DIN EN 1992-1-1/NA

DIN

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Supersedes
DIN EN 1992-1-1/NA:2011-01
and
DIN EN 1992-1-1/NA
Corrigendum 1:2012-06

National Annex –
Nationally determined parameters –
Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings,
English translation of DIN EN 1992-1-1/NA:2013-04

Nationaler Anhang –
National festgelegte Parameter –
Eurocode 2: Bemessung und Konstruktion von Stahlbeton- und Spannbetontragwerken –
Teil 1-1: Allgemeine Bemessungsregeln und Regeln für den Hochbau,
Englische Übersetzung von DIN EN 1992-1-1/NA:2013-04

Annexe Nationale –
Paramètres déterminés au plan national –
Eurocode 2: Calcul des structures en béton – Partie 1-1: Règles générales et règles pour les bâtiments,
Traduction anglaise de DIN EN 1992-1-1/NA:2013-04

Document comprises 105 pages

Translation by DIN-Sprachendienst.
In case of doubt, the German-language original shall be considered authoritative.

A comma is used as the decimal marker.

Foreword

This document has been prepared by Working Committee NA 005-07-01 AA *Bemessung und Konstruktion* of the *Normenausschuss Bauwesen* (Building and Civil Engineering Standards Committee).

This document is the National Annex to DIN EN 1992-1-1:2011-01, *Eurocode 2 — Design of concrete structures — Part 1-1: General rules and rules for buildings.*

European Standard EN 1992-1-1 allows national safety parameters, referred to as Nationally Determined Parameters (NDPs), to be specified for a number of points. The NDPs cover alternative verification methods, the provision of individual values and the selection of classes from designated classification systems. The relevant parts of the text are identified in the European Standard by references to the possibility of national choice and are listed in Clause NA.2.1. This National Annex also includes non-contradictory complementary information (NCI) for the application of DIN EN 1992-1-1:2011-01.

National clauses are preceded by “NA” in brackets together with a serial number.

Additional national figures, tables and equations are preceded by “NA” together with the number of the preceding element supplemented by “1 ff.”. (Example: The additional figure NA.6.22.1 is positioned between Figures 6.22 and 6.23.).

Where figures, tables and equations have been modified for national application purposes, the numbers are followed by the letters “DE” instead of “N” (e.g. Equation “7.6DE” instead of Equation “7.6N”).

This National Annex is an integral part of DIN EN 1992-1-1:2011-01.

Relationship between Eurocodes (EN) and harmonized technical specifications for construction products (European Technical Approvals, ETA)

In this National Annex reference is made to European Technical Approvals and German national technical approvals. These are also termed “technical approvals” for short in the following.

Where reference is made in DIN EN 1992-1-1 to European Technical Approvals, German national technical approvals may be referred to in Germany.

It should be noted that, in Germany, in some cases (e.g. as in ETAG 013[*)]) European Technical Approvals are only to be applied in conjunction with German national technical approvals.

Amendments

This document differs from DIN EN 1992-1-1/NA:2011-01 and DIN EN 1992-1-1/NA Corrigendum 1:2012-06 as follows:

a) The corrections from Corrigendum 1:2012-06 have been incorporated.

b) Amendments have been made to Table 4.1 (Exposure classes) and primarily to NCI re 2.3.1.3 (4), NCI re 2.7, NCI re 3.3.1 (5), NDP re 4.4.1.2 (8), NDP re 5.2 (5), NCI re 5.2 (8), NCI re 6.2.2 (2), NCI re 6.2.3 (5), NCI re 6.2.3 (6), NCI re 6.2.5 (NA.6), NDP re 6.4.4 (1), NCI re 6.4.4 (2), NCI re 6.5.3 (3), NCI re 8.4.4 (1), NCI re 8.7.3 (1), NDP re 9.6.2 (3), NCI re 10.9.6 and NCI re A.1.

