

## Four exposure classes

DUKO groups roof underlay materials into four exposure classes. Which class of material you should select depends on the roof covering it will be used with. This document explains how to choose the right exposure class. There are six factors that determine what kind of requirements the underlay should meet:

1. Roofing
2. Roof pitch
3. Complexity
4. Accessibility
5. Climate impact and storey height
6. To what extent an especially high degree of robustness is desired during installation and use

### 1-2 Roofing and roof pitch

Roofing is divided into three types: open, less open and tight. Open roofing makes greater demands on the underlay than closed roofing. If you know your desired degree of diffusion and roof pitch, Table 1 below will tell you whether your roofing is open, less open or tight.

### 3 Complexity

A roof is considered to be either high or low in complexity. A simple roof with simple penetrations is low in complexity, whilst a roof with large penetrations and/or relatively difficult details is high in complexity.

If the roof has one or more of the following details, it is a high-complexity roof:

- Valley gutter(s)
- Large ventilation duct(s)
- Chimney(s)
- Dormer(s)

Note: You can divide up the roof into high-complexity and low-complexity sections and only count the trusses with complex details as high-complexity sections. This means you can decide on a different application class and choose a different underlay for the trusses in the high-complexity sections.

### 4 Accessibility

The ability to inspect and maintain the roof from the inside of the building affects the risk and extent of possible underlay failure. We differentiate between accessible and difficult-to-access underlays. Difficult-to-access underlays have one or more of the following features:

- Low roof pitch (less than 25°)
- Parallel roofing (where either all or part of the insulation is laid parallel with the underlay)
- Other circumstances that make it more difficult to inspect the roof.

### 5 Climate impact and storey height

Special wind conditions can have specific climatic effects on a roof. Not only do heavy winds increase the amount of driving rain and drifting snow; the wind itself can also have a direct effect on the underlay. The cost of putting up scaffolding to repair any damage increases dramatically with the storey height of the building.

The 'climate impact and storey height' parameter is considered to be 'extraordinary'

- if the building is located in Category 1 or 2 terrain (see Danish Standard DS 410:1998: 'Code of Practice for Loads for the Design of Structures').
- or if the building has three or more storeys.

Please note: Pay special attention to ventilation conditions in areas with a high degree of protection and poor ventilation.

## 6 An especially high degree of robustness during underlay installation and use is desired

In a number of situations, a builder may want an underlay that is especially robust during installation (e.g. it has a high degree of abrasion resistance) and use (e.g. a higher degree of UV resistance). In situations that would normally require materials classified L, ML or MH, this higher degree of robustness is usually achieved by selecting a higher class of material. In the case of Exposure Class H, the H-Extra subgroup can be chosen instead of H-Normal.

### Results

Table 2 below is used to determine the resultant exposure class.

TABLE 1	Open	Less open	Tight
<b>Tile</b>			
Pantiles, narrow lap (< 70 mm*)	X		
Pantiles, wide lap (> 70 mm*) < 40°	X		
Pantiles, wide lap (> 70 mm*) > 40°		X	
Double pantiles, large	X		
Double pantiles, small, < 40°	X		
Double pantiles, small > 40°		X	
Interlocking tiles, < 35°		X	
Interlocking tiles, > 35°			X
Beavertail tiles	X		
Concrete			
Interlocking tiles, < 35°		X	
Interlocking tiles, > 35°			X
Interlocking tiles, factory-supplied jointing material, < 25°		X	
Interlocking tiles, factory-supplied jointing material, > 25°			2
Fibre cement			
Diagonal slates	X		
Diagonal slates, bedded in putty			(X) <sup>1</sup>
Slate sheets		X	
Slate sheets, bedded in putty			(X) <sup>1</sup>
Corrugated sheeting			(X) <sup>1</sup>
Metal sheeting			
Steel tiles, profiled			(X) <sup>1</sup>
Profiled steel sheeting			(X) <sup>1</sup>
Natural slate			
Slate sheets		X	
Slate sheets, bedded in putty			(X) <sup>1</sup>

1 Underlay may be necessary due to condensate. We recommend an assessment carried out by a technical consultant.

2 Underlay is normally not necessary. We recommend an assessment carried out by a technical consultant.

\* 70 mm is a nominal size used in design and not an outcome requirement to be used in an assessment of the quality of the workmanship.

**TABLE 2** Desired especially high degree of robustness during installation and use

Roofing	Complexity	Accessibility	Climate impact and storey height	Exposure Class
Tight	Low	Accessible	Normal	L
Tight	Low	Accessible	Extraordinary	L
Tight	Low	Difficult to access	Normal	L
Tight	Low	Difficult to access	Extraordinary	L
Tight	High	Accessible	Normal	L
Tight	High	Accessible	Extraordinary	L
Tight	High	Difficult to access	Normal	L
Tight	High	Difficult to access	Extraordinary	ML
Less open	Low	Accessible	Normal	ML
Less open	Low	Accessible	Extraordinary	MH
Less open	Low	Difficult to access	Normal	MH
Less open	Low	Difficult to access	Extraordinary	MH
Less open	High	Accessible	Normal	MH
Less open	High	Accessible	Extraordinary	MH
Less open	High	Difficult to access	Normal	MH
Less open	High	Difficult to access	Extraordinary	H-Normal
Open	Low	Accessible	Normal	MH
Open	Low	Accessible	Extraordinary	MH
Open	Low	Difficult to access	Normal	MH
Open	Low	Difficult to access	Extraordinary	H-Normal
Open	High	Accessible	Normal	MH
Open	High	Accessible	Extraordinary	H-Normal
Open	High	Difficult to access	Normal	H-Normal
Open	High	Difficult to access	Extraordinary	H-Normal
Less open	High	Difficult to access	Extraordinary	H-Extra
Open	Low	Difficult to access	Extraordinary	H-Extra
Open	High	Accessible	Extraordinary	H-Extra
Open	High	Difficult to access	Normal	H-Extra
Open	High	Difficult to access	Extraordinary	H-Extra