

Hygrothermal performance of buildings — Calculation and presentation of climatic data

Part 3: Calculation of a driving rain index for vertical surfaces from hourly wind and rain data

ICS 07.060, 91.120.10

National foreword

This British Standard is the UK implementation of EN ISO 15927-3:2009.

The UK participation in its preparation was entrusted to Technical Committee B/540/8, Mirror committee for ISO/TC 163.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Hygrothermal performance of buildings - Calculation and presentation of climatic data - Part 3: Calculation of a driving rain index for vertical surfaces from hourly wind and rain data (ISO 15927-3:2009)

Performance hygrothermique des bâtiments - Calcul et présentation des données climatiques - Partie 3: Calcul d'un indice de pluie battante pour surfaces verticales à partir de données horaires de vent et de pluie (ISO 15927-3:2009)

Wärme- und feuchteschutztechnisches Verhalten von Gebäuden - Berechnung und Darstellung von Klimadaten - Teil 3: Berechnung des Schlagregenindex für senkrechte Oberflächen aus stündlichen Wind- und Regendaten (ISO 15927-3:2009)

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Introduction

This part of ISO 15927 specifies two procedures for analysing data derived from hourly observations of wind and rainfall so as to provide an estimate in terms of both an annual average and short-term spells of the quantity of water likely to impact on a wall of any given orientation.

The first method, which uses hourly observations of wind and rainfall, is based closely on BS 8104 ^[1], which originated from a long series of measurements of driving rain on buildings in a wide range of locations within the UK. As such, the method applies to climates similar to those in the UK; in other regions, with very different climates, it is recommended that confirmation of its applicability be obtained by measurements of driving rain on representative buildings.

Where hourly observations of wind and rain are not available, the second procedure, based on the present weather code for rain and average wind speeds can be used.

In all cases, especially in mountainous areas, it is important that direct measurements of the rain impacting on building façades be made wherever possible.

Rain penetration around the edges of doors and windows or similar cracks in building façades depends on shorter periods of heavy rain and strong winds.

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1 Scope

This part of ISO 15927 specifies two procedures for providing an estimate of the quantity of water likely to impact on a wall of any given orientation. It takes account of topography, local sheltering and the type of building and wall.

The first method, given in Clause 3 and based on coincident hourly rainfall and wind data, defines a means of calculating

- the annual average index, which influences the moisture content of an absorbent surface, such as masonry, and
- the spell index, which influences the likelihood of rain penetration through masonry and joints in other walling systems.

The second method, given in Clause 4 and based on average wind data and a qualitative recording of the presence and intensity of rain (the present weather code for rain), defines a means of calculating the spell length during which an absorbent material such as masonry is moistened, which has a 10 % probability of being exceeded in any year (commonly referred to as having a mean return period of 10 years).

A comparison between the two methods is given in informative Annex D.

Procedures are given to correct the results of both methods for topography, local sheltering and the type of building and wall.

The methods included in this part of ISO 15927 do not apply in

- a) mountainous areas with sheer cliffs or deep gorges,
- b) areas in which more than 25 % of the annual rainfall comes from severe convective storms,
- c) areas and periods when a significant proportion of precipitation is made up of snow or hail.

2 Terms, definitions, symbols and units

For the purposes of this document, the following terms, definitions, symbols and units apply.

2.1 Definitions

2.1.1

spell

period, or sequence of periods, of wind-driven rain on a vertical surface of given orientation

NOTE Further information about spells is given in Annex B.

2.1.2

airfield hourly index

quantity of driving rain that would occur on a vertical wall of given orientation per square metre of wall during 1 h at a height of 10 m above ground level in the middle of an airfield, at the geographical location of the wall

2.1.3

airfield annual index

airfield index for a given wall orientation totalled over one year

2.1.4

airfield spell index

airfield index for a given wall orientation totalled over the worst spell likely to occur in any three-year period

2.1.5

wall annual index

quantity of wind-driven rain per square metre at a point on a wall of given orientation, based on the airfield annual index and corrections for roughness, topography, obstruction and wall factors

2.1.6

wall spell index

quantity of wind-driven rain per square metre at a point on a given wall, based on the airfield spell index and corrections for roughness, topography, obstruction and wall factors

2.1.7

line of sight

horizontal view away from the wall, over a sector spanning about 25° either side of the normal to the wall

2.1.8

terrain roughness category

classification of the surface roughness upwind in terms of the average height and spacing of obstructions such as buildings, trees or hedges

2.1.9

roughness coefficient

factor that allows for the modification of the wind speed by the roughness of the terrain upwind of a wall

2.1.10

topography coefficient

factor that allows for the effect of local topography on the wind speed

2.1.11

obstruction factor

factor that relates to shelter from the very local environment and allows for obstructions such as buildings, fences and trees close to, and upwind of, the wall

2.1.12

wall factor

ratio of the quantity of water hitting a wall to the quantity passing through an equivalent unobstructed space, allowing for the characteristics of the wall