



WINDSOR SEVERANCE FIRE RESCUE

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Policy: Lithium-ion and Lithium Metal Battery Storage	Effective Date: February 1, 2024	Revised: N/A
Policy Number: FP017	Section: Life Safety Division	Prior Policy Number: N/A
Department: District	Initial Policy Date: February 1, 2024	Prior Effective Date: N/A
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Purpose: The purpose of this policy is to ensure that occupancies in the Windsor Severance Fire Rescue response areas follow the best industry practices that have been advised by the International Code Council regarding Lithium-Ion batteries and their storage. This policy references the 2018 International Fire Code that is adopted currently in the WSFR district.

General. The storage of lithium-ion and lithium-metal batteries shall comply with this policy.

Exceptions:

1. New or refurbished batteries installed in the equipment, devices, or vehicles they are designed to power.
2. New or refurbished batteries packed for use with the equipment, devices, or vehicles they are designed to power.
3. Batteries in original retail packaging that are rated at not more than 300 watt-hours for lithium-ion batteries or contain not more than 25 grams of lithium metal batteries.
4. Temporary storage (no more than 90 days) of batteries or battery components during the battery manufacturing process prior to completion of final quality control checks.
5. Temporary (no more than 90 days) of batteries during the vehicle manufacturing or repair process

Permits. Permits shall be required for an accumulation of more than 15 cubic feet of lithium-ion and lithium-metal batteries.

Fire safety plan. A fire safety plan shall be provided in accordance with Section 404 of the 2018 International Fire Code. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium-metal battery storage.

Storage requirements. Lithium-ion and lithium-metal batteries shall be stored in accordance with the following sections:

Limited indoor storage in containers. Not more than 15 cubic feet (0.42 m³) of lithium-ion or lithium-metal batteries shall be permitted to be stored in containers in accordance with all of the following:

1. Containers shall be open-top and constructed of noncombustible materials or shall be approved for battery collection.
2. Individual containers and groups of containers shall not exceed a capacity of 7.5 cubic feet (0.21 m³).
3. A second container or group of containers shall be separated by not less than 3 feet (914 mm) of open space or 10 feet (3048 mm) of space that contains combustible materials.
4. Containers shall be located not less than 5 feet (1524 mm) from exits or exit access doors.

Indoor storage areas. Indoor storage areas for lithium-ion and lithium-metal batteries, other than those complying with limited indoor storage in containers, shall comply with the following sections.

Technical opinion and report. A technical opinion and report complying with Section 104.7.2 of the 2018 International Fire Code shall be prepared to evaluate the fire and explosion risks associated with the indoor storage area and to make recommendations for fire and explosion protection. The report shall be submitted to the fire code official and shall require the fire code official's approval prior to issuance of a permit. In addition to the requirements of Section 104.7.2, the technical opinion and report shall specifically evaluate the following:

1. The potential for deflagration of flammable gases released during a thermal runaway event.
2. The basis of design for an automatic sprinkler system or other approved fire suppression system. Such design basis shall reference relevant full-scale fire testing or another approved method of demonstrating the sufficiency of the recommended design.

Construction requirements. Where indoor storage areas for lithium-ion and lithium metal batteries are located in a building with other uses, battery storage areas shall be separated from the remainder of the building by 2-hour rated fire barriers or horizontal assemblies. Fire barriers shall be constructed in accordance with the 2018 International Building Code, and horizontal assemblies shall be constructed in accordance with the 2018 International Building Code.

Exceptions:

1. Where battery storage is contained in one or more approved prefabricated portable structures providing a complete 2-hour fire-resistance-rated enclosure, fire barriers and horizontal assemblies are not required.
2. Where battery storage is limited to new batteries in packaging that has been demonstrated to and approved by the fire code official as sufficient to isolate a fire in packaging to the package interior, fire barriers and horizontal assemblies are not required.

Fire protection systems. Indoor storage areas for lithium-ion and lithium-metal batteries shall be protected by an automatic sprinkler system complying with Section 903.3.1.1 of the 2018 International Fire Code or an approved alternative fire suppression system. The system design shall be based on recommendations in the approved technical opinion and report required by the Technical Opinion and Report as stated in this policy.

Fire alarm systems. Indoor storage areas for lithium-ion and lithium-metal batteries shall be provided with an approved automatic fire detection and alarm system complying with Section 907 in the 2018 International Fire Code. The fire detection system shall use air-aspirating smoke detection, radiant energy-sensing fire detection, or both.

Explosion control. Where the approved technical opinion and report required by this policy recommends explosion control, explosion control complying with Section 911 of the 2018 International Fire Code shall be provided.

