicable, and electrically powered fire pumps required to maintain pressure, shall be transferable to the standby source. Standby power shall be provided for at least one elevator to serve all floors and be transferable to any elevator.

**1203.3 Critical circuits.** Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196. Electrical circuit protective systems shall be installed in accordance with their listing requirements.

**1203.4 Maintenance.** Emergency and standby power systems shall be maintained in accordance with NFPA 110 and NFPA 111 such that the system is capable of supplying service within the time specified for the type and duration required.

**1203.4.1 Group I-2.** In Group I-2 occupancies, emergency and standby power systems shall be maintained in accordance with NFPA 99.

**1203.4.2 Schedule.** Inspection, testing and maintenance of emergency and standby power systems shall be in accordance with an approved schedule established upon completion and approval of the system installation.

**1203.4.3 Records.** Records of the inspection, testing and maintenance of emergency and standby power systems shall include the date of service, name of the servicing technician, a summary of conditions noted and a detailed description of any conditions requiring correction and what corrective action was taken. Such records shall be maintained.

**1203.4.4 Switch maintenance.** Emergency and standby power system transfer switches shall be included in the inspection, testing and maintenance schedule required by Section 1203.4.2. Transfer switches shall be maintained free from accumulated dust and dirt. Inspection shall include examination of the transfer switch contacts for evidence of deterioration. When evidence

of contact deterioration is detected, the contacts shall be replaced in accordance with the transfer switch manufacturer's instructions.

**1203.5 Operational inspection and testing.** Emergency power systems, including all appurtenant components, shall be inspected and tested under load in accordance with NFPA 110 and NFPA 111. Exception: Where the emergency power system is used for standby power or peak load shaving, such use shall be recorded and shall be allowed to be substituted for scheduled testing of the generator set, provided that appropriate records are maintained.

**1203.5.1 Group I-2.** In Group I-2 occupancies, emergency and standby power systems shall be inspected and tested under load in accordance with NFPA 99.

**1203.5.2 Transfer switch test.** The test of the transfer switch shall consist of electrically operating the transfer switch from the normal position to the alternate position and then return to the normal position. 1203.6 Supervision of maintenance and testing. Routine maintenance, inspection and operational testing shall be overseen by a properly instructed individual.

## **SECTION 1204 SOLAR PHOTOVOLTAIC POWER SYSTEMS**

**1204.1 General.** Solar photovoltaic systems shall be installed in accordance with Sections 1204.2 through 1204.5, and the International Building Code or International Residential Code. The electrical portion of solar PV systems shall be installed in accordance with NFPA 70.

**1204.1.1 Permits.** Permits shall be obtained from Sun City Fire & Medical Department for solar voltaic systems in accordance with Section 105.7.2.1.

**Exception:** Solar Voltaic Systems with a 3 kW or less alternating current nameplate rating that are not tied into the utility companies power grid system.

**1204.1.2 Marking.** Marking is required on interior and exterior direct-current (DC) conduit, enclosures, race-ways, cable assemblies, junction boxes, combiner boxes and disconnects.

**1204.1.2.1 Materials.** The materials used for marking shall be reflective, weather resistant and suitable for the environment. Marking as required in Sections 1204.1.2 through 1204.1.6 shall have capitalized letters with a minimum height of 3/8 inch (9.5 mm) white on red background.

**1204.1.2.2 Marking Content.** The marking shall contain the words "WARNING: PHOTVOLTAIC POWER SOURCE".

**1204.1.2.3 Main Service Disconnect.** The marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the disconnect is operated.

**1204.1.3 Location of Marking.** Marking shall be placed on DC conduit installed on the interior and exterior, raceways, enclosures and cable assemblies every 10 feet (3048 mm) within 1 foot (305 mm) of turns or bends and within 1 foot (035 mm) above and below penetrations of roof ceiling assemblies, walls or barriers.

**1204.2 Access and pathways.** Roof access, pathways, and spacing requirements shall be provided in accordance with Sections 1204.2.1 through 1204.3.3. Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions, such as vent pipes, conduit or mechanical equipment.

Residential structures shall be designed so that each photovoltaic array is no greater than 150 feet (45720mm) by 150 feet (45720 mm) in either axis.

Exceptions:

1. Detached, nonhabitable Group U structures including, but not limited to, detached garages serving Group R-3 buildings, parking shade structures, carports, solar trellises and similar structures.

2. Panels/modules shall be permitted to be located up to the roof ridge where an alternative fire ventilation method approved by the *fire code official* has been provided or where the *fire code official* has determined vertical ventilation techniques will not be employed.

**1204.2.1 Solar photovoltaic systems for Group R-3 buildings.** Solar photovoltaic systems for Group R-3 buildings shall comply with Sections 1204.2.1.1 through 1204.2.1.3.

Exceptions:

1. These requirements shall not apply to structures designed and constructed in accordance with the *International Residential Code*.
2. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal or less.

**1204.2.1.1 Roof Access Points.** Roof access points shall be located in areas that do not require the placement of ground ladders over openings such as windows or doors and located at strong points of building construction in locations where the access point does not conflict with overhead obstructions such as tree limbs, wires or signs.

**1204.2.1.2 Residential buildings with hip roof layouts.** Panels /modules installed on residential buildings with hip roof layouts shall be located in a manner that provides a 36-inch-wide (914 mm) clear access pathway from eave to the ridge on each roof slope where panels/modules are located. The access pathway shall be located at a structurally strong location on the building capable of supporting the live load of firefighters accessing the roof.

Exception: These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**1204.2.1.3 Residential buildings with a single ridge.** Panels/modules installed on residential buildings with a single ridge shall be located in a manner that provides two 3-foot wide (914 mm) access pathways from the eave to the ridge on each roof slope where panels/nodules are located.

**1204.2.1.4 Residential buildings with roof hips and valleys.** Panels/modules installed on residential buildings with roof hips and valleys shall be located no closer than 18 inches (457 mm) to a hip or valley where panels/modules are to be placed on both sides of the hip or valley. Where panels are to be located on only one side of a hip or valley that is of equal length, the panels shall be permitted to be placed directly adjacent to the hip or valley.

Exception: These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**1204.2.1.5 Residential building smoke ventilation.** Panels/modules installed on Group 3 buildings shall be located no higher than 36 inches (914 mm) below the ridge in order to allow for fire department smoke ventilation openings.

**1204.2.2 Emergency escape and rescue openings.** Panels and modules installed on Group R-3 buildings shall not be placed on the portion of a roof that is below an emergency escape and rescue opening. A pathway of not less than 36 inches (914 mm) wide shall be provided to the emergency escape and rescue opening.

**1204.3 Other than Group R-3 buildings.** Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections 1204.3.1 through 1204.3.3.

Exception: Where it is determined by the *fire code official* that the roof configuration is similar to that of a Group R-3 occupancy, the residential access and ventilation requirements in Sections 1204.2.1.1 through 1204.2.1.3 are a suitable alternative.

**1204.3.1 Perimeter pathways.** There shall be a minimum 6- foot-wide (1829 mm) clear perimeter around the edges of the roof.

**Exception:** Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum width of 4 feet (1219 mm).

**1204.3.2 Interior pathways.** Interior pathways shall be provided between array sections to meet the following requirements:

1. Pathways shall be provided at intervals not greater than 150 feet (45 720 mm) throughout the length and width of the roof.
2. A pathway not less than 4 feet (1219 mm) wide in a straight line to roof standpipes or ventilation hatches.

3. A pathway not less than 4 feet (1219 mm) wide around roof access hatches, with not fewer than one such pathway to a parapet or roof edge.
4. The pathway shall be over areas capable of supporting the live load of firefighters accessing the roof.
5. The centerline axis pathways shall be provided in both axes of the roof. Centerline axis pathways shall run where the roof structure is capable of supporting the live load of firefighters accessing the roof.

**1204.3.3 Smoke ventilation.** The solar installation shall be designed to meet the following requirements:

1. Where non gravity-operated smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide shall be provided bordering all sides.
2. Smoke ventilation options between array sections shall be one of the following:
  - 2.1. A pathway not less than 8 feet (2438 mm) wide.
  - 2.2. Where gravity-operated dropout smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide on not fewer than one side.
  - 2.3. A pathway not less than 4 feet (1219 mm) wide bordering 4-foot by 8-foot (1219 mm by 2438 mm) venting cutouts every 20 feet (6096 mm) on alternating sides of the pathway.
3. Arrays shall be no greater than 150 feet (45720 mm) by 150 feet (45720 mm) in distance in either axis in order to create opportunities for fire department smoke ventilation operations.

**1204.4 Ground mounted photovoltaic panel systems.** Ground mounted photovoltaic panel systems shall comply with Section 1204.1 and this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays. A clear, brush-free area of 10 feet (3048 mm) shall be required for ground mounted photovoltaic arrays.

