

Annex E (informative)

Terrain categories and effective height

E.1 Terrain categories

E.1.1 *General*

The roughness of the ground surface controls both the mean wind speed and its turbulent characteristics and is described by an effective aerodynamic roughness length z_o . Over a smooth surface such as open country the wind speed is higher near the ground than over a rougher surface such as a town. By defining three basic terrain categories wind speeds can be derived for any intermediate category or to account for the influence of differing upwind categories to that of the site. Accordingly no interpolation between the three terrain categories is permitted in this part. The three basic categories defined in 1.7 are as follows.

a) *Sea*. This applies to the sea, but also to inland lakes which are large enough and close enough to affect the wind speed at the site. Although this standard does not cover offshore structures, it is necessary to define such a category so that the gradual deceleration of the wind speed from the coast inland can be quantified and the wind speed for any land-based site can be determined. The aerodynamic roughness length for sea is taken as $z_o = 0.003$ m.

b) *Country*. This covers a wide range of terrain, from the flat open level, or nearly level country with no shelter, such as fens, airfields, moorland or farmland with no hedges or walls, to undulating countryside with obstructions such as occasional buildings and windbreaks of trees, hedges and walls. Examples are farmlands and country estates and, in reality, all terrain not otherwise defined as sea or town. The aerodynamic roughness length for country is taken as $z_o = 0.03$ m.

c) *Town*. This terrain includes suburban regions in which the general level of roof tops is about 5 m above ground level, encompassing all two storey domestic housing, provided that such buildings are at least as dense as normal suburban developments for at least 100 m upwind of the site. Whilst it is not easy to quantify it is expected that the plan area of the buildings is at least 8 % of the total area within a 30° sector centred on the wind direction being considered. The aerodynamic roughness length for town is taken as $z_o = 0.3$ m.

NOTE The aerodynamic roughness of forests and mature woodland is similar to town terrain ($z_o = 0.3$ m). It is inadvisable to take advantage of the shelter provided by woodland unless it is permanent (not likely to be clear felled).