

## Replace Chapter 5 with this document

### SECTION 501—GENERAL

**501.1 Scope.** Buildings and structures shall be constructed in accordance with the *International Residential Code and International Building Code* and this code.

**Exceptions:**

1. Accessory structures not exceeding 120 square feet (11 m<sup>2</sup>) in floor area where located greater than or equal to 50 feet from buildings containing habitable spaces.
2. Agricultural buildings greater than or equal to 50 feet from buildings containing habitable spaces.

**501.2 Objective.** The objective of this chapter is to establish minimum standards to locate, design and construct buildings and structures or portions thereof for the protection of life and property, to resist damage from wildfires, and to mitigate building and structure fires from spreading to wildland fuels. The minimum standards set forth in this chapter vary with the critical *fire weather*, slope and fuel type to provide increased protection, above the requirements set forth in the *International Building Code*, from the various levels of hazards.

**501.3 Fire-resistance-rated construction.** Where this code requires 1-hour *fire-resistance-rated construction*, the fire-resistance rating of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263.

**Exceptions:**

1. The fire-resistance rating of building elements, components or assemblies based on the prescriptive designs prescribed in Section 721 of the *International Building Code*.
2. The fire-resistance rating of building elements, components or assemblies based on the calculation procedures in accordance with Section 722 of the *International Building Code*.

### SECTION 503 NON-COMBUSTIBLE CONSTRUCTION AND MATERIAL

**503.1 General.** Buildings and structures hereafter constructed, modified or relocated into the City of Flagstaff, shall meet the construction requirements in accordance with Section 503.2 and 504.

**503.2.1 Noncombustible material.** Material shall comply with the definition of *noncombustible* materials in Section 202.

## SECTION 504 EXTERIOR CONSTRUCTION

**504.2 Roof assembly.** Roofs shall have a *roof assembly* that complies with a Class A rating when tested in accordance with ASTM E108 or UL 790. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Class A rated roof covering types include, but are not limited to:

- Cement shingles or sheets.
- Exposed concrete slab roof.
- Ferrous or copper shingles or sheets.
- Slate shingles.
- Clay or concrete roofing tile.

o Where provided, barrel tile or corrugated roof coverings shall include noncombustible bird stops at the eave ends to prevent the entry of embers and debris.

• Note: Given the potential service life uncertainties of both ignition-resistant treatments and applied ignition-resistant coatings, the use of wood shake, wood shingle, or any wood roof covering material regardless of test rating are not permitted.

**504.2.1 Roof valleys.** Where provided, valley flashings shall be not less than 0.019 inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 running the full length of the valley.

**504.3 Protection of eaves.** Eaves shall be enclosed or protected on the exposed underside using noncombustible materials.

**504.4 Gutters and downspouts.** Gutters and downspouts shall be constructed of *noncombustible* (metal) material. Gutters shall be covered with a noncombustible material to prevent the accumulation of leaves and debris in the gutter.

**504.5 Exterior walls.** Exterior walls of buildings or structures shall be constructed with:

1. *Approved noncombustible* materials. (e.g., metal, fibercement, masonry veneer, stucco, brick, concrete).

- Where provided, all shutters (e.g., decorative and operable) shall be made of noncombustible material.

- Note: Combustible wall cover material (e.g., wood shake, wood shingle, or any other wood siding material including ignition-resistant treatments and coatings) by construction or assembly are not permitted.

3. Heavy timber or *log wall construction may be permitted for projects based on Fire Code Official approval and Community Development review.*

**504.5.1 Flashing.** A minimum of 6 inches (152 mm) of metal flashing or noncombustible material applied vertically on the exterior of the wall shall be installed at the ground, decking and roof intersections where any non-combustible gaps may occur.

**504.6 Underfloor enclosure.** Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5 with noncombustible corrosion-resistant mesh not to exceed 1/8-inch in diameter covering any openings.

**Exception:** Complete enclosure shall not be required where underfloor areas are elevated more than 4 feet above the ground. In such a case, columns and supporting walls must either be non-combustible or covered with non-combustible material.

