



PHOTOVOLTAIC (PV) SUBMITTAL CHECKLIST

Pennsylvania Uniform Construction Code (UCC) referencing the IRC, IBC & NEC
as adopted by Manheim Township Ordinance. This checklist is based on the 2014 NEC

ROOF ATTACHMENT INFORMATION

SITE SPECIFIC ENGINEERING SUBMITTED UNDER SEAL & SIGNATURE OF DESIGN PROFESSIONAL

- Rack System manufacturer installation guidelines & specifications provided
- Verification that existing roof system(s) is adequate for the proposed roof mounted photovoltaic system
- Design assumptions provided to include applicable loads, roof type, roof slope and connection details
- Attachment methods including type, size and spacing of fasteners provided in engineering

WIRING DIAGRAM

SITE SPECIFIC SINGLE LINE ELECTRICAL DIAGRAM

The Single Line Diagram is to include the following:

- System kW rating _____ Stand Alone System Utility Interactive System Storage batteries
- Number of modules in series _____ Number of parallel source circuits _____ Total number of modules _____
- Microinverters # of microinverters on each branch circuit total length of ac home run circuit(s)
 - Circuit #1**, # of inverters _____ homerun length _____ **Circuit #2**, # of inverters _____ homerun length _____
 - Circuit #3**, # of inverters _____ homerun length _____ **Circuit #4**, # of inverters _____ homerun length _____
- Combiner/junction box is identified & type/listing information noted
- Wiring method(s) and sizes between array and combiner/junction identified
- Overcurrent protection required with **3 or more parallel strings**
- Equipment grounding** method and wiring type/size identified
- The PV **dc disconnect** is identified – 60 amp rated per NEC 230.79(D). **Manufacturer/Model #** _____
(If fused disconnect required, identify dc rating, voltage, current & interrupt rating) NEC 690.9(C)
- Wiring method(s) and sizes between combiner/junction and UL1741 inverter identified
- Inverter manufacturer, size and ratings provided
- Wiring method(s) and sizes between inverter/AC disconnect/house disconnect or panel identified
- Point of connection identified. If load side connection, circuit breaker size(s) _____ Breaker to match panel type
- The **ac disconnect** is identified – 60 amp rated per NEC 230.79(D). **Manufacturer/Model #** _____
- Premise grounding** method and wiring type/size identified. Fully compliant ac grounding required per NEC 250.50

INVERTER INFORMATION **Manufacturer/Model#** _____

MANUFACTURER'S SPECIFICATIONS, LISTING INFORMATION & APPLICABLE RATINGS

- UL 1741 listed equipment & identified for use in interactive Photovoltaic Power Systems
- Continuous output power & input voltage range of inverter provided

PV MODULE INFORMATION **Manufacturer/Model#** _____

MANUFACTURER'S SPECIFICATIONS, LISTING INFORMATION & APPLICABLE RATINGS

- | | |
|---|--|
| <input type="checkbox"/> _____ Open-circuit voltage (Voc) | <input type="checkbox"/> _____ Max Power (Pmax) at STC |
| <input type="checkbox"/> _____ Maximum permissible system voltage | <input type="checkbox"/> _____ Voltage at Pmax |
| <input type="checkbox"/> _____ Short-circuit current (Isc) | <input type="checkbox"/> _____ Current at Pmax |
| <input type="checkbox"/> _____ Maximum series fuse rating | |

ARRAY INFORMATION *(Not applicable for microinverter installations)*

PROJECT SPECIFIC VOLTAGE & CURRENT CALCULATIONS

- _____ Operating Voltage = (number of modules in series x module voltage at Pmax)
- _____ Operating Current = (number of parallel source circuits x modules at Pmax)
- _____ Maximum System Voltage = (Voc X 1.21 (per temp. adjust. NEC 690.7) X number of modules in series)
- _____ Short Circuit Current = (Isc X 1.25 X number of parallel source circuits)

WIRING & OVERCURRENT PROTECTION

- Wire type is 90 degree C & suitable for wet location. NEC 100, Table 310.104(A)
- Conductor ampacities are sufficient. Adjust ambient temperature for rooftop conduits per NEC Table 310.15(B)(3)(c)
- Provide adjusted ampacities and calculations *(Not applicable for microinverter installations)*
 - _____ Maximum PV source circuit current (Isc X 1.25)
 - _____ Maximum PV source circuit conductor ampacity (Isc X 1.25 X 1.25)
 - _____ Maximum PV output circuit conductor ampacity (Isc X 1.25 X 1.25 X # of parallel source circuits)
 - _____ Minimum inverter output circuit conductor ampacity (inverter output in Watts divided by minimum operating voltage x 1.25 = minimum inverter output ampacity)
- Source circuit overcurrent protection sufficient
- Overcurrent protection provided with 3 or more parallel strings
- Overcurrent protection on Inverter Output Circuit is sufficient
- PV system point of connection complies with **NEC 705.12 (A) Supply Side or (D) Load Side requirements**

Modifications are not to be made to electrical equipment unless approved by the manufacturer – i.e. tapping of bus bars)

Supply Side Connection. Method of Supply Side Connection _____

Load Side Connection. Method of Load Side Connection _____

- _____ Electrical service panel buss bar rating PV breaker same manufacturer as the electrical panel
- Circuit breaker(s) suitable for backfeed applications are in use
- Total rating of overcurrent devices supplying power (main + PV breaker) max 120% of rating per NEC 705.12(D)
- Bonding fittings used with metal conduit for ac components per NEC 250.92 and dc components per NEC 250.97
- Expansion fittings used with rigid PVC conduit installations per NEC 352.44 & Table 352.44
- Ampacity adjustments taken for more than 3 current carrying conductors in conduits per NEC Table 310.15(B)(3)(a)

LABEL & MARKING REQUIREMENTS

- Labels shall be made of sufficient durability to withstand the environments involved per NEC 110.21
- Labels/markings shall be permanently affixed to or adjacent to the equipment it is identifying
- Label/Marking Requirements: *(check all boxes that apply to your installation)*
 - Ground-Fault Protection and Interruption label on utility interactive inverter per NEC 690.5(C)
 - Electric Shock Hazard label at disconnecting means per NEC 690.17
 - Wiring Methods and Enclosures that contain PV source conductors per NEC 690.31(G)(3)
 - DC Junction/Combiner/Disconnect labels per NEC 690.35 (F)
 - Modules shall be marked per NEC 690.51
 - DC Power Source labeling at the DC disconnect per NEC 690.53
 - Identify maximum ac operating current & operating ac voltage at ac disconnect per NEC 690.54
 - Rapid Shutdown of PV Systems on Building Identification per NEC 690.12, 690.56(B)&(C)
 - Identify remote locations of utility & PV disconnects - permanent plaque/directory location of each source NEC 705.10
 - Distribution equipment warning label per NEC 705.12(D)(2)

General Requirements: All equipment installations to be provided with working space clearances per NEC Section 110.26. Maintain no less than 30 wide x 36 deep working spaces about all electrical equipment.

Signature of: **Owner/Contractor** _____ **Print Name** _____ **Date** _____