



AUGUST 2017

## Solar PV Permit Guidelines

**PERMIT FOR CONSTRUCTION:** A building permit must be obtained before the installation of any solar PV system. A licensed electrical contractor shall be listed on the permit for construction.

### **PLAN REVIEW SUBMITTAL REQUIREMENTS**

**Plan Review Required:** Solar PV permits are not issued over-the-counter and require plan review. The department goal is to process applications within seven (7) business days and the time sequence begins once all required and completed documents are submitted.

**Application:** The application for a PV System permit shall list the general contractor and/or licensed electrical contractor. A property owner who lists themselves as the contractor shall be required to meet the same requirements as a general contractor, including application and registration.

**Plans Required:** Applications for Solar PV systems shall include a paper copies (max. 11"x17") and an electronic copy submitted to the Building Inspection Department for plan review. The following plans shall be included with submittals for review:

- 1) **Site Plan:** A current property survey or hand-drawn plan that shows the structure or ground location on which the solar panels will be located. For ground-mounted systems, the installation cannot be located within any portion of an easement unless an encroachment agreement is executed.
- 2) **Roof Plans (for roof-mounted equipment only)** - Two separate plans that illustrate:
  - a) Roof layout (as viewed from above) that includes valleys, hips, ridges, etc. All solar panel/module locations shall be shown including required setbacks and access from eaves, ridges, valleys, roof edges, etc.
  - b) Side view detail which identifies roof slope, solar PV system mounting, and distance between module and roof surface
- 3) **Electrical Plan:** A line diagram that identifies the following:
  - a) AC and/or DC circuit arc fault protection as required by the National Electric Code
  - b) Inverter listed to UL 62109 or UL 1741 safety standard; photovoltaic module(s) listed to UL 1703 safety standard; equipment listings from a nationally recognized testing laboratory
  - c) Inverter AC output disconnect location, utility disconnect location, and AC output overcurrent protection device rating
  - d) Location of combiner box(s), disconnect switch, size of source circuit overcurrent protection (where required)
  - e) Service panel bus rating and main circuit breaker/fuse ampere rating
  - f) Circuit diagram with conduit, wire type and sizes, and/or cable type and wire sizes
  - g) Equipment grounding and bonding conductors, and grounding electrode conductor (if applicable)
  - h) Battery disconnect and overcurrent protection (if applicable)
  - i) List of all appropriate labels and markings per NEC and IFC requirements

- 4) **Framing Plan:** Shall identify the following components supporting the installation:
- a) Rafters or joists, including spacing, sizing and materials, used to support the imposed loads
  - b) Attachment point locations
  - c) Identification of existing HVAC equipment in the attic that is suspended from rafters or joists used to support new solar panels/modules

**INSPECTION SCHEDULING: (Solar PV Final Inspection)**

- 1) By phone using IVR (817-350-6321) and use code number 1190  
*OR*
- 2) Online using eTRAKiT with your contractor sign-in information. Visit [www.colleyville.com](http://www.colleyville.com) and click on Departments/Building Inspections to find the link.

**CODE REQUIREMENTS:** Installations shall comply with:

- 1) 2012 International Fire Code (IFC) – Section 605.11
- 2) 2017 National Electric Code – Article 690

**DESIGN CRITERIA - IFC – Section 605.11**

**605.11 Solar photovoltaic power systems.** Solar photovoltaic power systems shall be installed in accordance with Sections 605.11.1 through 605.11.4, the *International Building Code* and NFPA 70.

**Exception:** Detached, non-habitable Group U structures including, but not limited to, parking shade structures, carports, solar trellises and similar structures shall not be subject to the requirements of this section.

**605.11.1 Marking.** Marking is required on interior and exterior direct-current (DC) conduit, enclosures, raceways, cable assemblies, junction boxes, combiner boxes and disconnects.

**605.11.1.1 Materials.** The materials used for marking shall be reflective, weather resistant and suitable for the environment. Marking as required in Sections 605.11.1.2 through 605.11.1.4 shall have all letters capitalized with a minimum height of 3/8 inch (9.5 mm) white on red background.

**605.11.1.2 Marking content.** The marking shall contain the words "WARNING: PHOTOVOLTAIC POWER SOURCE."

**605.11.1.3 Main service disconnect.** The marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the disconnect is operated.

