

# **ELECTRONIC VERSION 1.91**

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## **Photovoltaic Power Systems And the *2005 National Electrical Code:* Suggested Practices**

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### **ABSTRACT**

This suggested practices manual examines the requirements of the *2005 National Electrical Code (NEC)* as they apply to photovoltaic (PV) power systems. The design requirements for the balance-of-systems components in a PV system are addressed, including conductor selection and sizing, overcurrent protection device rating and location, and disconnect rating and location. PV array, battery, charge controller, and inverter sizing and selection are not covered, as these items are the responsibility of the system designer, and they in turn determine the items in this manual. Stand-alone, hybrid, and utility-interactive PV systems are all covered. References are made to applicable sections of the *NEC*.

Revision/Errata History

Date	Revision Number	Pages Affected
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## PURPOSE

This document is intended to contribute to the widespread installation of safe, reliable PV systems that meet the requirements of the *National Electrical Code*.

## DISCLAIMER

This guide provides information on how the *2005 National Electrical Code (NEC)* applies to photovoltaic systems. The guide is not intended to supplant or replace the *NEC*; it paraphrases the *NEC* where it pertains to photovoltaic systems and should be used with the full text of the *NEC*. Users of this guide should be thoroughly familiar with the *NEC* and know the engineering principles and hazards associated with electrical and photovoltaic power systems. The information in this guide is the best available at the time of publication and is believed to be technically accurate. Application of this information and results obtained are the responsibility of the user.

In most locations, all electrical wiring including photovoltaic power systems must be accomplished by, or under the supervision of, a licensed electrician and then inspected by a designated local authority. Some municipalities have additional codes that supplement or replace the *NEC*. The local inspector has the final say on what is acceptable. In some areas, compliance with the *NEC* is not required.

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## APPLICABLE ARTICLES

In the

### ***2005 NATIONAL ELECTRICAL CODE***

Although most portions of the *National Electrical Code* apply to all electrical power systems, including photovoltaic power systems, those listed below are of particular significance.

Article	Contents
90	Introduction
100	Definitions
110	Requirements for Electrical Installations
200	Use and Identification of Grounded Conductors
210	Branch Circuits
240	Overcurrent Protection
250	Grounding and Bonding
300	Wiring Methods
310	Conductors for General Wiring
334	Nonmetallic-Sheathed Cable: Types NM, NMC, and NMS
336	Power and Control Tray Cable: Type TC
338	Service-Entrance Cable: Types SE and USE
340	Underground Feeder and Branch-Circuit Cable: Type UF
352	Rigid Nonmetallic Conduit: Type RNC
356	Liquidtight Flexible Nonmetallic Conduit: Type LFNC
366	Auxiliary Gutters
400	Flexible Cords and Cables
408	Switchboards and Panelboards
445	Generators
480	Storage Batteries
490	Equipment, Over 600 Volts, Nominal
690	Solar Photovoltaic Systems
705	Interconnected Electric Power Production Sources
720	Circuits and Equipment Operating at Less Than 50 Volts
Ch 9, Table 8	Conductor Properties
Annex C	Conduit and Tubing Fill Tables for Conductors and Fixture Wires of the Same Size