DIN EN 1991-1-4/NA:2024-08 (E)

National Annex - Nationally determined parameters - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Contents

Page

Foreword ... 4

NA.1 Scope ... 5

NA.2 National provisions for the application of DIN EN 1991-1-4:2010-12 ... 5
NA.2.1 General ... 5
NA.2.2 National provisions ... 7

Annex NA.A (normative) **Wind zone map** ... 17
NA.A.1 General ... 17
NA.A.2 Influence of the altitude ... 17

Annex NA.B (normative) **Influence of terrain roughness, orography and temporary states on the wind actions** ... 18
NA.B.1 Specification of the terrain categories ... 18
NA.B.2 Transitions between the terrain categories ... 19
NA.B.3 Gust velocity pressure for buildings and structural elements not susceptible to vibrations ... 20
NA.B.3.1 Procedures for determining the gust velocity pressure ... 20
NA.B.3.2 Simplified gust velocity pressure assumptions for buildings with heights of up to 25 m above ground level ... 20
NA.B.3.3 Height-dependent gust velocity pressure for the normal case ... 21
NA.B.4 Influence of terrain orography ... 23
NA.B.4.1 Determining the influence of terrain orography ... 23
NA.B.4.2 Numerical calculation of the orography coefficients ... 23
NA.B.5 Reduction of the velocity pressure for temporary states ... 23

Annex NA.C (normative) **Determination of the structural factor and evaluation of the vibration susceptibility** ... 25
NA.C.1 Determination of the structural factor ... 25
NA.C.1.1 General ... 25
NA.C.1.2 Wind turbulence ... 26
NA.C.1.3 Structural factor $c_s c_d$ ... 28
NA.C.1.4 Number of loads for dynamic response ... 28
NA.C.1.5 Service displacement and accelerations for serviceability assessments of a vertical structure ... 29
NA.C.2 Criterion for the susceptibility to vibrations ... 29

Annex NA.D (normative) **Vortex shedding** ... 30

Annex NA.E (informative) **Aeroelastic instabilities** ... 31
NA.E.1 Galloping and interference galloping ... 31
NA.E.2 Divergence and flutter ... 31
NA.E.2.1 General ... 31
NA.E.2.2 Divergence velocity ... 31

Annex NA.F (normative) **Dynamic characteristics of structures** ... 34

Annex NA.N (informative) **Wind actions on bridges** ... 35
NA.N.1 General ... 35
NA.N.2 Wind actions to be taken into account ... 38

Annex NA.V (normative) **Pressure coefficients for canopies** ... 42

Annex NA.R (normative) **Wind loads on footbridges and cycle bridges** **44**

Figures

Figure NA.1 — Pressure coefficients on the internal surfaces of laterally open structures **12**
Figure NA.2 — Definition of wind directions **13**
Figure NA.A.1 — Wind zone map for the territory of the Federal Republic of Germany **17**
Figure NA.C.1 — Turbulent length scale **27**
Figure NA.C.2 — Power spectral density function $S_L(f_L)$ **28**
Figure NA.C.3 — Number of gust loads N_g for an effect S_e/S_K during a 50-year period **28**
Figure NA.E.1 — Examples of rotational stiffness k_θ of single-span beams torsionally restrained on one or two sides under St. Venant's torsion **32**
Figure NA.E.2 — Rate of change of aerodynamic moment coefficient $dc_M/d\theta$ (relative to the geometric centre GC) for rectangular sections with respect to torsion θ **33**
Figure NA.V.1 — Dimensions and classification of surfaces for canopies **43**

Tables

Table NA.1 — External pressure coefficients for vertical walls of rectangular plan buildings **10**
Table NA.2 — Force coefficients for structural elements with sharp edged sections **13**
Table NA.B.1 — Terrain categories **18**
Table NA.B.2 — Profiles of the mean wind velocity, turbulence intensity, gust velocity pressure and gust velocity in level terrain for four terrain categories **19**
Table NA.B.3 — Simplified velocity pressures for building heights of up to 25 m **21**
Table NA.B.4 — Profiles of mean wind velocity, turbulence intensity and gust velocity on level terrain for the normal cases given in NA.B.3.3 ..... **22**
Table NA.B.5 — Reduced velocity pressure for the examination of temporary states **24**
Table NA.C.1 — Exponent ε **26**
Table NA.N.1 — Velocity pressure in inland regions **36**
Table NA.N.2 — Velocity pressure in coastal areas **37**
Table NA.N.3 — Aerodynamic force coefficients for bridges **37**
Table NA.N.4 — Aerodynamic force coefficients for piers **37**
Table NA.N.5 — Wind actions w in kN/m^2 on bridges for wind zones 1 and 2 (inland regions) **38**
Table NA.N.6 — Wind actions w in kN/m^2 on bridges for wind zones 3 and 4 (inland regions) **39**
Table NA.N.7 — Wind actions w in kN/m^2 on bridges for wind zones 1 and 2 (coastal regions) **39**
Table NA.N.8 — Wind actions w in kN/m^2 on bridges for wind zones 3 and 4 (coastal regions) **40**
Table NA.V.1 — Aerodynamic coefficients $c_{p,net}$ for the resulting pressure at canopies **42**