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## **Solar energy — Specification and classification of instruments for measuring hemispherical solar and direct solar radiation**

*Énergie solaire — Spécification et classification des instruments de mesure du rayonnement solaire hémisphérique et direct*



Reference number  
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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 180, *Solar energy*, Subcommittee SC 1, *Climate — Measurement and data*.

This second edition cancels and replaces the first edition (ISO 9060:1990), which has been technically revised. The main changes compared to the previous edition are as follows:

- in addition to thermopile radiometers, other technology options have been included such as photoelectric sensors as long as they fulfil the requirements specified in this document;
- the spectral error is used to characterize the spectral responsivity;
- to further characterize the radiometers, the additional properties “spectrally flat” and “fast response” can be added to the classification if the radiometers fulfil specific criteria;
- more intuitive names have been introduced for the classes: “A”, “B”, “C”.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

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## Introduction

This document is one of a series of standards that specify methods and instruments for the measurement of solar radiation in support to solar energy utilization.

Accurate solar radiation data are used in meteorology and are needed for developing solar energy appliances, in particular for performance testing, solar radiation simulation and resource assessment.

The measurement of radiation is needed for determination of the conversion efficiencies of solar appliances. The specification and classification of these instruments are needed in order to enable the comparison of solar radiation data on a worldwide basis. In addition, this classification is intended to assist end users/consumers and entities requiring and tendering radiometers with the choice or comparison of instruments, to protect end users/consumers and to offer a level playing field for manufacturers.

The specification and classification of solar radiometers specified in this document provides an accuracy ranking and focuses on application specific requirements and qualities. However, solar radiometers are used in a wide range of applications with often conflicting requirements. The best radiometer for one application may be inadequate for a different application. In order to address this issue at least partly, a sensor of a given class can be assigned the additional properties "fast response" and/or "spectrally flat" to further characterize the radiometers.