**504.7 Appendages, projections, attached patios, decks, and overhead structures (e.g., Covered Porches, Pergolas, Carports, and Gazebos).** Unenclosed accessory structures attached to buildings with habitable spaces and projections, such as decks, shall be constructed in accordance with one of the following methods:

1. All the components including posts, joists, railings, stairs, and walking surfaces are constructed with noncombustible.

2. Deck walking surfaces constructed with a solid (no gaps), noncombustible material such as metal or light-weight concrete; railings within 5 feet of the home constructed of a noncombustible material, including where railings attach to the home; and deck posts with a minimum of 6 vertical inches of noncombustible material at grade.

Staircases 4 feet in width or less that attach to a deck and are open underneath, shall meet one of the following requirements:

- Open risers (no solid risers)
  - shall have a minimum of 6 vertical inches of the bottom of stairs made from noncombustible material.
  - Stair treads should be a solid (no gaps), noncombustible material, such as metal or light-weight concrete.
- Closed risers
  - shall have a minimum of 6 vertical inches of the bottom of stairs made from noncombustible material.
  - Stair treads and risers should be a solid (no gaps), noncombustible material, such as metal or light-weight concrete.
    - Staircases wider than 4 feet that attach to a deck, the staircase shall be cleared underneath and enclosed with a noncombustible corrosion-resistant mesh with openings not to exceed 1/8-inch in diameter and meet the following requirements:

### 3: Retrofits

- Deck Walking Surfaces shall be constructed with a solid, noncombustible material (e.g., metal or lightweight concrete) with no gaps.
- Deck Railings within 5 feet of the home shall be constructed with noncombustible material, including where they attach to the home.
- Deck posts shall have a minimum of 6-inches of noncombustible material (e.g., metal flashing or fiber cement board) applied vertically to the base.
- Stairs Attached to a Deck shall meet one the following requirements:

- **Stairs Less than 4 Feet Wide and Open Underneath:**
  - o A minimum of 6-inches of noncombustible material (e.g., metal flashing or fiber-cement) shall be applied vertically at the exterior base, measured from the ground at grade.
  - o Stair treads shall be a solid (no gaps) and made of noncombustible material (e.g., metal or lightweight concrete).
  - o Exception: If stairs are constructed with closed risers, they shall also be solid (no gaps) and made of noncombustible material.
- **Stairs Wider Than 4 Feet:**
  - o The area underneath shall be enclosed with noncombustible, corrosion-resistant mesh with openings not to exceed 1/8-inch in diameter.
  - o A minimum of 6-inches of noncombustible material (e.g., metal flashing or fiber-cement) shall be applied vertically at the exterior base, measured from the ground at grade.
  - o Stairs shall have closed risers. Stair treads and risers shall be a solid, and made of noncombustible material (e.g., metal or light-weight concrete) with no gaps.
- **Roof Covering** – Shall meet one of the following requirements:
  - o A solid roof covering material with a Class A rating when tested in accordance with ASTM E108 or UL 790, or
  - o Constructed of combustible slats (e.g., pergola) that cover no more than 15% of the total surface area.
- **Setback** – A detached combustible overhead structure (e.g., pergola and gazebo) on an attached deck shall be at least 10 feet from all exterior walls of the home.
  - o *Exception:* An overhead structure constructed entirely of noncombustible materials is permitted with no setback requirement.
- **Posts** – exterior surface of the post must be non-combustible
- **Other** – Shall be free of any vegetation, curtains, drapes, and shade screens.
  - o *Exception:* Shade screens that retract into noncombustible housing are permitted.

- **Carpports and Garages** – Must have noncombustible wall covering material and the 0–5 Foot Noncombustible Zone under and around the structure.

- o An open carport with exposed combustible interior wall covering (e.g., wood), shall be enclosed.

- **6-inch Vertical Noncombustible Clearance** – Shall have noncombustible covering material for of all posts, supporting walls, and stairs measured from the ground at grade.

