

GUNNISON COUNTY, CO

Gunnison County Community Development Wildfire Planning

IWUI Code

- The International Wildland-Urban Interface Code (IWUIC) is one of 15 codes in the family of International Codes published by the International Code Council (ICC).
- The IWUIC establishes minimum requirements for land use and the built environment in designated wildland-urban interface areas using prescriptive and performance related provisions. It is founded on data collected from tests and fire incidents, technical reports and mitigation strategies from around the world.
- Defensible space management and ignition resistant construction materials can be required for structures within hazard zones.
- In County, site review and analysis will be needed in some areas.
- In municipalities review is expected to be less challenging. Landscaping standards may pose conflicts though.

3 classes of ignition resistant construction

Class 1 (IR1) is the highest level of protection

Class 2 (IR2) is the next step down in the level of fire protection

Class 3 (IR3) is the minimum level of fire protection

Class 1 – Ignition Resistant Materials

Specified building components for:

- Roof
- Roof valleys
- Protection of eaves
- Gutters and downspouts
- Exterior Walls
- Underfloor enclosures
- Appendages and projections
- Exterior glazing and doors
- Vents and vent locations
- Detached accessory structures

Class 1 – Ignition Resistant Materials-Roofs

Any roof assembly that complies with a Class A rating when tested in accordance with ASTM E108 or UL790.

ASTM E108

Fire-test response standard that is used to evaluate roof coverings in residential and commercial applications for materials used on combustible and non-combustible roof decks. The test simulates fire originating outside a building accompanied by wind conditions. Various materials can be tested, including but not limited to, asphalt shingles, sheet roofing, fire-retardant-treated wood shingles and shakes. Fire-retardant-treated wood shingles and shakes are subjected to rain and weathering tests in addition to flame spread, intermittent flame, burning brand, and flying brand tests.

UL790

Similar, almost identical to the ASTM E108 test. A UL790 Classification satisfies the requirements of ASTM E-108. Passing ASTM E-108 is not equivalent to an UL790 classification. A UL790 classification indicates that UL witnessed the construction of the panels using representative materials from the manufacturer. It also indicates that the materials used in a classified system carry a UL label. The UL790 Fire Tests of Roof Coverings would be appropriate for Building Integrated Photovoltaics products.

Class 1 – Ignition Resistant Materials-Roofs

Additionally, Class A roof assemblies include....

- Coverings of brick, masonry or an exposed concrete deck.
- Ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on non-combustible decks
- Ferrous, copper, or metal sheets installed without a roof deck on noncombustible framing.
- Copper sheets (at least 16oz/sq.ft.) over combustible roof decks.

Class 1 – Ignition Resistant Materials-Roofs

Noncombustible.

Material of which no part will ignite and burn when subjected to fire. Also, any material conforming to ASTM E136 shall be considered noncombustible.

Roof deck.

The flat or sloped surface not including its supporting members or vertical supports. A roof deck is the structural surface to which the roofing and waterproofing system (including insulation) is applied.

Class 1 – Ignition Resistant Materials-Roof valleys

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

Where valleys occur in a roof, they have a tendency to collect debris such as pine needles, leaves or other combustible items. As a result, the combustible debris adds a fire load directly on the roof covering in the roof valley.

Class 1 – Ignition Resistant Materials-Eaves

As fire approaches a structure, the heat wave spreads horizontally along the ground and rises. This heat wave can become concentrated beneath exterior projections such as eaves and roof overhangs. The underside of eaves must be protected to inhibit ignition. This is accomplished with either fire-resistant materials or lumber with a minimum dimension of 2 inches.

Class 1 – Ignition Resistant Materials-Eaves

Eaves and soffits shall be protected on the exposed underside by ignition-resistant materials or by materials approved for not less than 1-hour fire-resistance-rated construction, 2-inch nominal dimensional lumber, or 1-inch nominal fire-retardant-treated lumber or 3/4-inch nominal fire-retardant-treated plywood.

Fascias are required and shall be protected on the backside by ignition-resistant materials or by materials approved for not less than 1-hour fire-resistance-rated construction or 2-inch nominal dimension lumber.

Class 1 – Ignition Resistant Materials-Gutters and downspouts

Gutters and downspouts shall be of noncombustible material. Gutters shall be provided with an approved means to prevent the accumulation of leaves and debris in the gutter.

Rain gutters and associated downspouts are often constructed of vinyl or plastic materials, which are highly combustible. If the rain gutters and downspouts are ignited, they become a wick and carry fire up the exterior wall with flames directly on the exterior wall surface of the structure.

Gutters and downspouts are not typically observed during the construction process and no permit is required for these as an add-on or modification at a later date. Education and outreach to property owners, applicants, HOAs, contractors, suppliers, etc. will be important for this item.

Class 1 – Ignition Resistant Materials-Exterior Walls

Need to be constructed with one of the following:

1. 1-hour fire resistance-rated construction on the exterior side. ASTM E119.
2. Approved noncombustible materials. Examples include, metal and stucco, and stone.
3. Heavy timber or log wall construction.
4. Fire-retardant treated wood on the exterior side (labeled for exterior use).
5. Ignition-resistant materials complying with Section 503.2 on the exterior side. An example would be ignition-resistant cedar shingles.