**1204.5 Buildings with rapid shutdown.** Buildings with rapid shutdown solar photovoltaic systems shall have permanent labels in accordance with Sections 1204.5.1 through 1204.5.3.

**1204.5.1 Rapid shutdown type.** The type of solar photovoltaic system rapid shutdown shall be labeled with one of the following:

1. For solar photovoltaic systems that shut down the array and the conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of 3/8 inch (10 mm) in black on a yellow background. The remaining characters shall be uppercase with a minimum height of 3/16 inch (5 mm) in black on a white background. The label shall be in accordance with Figure 1204.5.1(1) and state the following:

**SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN.  
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN  
PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY.**

2. For photovoltaic systems that only shut down conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of 3/8 inch (10 mm) in white on a red background and the remaining characters shall be capitalized with a minimum height of 3/16 inch (5 mm) in black on a white background. The label shall be in accordance with Figure 1204.5.1(2) and state the following:

**THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN.  
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN  
CONDUCTORS OUTSIDE THE ARRAY.  
CONDUCTORS WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT.**

**1204.5.1.1 Diagram.** The labels in Section 1204.5.1 shall include a simple diagram of a building with a roof. Diagram sections in red signify sections of the solar photovoltaic system that are not shut down when the rapid shutdown switch is turned off.

**1204.5.1.2 Location.** The rapid shutdown label in Section 1204.5.1 shall be located not greater than 3 feet (914 mm) from the service disconnecting means to which the photovoltaic systems are connected and shall indicate the location of all identified rapid shutdown switches if not at the same location.

**1204.5.2 Buildings with more than one rapid shutdown type.** Solar photovoltaic systems that contain rapid shutdown in accordance with both Items 1 and 2 of Section 1204.5.1 or solar photovoltaic systems where only portions of the systems on the building



contain rapid shutdown, shall provide a detailed plan view diagram of the roof showing each different photovoltaic system and a dotted line around areas that remain energized after the rapid shutdown switch is operated.

**1204.5.3 Rapid shutdown switch.** A rapid shutdown switch shall have a label located not greater than 3 feet (914 mm) from the switch that states the following: RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

## **SECTION 1205 STATIONARY FUEL CELL POWER SYSTEMS**

**1205.1 General.** Stationary fuel cell power systems in new and existing occupancies shall comply with this section.

**1205.2 Permits.** Permits shall be obtained for stationary fuel cell power systems as set forth in Section 105.7.10.

**1205.3 Equipment.** Stationary fuel cell power systems shall comply with the following:

1. Prepackaged fuel cell power systems shall be listed and labeled in accordance with CSA FC 1.
2. The modules and components in a *pre-engineered fuel cell power system* shall be listed and labeled in accordance with CSA FC 1 and interconnected to complete the assembly of the system at the job site in accordance with the manufacturer's instructions and the module and component listings.
3. Field-fabricated fuel cell power systems shall be approved based on a review of the technical report provided in accordance with Section 104.7.2. The report shall be prepared by and bear the stamp of a registered design professional and shall include:
  - 3.1. A fire risk evaluation.
  - 3.2. An evaluation demonstrating that modules and components in the fuel cell power system comply with applicable requirements in CSA FC 1.
  - 3.3. Documentation of the fuel cell power system's compliance with applicable NFPA 2 and NFPA 853 construction requirements.

**1205.4 Installation.** Stationary fuel cell power systems shall be installed and maintained in accordance with NFPA 70 and NFPA 853, the manufacturer's installation instructions, and the listing. Stationary fuel cell power systems fueled by hydrogen shall be installed and maintained in accordance with NFPA 2 and NFPA 70, the manufacturer's installation instructions and the listing.

**1205.5 Residential use.** Stationary fuel cell power systems shall not be installed in Group R-3 and R-4 buildings, or dwelling units associated with Group R-2 buildings unless they are specifically listed for residential use.

**1205.6 Indoor installations.** Stationary fuel cell power systems installed in indoor locations shall comply with Sections 1205.6 through 1205.6.2. For purposes of this section, an indoor location includes a roof and 50 percent or greater enclosing walls.

**1205.6.1 Listed.** Stationary fuel cell power systems installed indoors shall be specifically listed and labeled for indoor use.

**1205.6.2 Separation.** Rooms containing stationary fuel cell power systems shall be separated from the following occupancies by fire barriers or horizontal assemblies, or both, constructed in accordance with the International Building Code.

- a. Group B, F, M, S and U occupancies by 1-hour fire resistance rated construction.
- b. Group A, E, I and R occupancies by 2-hour fire resistance rated construction.

**Exception:** Stationary fuel cell power systems with an aggregate rating less than 50 kW shall not be required to be separated from other occupancies provided that the systems comply with Section 9.3 of NFPA 853.

**1205.7 Vehicle impact protection.** Where stationary fuel cell power systems are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with Section 312.

**1205.8 Outdoor installation.** Stationary fuel cell power systems located outdoors shall be separated by not less than 5 feet (1524 mm) from the following:

1. Lot lines.
2. Public ways.
3. Buildings.
4. Stored combustible materials.
5. Hazardous materials.

6. High-piled stock.
7. Any portion of a designated means of egress system.
8. Other exposure hazards.

**1205.9 Fuel supply.** The design, location and installation of the fuel supply for stationary fuel cell power systems shall comply with Chapter 53, Chapter 58 and the International Fuel Gas Code, based on the particular fuel being supplied to the system.

**1205.10 Manual shutoff.** Access to a manual shutoff valve shall be provided for the fuel piping within 6 feet (1829 mm) of any fuel storage tank serving the fuel cell and within 6 feet (1829 mm) of the power system. If the fuel tank and the stationary fuel cell power system are less than 12 feet (3658 mm) apart, a single shutoff valve shall be permitted. If the stationary fuel cell power system is located indoors, the shutoff valve shall be located outside of the room in which the system is installed, unless otherwise approved by the *fire code official*.

**1205.11 Ventilation and exhaust.** Ventilation and exhaust for stationary fuel cell power systems shall be provided in accordance with NFPA 853.

**1205.12 Fire suppression.** Fire suppression for stationary fuel cell power system installations shall be provided in accordance with NFPA 853.

**1205.13 Gas detection systems.** Stationary fuel cell power systems shall be provided with a gas detection system. Detection shall be provided in approved locations in the fuel cell power system enclosure, the exhaust system or the room that encloses the fuel cell power system. The system shall be designed to activate at a flammable gas concentration of not more than 25 percent of the lower flammable limit (LFL).

**1205.13.1 System activation.** The activation of the gas detection system shall automatically:

1. Close valves between the gas supply and the fuel cell power system.
2. Shut down the fuel cell power system.
3. Initiate local audible and visible alarms in approved locations.

## SECTION 1206 ELECTRICAL ENERGY STORAGE SYSTEMS

**1206.1 Scope.** The provisions in this section are applicable to energy storage systems designed to provide electrical power to a building, facility or equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency. These systems are used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities. Energy storage system in Group R-3 and R-4 occupancies in accordance with 1206.2.1 and 1206.4. (R-1 and R-2 occupancies shall comply with Commercial Requirements). Approved signage is required for all installations.

**1206.1.1 Permits.** Permits shall be obtained from Building Dept. and Fire Dept. for the construction and operation of stationary storage battery systems with a capacity of more than 3 kWh in accordance with Section 105.7.2.

Exception: Operating permits are not required for Group R-3 and R-4 occupancies.

**1206.2 Stationary storage battery systems.** Stationary storage battery systems having capacities exceeding the values shown in Table 1206.2 shall comply with Section 1206.2.1 through 1206.2.13.6, as applicable. Approved signage is required for all installations.

**1206.2.1 Permits.** Permits shall be obtained from Building Dept. and Fire Dept. for the construction and operation of stationary storage battery systems with a capacity of more than 3 kWh in accordance with Section 105.7.2.

**1206.2.2 Construction documents.** The following information shall be provided with the permit application:

1. Location and layout diagram of the room in which the stationary storage battery system is to be installed.
2. Details on hourly fire-resistance-rated assemblies.
3. Quantities and types of storage batteries and battery systems.
4. Manufacturer's specifications, ratings and listings of storage batteries and battery systems.
5. Details on energy management systems.
6. Location and content of signage.

7. Details on fire-extinguishing, smoke detection and ventilation systems.
8. Rack storage arrangement, including seismic support criteria

**TABLE 1206.2  
BATTERY STORAGE SYSTEM THRESHOLD QUANTITIES.**

BATTERY TECHNOLOGY	CAPACITY(a)
Flow batteries(b)	20 kWh
Lead acid, all types	70 kWh
Lithium, all types	20 kWh
Nickel cadmium (Ni-Cd)	70 kWh
Sodium, all types	20 kWhc
Other battery technologies	10 kWh

For SI: 1 kilowatt hour = 3.6 megajoules.

- a. For batteries rated in amp-hours, kWh shall equal rated voltage times amp-hour rating divided by 1000.
- b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.
- c. 70 kWh for sodium-ion technologies.

