

Editor American Society for Testing and Standards



WIND LOAD CALCULATIONS FOR PV ARRAYS

**Stephen Balkas, PE,
Member Solar Energy Council**

**Carlson C. Brown, PE,
NREL Engineer**

Wind Load Calculations for PV Arrays Study Report Overview

This is about determining the loading and recommendations for the Solar America Research Center and Department of Energy Study Report, "Wind Load Calculations for PV Arrays."

Today's photovoltaic (PV) industry must rely on limited number of engineering recommendations of various building codes and standards to design PV mounting systems. Since no national wind-related loads database, the safety and sufficiency of structural components for PV arrays are not adequately addressed and any codes or standards that result in a diversity of code interpretations leave different individuals and groups, often yielding different design loads for the same design specifications.

This report provides helpful calculations for determining wind loads on PV arrays based on ASCE Standard 7-02. The report focuses on application of PV arrays mounted parallel to the roof slope and relatively close (3 ft or less) to the roof surface. The report does not address other array configurations or building-mounted PV.

Key Findings

It is necessary to conduct independent and systematic methods to ensure that PV exposures will remain attached to structures during maximum events, and that the additional loads on load-carrying components during these events do not exceed their structural capacities of the building. ASCE Standard 7-02 is the standard for measuring wind loads on structures, but it does not provide sufficient guidance to the design professionals and/or officials to properly wind loads on PV modules.

This lack of guidance causes confusion for the PV industry. The resulting questions include structural analysis, structural members, and wind-resist structural failure, in addition, uncertainty about what constitutes a code and array installation for a given wind direction due to the approved process for PV installation and compliance the meaning of code officials.

PV modules and array systems is unique design challenge as high wind regions. Currently, codes and standards will be updated to address the mounting of PV arrays to rooftops that otherwise prohibited or restrict their exposure in high wind regions.

In the meantime, this report provides design guidance including sample calculations for determining the wind loads on PV arrays based on the design wind loads of ASCE Standard 7-02.

Table A-10's Recommendations

- a. Use the structural design of roof-mounted PV systems on the ASCE Standard 7-02 as follows:
- a. Section 6.5.12.2: Wind conditions meeting system details in the recommended mounting guide for designing the PV mounting systems with the PV module mounted above and parallel to the roof surface.

Wind Load Calculations For Pv Arrays Solar Abcs

Shasha Hu



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