

Information Bulletin

Solar Photovoltaic Installations

The following is a guide to solar photovoltaic (PV) installations and permit requirements for wall mounted, roof mounted and ground mounted installations for both housing and commercial applications. This document attempts to address all scenarios however, solar PV system designs and equipment can vary greatly for each installation, so it should not be considered an all-inclusive document.

Development, building and electrical permits are required for solar PV installations in the City of Winnipeg. Documents submitted for permits must be clear, legible and good quality.

Development Permit Information

A development permit confirms the structure is located on the property in accordance with the zoning bylaw and other department's requirements. A development permit must be obtained prior to building permit application. Refer to the Development Permit Application Form for detailed information that must be included in each required document.

Building Permit Information

A building permit confirms the structure meets code requirements. Building permits must align with prior development permit approvals. Documents submitted for building permit applications must be sealed by a structural engineer licenced to practice in the Province of Manitoba. They must be accompanied by a completed Professional Designers Certificate (commercial) (winnipeg.ca/ppd/permits/Commercial/Resources.stm#7) or a Professional Designers Certificate for Housing (winnipeg.ca/ppd/Documents/Permits/PPDC/Professional-Designers-Certificate-for-Housing-Version-1-0.pdf), as applicable.

Wall and Roof-Mounted Systems

A building permit is required for all wall and roof-mounted solar PV installations and may be applied for by the licensed installer or homeowner.

The installation of solar panels will result in additional weights that the existing structure may not have been designed for. Structures are designed for specific loads. When combined with the solar panel and racking system weight, total loads can increase significantly which can cause ceiling finishes to crack or, in severe cases, collapse of the roof structure.

Winnipeg weather is variable resulting in roofs that may be subject to full design wind and snow loads, thus a building permit is required for all roof-mounted solar PV installations.

An engineering report assessing the existing structure is required under the seal and signature of a structural engineer licensed to practice in the Province of Manitoba. The engineer must certify that the existing structure can safely support all Code required design loads and increased loading due to the addition of the solar PV system, in compliance with the structural requirements of the Manitoba Building Code (MBC). Engineers must consider the structure as a whole in the report and not just the roof. A similar engineering report is required for wall mounted installations.

Submissions for building permits for wall and roof mounted solar PV systems must include the following items:

- Dimensioned site plan
- A completed Professional Designer's Certificate (commercial) or Professional Designer's Certificate for Housing, as applicable

A sealed engineer's report including:

- Framing plans, roof and/or wall, as applicable
- Locations of solar panels on a roof plan or wall elevation, including dimensions
- Attachment spacing including connection details
- Solar panel type, including weight
- Mounting system, including weight
- Existing designs loads (dead, live, wind, snow)
- Additional loads imposed by the solar panel installation (dead, live, wind, snow)
- Strengthening details to the existing structure, as required
- Confirmation of responsibility for the structural aspects of the installation
- Confirmation that the existing structure will retain its integrity after the installation

Ground Mounted Systems

A building permit for an accessory structure is required and may be applied for by the licensed installer or homeowner. Applications for building permits must include:

- A dimensioned site plan indicating the location and size of the solar PV installation.
- A completed Professional Designers Certificate (commercial) or a Professional Designers Certificate for Housing, as applicable

A sealed engineer's report including:

- Foundation type and layout
- Mounting system, including weight
- Design loads (dead, live, wind and snow)

Engineering Certification Letter

A professional certification letter must be provided by the structural engineer upon completion of the project. Acceptable wording can be found at winnipeg.ca/ppd/Documents/Permits/Commercial/Wording-for-Professional-Certification-Letters-No-Occupancy.pdf.

Electrical Permit Information

General

Electrical permits for solar PV installations may only be obtained by an electrical contractor licenced by the City of Winnipeg. See winnipeg.ca/ppd/permits/contractor_licenced_electrical.stm for an up-to-date list of active licenced electrical contractors. Installations by homeowner applicants are not permitted.

