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English version

General requirements for a
discontinuously laid roof covering

Exigences générales pour
une couverture de toit à pose
discontinue

Generelle Anforderungen an
eine Dacheindeckung

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Central Secretariat : Rue de Stassart 36, B - 1050 Brussels

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GENERAL REQUIREMENTS FOR A DISCONTINUOUSLY LAID ROOF COVERING

1. Introduction

This document was drawn up as a foundation for the work of CEN TC 128. It is the basis for further standards which deal with individual products, methods of test and application.

2. Scope

This document establishes general requirements for a discontinuously laid roof covering. It covers design, products and application.

This document does not cover:

- flat roof weatherproofings
- under-roof systems
- thermal or sound insulation.

3. Definitions3.1 Pitched Roof Covering

The pitched roof covering is an upper layer to a building and has a multiplicity of functions to fulfil. The discontinuously laid pitched roof covering consists of elements laid so that they overlap, e.g. in the form of roof tiles or thin sheet. Abutments, borders, roof penetrations and joints also come under pitched roof coverings.

Note: In contrast to discontinuously laid pitched roof coverings, flat roof weatherproof coverings are flat elements which form an impermeable layer over the whole surface.

3.2 Roof Pitch

The roof pitch is the slope of the roof surface (not that of the covering elements) compared to the horizontal. The Measurement of the roof pitch is expressed as the angle between the roof surface and the horizontal, in percent.

3.3 Support for Pitched Roof Covering

The support for the pitched roof covering is the element on which the roof covering is directly laid, e.g. boarding, battening or purlins.

Note: Apart from the support which is always necessary for the pitched roof covering, an under-roof system is an additional measure which may improve or ensure the fulfilment of certain requirements.

3.4 Penetration of a Pitched Roof Covering

A penetration is an element which pierces the roof covering and projects through it. Penetrations may for example be:

- roof windows
- roof access openings
- chimneys
- roof elements such as snow guard supports, roof safety hooks, access plank supports
- roof accessories, e.g. aerials.

3.5 Abutments on Pitched Roof Coverings

On pitched roof coverings an abutment is the joint between a pitched roof covering and the elements that either rise above or penetrate it. Abutments are necessary at walls, roof superstructures, such as gables and chimneys.

3.6 Borders of Pitched Roof Coverings

On pitched roof coverings, a border is the formation of the roof covering at the edge of the roof. The following borders may be discerned:

- eaves
- ridge
- vergé
- hip
- valley.

4. Requirements

4.1 Weather Resistance

4.1.1 Rain resistance.

Pitched roof coverings must be rainproof.

This means that the roof must prevent the ingress of rain, snow and hail. Rain-tight roof coverings

may not be watertight against exceptional severe rain, snow and hail, with or without the influence of wind.

The rain resistance requirement is met by the performance standard of the pitched roofing product and the method of application.

To reduce or impede the entry of water into the interior an under-roof may be necessary.

The pitched roofing products, roof design and construction methods must ensure the correct functioning of the completed roof and allow for the movement of the support.

The watertightness of the pitched roof covering is achieved by means of vertical and horizontal overlapping, with or without interlocking at the joints of the slabs or sheets, by means of the pitch of the roof surface or, for certain products, by sealing the joints.

Minimum roof pitches are laid down in regional, national or international codes of practice for various types of products, compliance with which ensures the watertightness of the pitched roof covering in practice.

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More far-reaching requirements, e.g. protections against wind-driven rain penetration, necessitate particular measures which should be taken into account at the design stage.

In high winds or storms allied with precipitation, or in frost and consequent icing over, the free drainage of water can be impeded with the result that transient precipitation water may succeed in entering under the roof covering. This can be influenced by the design of the overlapping and covering. Such water penetration through the joints between the roofing materials can be reduced or impeded by using an under-roof system.

4.1.2 Protection Against Wind-driven Snow, Sand and Dust

The entry of wind-driven snow, sand and dust cannot be excluded due to the method of laying the pitched roof covering and the resulting joints between the individual elements. If this must be reduced or impeded, a special requirement must be specified such as particular under-roof systems.