**1206.2.3 Hazard mitigation analysis.** A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided in accordance with Section 104.7.2 under any of the following conditions:

1. Battery technologies not specifically identified in Table 1206.2 are provided.
2. More than one stationary storage battery technology is provided in a room or indoor area where there is a potential for adverse interaction between technologies.
3. Where allowed as a basis for increasing maximum allowable quantities in accordance with Section 1206.2.9.
4. *Where required by the fire code official.*

**1206.2.3.1 Fault condition.** The hazard mitigation analysis shall evaluate the consequences of the following failure modes, and others deemed necessary by the *fire code official*. Only single-failure modes shall be considered.

1. Thermal runaway condition in a single-battery storage rack, module or array.
2. Failure of any energy management system.
3. Failure of any required ventilation system.
4. Voltage surges on the primary electric supply.
5. Short circuits on the load side of the stationary battery storage system.
6. Failure of the smoke detection, fire-extinguishing or gas detection system.
7. Spill neutralization not being provided or failure of the secondary containment system.
8. *Failure of temperature control.*

**1206.2.3.2 Analysis approval.** The *fire code official* is authorized to approve the hazardous mitigation analysis provided that the hazard mitigation analysis demonstrates all of the following:

1. Fires or explosions will be contained within unoccupied battery storage rooms for the minimum duration of the fire-resistance-rated walls identified in Table 509.1 of the International Building Code.
2. Fires and explosions in battery cabinets in occupied work centers will be detected in time to allow occupants within the room to evacuate safely.
3. Toxic and highly toxic gases released during fires and other fault conditions shall not reach concentrations in excess of Immediately Dangerous to Life or Health (IDLH) levels in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area.
4. Flammable gases released from batteries during charging, discharging and normal operation shall not exceed ~~25~~ **10** percent of their lower flammability limit (LFL).
5. Flammable gases released from batteries during fire, overcharging and other abnormal conditions shall not create an explosion hazard that will injure occupants or emergency responders.

**1206.2.3.3 Additional protection measures.** Construction, equipment and systems that are required for the stationary storage battery system to comply with the hazardous mitigation analysis, including but not limited to those specifically described in Section 1206.2, shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.

**1206.2.3.4 Large scale fire testing.** Where required in section 1206, large scale fire testing shall be conducted on a representative stationary storage battery system in accordance with UL 9540A. The testing shall be conducted or witnessed and reported by an approved testing laboratory. The test report shall be provided to the *fire code official* for review and approval in accordance with Section 104.7.2.

**1206.2.3.5 Fire remediation.** Where a fire or other event has damaged a stationary storage battery system and ignition or re-ignition of the stationary storage battery system is possible, the *fire code official* may require the system owner, agent, or lessee, take actions, at their expense, to mitigate the hazard or remove the damaged equipment from the premise to a safe location.

**1206.2.3.6 Forensic analysis.** The *fire code official* may also require a forensic analysis of the cause of failure by an independent laboratory approved by the *fire code official* in accordance with Section 104.10.2.

**1206.2.4 Seismic and structural design.** Stationary storage battery systems shall comply with the seismic design requirements in Chapter 16 of the International Building Code and shall not exceed the floor-loading limitation of the building.

**1206.2.5 Vehicle impact protection.** Where stationary storage battery systems are subject to impact by a motor vehicle, including fork lifts, vehicle impact protection shall be provided in accordance with Section 312.

**1206.2.6 Combustible storage.** ~~Combustible~~ Any materials not related to the stationary storage battery system shall not be stored in battery rooms, cabinets or enclosures. Combustible materials in occupied work centers covered by Section 1206.2.8.5 shall not be stored less than 3 feet (915 mm) from battery cabinets.

**1206.2.7 Testing, maintenance and repair.** Storage batteries and associated equipment and systems shall be tested and maintained in accordance with the manufacturer's instructions. Any storage batteries or system components used to replace existing units shall be compatible with the battery charger, energy management systems, other storage batteries and other safety systems. Introducing other types of storage batteries into the stationary storage battery system or other types of electrolytes into flow battery systems shall be treated as a new installation and require approval by the *fire code official* before the replacements are introduced into service.

**1206.2.8 Location and construction.** Rooms and areas containing stationary storage battery systems shall be designed, located and constructed in accordance with Sections 1206.2.8.1 through 1206.2.8.7.4.

**1206.2.8.1 Location.** Stationary storage battery systems shall not be located in the following areas:

1. Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access,
2. Where the floor level is located below the lowest level of exit discharge.

**Exceptions:**

1. Lead acid and nickel cadmium stationary storage battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.
2. Where approved, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.
3. Where approved by the *fire code official*, installations shall be permitted on higher and lower floors.
4. Installations on noncombustible rooftops of buildings exceeding 75 feet (22 860 mm) in height that do not obstruct fire department rooftop operations, where approved by the *fire code official*.

**1206.2.8.2 Separation.** Rooms containing stationary storage battery systems shall be separated from other areas of the building in accordance with Section 509.1 of the International Building Code. Battery systems shall be allowed to be in the same room with the equipment they support.

**1206.2.8.3 Stationary battery arrays.** Storage batteries, prepackaged stationary storage battery systems and pre-engineered stationary storage battery systems shall be segregated into stationary battery arrays not exceeding 50 kWh (180 megajoules) each. Each stationary battery array shall be spaced not less than 3 feet (914 mm) from other stationary battery arrays and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

**Exceptions:**

1. Lead acid and nickel cadmium storage battery arrays.
2. Listed pre-engineered stationary storage battery systems and prepackaged stationary storage battery systems shall not exceed 250 kWh (900 megajoules) each *where approved by the fire code official.*
3. The *fire code official* is authorized to approve listed, pre-engineered and prepackaged battery arrays with larger capacities or smaller battery array spacing if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving one array will not propagate to an adjacent array, and be contained within the room for a duration equal to the fire-resistance rating of the room separation specified in Table 509 of the International Building Code.

**1206.2.8.4 Separate rooms.** Where stationary batteries are installed in a separate equipment room that can be accessed only by authorized personnel, they shall be permitted to be installed on an open rack for ease of maintenance.

**1206.2.8.5 Occupied work centers.** Where stationary storage batteries are located in an occupied work center, they shall be housed in a noncombustible cabinet or other enclosure to prevent access by unauthorized personnel.

**1206.2.8.5.1 Cabinets.** Where stationary batteries are contained in cabinets in occupied work centers, the cabinet enclosures shall be located within 10 feet (3048 mm) of the equipment that they support.

**1206.2.8.6 Signage.** Approved signs shall be provided on or *adjacent to all entry doors for battery storage rooms or areas and on enclosures of battery storage cabinets and walk-in units located outdoors, on rooftops or in open parking garages.* Signs designed to meet both the requirements of this section and NFPA 70 shall be permitted. The signage shall include the following or equivalent:

1. "Energy Storage System", "Battery Storage System", "Capacitor Energy Storage System", "Energized Electrical Circuits" or the equivalent.
2. The identification of the electrochemical battery energy storage system technology present. "Energized Electrical Circuits".
3. If water reactive electrochemical battery energy storage system are present the signage shall include "APPLY NO WATER"
4. Current contact information, including phone number, for personnel authorized to service the equipment and fire mitigation personnel shall be permanently affixed to the sign.

**Exception:** Existing stationary storage battery systems shall be permitted to include the signage required at the time it was installed.

**1206.2.8.6.1 Electrical disconnects.** Where the stationary storage battery system disconnecting means is not within sight of the main service disconnecting means, placards or directories shall be installed at the location of the main service disconnecting means indicating the location of stationary storage battery system disconnecting means in accordance with NFPA 70.

**1206.2.8.6.2 Cabinet signage.** Battery storage cabinets provided in occupied work centers in accordance with Section 1206.2.8.5 shall have exterior labels that identify the manufacturer and model number of the system and electrical rating (voltage and current) of the contained battery system. There shall be signs within the cabinet that indicate the relevant electrical and chemical hazards, as required by Section 1206.2.12.

**1206.2.8.7 Outdoor installations.** Stationary storage battery systems located outdoors shall comply with Sections 1206.2.8.7 through 1206.2.8.7.4, in addition to all applicable requirements of Section 1206.2. Installations in outdoor enclosures or containers that can be occupied for servicing, testing, maintenance and other functions shall be treated as battery storage rooms.

*Remote outdoor installations include stationary battery systems located more than 100 feet from buildings, property lines, public ways, stored combustible storage, hazardous materials, high piled stock and other exposure hazards.*

Installations near exposures include all outdoor stationary battery systems that are not more than 100 feet from buildings, property lines, public ways, stored combustible storage, hazardous materials, high piled stock and other exposure hazards.

**Exception:** Stationary battery arrays in noncombustible containers shall not be required to be spaced 3 feet (914 mm) from the container walls.

