

SOLAR SUBMITTAL STANDARDS & CHECKLIST

Submittal Standards

File Naming Standards allow for easy identification of drawings by naming convention: vector file types such as .PDF facilitate the most efficient viewing of documents. **Plans must be submitted in PDF Format.** Files must be print ready, i.e. setup properly for printing with title block, no data outside the print page area, etc.

- ◆ All plans must be submitted in Landscape format in the horizontal position & each sheet must be a different file.
- ◆ All plans need to be drawn to scale.
- ◆ All plans must have a space reserved in the upper left corner for City Approval stamps.

Submittal Checklist

Applicant	Description
	PV Array Configuration
	Grounding
	Wire Management
	Conductors
	Rapid Shutdown of PV Systems on Buildings
	Charge Controllers
	Disconnects
	Inverters
	Batteries

Submittal File Naming Requirements

Drawing file name must include the first characters of the discipline name, followed by the sheet number and name. **Resubmittals must use the EXACT same file name as the original.**

File Naming Examples for Solar Projects

Discipline	Sheet ID	Sheet #	Example File Names
Site Plan/Cover	NA	NA	Cover Sheet
Elevations	NA	NA	Elevations
Bracing Details	NA	NA	Bracing Details



12/15/2020

Solar Panel Installation Companies

RE: 2018 IFC Code Adoption

Good morning! Beginning on January 1, 2021, the City of Meridian has adopted the 2018 International Fire Code. Along with that comes changes to solar panel installations. I have summarized what the code says below:

- No fewer than two – 3-foot pathways up the rakes with at least one being on the front, or driveway side of the structure.
- 18” across the ridge on both sides if the solar panels occupy less than 33% of the plan view of the total roof area. If it is more than 33% then the ridge dimension is 3’ of clear space on each side of the ridge.
- No solar panels can be installed below an emergency escape or rescue access (i.e. a bedroom widow).
- The 2018 code does not address hips and valleys. For fire operations and consistency – I will be using the 18” of clearance on each side of the hip or valley.
- Also new is this section of code pertaining to labeling:

1204.5.1 Rapid shutdown type. The type of solar photovoltaic system rapid shutdown shall be labeled with one of the following:

1. For solar photovoltaic systems that shut down the array and the conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of 3/8 inch (10 mm) in black on a yellow background. The remaining characters shall be uppercase with a minimum height of 3/16 inch (5 mm) in black on a white background. The label shall be in accordance with Figure 1204.5.1(1) and state the following:

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN. TURN RAPID SHUTDOWN SWITCH TO THE “OFF” POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY.

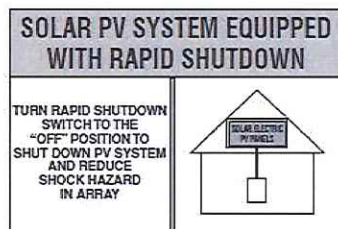


FIGURE 1204.5.1(1)
LABEL FOR SOLAR PV SYSTEMS THAT
REDUCE SHOCK HAZARD WITHIN ARRAY AND
SHUT DOWN CONDUCTORS LEAVING ARRAY



2. For photovoltaic systems that only shut down conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of 3/8 inch (10 mm) in white on a red background and the remaining characters shall be capitalized with a minimum height of 3/16 inch (5 mm) in black on a white background. The label shall be in accordance with Figure 1204.5.1(2) and state the following:

THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN. TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT.

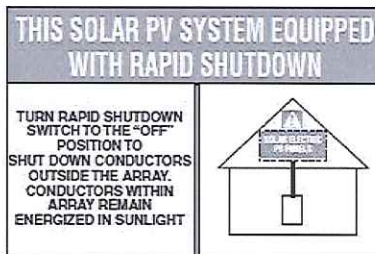


FIGURE 1204.5.1(2)
LABEL FOR SOLAR PV SYSTEMS THAT ONLY SHUT DOWN
CONDUCTORS LEAVING THE ARRAY

As always – if you have something that does not quite “fit”, please contact me and we can discuss.

Please contact my office if you have additional questions.