Except for solar PV systems with a capacity less than 10 kW serving a single detached dwelling, all documents for electrical permit applications are required to be submitted under the seal of an electrical engineer licenced to practice in the Province of Manitoba and must be accompanied by a Professional Designer's Certificate and Owner Statement available under the "Forms and documents" heading of our Electrical Info Centre at winnipeg.ca/ppd/InfoCentre/Electrical/default.stm. At the completion of the project, an engineer's certification letter must be provided.

Supply utility approvals and coordination of grid connection and metering should be directed to the utility, Manitoba Hydro. Any energy efficiency rebate information must be directed to the appropriate rebate entity.

Permit application description of work

On the permit application, it is required that a brief description of work be provided. The description must include the following:

- The type of system, i.e.: micro-inverter, string inverter with optimizer, or string inverter.
- The total capacity of the installation in kW.
- The PV system DC source circuit voltage (i.e.: string voltage) or, in the case of micro-inverters, the AC output voltage.

Housing Installations

The source or output circuits voltage for solar PV installations on houses and their accessory structures are not allowed to exceed 600 V DC [*WEB Subrule 64-202(4)*] and:

- ◆ The installation is on the roof of a single dwelling and serves only that single dwelling and its accessory structures (i.e.: detached garage, gazebo, etc.), or
- ◆ The installation is on the roof of an accessory structure and serves only the single dwelling and that accessory structure (examples as mentioned above), or
- ◆ The installation is ground-mounted within the property lines of a single dwelling and serves only that single dwelling and its accessory structures (examples as mentioned above).

Electrical Permit Application Requirements

All permit applications for solar PV installations require review by electrical plan examination. Documents required to be submitted and the information required to be contained on them are listed on the checklists below.

Single Line Diagram

Items listed in the checklists below must be shown on the single line diagram, as applicable for the specific system type.

Micro inverter systems

- The number of solar panels per micro inverter & the total number of output circuits
- Micro inverters
- Combination panel c/w bus rating and overcurrent device ratings, incl. main breaker rating
- Utility interactive point of connection
- Utility disconnect switch
- Solar PV breaker c/w rating
- Panelboard bus rating and main breaker rating
- All conductor and raceway sizes and types
- Bonding details
- Rated output circuit current and the rated short circuit current
- Rated output circuit voltage
- Rodent protection method if rooftop installation
- Energy storage systems and charging controllers, if applicable
- Equipment labels (see Appendix A)

String Inverter and String Inverter/Optimizer Systems

- The number of solar panels for each string & the total number of strings
- DC optimizers, where applicable
- DC combiners
- Junction boxes
- Inverters
- Utility interactive point of connection
- Utility disconnect switch
- All solar PV system disconnects c/w ratings, AC & DC
- Solar PV breaker c/w rating
- Panelboard bus rating & main breaker rating

- All overcurrent protection sizes and types, AC & DC
- All conductor and raceway sizes and types
- DC system grounding details (if a grounded system)
- Maximum PV output circuit DC current & the rated short circuit current
- Bonding details, AC & DC
- Rated DC output circuit voltage
- Rodent protection method if rooftop installation
- Energy storage systems and charging controllers, if applicable
- Equipment labels (see Appendix A)

Site plan

Locations of the following must be clearly shown:

- Electrical service, splitter, panels & metering
- Arrangements of the solar PV arrays
- Utility disconnect
- Rapid shutdown switch
- All solar PV system disconnects (AC & DC)
- Combiner
- Inverters
- Energy storage system
- Charge controllers

Manufacturers' product data sheets

The specific model must be clearly identified via highlighter, arrow, circled or otherwise so marked for the following:

- | | |
|---|--|
| <input type="checkbox"/> Solar panels | <input type="checkbox"/> AC combination panels |
| <input type="checkbox"/> Racking system | <input type="checkbox"/> Utility disconnect |
| <input type="checkbox"/> Optimizers or micro-inverters, as applicable | <input type="checkbox"/> Rapid shutdown switch |
| <input type="checkbox"/> DC combiners | <input type="checkbox"/> Charge controllers |
| <input type="checkbox"/> Inverters | <input type="checkbox"/> Energy storage system |
| <input type="checkbox"/> AC and DC disconnects | |

Installation Information

This section clarifies the requirements for metering facilities and busbar ratings, AC equipment disconnects with utility interactive inverters, locations of array installations, combiners, disconnects, utility disconnect, labelling and utility interactive point of connection.

Metering Facilities and Busbar Ratings

Metering facilities permitted for the subdivision of the consumer's service and supplied simultaneously by a primary power source and one of more utility-interactive inverters shall comply with the bus bar requirements of WEB 64-112 and the following:

1. **Customer Service Termination Enclosure (CSTE)** – for calculating the busbar rating of a CSTE, the ampere rating of the CSTE shall be used for the utility source overcurrent device ampere rating. The ampere rating of the CSTE shall be deemed the bus bar rating on an existing CSTE that is not marked with a bus bar ampacity. The CSTE may also be re-labelled with a bus bar ampacity rating by an approved certification organization. The sum of the connected solar cannot exceed the ampere rating of the CSTE.
2. **Transformer Rated Meter Mounting Device (TRMMD)** – The sum of the ampere rating of the overcurrent devices for connected consumers' services shall not exceed the ampere rating of the TRMMD. E.g.: a 400A TRMMD is permitted one 400 Amp or two 200 A consumer's services.
3. **Dual-Lug Meter Sockets (DLMS)** –The sum of the ampere rating of the overcurrent devices for connected consumer's services shall not exceed the ampere rating of the DLMS. E.g.: A 200 A rated DLMS is permitted two 100 A consumer's services.

Inspections

City of Winnipeg Inspectors do not perform sloped roof-top inspections. On-site photos of the following must be submitted via Permits Online prior to inspection of sloped roof mounted solar PV installations:

- Supports and mounting platform
- Rodent protection
- Bonding

A professional certification letter must be provided by the electrical engineer, where applicable, upon completion of the project and prior to call for final inspection. Acceptable wording can be found under the Forms and Documents heading of our Electrical Info Centre at winnipeg.ca/ppd/InfoCentre/Electrical/default.stm utilizing the "No Occupancy" version.

For projects that do not require an engineer's seal (i.e.: those less than 10 kW for single detached dwellings) installed on a sloped roof, an installation declaration from the licenced electrical

contractor must be submitted. The document can be obtained upon request to ppd-seniorhousinginspect@winnipeg.ca.

Common Defects

The following is a list of common defects that have caused delays in either permit issuance or permit closing. Ensure your submission and installation meets all the following requirements.

Submission deficiencies causing delays in permit issuance

| | |
|------------|---|
| Electrical | Incomplete information provided |
| | Spec sheets don't show specifically which piece of equipment is being installed |
| | Feeder descriptions – wiring types and installation methods are not detailed |
| Building | Documents aren't sealed by a Professional Engineer licenced to practice in the Province of Manitoba |
| | Statement is missing on the engineer's report re: declaration that the structure will retain its integrity after the installation is complete |
| | Information on the connection of the solar panels to the existing structure is missing |





Inspections defects

| Defect | Potential consequences |
|---|--|
| 1. Installation is substantially different from the documents that were reviewed and accepted for permit issuance | <ul style="list-style-type: none"> ▪ Revised documents must be submitted for review ▪ Re-review fees may apply |
| 2. Photos for sloped roof-mount installations are not available on site for the Inspector | <ul style="list-style-type: none"> ▪ Additional call for inspection is required ▪ Fees for additional inspections may apply |
| 3. Labelling has not been installed | <ul style="list-style-type: none"> ▪ Additional call for inspection required when labelling is installed ▪ Fees for additional inspections may apply |
| 4. Engineer's certification letter for the project completion or contractor declaration has not been submitted | <ul style="list-style-type: none"> ▪ Inspections unable to close the permit |