Class 1 – Ignition Resistant Materials-Exterior Walls

Section 503.2 Ignition Resistant Materials:

1. Tested to ASTM E84 (UL723) for 30 minutes or ASTM E2768. These standards provide the test method and the code specifies the following pass/fail criteria:
 - flame spread not exceeding 23 and shall not show evidence of progressive combustion following the extended 30-minute test.
 - flame front that does not progress more than 10.5 feet beyond the centerline of burner at any time during the 30-minute test.
 - Weathering. Materials shall maintain their performance in accordance with this section under conditions of use. Materials shall meet the performance requirements for weathering (including exposure to temperature, moisture, and ultraviolet radiation) contained in the following standards, as applicable to the materials and the conditions of use: ASTM D2898 for fire-resistant wood, ASTM D7032 for wood-plastic composite material, ASTM D6662 for plastic lumber materials
2. Noncombustible material.
3. Fire-retardant-treated wood identified for exterior use.
4. Fire-retardant-treated wood coverings. Roof assemblies containing fire-retardant-treated wood shingles and shakes that comply with certain requirements of the IBC. The sections require that the treated roof covering has been treated in accordance with American Wood Protection Association Standard C1, *All Timber Products-Preservative Treatment by Pressure Processes* and then testing in accordance with ASTM D2898, *Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing* and meets the criteria for Class A.

Class 1 – Ignition Resistant Materials-Underfloor enclosure

Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls. Except, complete enclosure is not required where the underside of the exposed floors and exposed structural columns, beams, and supporting walls are protected as required for exterior 1-hour fire-resistant-rated construction or heavy timber constructions or fire-retardant-treated wood (labeled for exterior use).

This would be apply to structures built on a slope. Either the portion of the building on the downslope becomes enclosed, or the floor above is supported by columns with no exterior walls below. This second situation creates an area where heat and wind-driven embers can become trapped as the fire ascends the hillside from below.

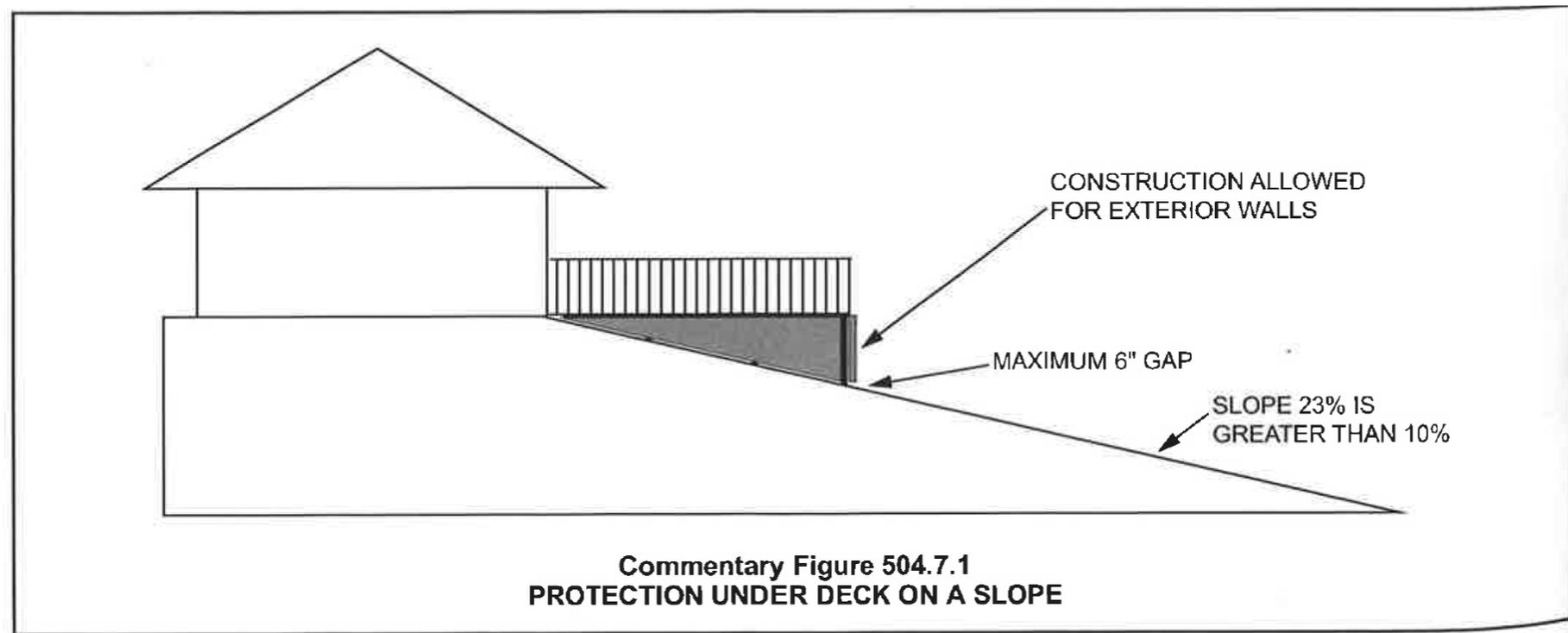
Class 1 – Ignition Resistant Materials-Appendages and projections

Unenclosed accessory structures attached to building with habitable spaces and projections, such as decks, shall be not less than 1-hour fire-resistance-rated construction, heavy timber construction or constructed of one of the following:

1. Approved noncombustible materials.
2. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the IBC.
3. Ignition-resistant building materials in accordance with Section 503.2

Class 1 – Ignition Resistant Materials-Appendages and projections

Additionally, where located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10%, the area below the structure shall have underfloor areas enclosed to within 6 inches of the ground, with exterior wall construction for Class 1.