**TABLE 1206.2.8.7 OUTDOOR INSTALLATIONS**

Compliance Required	Remote Installations	Installations Near Exposures
General Installation Requirements	Yes	Yes
Size and separation	No	Yes (a)
Smoke and automatic fire detection	Yes	Yes
Fire suppression systems	Yes (b)	Yes
Maximum enclosure size	Yes	Yes
Vegetation control	Yes	Yes
Means of egress separation	Yes	Yes
Clearance to exposures	Yes	Yes
Technology specific protection	Yes	Yes

- a. In outdoor walk-in units, spacing is not required between energy storage systems units and the walls of the enclosure.
- b. Where approved by the *fire code official*, fire suppression systems are permitted to be omitted.

**1206.2.8.7.1 Separation.** Stationary storage battery systems located outdoors shall be separated by a minimum 5 10 feet (1524 mm) from the following:

1. Lot lines.
2. Public ways.
3. Buildings.
4. Stored combustible materials.
5. Hazardous materials.
6. High-piled stock.
7. Other exposure hazards.

**Exception:** The *fire code official* is authorized to approve smaller separation distances if largescale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress from adjacent buildings, or adversely impact adjacent stored materials or structures.

**1206.2.8.7.2 Means of egress.** Stationary storage battery systems located outdoors shall be separated from any means of egress as required by the *fire code official* to ensure safe egress under fire conditions, but not less than 10 feet (3048 mm).

**Exception:** The *fire code official* is authorized to approve lesser separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress.

**1206.2.8.7.3 Security of outdoor areas.** Outdoor areas in which stationary storage battery systems are located shall be secured against unauthorized entry and safeguarded in an approved manner.

**1206.2.8.7.4 Walk-in units.** Where a stationary storage battery system includes an outer enclosure, the unit shall only be entered for inspection, maintenance and repair of batteries and electronics, and shall not be occupied for other purposes.

**1206.2.9 Maximum allowable quantities.** Fire areas within buildings containing stationary storage battery systems exceeding the maximum allowable quantities in Table 1206.2.9 shall comply with all applicable Group H occupancy requirements in this code and the International Building Code.

**Exception:** Where approved by the *fire code official*, areas containing stationary storage batteries that exceed the amounts in Table 1206.2.9 shall be treated as incidental use areas and not Group H occupancies based on a hazardous mitigation analysis in accordance with Section 1206.2.3 and large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory.

**1206.2.9.1 Mixed battery systems.** Where areas within buildings contain different types of storage battery technologies, the total aggregate quantities of batteries shall be determined based on the sum of percentages of each battery type quantity divided by the maximum allowable quantity of each battery type. If the sum of the percentages exceeds 100 percent, the area shall be treated as a Group H occupancy in accordance with Table 1206.2.9.

**1206.2.10 Storage batteries and equipment.** The design and installation of storage batteries and related equipment shall comply with Sections 1206.2.10.1 through 1206.2.10.8.

Battery storage systems installations shall comply with the requirements of this Section in accordance with the applicable requirements of Table 1206.2.10

**1206.2.10.1 Listings.** Storage batteries and battery storage systems shall comply with the following:

1. Storage batteries shall be listed in accordance with UL 1973.
2. Prepackaged and pre-engineered stationary storage battery systems shall be listed in accordance with UL 9540.

**Exception:** Lead-acid batteries are not required to be listed.

**1206.2.10.2 Prepackaged and pre-engineered systems.** Prepackaged and pre-engineered stationary storage battery systems shall be installed in accordance with their listing and the manufacturer’s instructions.

**TABLE 1206.2.9  
MAXIMUM ALLOWABLE BATTERY QUANTITIES(d)**

BATTERY TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES(a)	GROUP H OCCUPANCY
Flow batteries (b)	600 kWh	Group H-2
Lead acid, all types	Unlimited	Not Applicable
Lithium, all types	600 kWh	Group H-2
Nickel cadmium (Ni-Cd)	Unlimited	Not Applicable
Sodium, all types	600 kWh	Group H-2
Other battery technologies	200 kWh	Group H-2 (c)

For SI: 1 kilowatt hour = 3.6 megajoules.

- a. For batteries rated in amp-hours, Kilowatt-hours (kWh) shall equal rated battery voltage times the amp-hour rating divided by 1,000.
- b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.
- c. Shall be a Group H-4 occupancy if the *fire code official* determines that a fire or thermal runaway involving the battery technology does not represent a significant fire hazard.



**TABLE 1206.2.10  
BATTERY TECHNOLOGY SPECIFIC**

Compliance Required (b)	Battery Technology				Other Battery Storage Systems and Battery Technologies (b)
	Lead-acid	Ni-Cad & NiMH	Lithium-ion	Flow	
Exhaust ventilation	Yes	Yes	Yes	Yes	Yes
Spill control and neutralization	Yes (c)	Yes (c)	No	Yes	Yes
Explosion control	Yes (a)	Yes (a)	Yes	Yes	Yes
Safety Caps	Yes	Yes	No	Yes	Yes
Thermal runaway	Yes (d)	Yes	Yes (e)	Yes	Yes (e)
<p>a. Not required for lead-acid and nickel cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.</p> <p>b. Protection shall be provided unless documentation acceptable to the <i>fire code official</i> in accordance with the 2021 <i>International Fire Code</i> Section 104.7.2, provides justification why the protection is not necessary based on the technology used.</p> <p>c. Applicable to vented (i.e. flooded) type nickel cadmium and lead acid batteries.</p> <p>d. Not required for vented (i.e. flooded) type lead acid batteries.</p> <p>e. The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973.</p>					

**1206.2.10.3 Energy management system.** An approved energy management system shall be provided for battery technologies other than lead-acid and nickel cadmium for monitoring and balancing cell voltages, currents and temperatures within the manufacturer’s specifications. The system shall transmit an alarm signal to an approved, **constantly attended** location and to an approved annunciator panel if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

**1206.2.10.3.1 Annunciator panel.** The approved annunciator panel shall visibly indicate any hazardous temperature, **gases** or other conditions. The location of the annunciator panel shall be approved by the *fire code official*.

**1206.2.10.4 Battery chargers.** Battery chargers shall be compatible with the battery chemistry and the manufacturer’s electrical ratings and charging specifications. Battery chargers shall be listed and labeled in accordance with UL 1564 or provided as part of a listed pre-engineered or prepackaged stationary storage battery system.

**1206.2.10.5 Inverters.** Inverters shall be listed and labeled in accordance with UL 1741. Only inverters listed and labeled for utility interactive system use and identified as interactive shall be allowed to operate in parallel with the electric utility power system to supply power to common loads.

**1206.2.10.6 Safety caps.** Where required by Table 1206.2.10, batteries shall be provided with flame-arresting safety caps.

**1206.2.10.7 Thermal runaway.** Where required by **Table 1206.2.10** storage batteries shall be provided with a listed device or other approved method to prevent, detect and control thermal runaway.

**1206.2.10.8 Toxic and highly toxic gas.** Stationary storage battery systems that have the potential to release toxic and highly toxic gas during charging, discharging and normal use conditions shall comply with Section 1206.2.11.3 and Chapter 60.

**1206.2.11 Fire protection and life safety systems.** Fire- **protection and life safety** systems shall be provided in accordance with Sections 1206.2.11.1 through 1206.2.11.7. **All alarm, and supervisory signals from the fire protection and life safety systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, and to an approved annunciator panel.**

**1206.2.11.1 Fire-extinguishing systems.** Rooms and areas within buildings and walk-in units containing electrochemical battery energy storage systems shall be equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1. Commodity classifications for specific technologies of storage batteries shall be in accordance with Chapter 5 of NFPA 13. If the storage battery types are not addressed in Chapter 5 of NFPA 13, the *fire code official* is authorized to approve the fire-extinguishing system based on full scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.

**Exception:** Spaces or areas containing stationary storage battery systems used exclusively for telecommunications equipment in accordance with Section 903.2.

**1206.2.11.1.1 Fire-extinguishing systems.** Rooms and areas within buildings and walk-in units containing electrochemical battery energy storage systems shall be protected by an automatic fire suppression system designed and installed in accordance with the most stringent of the following:

1. An automatic sprinkler system designed and installed in accordance with Section 903.3.1.1 with a minimum density of 0.6 gpm/ft.2 based on the fire area or 2,500 ft.2 (232 m2) design area, whichever is smaller.
2. Where approved, an automatic sprinkler system designed and installed in accordance with Section 903.3.1.1 with a sprinkler hazard classification based on large scale fire testing.
3. An alternate automatic fire extinguishing system designed and installed in accordance with Section 904, provided the installation is approved by the *fire code official* based on large scale fire testing.

