SLOVENSKI STANDARD
SIST EN ISO 9488:2022

01-julij-2022

Nadomešča:
SIST EN ISO 9488:2000

Sončna energija - Slovar (ISO 9488:2022)

Solar energy - Vocabulary (ISO 9488:2022)

Sonnenenergie - Vokabular (ISO 9488:2022)

Énergie solaire - Vocabulaire (ISO 9488:2022)

Ta slovenski standard je istoveten z: **EN ISO 9488:2022**

ICS:

01.040.27	Prenos energije in toplote (Slovarji)	Energy and heat transfer engineering (Vocabularies)
27.160	Sončna energija	Solar energy engineering

SIST EN ISO 9488:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 9488

April 2022

ICS 01.040.27; 27.160

Supersedes EN ISO 9488:1999

English Version

Solar energy - Vocabulary (ISO 9488:2022)

?nergie solaire - Vocabulaire (ISO 9488:2022)

Sonnenenergie - Vokabular (ISO 9488:2022)

This European Standard was approved by CEN on 31 January 2022.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN ISO 9488:2022 E

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European foreword

This document (EN ISO 9488:2022) has been prepared by Technical Committee ISO/TC 180 "Solar energy" in collaboration with Technical Committee CEN/TC 312 “Thermal solar systems and components” the secretariat of which is held by NQIS/ELOT.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2022, and conflicting national standards shall be withdrawn at the latest by October 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 9488:1999.

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INTERNATIONAL STANDARD

ISO 9488

Second edition
2022-03

Solar energy — Vocabulary

Sonnenenergie — Vokabular

Énergie solaire — Vocabulaire

Reference number
ISO 9488:2022(E)

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Published in Switzerland

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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.

This document was prepared by Technical Committee ISO/TC 180, *Solar energy*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 312, *Thermal solar systems and components*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 9488:1999), which has been technically revised.

The main changes compared to the previous edition are as follows:

— update of definitions;

— addition of several new terms, according to the development of new standards for solar thermal technology in the past two decades.

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.

Solar energy — Vocabulary

1 Scope

This document defines basic terms relating to the work of ISO/TC 180. The committee covers standardization in the field of the measurement of solar radiation and solar energy utilization in space and water heating, cooling, industrial process heating and air conditioning. Consequently, the vocabulary within this document is focussed on definitions relating to those measurement and utilisation technologies.

Since the 1999 version of this document there has been considerable development in solar photovoltaic technologies and high temperature solar thermal technologies that use heat to produce electricity or to provide high temperatures for processes that require elevated temperatures. This standard has some definitions that are useful also for those technologies; however, there are other documents that cover vocabulary for these technologies in more detail.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 Terms for solar geometry

3.1.1
aphelion
<of Earth> point in the Earth's orbit at which it is furthest from the Sun

Note 1 to entry: At the aphelion, the Earth is approximately 152 × 10^6 km from the Sun.

3.1.2
perihelion
<of Earth> point in the Earth's orbit at which it is closest to the Sun

Note 1 to entry: At the perihelion, the Earth is approximately 147 × 10^6 km from the Sun.

3.1.3
solar declination
δ
angle subtended between the Earth-sun line and the plane of the equator (north positive)

Note 1 to entry: The solar declination is zero on equinox dates, varying between +23,45° (June 22) and -23,45° (December 22).

3.1.4
solar azimuth angle
solar azimuth
γ_S
angular displacement from the chosen reference direction of the projection of a straight line from the apparent position of the sun to the point of observation, onto the horizontal plane

Note 1 to entry: To avoid errors, the same definition (reference direction and measuring direction) must be used for both solar azimuth and inclined surface azimuth.

Note 2 to entry: The reference direction can be either North or South and the azimuth angular displacement from the reference direction can range from 0° to 360° or -180° to +180°.

Note 3 to entry: The geographic azimuth is measured clockwise from due north 0° to 360°.

