

# CITY OF HENDERSON FIRE SAFETY GUIDELINE

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**Effective Date:** July 1, 2014

**HFS#** 017

**Supersedes:** All Others

**Updated:** August 26, 2014

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**TITLE:** Solar Photovoltaic Modules and Shingles

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## **PURPOSE:**

In accordance with the provisions of the 2012 International Residential Code, as adopted by the City of Henderson, Section 905.16 solar photovoltaic power systems shall be installed in accordance with the 2012 IFC, 2012 IBC & 2011 NEC.

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**REFERENCE:** 2012 IRC, 2012 IFC, 2012 IBC & 2011 NEC as amended.

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## **RULES & REGULATIONS**

1. Show Locations of all main system components including photovoltaic panels/modules, inverters, panels, disconnects, etc. shall be shown on the plans.
2. Provide a one-line-diagram. Include;
  - a. All raceway size and type,
  - b. Conductor size and type,
  - c. Equipment and device information,
  - d. AC and DC grounding,
  - e. Required AC and DC disconnecting means. Disconnecting means shall comply with Article 690.14,
  - f. Indicate whether disconnect is utility interactive,
  - g. Show main load center and point of connection.
3. Provide documents from each manufacturer showing listings and installation instruction of all panels/modules, disconnects, inverters, disconnects, meters and other equipment and devices for review.
4. Show type and number of photovoltaic modules in each string.
5. The AC and DC sides of the photovoltaic system shall be grounded in accordance with Article 690.74.
6. The photovoltaic disconnecting means and overcurrent device shall be installed at an accessible location on the outside of a building or structure before any system conductors

- enter the building or structure. NEC Article 690.14(C)(1)
7. Provide a utility interactive inverter in a readily accessible location, or the installation shall comply with Article 690.14(D).
  8. Provide a directory or plaque at the service equipment location. NEC Article 705.10.
  9. Provide ground fault protection for roof mounted photovoltaic systems located on dwelling roofs. NEC Article 690.5
  10. Marking is required on interior and exterior direct-current (DC) conduit, enclosures, raceways, cable assemblies, junction boxes, combiner boxes and disconnects. IFC Section 605.11.1.
    - a. The materials used for marking shall be reflective, weather resistant and suitable for the environment.
    - b. Markings shall have all letters capitalized with a minimum height of 3/8-inch white on red background.
    - c. The marking shall contain the words "WARNING: PHOTOVOLTAIC POWER SOURCE."
    - d. The marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the disconnect is operated.
    - e. Marking shall be placed on interior and exterior DC conduit, raceways, enclosures and cable assemblies every 10-feet, within 1-foot of turns or bends and within 1-foot above and below penetrations of roof/ceiling assemblies, walls or barriers.
  11. Conduit, wiring systems, and raceways for photovoltaic circuits shall be located to reduce trip hazards and maximize fire-fighting operations including ventilation opportunities, as follows:
    - a. as close as possible to the ridge or hip or valley
    - b. as directly as possible from the hip or valley to an outside wall
    - c. Conduit runs between sub arrays and to DC combiner boxes shall be installed in a manner that minimizes the total amount of conduit on the roof by taking the shortest path from the array to the DC combiner box.
    - d. The DC combiner boxes shall be located such that conduit runs are minimized in the pathways between arrays.
  12. DC wiring shall be installed in metallic conduit or raceways when located within enclosed spaces in a building. Conduit shall run along the bottom of load bearing members. IFC Section 604.11.2
  13. Roofs having photovoltaic systems shall be provided with roof access points. Roof access points shall be located in areas that do not have openings such as windows or doors, and do not conflict with overhead obstructions such as tree limbs, wires, or signs. Roof access points shall connect to roof access pathways per IFC Section 605.11.3.2. IFC Section 605.11.3.1.
  14. Roofs sloping more than 2 vertical in 12 horizontal having photovoltaic systems shall be provided with roof access pathways. IFC Section 605.11.3.2.

- a. Hip roof layout. Panels/modules installed on residential buildings with hip roof layouts shall be located in a manner that provides a 3-foot-wide clear access pathway from the eave to the ridge on each roof slope where panels/modules are located. IFC Section 605.11.3.2.1.
  - b. Single ridge roof layout. Panels/modules installed on residential buildings with a single ridge shall be located in a manner that provides two, 3-foot-wide access pathways from the eave to the ridge on each roof slope where panels/modules are located. IFC Section 605.11.3.2.2.
  - c. Hips and valleys roof layout. Panels/modules installed on residential buildings with roof hips and valleys shall be located no closer than 18-inches to a hip or a valley where panels/modules are to be placed on both sides of a hip or valley. Where panels are to be located on only one side of a hip or valley that is of equal length, the panels shall be permitted to be placed directly adjacent to the hip or valley. IFC Section 605.11.3.2.3.
15. Do not install panels/modules closer than 36-inches from the ridge. IFC Section 605.11.3.2.4.
  16. A clear, brush-free area of 10 feet shall be required for ground mounted photovoltaic arrays. IFC Section 605.11.4.
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