**605.11.1.4 Location of marking.** Marking shall be placed on interior and exterior DC conduit, raceways, enclosures and cable assemblies every 10 feet (3048 mm), within 1 foot of turns or bends and within 1 foot above and below penetrations of roof/ceiling assemblies, walls or barriers.

**605.11.2 Locations of DC conductors.** Conduit, wiring systems, and raceways for photovoltaic circuits shall be located as close as possible to the ridge or hip or valley and from the hip or valley as directly as possible to an outside wall to reduce trip hazards and maximize ventilation opportunities. 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. The DC combiner boxes shall be located such that conduit runs are minimized in the pathways between arrays. 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.

**605.11.3 Access and pathways.** Roof access, pathways, and spacing requirements shall be provided in accordance with Sections 605.11.3.1 through 605.11.3.3.3.

**Exceptions:**

- 1. Residential structures shall be designed so that each photovoltaic array is no greater than 150 feet by 150 feet in either axis.
- 2. Panels/modules shall be permitted to be located up to the roof ridge where an alternative ventilation method approved by the fire chief has been provided or where the fire chief has determined vertical ventilation techniques will not be employed.

**605.11.3.1 Roof access points.** Roof access points shall be located in areas that do not require the placement of ground ladders over openings such as windows or doors, and located at strong points of building construction in locations where the access point does conflict with overhead obstructions such as tree limbs, wires, or signs.

**605.11.3.2 Residential systems for one- and two-family dwellings.** Access to residential systems for one- and two-family dwellings shall be provided in accordance with Sections 605.11.3.2.1 through 605.11.3.2.4.

**605.11.3.2.1 Residential buildings with hip roof layouts.** 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. The access pathway shall be located at a structurally strong location on the building capable of supporting the live load of fire fighters accessing the roof.

**Exception:** These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**605.11.3.2.2 Residential buildings with a single ridge.** 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.

**Exception:** This requirement shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**605.11.3.2.3 Residential buildings with roof hips and valleys.** 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.

**Exception:** These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**605.11.3.2.4 Residential building smoke ventilation.**

Panels/modules installed on residential buildings shall be located no higher than 3 feet below the ridge in order to allow for fire department smoke ventilation operations.

**605.11.3.3 Other than residential buildings.** Access to systems for occupancies other than one- and two-family dwellings shall be provided in accordance with Sections 605.11.3.3.1 through 605.11.3.3.3.

**Exception:** Where it is determined by the *fire code official* that the roof configuration is similar to that of a one- or two-family dwelling, the residential access and ventilation requirements in Sections 605.11.3.2.1 through 605.11.3.2.4 shall be permitted to be used.

**605.11.3.3.1 Access.** There shall be a minimum 6- foot-wide clear perimeter around the edges of the roof.

**Exception:** Where either axis of the building is 250 feet or less, there shall be a minimum 4-foot-wide clear perimeter around the edges of the roof.

**605.11.3.3.2 Pathways.** The solar installation shall be designed to provide designated pathways. The pathways shall meet the following requirements:

1. The pathway shall be over areas capable of supporting the live load of fire fighters accessing the roof.
2. The centerline axis pathways shall be provided in both axes of the roof. Centerline axis pathways shall run where the roof structure is capable of supporting the live load of fire fighters accessing the roof.
3. Shall be a straight line not less than 4 feet clear to skylights or ventilation hatches
4. Shall be a straight line not less than 4 feet clear to roof standpipes.
5. Shall provide not less than 4 feet clear around roof access hatch with at least one not less than 4 feet clear pathway to parapet or roof edge.

**605.11.3.3.3 Smoke ventilation.** The solar installation shall be designed to meet the following requirements:

1. Arrays shall be no greater than 150 feet by 150 feet in distance in either axis in order to create opportunities for fire department smoke ventilation operations.
2. Smoke ventilation options between array sections shall be one of the following:
  - 2.1. A pathway 8 feet or greater in width.
  - 2.2. A 4-foot or greater in width pathway and bordering roof skylights or smoke and heat vents.
  - 2.3. A 4-foot or greater in width pathway and bordering 4-foot by 8-foot "venting cutouts" every 20 feet on alternating sides of the pathway.

**605.11.4 Ground-mounted photovoltaic arrays.**

Ground-mounted photovoltaic arrays shall comply with Sections 605.11 through 605.11.2 and this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays. A clear, brush-free area of 10 feet shall be required for ground-mounted photovoltaic arrays