Note 4 to entry: The two most common definitions in use for solar energy applications are:

1) Solar azimuth is 0° for a northern hemisphere location (north of the tropics at latitude angles > +23,45º) at *solar noon* (3.1.9). Angular displacements east are negative and west are positive, i.e. $-180° \leq \gamma_S \leq +180°$. This definition results in a simple set of equations; however, it leads to counter intuitive values for southern hemisphere locations (outside of the tropics at latitude angles < -23,45º), the solar azimuth angle being 180° for a north facing inclined *solar collector* (3.6.1) in the southern hemisphere (see Reference [3]).

2) Solar azimuth angle is 0° at *solar noon* (3.1.9) for both Northern & Southern hemispheres (outside the tropics). Angular displacements east are negative and west are positive, i.e. $-180° \leq \gamma_S \leq +180°$. For this definition, the solar azimuth angle of a *solar collector* (3.6.1) tilted towards the equator at *solar noon* (3.1.9) in both north and south hemispheres is 0° (outside the tropics).

3.1.5
zenith
point vertically above the observer

3.1.6
solar zenith angle
θ_z
angular distance of the sun from the vertical

3.1.7
solar altitude angle
solar elevation angle
h
complement of the *solar zenith angle* (3.1.6)

$$h = 90° - \theta_z$$

3.1.8
solar hour angle
ω
angle between the sun projection on the equatorial plane at a given time and the sun projection on the same plane at *solar noon* (3.1.9)

Note 1 to entry: The solar hour angle changes by approximately 360° within 24 h (approximately 15° within 1 h). This angle is negative for morning hours and positive for afternoon hours, i.e. ω (in degrees) ≈ 15 (t_{Hr}-12) where t_{Hr} is the *solar time* (3.1.10) in hours.

3.1.9
solar noon
local time of day at which the sun crosses the observer's meridian

3.1.10
solar time
t_{sol}
hour of the day as determined by the apparent angular motion of the sun across the sky, with *solar noon* (3.1.9) as the reference point for 12:00 h

Note 1 to entry: $t_{sol} = t_{st} + 4\ (L_{st} - L_{loc}) + E$, where t_{st} is the standard time, L_{st} is the longitude of the standard meridian for the local time zone and L_{loc} is the longitude of the location in question with both longitudes specified in degrees west (0° ≤ L° ≤ 360º). E is the equation of time, which takes into account the perturbations in the Earth's rate of rotation around the sun that affect the time at which the sun crosses the observer's meridian.

Note 2 to entry: The correction $4\ (L_{st} - L_{loc}) + E$ is expressed in minutes. An additional correction is needed if the standard time is a daylight saving time.

3.1.11
angle of incidence
incidence angle
θ
angle between the line joining the centre of the solar disc to a point on an irradiated surface and the outward normal to the irradiated surface

3.1.12
solar tracker
sun tracker
power-driven or manually operated movable support which may be employed to keep a device oriented toward a given direction with respect to the sun.

3.1.13
equatorial tracker
sun-following device having an axis of rotation parallel to the Earth's axis

Note 1 to entry: The parameters of motion are the hour angle and the declination of the sun.

3.1.14
altazimuth tracker
sun-following device which uses the *solar elevation angle* (3.1.7) and the *azimuth angle* (3.1.4) of the sun as coordinates of movement

3.1.15
sun-path diagram
graphic representation of *solar altitude* (3.1.7) versus *solar azimuth* (3.1.4), showing the position of the Sun as a function of time for various dates of the year

Note 1 to entry: If *solar time* (3.1.10) is used, the diagram is valid for all locations of the same latitude.

3.1.16
heliodon
solar-angle simulator for conducting shading assessments on buildings or collector arrays, usually having a model table which tilts for the latitude and rotates for the hour of day, and a lamp to represent the sun, mounted at some distance away on a vertical rail, allowing adjustment for declination

3.1.17
solarscope
device similar to a *heliodon* (3.1.16), but having a fixed horizontal model table and a light source movable to any solar altitude and azimuth

