

SOLAR PHOTOVOLTAIC SYSTEMS AND THE 2020 MN RESIDENTIAL CODE

Minnesota Department of Labor and Industry

Where and when are the International Residential Code (IRC) requirements for residential solar energy systems?

Section R324 of the 2020 Minnesota Residential Code includes new provisions for the design and installation of solar photovoltaic (PV) systems. Effective March 31, 2020, solar PV systems must be designed and installed in accordance with Section R324, NFPA 70, and the manufacturer's installation instructions.

Are permits required to install solar PV systems?

A building permit is required for all solar PV installations where the State Building Code is enforced by a municipality. All PV installations must comply with the State Building Code, which includes the Minnesota Residential Code. Electrical permits are also required for solar PV systems.

Is a structural engineer required to design the roof support of roof-mounted solar PV systems?

Roof-mounted solar PV systems add weight and snow-drift loads to the roof. For wood-framed buildings, structural compliance with the additional weight of the solar PV system can be determined using the standardized load tables developed by the Minnesota Department of Labor and Industry and Minnesota Department of Commerce (see <http://mn.gov/commerce-stat/pdfs/standardized-load-table-report.pdf>). If the roof structure is not listed in the load table, a structural engineer must certify the design.



Photo credit: Equisolar Solar Company

Are setbacks from property lines regulated by the 2020 Minnesota Residential Code?

The Minnesota Residential Code does not address minimum property line setback requirements for PV systems. Solar PV system installations may be regulated by local zoning ordinances for property line setbacks and locations on the building.

Which residential solar PV system installations need to comply with Section R324 of the 2020 Minnesota Residential Code?

The 2020 Minnesota Residential Code regulates solar PV systems on buildings classified as IRC-1 (one-family), IRC-2 (two-family), IRC-3 (townhouses) and IRC-4 (accessory structures). The 2020 Minnesota Building Code Section 3111 regulates solar PV systems installed on all other buildings (not classified as IRC-1, IRC-2, IRC-3, or IRC-4), structures and appurtenances connected or attached to them.

How are ground-mounted solar PV systems regulated?

Ground-mounted installations accessory to IRC-1, IRC-2, or IRC-3 buildings are classified as IRC-4 and are designed and installed in accordance with 2020 Minnesota Residential Code, Section R301.

What are some of the new provisions in Section R324 of the 2020 Minnesota Residential Code?

Roof-mounted solar PV systems must allow for roof access, including access pathways from the lowest roof edge to the ridge and setbacks at the ridge. Access to the ridge is necessary for smoke ventilation in the event of a fire.

Required access and pathways:

- At least two pathways (one on street/driveway side, one on each PV array plane).
- Pathways must be at least 36-inches wide and lead from roof edge to ridge.
- Pathway structure must support fire fighters.
- No overhead powerlines, minimal obstructions (vent pipes or mechanical equipment, etc).

Required roof edge to ridge access:

- At least two pathways at least 36-inches in width from roof edge to ridge (one must be street/driveway side).
- On same roof plane as PV array, on adjacent roof plane, or straddling the same and adjacent roof plane.

Required setback at ridge:

- Setbacks on each side of ridge are based on “plan view total roof area” (the roof as seen from above).
- PV arrays less than 33 percent of plan view total roof area require 18-inch minimum setbacks on each side of ridge.
- PV arrays greater than 33 percent of plan view total roof area require 36-inch minimum setbacks on each side of ridge.

Alternate setback at ridge (buildings equipped with automatic fire sprinkler system):

- PV arrays less than 66 percent of plan view total roof area require 18-inch minimum setbacks on each side of ridge.
- PV arrays greater than 66 percent of plan view total roof area require 36-inch minimum setbacks on each side of ridge.



Emergency escape and rescue openings:

- PV panels or modules cannot be placed below an emergency escape or rescue opening location.
- A pathway of at least 36 inches to the emergency escape and rescue opening from the roof edge must be provided.

Are there exceptions to the roof access and pathway requirements?

The 2020 Minnesota Residential Code has three exceptions:

- Detached, nonhabitable structures such as: detached garages, carports, parking shade structures and solar trellises do not require roof access or access pathways on the roof. Detached structures with habitable attic space, finished or unfinished and a ceiling height of seven feet or greater must provide roof access, pathways and ridge setbacks.
- Roofs with a slope of two units vertical in 12 units horizontal (17 percent) or less do not require roof access or access pathways.
- Roof access is not required where the code official, with input from the fire code official, determines that rooftop operations will not be used in the event of a fire.

How are access pathways, ridge setbacks, total roof areas, and solar array areas measured?

Pathways, setbacks and total roof and solar array areas are measured in plan view. Pathways and setbacks are measured horizontally as in plan view so that a person standing vertically will have at least 36 inches of clear width.

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