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4.1.3 Wind Resistance

Due to the fact that pitched roof coverings are made of products laid to overlap each other, they cannot in general be made windproof except for products where the joints are sealed. The resulting ventilation under the covering is in part desirable for the functioning of the pitched roof covering, or may be a regional requirement.

Airtightness of the outer surfaces of heated rooms which may be needed for other purposes must be achieved by using other additional measures.

4.2 Mechanical Requirements

4.2.1 Requirements for Snow and Ice Loading

The extent of specified snow or ice loading on a pitched roof covering is specified in the relevant national and regional regulations. It is dependent upon anticipated snow conditions and takes into consideration the roof pitch, height above sea level and local conditions. The roof covering and its substructure must resist the relevant anticipated loading.

A safe transfer of load on the roof by the roof covering into the roof construction must be provided.

Due to the formation of ice or snow deposits, normal estimates for loading may be greatly exceeded. These loadings can exceed the load bearing capacity and impair the functioning of the roof covering. This should be taken into account during the design stage.

4.2.2 Wind Loading Requirements

The extent of specified wind loading on the pitched roof covering is regulated by the relevant national and regional regulations. It depends upon the wind conditions and the geometry and location of the building. The type of roof covering and the choice of roofing products must take account of the relevant wind loadings.

Any fixings that may be necessary can be incorporated as part of the product standard and their application in quantity and position can be specified in the relevant codes of practice.

Suction and compressive forces can be particularly enhanced on the abutments and borders, which need

special measures to ensure the safety of the pitched roof covering. Complete security against catastrophic storm damage cannot be ensured.

4.2.3 Requirements for Loading from People (Trafficability)

Pitched roof coverings are laid on roof surfaces which are not designed for long term use by people, or vehicles or for vegetation. Occasional access to the roof surface, with stipulated precautions, should be possible, for example for repair purposes, maintenance and servicing and should take into account national and regional accident prevention regulations.

4.2.4 Hail Loading Requirements

Hail loading of the pitched roof covering is an additional mechanical requirement on the roofing products. The extent of the loading is determined by mass, rate and direction of descent. The product characteristics for pitched roof coverings can only be aimed to meet a limited hail loading. Loadings of catastrophic proportions cannot be included in quality standards.

4.3 Physical (and Chemical) Requirements

4.3.1 Temperature Resistance

Pitched roof coverings should not change in performance so much with anticipated maximum and minimum temperature ranges that their function is put at risk. This also applies to sudden changes in temperature. The performance requirements are laid down in the products standards and where necessary in the relevant codes of practice.

Short term and frequent freeze-thaw action represent additional requirements on pitched roofing products in certain areas.

Such requirements are laid down in the product standards.

4.3.2 Thermal Insulation Performance

Most pitched roof products have only a marginal effect on thermal performance.

Requirements for the thermal and moisture vapour protection of a building/roof must be satisfied by additional measures.

4.3.3 Acoustic Performance

The acoustic performance of pitched roofing varies with the type of construction. Requirements for sound or noise protection of a building/roof must be satisfied by additional measures. The pitched roof coverings have only a slight effect.

4.3.4 Fire Performance

The fire performance of pitched roofing products must comply with national regulations.

Requirements for performance for flash fires and radiant heat are laid down in national regulations.

4.3.5 Resistance to UV Rays and Aggressive Environmental Damage

UV rays and aggressive environmental influences affect the surface. The functioning of pitched roofing products should not be unduly impaired by UV rays and environmental influences. The characteristics of pitched roofing products can only be aimed at a normal amount of environmental damage. Requirements are laid down in the product standards.

Environmental compatibility of the products must be ensured.

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4.3.6 Compatibility

Materials and building elements must be compatible with the other materials and building elements with which they come into direct or indirect contact. Suitable measures should be taken to avoid damage caused by incompatibilities, e.g. the arrangement of separate layers or protective coatings.

4.4 Requirements for the External Appearance

The external appearance of the roof is determined by the roofing products and by the roof design. The shape of the roof is determined by the building concept. Roofing details, for example abutments, edges and penetrations, will influence the outward appearance of the roof. The desired external appearance of the roof must be considered at the design stage, when choosing the roofing materials and when carrying out the roofing work.