**Exception:** Fire suppression systems for lead acid and nickel cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.

**1206.2.11.1.2 Fire department connections.** Fire Department Connections shall be installed in an approved location.

**1206.11.1.3 Hydrants.** Fire hydrants shall be installed and maintained in accordance with Chapter 5 and Chapter 9.

**1206.11.1.4 Alternative fire-extinguishing systems.** Battery systems that utilize water-reactive materials shall be protected by an approved alternative automatic fire extinguishing system in accordance with Section 904. The system shall be listed for protecting the type, arrangement and quantities of storage batteries in the room. The *fire code official* shall be permitted to approve the alternative fire extinguishing system based on full scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.

**1206.2.11.2 Smoke detection system.** An approved automatic smoke detection system shall be installed in rooms containing stationary storage battery systems in accordance with Section 907.2.

**1206.2.11.3 Ventilation.** Where required by Table 1206.2.10, ventilation of rooms containing stationary storage battery systems shall be provided in accordance with the International Mechanical Code and one of the following:

1. The ventilation system shall be designed to limit the maximum concentration of flammable gas to 10 percent of the lower flammability limit, or for hydrogen, 1.0 percent of the total volume of the room.
2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute (cfm) per square foot [0.00508 m3/(s • m2)] of floor area, but not less than 150 cfm (4 m3 /min). The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the vault ceiling for gases having a vapor density less than air.

**1206.2.11.3.1 Cabinet ventilation.** Where cabinets located in occupied spaces contain storage batteries that are required by Table 1206.2.10 to be provided with ventilation, the cabinet shall be provided with ventilation in accordance with Section 1206.2.11.3.

**1206.2.11.3.2 Supervision.** Required mechanical ventilation systems for rooms and cabinets containing storage batteries shall be supervised by an approved central station, proprietary or remote station service or shall initiate an audible and visual signal at an approved constantly attended on-site location.

**1206.2.11.3.3 Standby power.** Required Mechanical exhaust ventilation and HVAC systems shall be provided to maintain the desired building environment with a minimum of 6 hours of standby power in accordance with International Building Code. Separation shall be in accordance with NFPA 70. Where the building, or a portion of the building, served by the mechanical exhaust ventilation is intended to remain operational/occupied during a utility power outage, through the use of an electrical standby power system, whether required or optional; the mechanical exhaust ventilation shall be connected to both the normal electrical service and emergency or standby power system for equivalent time periods.

**1206.2.11.3.4 Mechanical exhaust ventilation controls.** Clearly identified separate switches shall be provided to both to activate the mechanical exhaust ventilation system and to shutoff the ventilation system. Control switches shall be located outside of the rooms or building(s) containing the storage battery systems in a location approved by the *fire code official*.

**1206.2.11.4 Gas detection system.** Where required by Section 1206.2.3 or 1206.2.10.8 rooms containing stationary storage battery systems shall be protected by a gas detection system complying with IFC Section 916. The gas detection system shall be designed to activate where the level of flammable gas exceeds 10 percent of the lower flammable limit (LFL), or where the level of toxic or highly toxic gas exceeds one half of the IDLH.

**1206.2.11.4.1 System activation.** Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visible alarms in the battery storage room.
2. Transmission of an alarm to an approved location.
3. De-energizing of the battery charger.
4. Activation of the mechanical ventilation system, where the system is interlocked with the gas detection system.

**Exception:** Lead-acid and nickel-cadmium stationary storage battery systems shall not be required to comply with Items 1, 2 and 3.

**1206.2.11.5 Spill control and neutralization.** Where required by Table 1206.2.10, approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in areas containing stationary storage batteries as follows:

1. For batteries with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.
2. For batteries with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

**1206.2.11.5.1 Spill control barrier.** Each rack of batteries, or group of racks shall be provided with a liquid-tight 4-inch (102 mm) spill control barrier which extends at least 1-inch (25 mm) beyond the battery rack in all directions.

**1206.2.11.6 Explosion Control.** Where required by Table 1206.2.10, explosion control, complying with Section 911, NFPA 68 and NFPA 69, shall be provided for rooms, areas or walk-in units containing electrochemical battery energy storage system technologies.

**Exceptions:**

1. Where approved, explosion control is permitted to be waived by the *fire code official* based on large scale fire testing which demonstrates that flammable gases are not liberated from electrochemical battery energy storage system cells or modules.
2. Where approved, explosion control is permitted to be waived by the *fire code official* based on documentation provided in accordance with Section 104.7 that demonstrates that the electrochemical battery energy storage system technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the lower flammable limit (LFL) anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.

**1206.2.11.7 Emergency energy release.** An approved means must be provided to safely release stored energy from the batteries in an emergency situation.

**1206.2.12 Specific battery-type requirements.** This section includes requirements applicable to specific types of storage batteries. Stationary storage battery systems with more than one type of storage battery shall comply with requirements applicable to each battery type.

Ventilation, spill control and neutralization, explosion control, safety caps and thermal runaway shall be required in accordance with Table 1206.2.10

**1206.2.12.1 Lead-acid storage batteries.** Stationary storage battery systems utilizing lead-acid storage batteries shall comply with Tables 1206.2.9 and 1206.2.10 and the following:

1. The signage in Section 1206.2.8.6 shall indicate the room contains lead-acid batteries.

**1206.2.12.2 Nickel-cadmium (Ni-Cd) storage batteries.** Stationary storage battery systems utilizing nickel cadmium (Ni-Cd) storage batteries shall comply with Tables 1206.2.9 and 1206.2.10 and the following:

1. The signage in Section 1206.2.8.6 shall indicate the room contains lead-acid batteries.

**1206.2.12.3 Lithium-ion storage batteries.** The signage in Section 1206.2.8.6 shall indicate the type of lithium batteries contained in the room.

**1206.2.12.4 Sodium-beta storage batteries.** Stationary storage battery systems utilizing sodium-beta storage batteries shall comply with Tables 1206.2.9 and 1206.2.10 and the following:

1. The signage in Section 1206.2.8.6 shall indicate the type of sodium batteries in the room and include the instructions, "APPLY NO WATER."

**1206.2.12.5 Flow storage batteries.** Stationary storage battery systems utilizing flow storage batteries shall comply with Tables 1206.2.9 and 1206.2.10 and the following:

1. The signage required in Section 1206.2.8.6 shall indicate the type of flow batteries in the room.

**1206.2.12.6 Other battery technologies.** Stationary storage battery systems utilizing battery technologies other than those described in Sections 1206.2.12.1 through 1206.2.12.5 shall comply with Tables 1206.2.9 and 1206.2.10 and the following:

1. Gas detection systems complying with Section 916 shall be provided in accordance with Section 1206.2.11.4 where the batteries have the potential to produce toxic or highly toxic gas in the storage room or cabinet in excess of the permissible exposure limits (PEL) during charging, discharging and normal system operation.
2. In addition to the signage required in Section 1206.2.8.6, the marking shall identify the type of batteries present, describe the potential hazards associated with the battery type, and indicate that the room contains energized electrical circuits.

**1206.2.13 Special Installations.** Rooftop and open parking garage battery energy storage system installations shall comply with Sections 1206.2.13.1 through 1206.2.13.6. Signage shall comply with section 1206.2.8.6.

**1206.2.13.1 Rooftop installations.** For the purpose of Table 1206.2.12.7, rooftop installations are those located on the roofs of buildings.

**1206.2.13.2 Open parking garage installations.** For the purpose of Table 1206.2.13, open parking garage installations are those located in a structure or portion of a structure that complies with Section 406.5 of the *International Building Code*.

**TABLE 1206.2.13 SPECIAL INSTALLATIONS**

<b>Compliance Required</b>	<b>Rooftops</b>	<b>Open Parking Garages</b>
<b>General Installation Requirements</b>	Yes	Yes

Size and separation	Yes	Yes
Smoke and automatic fire detection	Yes	Yes
Maximum enclosure size	Yes	Yes
Means of egress separation	Yes	Yes
Clearance to exposures	Yes	Yes
Fire suppression systems	Yes	Yes
Technology specific protection	Yes	Yes

**1206.2.13.3 Clearance to exposures.** Battery storage systems located on rooftops and in open parking garages shall be separated by a minimum 10 feet (3048 mm) from the following exposures:

1. Buildings, except the building on which rooftop battery energy storage system is mounted
2. Any portion of the building on which a rooftop system is mounted that is elevated above the rooftop on which the system is installed
3. Lot lines
4. Public ways
5. Stored combustible materials
6. Locations where motor vehicles can be parked
7. Hazardous materials
8. Other exposure hazards

**Exceptions:**

1. Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour free standing fire barrier, suitable for exterior use, and extending 5 feet (1524 mm) above and extending 5 feet (1524 mm) beyond the physical boundary of the battery energy storage system installation is provided to protect the exposure.
2. Clearances are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the battery energy storage system and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure.

**1206.2.13.4 Fire suppression systems.** Battery storage systems located in walk-in units on rooftops or in walk-in units in open parking garages shall be provided with automatic fire suppression systems within the battery energy storage system enclosure in accordance with Section 1206.2.11.1. Areas containing battery energy storage system other than walk-in units in open parking structures on levels not open above to the sky shall be provided with an automatic fire suppression system complying with Section 1206.2.11.1.