Reduced requirements for storage of partially charged batteries. Indoor storage areas for lithium-ion and lithium metal batteries with a demonstrated state of charge not exceeding 30 percent shall not be required to comply with the technical opinion and report, the construction requirements, and the explosion control, provided that procedures for limiting and verifying that the state of charge will not exceed 30 percent have been approved.

Outdoor storage. Outdoor storage of lithium-ion or lithium-metal batteries shall comply with the following sections:

Distance from storage to exposures. Outdoor storage of lithium-ion or lithium metal batteries, including storage beneath weather protection in accordance with the 2018 International Building Code, shall comply with one of the following:

1. Battery storage shall be located not less than 20 feet (6096 mm) from any building, lot line, public street, public alley, public way, or means of egress.
2. Battery storage shall be located not less than 3 feet (914 mm) from any building, lot line, public street, public alley, public way, or means of egress, where the battery storage is separated by a 2-hour fire-resistance-rated assembly without openings or penetrations and extending 5 feet (1524 mm) above and to the sides of the battery storage area.
3. Battery storage shall be located not less than 3 feet (914 mm) from any building, lot line, public street, public alley, public way, or means of egress, where batteries are contained in approved, prefabricated portable structures providing a complete 2-hour fire-resistance-rated enclosure.

Storage area size limits and separation. Outdoor storage areas for lithium-ion or lithium metal batteries, including storage beneath weather protection in accordance with the 2018 International Building Code, shall not exceed 900 square feet (83.6 m²). The height of battery storage in such areas shall not exceed 10 feet (3048 mm). Multiple battery storage areas shall be separated from each other by not less than 10 feet (3048 mm) of open space.

Fire detection. Outdoor storage areas for lithium-ion or lithium metal batteries, regardless of whether such areas are open, under weather protection, or in a prefabricated portable structure, shall be provided with an approved automatic fire detection and alarm system complying with Section 907 of the 2018 International Fire Code. The fire detection system shall use radiant energy-sensing fire detection.

Future retroactive changes when the 2024 International Fire Code is adopted with amendments (early 2025). They will be placed in Chapter 11 for Existing Buildings and will mirror the requirements already in the code for new or changing occupancies:

1. Section 903.2.2 Group B

Section 903.2.2.2 Laboratories involving research and development or testing. An automatic fire sprinkler system shall be installed throughout the fire areas utilized for the research and development or testing of lithium-ion or lithium-metal batteries.

2. Section 903.2.4 Group F-1

4. A Group F-1 occupancy is used to manufacture lithium-ion or lithium-metal batteries.

3. Section 903.2.7 Group M

Section 903.2.7.3 Lithium ion or lithium metal battery storage. An automatic sprinkler system shall be provided in a room or space within a Group M occupancy where required for the storage of lithium-ion or lithium-metal batteries by Section 320 or Chapter 32.

4. Section 903.2.9 Group S-1

5. A Group S-1 fire area used for the storage of lithium-ion or lithium-metal-powered vehicles where the fire area exceeds 500 square feet.

5. Section 903.2.9.1 Repair Garages

5. A Group S-1 fire area used for the storage of lithium-ion or lithium-metal-powered vehicles where the fire area exceeds 500 square feet.

6. Section 907.2.2 Group B

Section 907.2.2.2 Laboratories involving research and development or testing. A fire alarm system activated by an air-sampling type smoke detection system or a radiant energy sensing detection system shall be installed throughout the entire fire area utilized for the research and development or testing of lithium-ion or lithium metal batteries.

7. Section 907.2.4 Group F

Section 907.2.4.1 Manufacturing involving lithium-ion or lithium metal batteries. A fire alarm system activated by an air-sampling type smoke detection system or a radiant energy sensing detection system shall be installed throughout the entire fire area are manufactured and where the manufacture of vehicles, energy storage systems, or equipment containing lithium-ion or lithium metal batteries where the batteries are installed as part of the manufacturing process.

8. Section 907.2.7 Group M

Section 907.2.7.2 Storage of lithium-ion or lithium metal batteries. A fire alarm system activated by an air-sampling type smoke detection system or a radiant energy sensing detection system shall be installed in a room or space within a Group M occupancy where required for the storage of lithium-ion or lithium metal batteries in accordance with Section 320.

9. Section 907.2.10 Group S. A fire alarm system activated by an air-sampling type smoke detection system or a radiant energy sensing detection system shall be installed throughout the entire fire area where required for the storage of lithium-ion or lithium metal batteries in accordance with Section 320.