

# **DS/EN 1991-1-5 DK NA:2012**

National Annex to

## **Eurocode 1: Actions on structures - Part 1-5: General actions – Thermal actions**

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### **Foreword**

This national annex (NA) is a revision and compilation of EN 1991-1-5 DK NA:2007 and Addendum 2010 and will replace these documents on 2012-11-01. Major editorial changes have been made, and technical changes have been incorporated into clause 7.6.

This NA lays down the conditions for the implementation in Denmark of DS/EN 1991-1-5 for construction works in conformity with the Danish Building Act or the building legislation. Other parties can put this NA into effect by referring thereto.

This NA includes:

- an overview of possible national choices and complementary information;
- national choices;
- complementary (non-contradictory) information.

Headings and numbering refer to the clauses of DS/EN 1991-1-5 where choices have been made and/or complementary information is given.

## Overview of possible national choices and complementary information

The list below identifies the clauses where national choices are possible and the applicable/not applicable informative annexes. Furthermore, clauses giving complementary information are identified. Complementary information is given at the end of this document.

Clause	Subject	National choice	Complementary information
5.3(2)	Determination of temperature profiles		
– Table 5.1 ( $T_1$ , $T_2$ )	Indicative temperatures of inner environment, $T_{in}$	National choice	
– Table 5.2 ( $T_3$ , $T_4$ , $T_5$ )	Indicative temperatures, $T_{out}$ , for buildings above the ground level	National choice	
– Table 5.3 ( $T_6$ , $T_7$ , $T_8$ , $T_9$ )	Indicative temperatures, $T_{out}$ , for underground parts of buildings	National choice	
6.1.1(1)	Bridge deck types	Not relevant for building structures	
6.1.2(2)	Consideration of thermal actions	Not relevant for building structures	
6.1.3.1(4)	Uniform temperature component General	Not relevant for building structures	
6.1.3.2(1)P	Uniform temperature component Shade air temperature	Not relevant for building structures	
6.1.3.3(3)	Uniform temperature component Range of uniform bridge temperature component	Not relevant for building structures	
6.1.4(3)	Temperature difference components	Not relevant for building structures	
6.1.4.1(1)	Temperature difference components Vertical linear component (Approach 1)	Not relevant for building structures	
6.1.4.2(1)	Temperature difference components Vertical temperature components with non-linear effects (Approach 2)	Not relevant for building structures	
6.1.4.3(1)	Temperature difference components	Not relevant for building structures	

Clause	Subject	National choice	Complementary information
	Horizontal components		
6.1.4.4(1)	Temperature difference components within walls of concrete box girders	Not relevant for building structures	
6.1.5(1)	Simultaneity of uniform and temperature difference components	Not relevant for building structures	
6.1.6(1)	Differences in the uniform temperature component between different structural elements	Not relevant for building structures	
6.2.1(1)P	Consideration of thermal actions	Not relevant for building structures	
6.2.2(1)	Temperature differences - between opposite outer faces of concrete piers	Not relevant for building structures	
6.2.2(2)	Temperature differences - between inner and outer faces of walls	Not relevant for building structures	
7.2.1(1)P	Shade air temperature	National choice, see Annex A, A.1(1)	
7.5(3)	Values of temperature components (indicative values) - Linear temperature difference component between the inner and outer faces of concrete pipelines	The recommended value should be applied where more specific data are not available	
7.5(4)	Values of temperature components (indicative values) - Temperature difference component round the circumference of concrete pipelines	The recommended value should be applied where more specific data are not available	
7.6	Simultaneity of temperature components		Complementary information
Annex A A.1(1)	<p>Isotherms of national minimum and maximum shade air temperatures</p> <p>NOTE 1 - Choice of characteristic minimum and maximum shade air temperatures</p> <p>NOTE 2 - Adjustment for height above sea level</p>	<p>National choice</p> <p>National choice</p>	
Annex A	Isotherms of national minimum	National choice	

Clause	Subject	National choice	Complementary information
A.1(3)	and maximum shade air temperatures  Choice of initial temperature $T_0$		
Annex A A.2(2)	Maximum and minimum shade air temperature values with an annual probability of being exceeded $p$ other than 0,02	National choice	
Annex B B(1) Table B.1, B.2 and B.3	Temperature differences for various surfacing depths	Not relevant for building structures	
Annex C	Coefficients of linear expansion	Applicable	
Annex D	Temperature profiles in buildings and other construction works	Applicable	

NOTE Unchanged: Recommendations in the standard are followed.

## National choices

### 5.3(2) Determination of temperature profiles, Table 5.1

( $T_1, T_2$ )

The recommended values are applicable where more specific data are not available.

### 5.3(2) Determination of temperature profiles, Table 5.2

( $T_3, T_4, T_5$ )

The recommended values are applicable for Denmark.

*Complementary information:  $T_{\max}$  and  $T_{\min}$  appear from Annex A, A.1(1).*

### 5.3(2) Determination of temperature profiles, Table 5.3

( $T_6, T_7, T_8, T_9$ )

The recommended values are applicable for Denmark.

### A.1(1) Isotherms of national minimum and maximum shade air temperatures - General

#### NOTE 1 - Choice of characteristic minimum and maximum shade air temperatures

$T_{\min} = -31^{\circ}\text{C}$  and  $T_{\max} = 36^{\circ}\text{C}$ , respectively, are to be used as characteristic minimum and maximum shade air temperatures.

### A.1(1) Isotherms of national minimum and maximum shade air temperatures - General

#### NOTE 2 - Adjustment for height above sea level

Adjustment for height above sea level is not required in Denmark.

### A.1(3) Isotherms of national minimum and maximum shade air temperatures - General

#### Choice of initial temperature $T_0$

The recommended value is applicable where more specific data are not available.

### A.2(2) Maximum and minimum shade air temperature values with an annual probability of being exceeded $p$ other than 0,02

In Denmark, the following values of coefficients  $k_1, k_2, k_3$  and  $k_4$  are to be used:

$k_1 = 0,908, k_2 = 0,024, k_3 = 0,719, k_4 = -0,0719$

## **Complementary (non-contradictory) information.**

### **7.6 Simultaneity of temperature components**

Where wind constitutes the predominant action, the temperature may be taken as  $+5^{\circ}\text{C}$ .

Where snow is the predominant action, the most unfavorable temperature within the range from  $-15^{\circ}\text{C}$  to  $+5^{\circ}\text{C}$  is chosen.