**1206.2.13.5 Rooftop installations.** Battery storage systems and associated equipment that are located on rooftops and not enclosed by building construction shall comply with the following:

1. Stairway access to the roof for emergency response and fire department personnel shall be provided either through a bulkhead from the interior of the building or a stairway on the exterior of the building.
2. Service walkways at least 5 feet (1524 mm) in width shall be provided for service and emergency personnel from the point of access to the roof to the system.
3. Battery storage systems and associated equipment shall be located from the edge of the roof a distance equal to at least the height of the system, equipment, or component but not less than 5 feet (1524 mm).
4. The roofing materials under and within 5 feet (1524 mm) horizontally from a battery storage systems or associated equipment shall be noncombustible or shall have a Class A rating when tested in accordance with ASTM E108 or UL 790.
5. A Class I standpipe outlet shall be installed at an approved location on the roof level of the building or in the stairway bulkhead at the top level.
6. The battery storage systems shall be the minimum of 10 feet (3048 mm) from the fire service access point on the roof top.

**1206.2.13.6 Open parking garages.** Battery storage systems and associated equipment that are located in open parking garages shall comply with all of the following:

1. Battery storage systems shall not be located within 50 feet (15 240 mm) of air inlets for building HVAC systems.

**Exception:** This distance shall be permitted to be reduced to 25 feet (7620 mm) if the automatic fire alarm system monitoring the radiant-energy sensing detectors de-energizes the ventilation system connected to the air intakes upon detection of fire.

2. Battery storage systems shall not be located within 25 feet (7620 mm) of exits leading from the attached building where located on a covered level of the parking structure not directly open to the sky above.
3. An approved fence with a locked gate or other approved barrier shall be provided to keep the general public at least 5 feet (1024 mm) from the outer enclosure of the battery energy storage system.

**1206.3 Capacitor energy storage systems.** Capacitor energy storage systems having capacities exceeding 3 kWh (10.8 megajoules) shall comply with Sections 1206.3 through 1206.3.2.6.1.

**Exception:** Capacitors regulated by NFPA 70, Chapter 460, and capacitors included as a component part of other listed electrical equipment are not required to comply with this section.

**1206.3.1 Permits.** Permits shall be obtained from the Fire Department for the installation of capacitor energy storage systems in accordance with Section 105.7.3.

**1206.3.2 Location and construction.** Rooms and areas containing capacitor energy storage systems shall be designed, located and constructed in accordance with Sections 1206.3.2 through 1206.3.2.5.

**1206.3.2.1 Location.** Capacitor energy storage systems shall not be located in areas where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, or where the floor level is more than 30 feet (9144 mm) below the finished floor of the lowest level of exit discharge.

**1206.3.2.2 Separation.** Rooms containing capacitor energy storage systems shall be separated from the following occupancies by fire barriers or horizontal assemblies, or both, constructed in accordance with the *International Building Code*.

1. Group B, F, M, S and U occupancies by 1-hour fire resistance-rated construction.
2. Group A, E, I and R occupancies by 2-hour fire resistance rated construction.

**1206.3.2.3 Capacitor arrays.** Capacitor energy storage systems shall be segregated into capacitor arrays not exceeding 50 kWh each. Each array shall be spaced not less than 3 feet (914 mm) from other arrays and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

**Exception:** Capacitor energy storage systems in noncombustible containers located outdoors shall not be required to be spaced 3 feet (914 mm) from the container walls.

**1206.3.2.4 Signage.** Approved signs shall be provided on doors or in locations adjacent to the entrances to capacitor energy storage system rooms and shall include the following or equivalent verbiage and information:

1. "CAPACITOR ENERGY STORAGE ROOM."
2. "THIS ROOM CONTAINS ENERGIZED ELECTRICAL CIRCUITS."
3. An identification of the type of capacitors present and the potential hazards associated with the capacitor type.

**1206.3.2.5 Electrical disconnects.** Where the capacitor energy storage system disconnecting means is not within sight of the main service disconnecting means, placards or directories shall be installed at the location of the main service disconnecting means identifying the location of the capacitor energy storage system disconnecting means in accordance with NFPA 70.

**1206.3.2.6 Outdoor installation.** Capacitor energy systems located outdoors shall comply with Sections 1206.3.2.6 through 1206.3.2.6.4 in addition to all applicable requirements of Section 1206.3. Installations in outdoor enclosures or containers that can be occupied for servicing, testing, maintenance and other functions shall be treated as capacitor storage rooms.

**Exception:** Capacitor arrays in noncombustible containers shall not be required to be spaced 3 feet (914 mm) from the container walls.

**1206.3.2.6.1 Separation.** Capacitor energy systems located outdoors shall be not less than 5 feet (1524 mm) from the following:

1. Lot lines.

2. Public ways.
3. Buildings.
4. Stored combustible materials.
5. Hazardous materials.
7. High-piled stock.
8. Other exposure hazards.

**Exception:** The *fire code official* is authorized to approve lesser separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress from adjacent buildings, or adversely impact adjacent stored materials or structures.

**1206.3.2.6.2 Means of egress.** Capacitor energy storage systems located outdoors shall be separated from any means of egress as required by the *fire code official* to ensure safe egress under fire conditions, but not less than 10 feet (3048 mm).

**Exception:** The *fire code official* is authorized to approve lesser separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress.

**1206.3.2.6.3 Security of outdoor areas.** Outdoor areas in which capacitor energy storage systems are located shall be secured against unauthorized entry and safeguarded in an approved manner.

**1206.3.2.6.4 Walk-in units.** Where a capacitor energy storage system includes an outer enclosure, the unit shall only be entered for inspection, maintenance and repair of capacitors and electronics, and shall not be occupied for other purposes.

**1206.3.3 Maximum allowable quantities.** Fire areas within buildings containing capacitor energy storage systems that exceed 600 kWh of energy capacity shall comply with all applicable Group H occupancy requirements in this code and the International Building Code.

**1206.3.4 Capacitors and equipment.** The design and installation of capacitor energy storage systems and related equipment shall comply with Sections 1206.3.4.1 through 1206.3.4.5.

**1206.3.4.1 Listing.** Capacitors and capacitor energy storage systems shall comply with the following:

1. Capacitors shall be listed in accordance with UL 1973.
2. Prepackaged and pre-engineered stationary capacitor energy storage systems shall be listed in accordance with UL 9540.

**1206.3.4.2 Prepackaged and pre-engineered systems.** In addition to other applicable requirements of this code, prepackaged and pre-engineered capacitor energy storage systems shall be installed in accordance with their listing and the manufacturer's instructions.

**1206.3.4.3 Energy management system.** An approved energy management system shall be provided for monitoring and balancing capacitor voltages, currents and temperatures within the manufacturer's specifications. The system shall transmit an alarm signal to an approved location if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

**1206.3.4.4 Capacitor chargers.** Capacitor chargers shall be compatible with the capacitor manufacturer's electrical ratings and charging specifications. Capacitor chargers shall be listed and labeled in accordance with UL 1564 or provided as part of a listed pre-engineered or prepackaged capacitor energy storage system.

**1206.3.4.5 Toxic and highly toxic gas.** Capacitor energy storage systems that have the potential to release toxic and highly toxic materials during charging, discharging and normal use conditions shall comply with Chapter 60.

**1206.3.5 Fire-extinguishing and detection systems.** Fire extinguishing and smoke detection systems shall be provided in capacitor energy storage system rooms in accordance with Sections 1206.3.5.1 through 1206.3.5.2.



**1206.3.5.1 Fire-extinguishing systems.** Rooms containing capacitor energy storage systems shall be equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1. Commodity classifications for specific capacitor technologies shall be in accordance with Chapter 5 of NFPA 13. If the capacitor types are not addressed in Chapter 5 of NFPA 13, the *fire code official* is authorized to approve the automatic sprinkler system based on full-scale fire and fault condition testing conducted by an approved laboratory.

**1206.3.5.1.1 Alternative fire-extinguishing systems.** Capacitor energy storage systems that utilize water-reactive materials shall be protected by an approved alternative automatic fire-extinguishing system in accordance with Section 904. The system shall be listed for protecting the type, arrangement and quantities of capacitors in the room. The *fire code official* shall be permitted to approve the system based on full-scale fire and fault condition testing conducted by an approved laboratory.

**1206.3.5.2 Smoke detection system.** An approved automatic smoke detection system shall be installed in rooms containing capacitor energy storage systems in accordance with Section 907.2.

**1206.3.5.3 Ventilation.** Where capacitors release flammable gases during normal operating conditions, ventilation of rooms containing capacitor energy storage systems shall be provided in accordance with the *International Mechanical Code* and one of the following:

1. The ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammability limit.
2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute (cfm) per square foot [0.00508 m<sup>3</sup>/(s • m<sup>2</sup>)] of floor area, but not less than 150 cfm (4 m<sup>3</sup>/min).