Thank you,

Joseph Bongiorno, CFI, CFEI
Deputy Chief of Prevention
Meridian Fire Department
208-936-9554 - Cell
208-888-1234 – Office
jbongiorno@meridiancity.org

cc: Sam Zahorka, Meridian Building Official



SOLAR Installations

January 10, 2022

To: Homeowners & Electrical Contractors

From: Sam Zahorka, CBO - Building Official

Re: **Homeowner Electrical Permits for Solar** (issued only to a qualified person)

******* Effective Date – 1-10-2022 *******

Residential Solar, photovoltaic (PV) systems, are very technical installations which require special equipment, special conditions and special knowledge as defined in the adopted 2017 National Electrical Code. These systems include, but are not limited to items such as;

“Array configuration, specialty grounding and bonding requirements, wire management, conductor sizing, AC/DC voltages, overcurrent protection, specialty equipment and inverters, compliance with Underwriter Laboratory (UL) specifications, and meeting utility regulations. Other system items include charge controllers, disconnect switches, batteries, special marking and labeling”.

Other considerations;

Contact Idaho Power before starting a solar project regarding the net meter application. Contact is Scott Gates (208) 388-2518 or sgates@idahopower.com or netmetering@idahopower.com. Idaho Power will also be involved with a system test after a municipal electrical inspection pass.

The City of Meridian will not issue electrical solar permits to homeowners based on the 2017 National Electrical Code (NEC) section 690.4(c) “Qualified Personnel. The installation of photovoltaic systems and all associated wiring and interconnections shall be performed by qualified persons”. In addition, (NEC) article 100 - “Qualified Person - One who has the skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved.

Homeowners who hold a current State of Idaho Journeyman Electrical license may be able to obtain a permit if they are actually performing the work on their primary residence.

Sincerely,

Sam Zahorka
Building Official
City of Meridian

City of Meridian Solar Photovoltaic Installation Checklist

The City of Meridian requires an electrical plan review for all photovoltaic installations. Once the plan review process is complete, installation can be commenced and necessary inspections conducted. All work shall be in accordance with the current adopted version of the National Electrical Code.

Section 1: PV Array Configuration

- Module manufacturer specification sheets and installation manuals provided.
- PV modules are listed. *110.3 (B); 690.4 (B)*
- AC modules are listed to UL 1703 and UL 1741.
- Residential one- and two-family dwellings limited to maximum PV system voltage of 600 volts. *690.7 (C)*
- One-line diagram depicting location of equipment, voltage and current ratings, wire size, disconnect ratings, overcurrent protection ratings. Other information required in sections 2-

Section 2: Grounding

- A complete grounding electrode system is installed. *690.47 (A) and (B)*
- Modules are grounded in accordance with manufacture's installation instructions using the supplies hardware of listed equipment specified in the instructions and identified for the environment, and using the grounding point identified on the module and in the manufacture's instructions. *690.43*
- Properly sized equipment grounding conductor is routed with the circuit conductors. *690.45; 250.134 (B); 300.0 (B)*
- AC and DC grounding electrode conductors are properly connected. Separate electrodes, if used, are bonded together. *690.47; 250.50; 250.58*
- Bonding fittings are used on concentric/eccentric knockouts with metal conduits for circuits over 250 volts. *250.97 see exceptions 1-4*
- Bonding fittings are used for ferrous metal conduits enclosing grounding electrode conductors. *250.64*

Section 3: Wire Management

- Wires are secured by staples, cable ties, straps, hangers or similar fittings in accordance with NEC.
- Wires are secured within 12" of each box, cabinet, conduit body or other termination. *334.30; 338.12 (A)(3)*
- Cable or flexible wiring methods closely follow the building surface or be protected from physical damage. *690.31 (G)*

Section 4: Conductors

- Conductors are listed and labeled for the location. *690.31*
- Conductor insulation is rated at 90C to allow for operation at 70C+ near modules. *310.15*
- Grounded conductor is identified white or grey. *200.6*
- Open conductors are secured and protected *334.30*
- Conductors are not in contact with the roof surface. *334.30*
- DC conductor inside a building are in a metal raceway or MC cable that complies with *250.118 (10)*, or metal enclosures. *690.31 (G)*
- Where conductors of different systems are installed in the same raceway they must be identified by system. *200.6(D); 210.5 (C)*
- Underground conductors' must be buried in accordance with table *300.5*.
- DC source circuit conductors are rated $1.25 \times 1.25 = 156\%$ short-circuit current from modules. **(NOTE: The module ISC x number of combined strings, if strings are combined. When DC source circuits (strings) are connected in parallel the short circuit current multiplies and PV output conductors from combined strings need to be sized appropriately.)** *690.8 (A)(1) and (B)(1)*

Section 4: Conductors continued...

