

## Chapter E 513

## AIRCRAFT HANGARS

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**E 513.01 Definition.** This occupancy shall include locations used for storage or servicing of aircraft in which gasoline, jet fuels, or other volatile flammable liquids, or flammable gases, are used, but shall not include such locations when used exclusively for aircraft which have never contained such liquids or gases, or which have been drained and properly purged.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.02 Hazardous areas.** Classification under chapter E 500. (1) Any pit or depression below the level of the hangar floor shall be considered to be a class I, division 1 location which shall extend up to said floor level.

(2) The entire area of the hangar including any adjacent and communicating areas not suitably cut off from the hangar shall be considered to be a class I, division 2 location up to a level 18 inches above the floor.

(3) The area within 5 feet horizontally from aircraft power plants, aircraft fuel tanks or aircraft structures containing fuel shall be considered to be a class I, division 2 hazardous location which shall extend upward from the floor to a level 5 feet above the upper surface of wings and of engine enclosures.

(4) Adjacent areas in which hazardous vapors are not likely to be released such as stock rooms, electrical control rooms, and other similar locations, shall not be classed as hazardous when adequately ventilated and when effectively cut off from the hangar itself by walls or partitions.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.03 Wiring and equipment in hazardous areas.** All fixed and portable wiring and equipment which is or may be installed or operated within any of the hazardous locations defined in section E 513.02 shall conform to applicable provisions of chapter E 501. All wiring installed in or under the hangar floor shall conform to the requirements for class I, division 1. When such wiring is located in vaults, pits, or ducts, adequate drainage shall be provided, and the wiring shall not be placed within the same compartment with any other service except piped compressed air

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.04 Wiring not within hazardous areas.** (1) All fixed wiring in a hangar, but not within a hazardous area as defined in section E 513.02, shall be installed in metallic raceways or shall be type MI or type ALS cable, except that wiring in non-hazardous locations as defined in section E 513.02 (4) may be of any type recognized in chapter E 300 of this code.

(2) For pendants, flexible cord suitable for the type of service and approved for hard usage shall be used. Each such cord shall include a separate grounding conductor.

(3) For portable utilization equipment and lamps, flexible cord suitable for the type of service and approved for extra hard usage shall be used. Each such cord shall include a separate grounding conductor.

(4) Where a circuit which supplies portables or pendants includes an identified grounded conductor as provided in chapter E 200, receptacles, attachment plugs, connectors, and similar devices shall be of polarized type, and the identified conductor of the flexible cord shall be connected to the screw shell of any lampholder or to the identified terminal of any utilization equipment supplied. Acceptable means shall be provided for maintaining continuity of the grounding conductor between the fixed raceway system and the non-current-carrying metallic portions of pendant fixtures, portable lamps, and portable utilization equipment.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.05 Equipment not within hazardous areas.** (1) In locations other than those described in section E 513.02, equipment which is less than 10 feet above wings and engine enclosures of aircraft and which may produce arcs, sparks or particles of hot metal, such as lamps and lampholders for fixed lighting, cutouts, switches, receptacles, charging panels, generators, motors, or other equipment having make and break or sliding contacts, shall be of totally-enclosed type or shall be provided with suitable guards or screens to prevent escape of sparks or hot metal particles, except that equipment in areas described in section E 513.02 (4) may be of general purpose type.

(2) Lampholders of metal shell, fiber-lined types shall not be used for fixed incandescent lighting.

(3) Portable lamps which are or may be used within a hangar shall be approved for class I locations.

(4) Portable utilization equipment which is or may be used within a hangar shall be of a type suitable for use in class I, division 2 locations.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.06 Stanchions, rostrums and docks.** (1) Electric wiring, outlets and equipment (including lamps) on or attached to stanchions, rostrums or docks which are located or likely to be located in a hazardous area as defined in section E 513.02 (3) shall conform to the requirements for class I, division 2 locations.

(2) Where stanchions, rostrums, or docks are not located or likely to be located in a hazardous area as defined in section E 513.02 (3), wiring and equipment shall conform to sections E 513.04 and E 513.05, except that such wiring and equipment not more than 18 inches above the floor in any position shall conform to section E 513.06 (1).

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Receptacles and attachment plugs shall be of locking type which will not break apart readily.

(3) Mobile stanchions with electrical equipment conforming to section E 513.06 (2) shall carry at least one permanently affixed warning sign to read: "WARNING—KEEP 5 FEET CLEAR OF AIRCRAFT ENGINES AND FUEL TANK AREAS."

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.07 Sealing.** Approved seals shall be provided in conformance with section E 501.05, and subsections E 501.05 (1) (c) and E 501.05 (2) (b) and shall apply to horizontal as well as vertical boundaries of the defined hazardous areas. Raceways embedded in a masonry floor or buried beneath a floor shall be considered to be within the hazardous area above the floor when any connections or extensions lead into or through such area.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.08 Aircraft electrical systems.** Aircraft electrical systems should be de-energized when the aircraft is stored in a hangar, and, whenever possible, while the aircraft is undergoing maintenance.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.09 Aircraft battery; charging and equipment.** (1) Aircraft batteries should not be charged when installed in an aircraft located inside or partially inside a hangar.

(2) Battery chargers and their control equipment shall not be located or operated within any of the hazardous areas defined in section E 513.02, and should preferably be located in a separate building or in an area such as described in section E 513.02 (4). Mobile chargers shall carry at least one permanently affixed warning sign to read: "WARNING—KEEP 5 FEET CLEAR OF AIRCRAFT ENGINES AND FUEL TANK AREAS." Tables, racks, trays, and wiring shall not be located within a hazardous area, and shall, in addition, conform to the provisions of chapter E 480.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.10 External power sources for energizing aircraft.** (1) Aircraft energizers shall be so designed and mounted that all electrical equipment and fixed wiring will be at least 18 inches above floor level and shall not be operated in a hazardous area as defined in section E 513.02 (3).

(2) Mobile energizers shall carry at least one permanently affixed warning sign to read: "WARNING—KEEP 5 FEET CLEAR OF AIRCRAFT ENGINES AND FUEL TANK AREAS."

(3) Aircraft energizers shall be equipped with polarized external power plugs and shall have automatic controls to isolate the ground power unit electrically from the aircraft in case excessive voltage is generated by the ground power unit.

(4) Flexible cords for aircraft energizers and ground support equipment shall be approved for the type of service and extra hard usage and shall include a ground conductor.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.11 Mobile servicing equipment with electrical components.** (1) Mobile servicing equipment (such as vacuum cleaners, air com-

pressors, air movers, etc.) having electrical wiring and equipment not suitable for class I, division 2 locations shall be so designed and mounted that all such fixed wiring and equipment will be at least 18 inches above the floor. Such mobile equipment shall not be operated within the hazardous areas defined in section E 513.02 (3) and shall carry at least one permanently affixed warning sign to read: "WARNING—KEEP 5 FEET CLEAR OF AIRCRAFT ENGINES AND FUEL TANK AREAS."

(2) Flexible cords for mobile equipment shall be suitable for the type of service and approved for extra hard usage, and shall include a grounding conductor. Attachment plugs and receptacles shall be approved for the location in which they are installed, and shall provide for connection of the grounding conductor to the raceway system.

(3) Equipment not of a type suitable for class I, division 2 locations shall not be operated in areas where maintenance operations likely to release hazardous vapors are in progress.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 513.12 Grounding.** All metallic raceways, and all non-current-carrying metallic portions of fixed or portable equipment, regardless of voltage, shall be grounded as provided in Wis. Adm. Code chapter E 250.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.