The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the ceiling for gases having a vapor density less than air.

**1206.3.5.3.1 Supervision.** Required mechanical ventilation systems for rooms containing capacitor energy storage systems shall be supervised by an approved central station, proprietary or remote station service, or shall initiate an audible and visible signal at an approved, constantly attended on-site location.

**1206.3.5.4 Spill control and neutralization.** Where capacitors contain liquid electrolyte, approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in areas containing capacitors as follows:

1. For capacitors with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.
2. For capacitors with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

**1206.3.6 Testing, maintenance and repair.** Capacitors and associated equipment and systems shall be tested and maintained in accordance with the manufacturer's instructions. Any capacitors or system components used to replace existing units shall be compatible with the capacitor charger, energy management systems, other capacitors, and other safety systems. Introducing different capacitor technologies into the capacitor energy storage system shall be treated as a new installation and require approval by the *fire code official* before the replacements are introduced into service.

**1206.4 Energy storage system in Group R-3 and R-4 occupancies.** Energy storage systems in Group R-3 and R-4 occupancies shall be installed and maintained in accordance with this section. The temporary use of an owner or occupant's electric powered vehicle as an energy storage system shall be in accordance with Section 1206.4.

**Exception:** Energy Storage Systems in R-3 and R-4 occupancies with a capacity of 3 kWh or less.

**1206.4.1 Equipment listings.** Energy storage system shall be listed and labeled for residential use in accordance with UL 9540.

**Exceptions:**

1. Where approved, repurposed unlisted battery systems from electric vehicles may be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.

2. Energy storage system less than 1 kWh.

**1206.4.2 Installation.** Energy storage system shall be installed in accordance with the manufacturer's instructions and their listing.

**1206.4.2.1 Spacing.** Individual units shall be separated from each other by at least 3 feet (914 mm) of spacing unless smaller separation distances are documented and approved by the *fire code official* to be adequate based on large scale fire testing.

**1206.4.3 Location.** Energy storage system shall only be installed in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space and sleeping units in accordance with Section 406.3.2 of the *International Building Code*.
3. Outdoors on exterior walls in accordance with 1206.4.3.1
4. ~~Utility closets and storage or utility spaces within dwelling units and sleeping units.~~
4. Other Locations as approved by the *Fire code official*.

**1206.4.3.1 Exterior wall installations.** Energy storage system shall be permitted to be installed outdoors on exterior walls of buildings when all of the following conditions are met:

1. The maximum energy capacity of individual energy storage system units shall not exceed 20 kWh.
2. The energy storage system shall comply with applicable requirements in Sections 1206.
3. The energy storage system shall be installed in accordance with the manufacturer's instructions and their listing.
5. Individual energy storage system units shall be separated from each other by not less than 3 feet (914 mm).
6. The energy storage system shall be separated from doors, windows, operable openings into buildings, or HVAC inlets by at least 5 feet (1524 mm).

**Exception:** Where approved by the *fire code official*, smaller separation distances in items 4 and 5 may be permitted based on large scale fire testing

**1206.4.4 Energy ratings.** Individual energy storage system units shall have a maximum rating of 20 kWh. The aggregate rating structure shall not exceed:

1. ~~40 kWh within utility closets and storage or utility spaces.~~
1. 80 kWh in attached or detached garages and detached accessory structures.
2. 80 kWh on exterior walls.
3. 80 kWh outdoors on the ground.

**1206.4.5 Electrical installation.** Energy storage system shall be installed in accordance with NFPA 70. Inverters shall be listed and labeled in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters listed for utility interaction.

**1206.4.6 Fire detection.** Rooms and areas within dwellings units, sleeping units and attached garages in which energy storage system are installed shall be protected by smoke alarms in accordance with Section 907.2.10. A heat detector listed and interconnected to the smoke alarms shall be installed in locations within dwelling units, sleeping units and attached garages where smoke alarms cannot be installed based on their listing.

**1206.4.7 Protection from impact.** Stationary storage battery systems installed in a location subject to vehicle damage shall be protected by approved barriers. Appliances in garages shall also be installed in accordance with Section 304.3 of the *International Mechanical Code*.

**1206.4.8 Ventilation.** Indoor installations of energy storage system that include batteries that produce hydrogen or other flammable gases during charging shall be provided with ventilation in accordance with Section 1206.2.11.3.

**1206.4.9 Toxic and highly toxic gas.** Energy storage system that have the potential to release toxic or highly toxic gas during charging, discharging and normal use conditions shall not be installed within Group R-3 or R-4 occupancies.

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**Section 3310.1 Required Access.** Is hereby **DELETED** and **REPLACED** with the following language:

**3310.1 Required Access.** Approved vehicle access for firefighting shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 feet (30 480 mm) of temporary or permanent fire department connections. Vehicle access shall be provided by either temporary or permanent roads, capable of supporting vehicle loading under all weather conditions. Vehicle access shall be maintained until permanent fire apparatus access roads are available. All open trenches shall have steel plates capable of maintaining the integrity of the access road design when these trenches cross an access road. These access roads may be temporary or permanent. This policy applies only during construction and/or demolition. Permanent access per the fire code shall be in place prior to any final inspection or **approval for** certificate of occupancy.

**Section 3310.1 Required Access.** Is hereby **AMENDED** by **ADDING** the following subsections:

**Section 3310.1.1 Access road signs.** During construction, approved signs shall be erected and located to direct emergency responders into and through the construction site.

**SECTION 5307 Has Significant changes and is retroactively required in all buildings upon adoption of this ordinance in accordance with the following amendments:**

**Section 5307 Compressed Gases** is hereby **DELETED** and **REPLACED** with the following language:

These requirements are retroactive to existing locations. Existing locations that do not have a construction permit issued by Sun City Fire District are required to comply with the same requirements as a new project.

**5307.1 General.** *Compressed gases* in storage or use including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter.

**5307.2 Gas Detection.** A Carbon Dioxide gas detection system **shall** be provided. Carbon dioxide and other simple asphyxiant gas systems with more than 50 pounds (22.7 kg) in use, per system, shall comply with this section.

**Exception:** One (1) additional 50lb DOT 3AA cylinder of carbon dioxide may be connected to the same system provided an isolation valve is in place, and only one cylinder can be in use at a time.

**5307.2.1 Permits.** Permits from Sun City Fire District shall be required as set forth in Section 105.6 through 105.12.

**5307.2.1.1 Equipment.** The storage use, and handling of liquid carbon dioxide shall be in accordance with IFC Chapter 53 and the applicable requirements of NFPA 55, Chapter 13. Insulated liquid carbon dioxide systems shall have pressure relief devices vented in accordance with NFPA 55.

**5307.2.1.2 Protection from damage.** Carbon dioxide and other simple asphyxiant gas systems shall be installed so the storage tanks, cylinders, piping fittings, detection and notification devices are protected from damage by occupants or equipment during normal facility operations, in accordance with IFC Section 5303.5 and 5303.6

**5307.2.1.3 General CO-2 System Requirements:**

1. The fill port is to be piped to the outside atmosphere.
2. All venting is to be piped to the outside atmosphere.

3. When used, insulated liquid carbon dioxide containers are to be anchored to the slab.
4. When used, high pressure compressed gas carbon dioxide cylinders, only one cylinder can be connected into a beverage system at a time. A second cylinder can be connected provided a 3-way transfer switch is used so that no more than one (1) cylinder can be used at a time.

**5307.2.2 Gas Ventilation Requirements.** When any ASME pressure vessels containing liquified carbon dioxide or other simple asphyxiant gas of more than two 50 lb. DOT AA3 gaseous cylinders per system are connected to a piping system and located *within* the structure, a mechanical exhaust ventilation system ***shall*** be provided in accordance with the International Mechanical Code designed to maintain the room containing the asphyxiant gas at a negative pressure in relation to the surrounding area. A separate plan submittal for the installation of this mechanical exhaust ventilation system is required by the Sun City Fire & Medical Department.

**5307.2.2.1 Exhaust.** The mechanical exhaust ventilation system shall be designed at a rate not less than one cubic foot per minute, per square foot of floor area in the room where the cylinders are located. The ventilation system shall be designed to operate at a negative pressure in relation to the surrounding area.

**5307.2.2.2 Exhaust intake.** The exhaust intake shall be taken from a point within 12 inches (305mm) of the floor. The exhaust system intake shall be located a minimum of 2 feet away from any gas detector or located on the opposite wall of any gas detector.

**5307.2.2.3 Exhaust termination.** The termination point of exhaust outlets and ducts discharging to the outdoors shall be located a minimum of 10 feet from property lines, a minimum of 3 feet above the roof line and a minimum of 10 feet from operable openings into the building and minimum of 10 feet above adjoining grade.