- When PV system conductors are more than 5' in length inside a building, or more than 10' from an array a listed Rapid shutdown system shall be installed. 690.12

Section 5: Overcurrent Protection

- Overcurrent devices in the DC circuits are listed for DC operation. 690.9 (C)
- DC source circuit overcurrent protective devices are rated $1.25 \times 1.25 = 156\%$ short-circuit current from modules. NOTE: The module ISC x number of combined strings, if strings are combined. When DC source circuits (strings) are connected in parallel the short circuit current multiplies and DC overcurrent protective devices need to be sized appropriately. 690.8 (A)(1) and (B)(1)
- Inverter output circuit overcurrent protection shall be sized in accordance with article 240. 690 (A) and (B)
- The source interconnection of one or more inverters installed in one system shall be made at a dedicated circuit breaker or fusible disconnect. 705.12 (D) (1) (NOTE: **No Twins are connection to "twin breakers" allowed**)
- The sum of 125% of the inverter output circuit and the rating of the overcurrent protective device protecting the busbar shall not exceed 120% of the ampacity of the busbar. 705.12 (D)(2)(3)(b)

Section 6: Rapid Shutdown of PV Systems on Buildings

- Rapid shutdown provided in accordance with 690.12.

Section 7: Charge Controllers

- Charge controllers intended for use in PV power systems shall be listed for the PV application. 690.4 (B)
- Diversion charge controllers that are used as the sole means of regulating the charging of batteries shall be equipped with a second independent means to prevent overcharging of the batteries. 690.72 (B)(1)

Section 8: Disconnects

- Disconnects used in DC circuits are listed for DC operation. 110.3
- Disconnects are installed for the PV equipment. (NOTE: For inverters and other equipment that are energized from more than one source, the disconnecting means must be grouped and identified.)
- Rapid shutdown of PV systems on building. AC microinverters, DC-DC converters and other equipment must be listed 690.12 compliant.

Section 9: Inverters

- Grid-Tied system inverters need to be identified for use in interactive power systems. 690.4 (B)
- Point of connection is at a dedicated breaker or disconnect. 705.12 (D)(1)
- No multi-wire branch circuits are installed where single 120-volt inverters are connected to 120/240-volt load centers. 690.10 (C)

Section 10: Batteries

- Storage batteries for dwellings shall have the cells connected so as to operate at a voltage of 50 volts nominal, or less. 690.71 (B)(1)
- Live parts of battery systems for dwellings are guarded to prevent accidental contact by persons or objects. 690.70 (B)(1)
- Flexible cables, as identified in article 400, in sizes 2/0 AWG and larger shall be permitted for battery cell connection. 690.74 (A)
- Flexible, fine-stranded cables shall be terminated only with terminals, lugs, devices, or connectors in accordance with 110.14; 690.74 (A)
- Listed current-limiting Overcurrent protective devices are used adjacent to batteries to protect against available short circuit current. 690.71 (C); 690.16

Section 10 Batteries continued.....

- All cables to inverters, DC load centers, and or charge controllers are in conduit. 690.31 (A) and (G)
- To **prevent avoid the ventilation** of gases into electrical conduit, conduit shall enter the battery enclosure below the tops of the battery. 480.9 (A); 480.10
- A disconnection means shall be provided for all ungrounded derived from a stationary battery system over 50 volt. Disconnecting means shall be readily accessible and located within sight of the battery system. 480.6 (A); 690.15
- Batteries connected in series shall have disconnects limiting them to 48 volts nominal. 690.71€
- Area shall be will ventilated and batteries not installed in living area. 480.9
- Battery rooms shall have egress doors that open out and shall be equipped with listed panic hardware. 480.9 €
- Gas piping shall not be permitted in dedicated battery rooms. 480.9 (F)

Section 11: Marking and Labeling requirement

The following wiring methods and enclosure that contain PV power source conductors shall be marked with the wording:

“WARNING: PHOTOVOLTAIC POWER SOURCE”

- Exposed raceways, cable trays, and other wiring methods. 690.31 (G)(3)
- Covers or enclosures of pull boxes and junction boxes.
- Conduit bodies in which any of the available conduit openings are unused.
- The labels shall be reflective and all letters shall be capitalized with a minimum height of 3/8” in white on red background.
- Labels shall appear on every section of the wiring system that is separated by enclosures, walls, partitions, ceilings, or floors spacing between labels shall not be more that 10’ and suitable for the environment. 690.31 (G)(4)