Class 1 – Ignition Resistant Materials-Exterior glazing

Exterior windows, window walls and glazed doors, windows within exterior doors, and skylights shall be tempered glass, multilayered glazed panels, glass block or have a fire protection rating of not less than 20 minutes.

Windows create openings in the exterior walls. Radiant heat can pass through glass and ignite combustibles inside buildings.

Class 1 – Ignition Resistant Materials-Exterior doors

Exterior doors shall be approved noncombustible construction, solid core wood not less than 1 ¾ inches thick, or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall comply with the exterior glazing section.

Windows create openings in the exterior walls. Radiant heat can pass through glass and ignite combustibles inside buildings.

Class 1 – Ignition Resistant Materials-Vents

Attic ventilation openings, foundation or under-floor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed $\frac{1}{4}$ inch, or shall be design and approved to prevent flame or ember penetration into the structure.

Fire investigations have discovered that structures lost in wildland fires are often the result of embers entering concealed spaces through vents. The intent is that ventilation openings be designed to prevent entry of burning embers.

ASTM E2886, Standard Test Method for Evaluating the Ability of Exterior Vents to Resist the Entry of Embers and Direct Flame Impingement could be used for guidance.

Class 1 – Ignition Resistant Materials-Vent locations

Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang area.

New vents have/are being designed for soffits that have/will pass the ASTM E2886 tests and could be considered for approval as an alternative method. This could be desirable for existing construction retro-fitting as well as new construction.



Commentary Figure 504.10.1
FIRE TEST FOR SOFFIT VENT UNDER ASTM E2886

Photo courtesy of Brandguard Vents

Class 1 – Ignition Resistant Materials-Detached accessory structures

Detached accessory structures located less than 50 feet from a building containing habitable space shall have exterior walls constructed with materials approved for not less than 1-hour fire-resistance-rated construction, heavy timber, log wall construction, or constructed with approved noncombustible materials or fire-retardant-treated wood (labeled for exterior use).

These structures include sheds, storage buildings, gazebos, detached garages or carports, etc. The exterior walls of these structures, when located less than 50 feet away, need to be constructed of the same materials as the main building. If the accessory structure were to become involved in a fire, the main building would become an exposure. To reduce this hazard, the accessory structures are either located a minimum of 50 feet away from the main building or constructed with materials equivalent to the level of protection in the main building.

Class 1 – Ignition Resistant Materials-Detached accessory structures

Where the detached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches of the ground, with exterior wall construction or underfloor protection for Class 1.

The enclosure is not required where the underside of the floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction or heavy timber construction or fire-retardant-treated wood (labeled for exterior use).

This does not apply to accessory structures that are at least 50 feet from the main building.

Class 2 – Ignition Resistant Materials

Specified building components for:

- Roof
- Roof valleys-same as for Class 1
- Protection of eaves
- Gutters and downspouts-same as for Class 1
- Exterior Walls-same as for Class 1
- Underfloor enclosures-same as for Class 1
- Appendages and projections-same as for Class 1
- Exterior glazing and doors-same as for Class 1
- Vents and vent locations-same as for Class 1
- Detached accessory structures-same as for Class 1

Class 2– Ignition Resistant Materials-Eaves

Combustible eaves, fascias and soffits shall be enclosed with solid materials with a minimum thickness of $\frac{3}{4}$ inch. Exposed rafter tails shall not be permitted unless constructed of heavy timber.

Class 2 ignition-resistant construction is not designed to take the same magnitude of fire impact as Class 1. Whereas Class 1 ignition-resistant requirements for eaves require either fire-resistant materials or lumber with a minimum dimension of 2 inches, Class 2 ignition-resistance criteria require enclosure with a minimum $\frac{3}{4}$ -inch plywood. The plywood enclosing the eave does not need to be fire retardant treated. Certainly, any of the design options for protecting the eaves allowed for Class 1 would be acceptable for Class 2.

Class 3 – Ignition Resistant Materials

Specified building components for:

- Roof
- Roof valleys-same as for Class 1
- Protection of eaves-no requirement
- Gutters and downspouts-same as for Class 1
- Exterior Walls-no requirement
- Underfloor enclosures-same as for Class 1
- Appendages and projections-no requirement
- Exterior glazing and doors-no requirement
- Vents and vent locations-no requirement
- Detached accessory structures-no requirement

Class 3– Ignition Resistant Materials-Roofs

- Roof assembly that complies with a Class B rating
- Approved non-combustible covering