**5307.2.2.4 Automatic activation.** The exhaust system shall automatically activate when:

1. The concentration of carbon dioxide reaches 3% (30,000 ppm), or
2. The concentration of oxygen reaches 19.5% in an oxygen deficient environment, or

**Exception:** Continuous ventilation.

**5307.2.2.5 Manual activation.** A manual activation switch for the ventilation system shall be provided at the entrance of the area where the vessel or cylinders are located. This manual activation switch shall be clearly marked with its function.

**5307.2.3 Equipment venting.** On all new and existing installations, emergency relief vents, burst disks and pump vents shall be terminated outside the building and at least 10 feet from openings into the building or property lines.

**5307.2.4 Gas detection.** Compressed gasses such as Carbon Dioxide, Helium, Argon, Nitrogen and other compressed gasses that are classified as an asphyxiant ***shall*** be provided with a gas detection and alarm system.

For buildings that are constructed new, the building fire alarm system shall be designed to monitor two points on the gas detection system. The building fire alarm system shall be capable of reporting specific signals to the Central Station for alarm signals in accordance with 5307.2.4.6 (below).

For existing buildings, the building fire alarm is to be evaluated to determine the capability of monitoring the gas detection system and shall be installed as per the new building requirements.

For buildings without a fire alarm system, in addition to the CO-2 alarms inside the building, an alarm device is to be located outside the building at the Fire Dept. entrance to notify personnel of a CO-2 activation. This device shall be labeled as a CO-2 alarm and shall activate upon activation of the CO-2 sensor.

The gas detection and alarm systems shall be installed, inspected, tested, calibrated and maintained per the manufacturer's instructions or at a minimum annually and have an inspection card attached identifying the date of inspection by a third party.

**5307.2.4.1 Gas detectors.** Gas detectors shall be field tested at the time of final inspection and annually, or as required per the manufacturer. Testing inspection and maintenance of detection devices shall be performed with an approved test gas. All test gas shall have a recognized certification that documents the type and percentage of gas.

**5307.2.4.2 Records.** Records of inspections and maintenance shall be available for review upon request by the Sun City Fire & Medical Department.

**5307.2.4.3 Specific gas detection.** When the gas is carbon dioxide, the gas detection systems shall be designed to detect carbon dioxide. All other simple asphyxiants shall use an oxygen sensor.

**5307.2.4.4 Location.** Gas detection shall be provided at each point of use and at vessels or cylinders inside structures. Carbon dioxide sensors shall be provided within 12 inches of the floor in the area where the gas is expected to accumulate or other *Fire Code Official* approved locations. A minimum of one (1) detector is to be placed by the cylinder, or where pressure regulators are located if the cylinder(s) are outside the building. Basements and or subterranean spaces that could be physically entered and have product lines, shall have gas detection. Additional detection devices are required where pure CO-2 is piped into the building. This includes remote stations for beer storage or remote serving locations. If the carbonator is located in a different location than the cylinders, a second detector shall be installed at the carbonator as required by the *Fire Code Official*.

**Exception:** CO-2 that has been mixed with product; i.e.: after the carbonator, is exempt.

**5307.2.4.5 Carbon dioxide two tier detection.** The Carbon Dioxide detection system shall be capable of two-tier detection.

1. Tier one (low level) shall be set at 0.5% carbon dioxide or 5,000 ppm and shall provide a supervisory signal in accordance with 5307.2.5 (below).
2. Tier two (high level) shall be set at 3% carbon dioxide or 30,000 ppm, and shall provide an alarm signal in accordance with 5307.2.6 (below).

**5307.2.4.6 Simple asphyxiant two tier detection.** The Simple Asphyxiant detection system shall be capable of two-tier detection. Tier one shall be set at 19.5% oxygen in an oxygen deficient environment. Tier two shall be set at 18% in an oxygen deficient environment.

**5307.2.4.6.1 System Activation.** Activation of the low-level gas detection system alarm shall automatically:

1. stop the flow of carbon dioxide to the piping system,
2. activate the mechanical exhaust system
3. activate the audible and visible supervisory alarm signal at an *approved* location within the building. (Reference 5307.2.5)

Activation of the high-level gas detection system alarm shall automatically:

1. stop the flow of carbon dioxide to the piping system,
2. activate the mechanical exhaust system
3. activate an audible and visible evacuation alarm signal within the building as required by the *Fire Code Official*. (Reference 5307.2.6)

**5307.2.4.7 Installation.** Asphyxiant gas detection systems or appropriate gas detection for the gas, shall be installed per the manufacture's manual.

**5307.2.4.8 Power.** The power supply to the gas detection system shall be circuit locked and labeled. Battery backup is required for CO-2 detectors that reset to an alarm condition upon loss of primary power.

**5307.2.5 Supervisory signal.** At 0.5% (5,000 ppm) carbon dioxide or 19.5% oxygen a local warning/supervisory signal with visible and audible indication shall occur at a constantly attended location and shall be transmitted off-site in a UL approved third party monitoring station as a supervisory signal alarm when the facility has a system that monitors signals off-site.

**5307.2.6 Evacuation alarm.** At 3% (30,000 ppm) carbon dioxide or 18% oxygen, an evacuation alarm shall sound for the occupancy and shall be transmitted off-site to a UL approved third party monitoring station as a gas specific alarm.

**Exception:** When the facility does not have a system capable of transmitting signals off site then established approved protocols shall be in place to call 911.

**5307.2.6.1 Monitoring.** Connection to a fire alarm panel or monitoring panel shall be completed by an approved fire protection company. A separate permit obtained by an approved fire alarm contractor from the Sun City Fire & Medical Department is required.

**5307.2.7 Notification.** Evacuation notification devices with audible and visible notification shall be provided:

1. Near every point-of-use.
2. In the area or room where the asphyxiant gas cylinders are located.
3. In the common area where public gathers.
4. At the entrance to the room with required detection.
5. When asphyxiant gas is present so it is clear to the responders upon approach to the hazard.
6. As required by the Fire Code Official.

**5307.2.7.1 Notification devices.** Notification devices shall comply with the following:

1. The notification device shall be rated a minimum of 100 candela rating for a visual effect and 75 decibels for an audible effect.
2. The notification devices shall be identified and labeled for the gas being detected.  
Use of the building fire alarm notification devices for evacuation is acceptable, provided the asphyxiant gas detection has visible and audible clear indicators in the hazard area upon both the warning level and alarm level of the gas.

**5307.3 Tank and Piping Requirements.** Piping systems shall be designed and constructed and tested in accordance with ASME/ANSI B31.3 - Process Piping Code.

**5307.3.1 Piping and marking.** Piping and tubing shall be identified in accordance with ASME A13.1 to indicate the material conveyed. Markings used for piping systems shall consist of the content's name and include a direction-of-flow arrow. Markings shall be provided at each valve: at wall, floor or ceiling penetrations; at each change of direction; and repeated at not less than every 20 feet (6096 mm) or fraction thereof throughout the piping run.

**5307.3.2 Piping design.** Gas piping systems shall be designed as follows:

1. Piping systems shall be designed to a bursting pressure of at least four times the system design pressure.
2. All fittings used in the piping system shall be designed for a working pressure not to exceed 125% of designed pressure of the hose.

**5307.3.3 Piping materials.** Carbon Dioxide Gas piping systems shall be of listed and approved materials for each specific gas in use. *Rigid plastic piping shall not be allowed.*

**Exceptions:**

1. Non-listed materials require a special report by an Arizona registered engineer on the piping material and shall be submitted to the Fire Code Official for approval.
2. A special report on the piping material shall not be required if the piping material has been listed by a third-party testing group such as UL or FM for the intended use.

**5307.3.4 Leak tests.** All piping systems shall be leak tested in accordance with the following:

1. Piping systems shall be tested by a pneumatic pattern at a pressure equal to the working pressure for 15 minutes or as long as it takes to check each joint; the test medium shall be carbon dioxide, and,
2. Soap testing of all fittings shall be witnessed at time of inspection.

**Chapter 80, Referenced Standards** is hereby **AMENDED to INCLUDE** the following reference:

**NFPA 855 – 2020: Standard for the Installation of Stationary Energy Storage Systems**

**Appendix D, Section D103.3 Turning Radius.** Is hereby **DELETED** and **REPLACED** with the following language:

**D103.3 Turning Radius.** The required minimum turning radius of a fire apparatus access road shall be per **WB-40 as published by AASHTO: 19.3 feet inside and 40 feet outside.**

**Appendix D, Section D103.6.1 Roads 20 to 26 feet in width.** Is hereby **AMENDED** by **ADDING** the following subsections:

**D103.6.1.1 Fire Lane.** In addition to section D103.6 Signs, Fire Lane curbs must be painted red in color on the top and outward face of the curb and shall be marked with the words “NO PARKING – FIRE LANE” in 4 inch white block letters on the top and vertical face of the curb spaced every 50 feet on center, be posted at the beginning and end of the fire lane, or as required by the Fire Code Official.