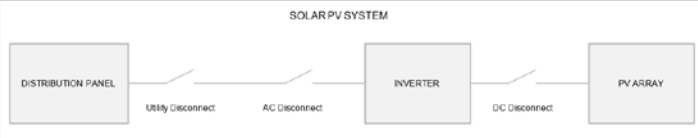

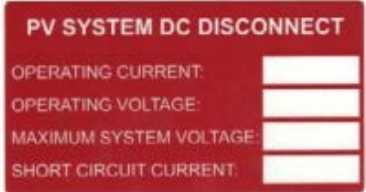

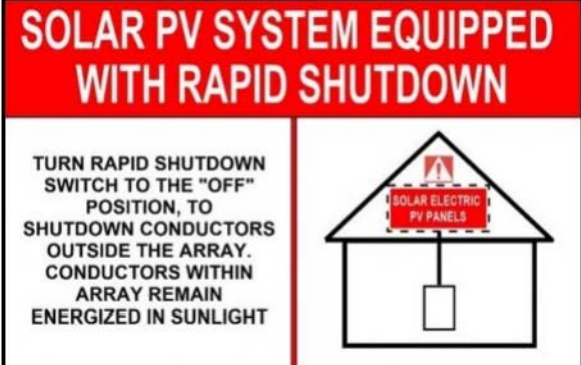
Appendix A

Solar PV Labelling Requirements





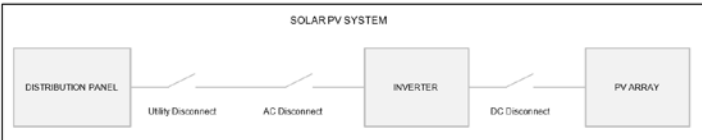
The following are common solar PV system labels; this is not an exhaustive list. All labels must be engraved lamincoid, red background with white lettering.

| Equipment | Code Rule(s) | Details | Sample Label |
|---|---------------------------|---|---|
| Inverters and equipment fed from two sources | 14-414 3) | Provide one label for each source disconnect or one label on equipment indicating that multiple disconnects must be opened. |  |
| AC disconnect switches | 64-060 10) & 84-024 1) i) | Locate at the inverter, utility and isolation AC disconnect switches. Wording must be verbatim per Appendix B. |  |
| DC combiners, DC junction boxes, DC disconnect switches and inverters | 64-066 1) b) Appendix B | Underground systems only. Wording must be verbatim per Appendix B. |  |
| All PV interactive points of interconnection with other sources | 64-072 | Locate at AC disconnects for inverters, panelboards, splitters, etc. |  |

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| Equipment | Code Rule(s) | Details | Sample Label |
|--|-------------------|---|--|
| Meter location and service box diagram | 64-074 3) | Locate at the supply meter and service box. |  |
| Backfed breaker – do not relocate | 64-112 4) b) iii) | Wording must be verbatim per Appendix B. |  |
| DC disconnect switch | 64-200 1) | Locate at the PV output circuit disconnect at an accessible location. |  |
| Rapid shutdown | 64-200 2) | Locate at the disconnecting means for the PV output circuit. |  |
| Rapid shutdown | 64-218 6) | Locate at the supply meter and at the consumer's service equipment. |  |

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| Equipment | Code Rule(s) | Details | Sample Label |
|--------------------|----------------|--|--|
| Utility disconnect | 84-024 1) i) | Wording must be verbatim to that shown. |  |
| Meter socket | 84-030 | Provide location of utility disconnect when permitted to be not adjacent. |   |
| Utility disconnect | 84-030 1) & 2) | Warning label and diagram required. Will accept the diagram located on an adjacent meter socket. |   |