- **Lattice and Mesh** – Must be noncombustible material (e.g., metal). Where noncombustible corrosion-resistant metal mesh is provided, the mesh shall be installed on the outside of the lattice.

- **No Storage** – Shall have nothing combustible stored underneath.

- o *Exception:* An open outdoor living area under the deck shall meet the same requirements (see “Top of walking surfaces” above).

- Additionally, decks with a walking surface of 4 feet or less above the ground, shall be enclosed with the following:

- o When measured from the walking surface to the ground, the underdeck area with this height or less shall be enclosed with noncombustible, corrosion-resistant mesh. The mesh openings shall not exceed 1/8-inch in diameter and shall fully enclose the outer edge of the deck from the walking surface to the ground. This enclosure is required to reduce debris accumulation and limit ember intrusion beneath the deck.

***Detached Decks and Overhead Structures (e.g., Covered Porches, Pergolas, Carports, and Gazebos)*** Where provided, detached decks and overhead structures within 10 feet of the home shall meet the same requirements as attached decks

**504.7.1 Underfloor areas.** Where the attached structure is located and constructed so that the structure or any portion there of projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed with exterior wall construction in accordance with Section 504.5.

**504.8 Exterior glazing. Exterior Glass (Windows, Skylights, and Glazed Openings within Doors)**

All exterior windows, skylights, and glazed openings within doors shall comply with one of the following requirements:

- Multipaned glass with at least two tempered panes.
- Glass with a minimum of 20-minutes fire-resistance rating when tested in accordance with NFPA 257.
- Glass blocks (windows only).
- Operable skylights shall be protected by a noncombustible mesh screen where mesh openings shall not exceed 1/8-inch in diameter
  - All retrofit/replacement windows must comply

**504.9 Exterior doors.** All exterior doors shall comply with one of the following requirements:

- Exterior doors shall be approved noncombustible construction, or solid-core wood not less than 1-<sup>3</sup>/<sub>4</sub> inches thick (44 mm). The exterior doors shall be constructed with noncombustible threshold. Windows within doors and glazed doors shall be in accordance with this standard's exterior glass requirements (see 3.1.5 Exterior Glass).
- Exterior door assembly shall have a fire-resistance rating of not less than 20-minutes when tested according to NFPA 252.
- Doors made of combustible material (e.g. non-solid core wood doors) are permissible provided a noncombustible exterior storm door is installed as the outermost door.

**504.10 Vents.** Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical surface, shall meet one of the following requirement options:

- **Performance-based Option** – Corrosion-resistant vents installed, conforming with the following ASTM E2886 test requirements for flame- and ember-resistance:
  - o No flaming ignition of the cotton material during the Ember Intrusion Test.
  - o No flaming ignition during the Integrity Test portion of the Flame Intrusion Test.

- o Temperature of the unexposed side of the vent does not exceed 662°F.

- o *Note:* Joints around such vents shall be sealed with sealants in accordance with vent manufacturer installation instructions to avoid ember and flame intrusion through the joints.

- **Prescriptive Option** – Vents shall be covered with a noncombustible, corrosion-resistant mesh with openings not to exceed 1/8-inch in diameter for ember-resistance.

- o *Exceptions:*

- o Forced air vents (e.g., dryer and central vacuum) shall have a functional louver or flap made of non-combustible material in lieu of mesh.

- o Plumbing vents are excluded from this requirement.

**504.10.3 Vent locations.** Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves or in other overhang areas. Gable-end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

**504.11 Detached accessory dwelling units and accessory structures.** All accessory structures with a footprint greater than or equal to 120 square feet shall fully comply with Section 5 Construction, unless more than 50 feet away from habitable spaces.

## **SECTION 507—REPLACEMENT OR REPAIR OF ROOF COVERINGS**

**507.1 General.** The *roof covering* on buildings or structures in existence prior to the adoption of this code that are replaced or have 25 percent or more replaced in a 12-month period shall be replaced with a *roof covering* required for new construction based on the type of ignition-resistant construction specified in accordance with Section 503.