

D1227 or ASTM D3468, ASTM D6083, ASTM D6694 or ASTM D6947.

1507.16 Vegetative roofs, roof gardens and landscaped roofs. *Vegetative roofs*, roof gardens and landscaped roofs shall comply with the requirements of this chapter, Section 1607.13.3 and the *International Fire Code*.

[BF] 1507.16.1 Structural fire resistance. The structural frame and roof construction supporting the load imposed on the roof by the *vegetative roof*, roof gardens or landscaped roofs shall comply with the requirements of Table 601.

1507.17 Photovoltaic shingles. The installation of *photovoltaic shingles* shall comply with the provisions of this section.

1507.17.1 Deck requirements. *Photovoltaic shingles* shall be applied to a solid or closely fitted deck, except where the shingles are specifically designed to be applied over spaced sheathing.

1507.17.2 Deck slope. *Photovoltaic shingles* shall be installed on roof slopes of not less than two units vertical in 12 units horizontal (2:12).

1507.17.3 Underlayment. Underlayment shall comply with Section 1507.1.1.

1507.17.4 Ice barrier. Where required, ice barriers shall comply with Section 1507.1.2.

1507.17.5 Fasteners. Fasteners for *photovoltaic shingles* shall be galvanized, stainless steel, aluminum or copper roofing nails, minimum 12-gage [0.105 inch (2.67 mm)] shank with a minimum $\frac{3}{8}$ -inch-diameter (9.5 mm) head, of a length to penetrate through the roofing materials and not less than $\frac{3}{4}$ inch (19.1 mm) into the roof sheathing. Where the roof sheathing is less than $\frac{3}{4}$ inch (19.1 mm) thick, the nails shall penetrate through the sheathing. Fasteners shall comply with ASTM F1667.

1507.17.6 Material standards. *Photovoltaic shingles* shall be *listed* and labeled in accordance with UL 1703.

1507.17.7 Attachment. *Photovoltaic shingles* shall be attached in accordance with the manufacturer's installation instructions.

1507.17.8 Wind resistance. *Photovoltaic shingles* shall be tested in accordance with procedures and acceptance criteria in ASTM D3161. *Photovoltaic shingles* shall comply with the classification requirements of Table 1504.1.1 for the appropriate maximum nominal design wind speed. *Photovoltaic shingle* packaging shall bear a *label* to indicate compliance with the procedures in ASTM D3161 and the required classification from Table 1504.1.1.

1507.18 Building-integrated photovoltaic roof panels. The installation of building-integrated photovoltaic (BIPV) roof panels shall comply with the provisions of this section.

1507.18.1 Deck requirements. BIPV roof panels shall be applied to a solid or closely fitted deck, except where the roof covering is specifically designed to be applied over spaced sheathing.

1507.18.2 Deck slope. BIPV roof panels shall be used only on roof slopes of two units vertical in 12 units (2:12) or greater.

1507.18.3 Underlayment. Underlayment shall comply with ASTM D226, ASTM D4869 or ASTM D6757.

1507.18.4 Underlayment application. Underlayment shall be applied shingle fashion, parallel to and starting from the eave, lapped 2 inches (51 mm) and fastened sufficiently to hold in place.

1507.18.4.1 High-wind attachment. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied in accordance with the manufacturer's instructions. Fasteners shall be applied along the overlap at not more than 36 inches (914 mm) on center. Underlayment installed where V_{asd} is not less than 120 mph (54 m/s) shall comply with ASTM D226, Type III, ASTM D4869, Type IV or ASTM D6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. The underlayment shall be applied in accordance with Section 1507.2.8 except all laps shall be not less than 4 inches (102 mm). Underlayment shall be attached using cap nails or cap staples. Caps shall be metal or plastic with a nominal head diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Staple gage shall be not less than 21 gage [0.02 inch (0.81 mm)]. Cap nail shank and cap staple legs shall have a length sufficient to penetrate through-the-roof sheathing or not less than $\frac{3}{4}$ inch (19.1 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D1970 shall be permitted.

1507.18.4.2 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a back-up of water, an ice barrier consisting of not fewer than two layers of underlayment cemented together or of a self-adhering polymer/modified bitumen sheet shall be used instead of normal underlayment and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached accessory structures that do not contain conditioned floor area.

1507.18.5 Material standards. BIPV roof panels shall be listed and labeled in accordance with UL 1703.

1507.18.6 Attachment. BIPV roof panels shall be attached in accordance with the manufacturer's installation instructions.