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Plastics - Method for estimating heat build up of flat surfaces by simulated solar radiation

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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English Version

Plastics - Method for estimating heat build up of flat surfaces by simulated solar radiation

Plastiques - Méthode d'estimation de l'échauffement de surfaces planes par rayonnement solaire simulé

Kunststoffe - Verfahren mit simulierter Sonnenstrahlung zur Bewertung der Aufheizung auf ebenen Oberflächen

This European Standard was approved by CEN on 7 November 2015.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 16795:2015) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by June 2016 and conflicting national standards shall be withdrawn at the latest by June 2016.

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Introduction

Solar radiation causes the temperature of irradiated surfaces to rise substantially above the temperature of the surrounding air. The resulting surface temperature depends on the climatic parameters at the location in question, the spectral absorption of the surface, the geometric dimensions and on the specific structure of the object. Generally, the darker the colour, the more the sun's energy is absorbed and the higher is the heat build-up.

The performance characteristics of most of the materials are also defined by the in service temperature. Such materials can be window profiles or other polymeric carrier materials. The micro climate at house walls is also essential defined by the absorbed solar radiation (depending on the material properties). The same applies for interior room and automobile temperatures.

The examples reveal the significance of the knowledge of the temperature of sun irradiated surfaces. If the temperature magnitude is estimated to be critical, provisions can be taken to optimize the in-service micro climate, e.g. reduction of the in-service temperature by improvement of the spectral reflection characteristics or appropriate change in design and improving the air conditioning.

1 Scope

This European Standard specifies a method for estimating the temperature increase of a flat polymer surface, due to its solar radiant energy absorption, compared to the ambient temperature.

For that purpose, a specimen and black and white reference plates are exposed to simulated solar radiation under specified conditions (simulated solar radiation, ambient air temperature, convective flow). For opaque specimens, a thermally sensitive electrical element at the backside or a pyrometer is used to measure the surface temperature. For translucent specimens, a pyrometer is used to measure surface temperature.

NOTE Some specific polymeric materials are translucent (transparent) and might have a transmittance window in a wavelength range where the used pyrometer is sensitive (e.g. polyethylene). The surface temperature of these materials cannot be measured with the contact and the contactless method.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 4892-1, *Plastics - Methods of exposure to laboratory light sources - Part 1: General guidance (ISO 4892-1)*

ISO 9370, *Plastics - Instrumental determination of radiant exposure in weathering tests - General guidance and basic test method*