

A Guide to the Requirements for Building Permits for Solar Systems on Residential Part I Buildings in the City of Toronto

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PURPOSE:

This guide provides assistance in determining when a building permit (structural) may be required for installing solar panels on the roofs of residential Part 9 buildings in the City of Toronto.

Solar panels may be for either the production of electricity (photovoltaic modules) or the production of heat (solar thermal collectors for air heating, hot water, or for swimming pools). A building permit (mechanical) will be required where there is a connection to the potable water supply or where the solar panels are the sole source of energy to the building. An Electrical Inspection will also be required where there are electrical connections as part of the system (i.e. photovoltaics).

In all cases the homeowner or his/her agent should contact Toronto Building to verify if a building permit is required before proceeding with the installation.

PROCEDURE

If the installation of solar panels on a roof of a residential Part 9 building falls below the following conditions then the addition of the solar panels will not require additional structural support and hence the installation should not require a building permit in the City of Toronto. This applies to both flat roof (under 10° slope) and sloped roofs and roofs of rafter or truss construction.

1. The solar panel's distributed weight is less than 5 pounds per square foot (24.4 kg/m²) and the roofing is a single layer of lightweight material (such as asphalt shingles, cedar shakes, or metal).
2. The solar panel's connections to the roof result in the panel's weight being uniformly distributed amongst the rafters under the solar panels. The maximum point load shall be less than 50 pounds (22.7 kg) per roof connection.
3. The solar panels do not extend more than 18" (46 cm) from the surface of the roof, they are below or flush to the roof ridge (of sloped roofs) and they do not extend beyond the roof edges (i.e. eaves) on all sides of the building.
4. The mounting structure must provide direct connection to the roof to prevent wind uplift and anchorage penetration must be directly to rafters or trusses.
5. The mounting structure is an engineered product specifically designed to mount the solar panels to roofs of similar design to that at the proposed site.

6. There are installation instructions provided by the supplier of the mounting structure and they follow good engineering practices.

If the above conditions are not met then a building permit is required. Specifically, the following conditions require that a building permit is obtained for the installation of solar panels.

1. A building permit is required in all cases where there is a change to the roof structure or where there is a need to reinforce the roof due to the installation of the solar panels. The installation of the solar panels by itself does not constitute a structural change to the roof.

2. If the means of attaching the solar panel rack onto the roof is by use of ballast (versus a direct connection as in item 4 above).

3. The installation on a flat roof where there is a major obstruction such as a parapet or wall around the edge.

Direction on Determining Conditions

1. The distributed weight of the solar panels may be determined by using information found in the product spec sheets. Add together the weight of the solar panel (filled with liquid) plus mounting structure and then divide by the area of the solar panels.

2. The point load of the solar panels may be determined by using information found in the product spec sheets. The number of roof connection points will be shown on the roof rack spec sheet. Divide the total weight (from #1) by the number of roof connection points to determine the point load.

5. The mounting structure's (or rack) installation manual shall show the roof conditions which it may be installed on – i.e. a listing of acceptable roof rafter dimensions and conditions or a product roof span table.

Structural Building Permit Requirements in Other Municipalities

This guide is consistent with policies developed by other municipalities:

| Municipality | Web link | Requirements |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| City of San Jose (CA) | www.sanjoseca.gov/building/PDFHandouts/1-10Solar.pdf | Building permits are not required for roof installations where: <ul style="list-style-type: none"> - total panel weight is less than 5 lbs per square foot - maximum load at each point of support does not exceed 40 lbs - maximum height above roof surfaced does not exceed 18" |
| City of Palo Alto Utilities (CA) | www.cityofpaloalto.org/civica/filebank/blobdload.asp?BlobID=12062 | City of Palo Alto code officials require calculations for roofs only if the roof load exceeds 5 lbs/ft ² . |
| City of San Diego (CA) | http://www.sandiego.gov/development-services/industry/pdf/infobulletin/ib301.pdf | Where alterations are required to existing structures to support and provide an attachment for PV systems, structural plans shall be provided that are sufficient in detail and scope to demonstrate the required load path to ground. Structural calculations may be required for the following: <ul style="list-style-type: none"> - Roof or structure mounted PV systems if the weight of the PV system exceeds 5 pounds per square foot. - PV panels mounted more than 30 inches above the roof. |
| City of Portland (OR) | www.portlandonline.com/bds/index.cfm?c=36814&a=195360 | If meet the following conditions are assumed to meet building code requirements" <ul style="list-style-type: none"> - roofing material is lightweight - weight shall not exceed 4.5 psf - maximum height above roof line is 18" |
| Solar America Board of Codes and Standards | www.solarabcs.org/permitting/ | Recommendations for reduced requirements it: <ul style="list-style-type: none"> - weight per attachment point is less than 45 lbs. - distributed weight is less than 5 lbs/ft² |