[*)] Translator’s note. ETAG 013, Approval of post-tensioning systems

Previous editions

DIN 1045: 1925-09, 1932-04, 1937-05, 1943xxx, 1959-11, 1972-01, 1978-12, 1988-07
DIN 1045-1: 2001-07, 2008-08
DIN 1045-1 Corrigendum 1: 2002-07
DIN 1045-1 Corrigendum 2: 2005-06
DIN 1046: 1925-09, 1932-04, 1935-12, 1943x
DIN 1047: 1925-09, 1932-04, 1937-05, 1943x
DIN 4028: 1938-10
DIN 4030: 1954-09
DIN 4163: 1951-02
DIN 4219-2: 1979-12
DIN 4225: 1943, 1951xx-02, 1960-07
DIN 4227-1: 1953xx-10, 1979-12, 1988-07
DIN 4227-1/A1: 1995-12
DIN 4227-2: 1984-05
DIN V 4227-4: 1985-12
DIN 4227-4: 1986-02
DIN 4229: 1950-07
DIN 4233: 1951-03, 1953x-12
DIN 4420: 1952x-01
DIN V 18932-1: 1991-10
DIN V ENV 1992-1-1: 1992-06
DIN V ENV 1992-1-3: 1994-12
DIN V ENV 1992-1-4: 1994-12
DIN V ENV 1992-1-5: 1994-12
DIN V ENV 1992-1-6: 1994-12
DIN EN 1992-1-1: 2005-10
DIN EN 1992-1-1 Corrigendum 1: 2010-01
DIN EN 1992-1-1/NA: 2011-02
DIN EN 1992-1-1/NA Corrigendum 1: 2012-06

NA.1 Scope

This National Annex contains provisions relating to the design of structures in reinforced and prestressed concrete made with normal and lightweight aggregates, together with specific rules for buildings, that are to be taken into consideration when applying DIN EN 1992-1-1 in Germany.

This National Annex is only valid in conjunction with DIN EN 1992-1-1:2011-01.

NA.2 National provisions for the application of DIN EN 1992-1-1:2011-01

NA.2.1 General

DIN EN 1992-1-1 refers to the option of choosing Nationally Determined Parameters (NDPs) at the following places in the text:

— 2.3.3 (3)
— 2.4.2.1 (1)
— 2.4.2.2 (1)
— 2.4.2.2 (2)
— 2.4.2.2 (3)
— 2.4.2.3 (1)
— 2.4.2.4 (1)
— 2.4.2.4 (2)
— 2.4.2.5 (2)
— 3.1.2 (2)P
— 3.1.2 (4)
— 3.1.6 (1)P
— 3.1.6 (2)P
— 3.2.2 (3)P
— 3.2.7 (2)
— 3.3.4 (5)
— 3.3.6 (7)
— 4.4.1.2 (3)
— 4.4.1.2 (5)
— 4.4.1.2 (6)
— 4.4.1.2 (7)
— 4.4.1.2 (8)
— 4.4.1.2 (13)
— 4.4.1.3 (1)P
— 4.4.1.3 (3)
— 4.4.1.3 (4)
— 5.1.3 (1)P
— 5.2 (5)
— 5.5 (4)
— 5.6.3 (4)
— 5.8.3.1 (1)
— 5.8.3.3 (1)
— 5.8.3.3 (2)
— 5.8.5 (1)
— 5.8.6 (3)
— 5.10.1 (6)
— 5.10.2.1 (1)P
— 5.10.2.1 (2)
— 5.10.2.2 (4)
— 5.10.2.2 (5)
— 5.10.3 (2)
— 5.10.8 (2)
— 5.10.8 (3)
— 5.10.9 (1)P
— 6.2.2 (1)
— 6.2.2 (6)
— 6.2.3 (2)
— 6.2.3 (3)
— 6.2.4 (4)
— 6.2.4 (6)
— 6.4.3 (6)
— 6.4.4 (1)
— 6.4.5 (3)
— 6.4.5 (4)
— 6.5.2 (2)
— 6.5.4 (4)
— 6.5.4 (6)
— 6.8.4 (1)
— 6.8.4 (5)
— 6.8.6 (1)
— 6.8.6 (3)
— 6.8.7 (1)
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— 7.2 (5)
— 7.3.1 (5)
— 7.3.2 (4)
— 7.3.3 (2)
— 7.3.4 (3)
— 7.4.2 (2)
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— 8.8 (1)
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— 9.2.1.1 (3)
— 9.2.1.2 (1)
— 9.2.1.4 (1)
— 9.2.2 (4)
— 9.2.2 (5)
— 9.2.2 (6)
— 9.2.2 (7)
— 9.2.2 (8)
— 9.3.1.1(3)
— 9.5.2 (1)
— 9.5.2 (2)
— 9.5.2 (3)
— 9.5.3 (3)
— 9.6.2 (1)
— 9.6.3 (1)
— 9.7 (1)
— 9.8.1 (3)
— 9.8.2.1 (1)
— 9.8.3 (1)
— 9.8.3 (2)
— 9.8.4 (1)
— 9.8.5 (3)
— 9.10.2.2 (2)
— 9.10.2.3 (3)
— 9.10.2.3 (4)
— 9.10.2.4 (2)
— 11.3.5 (1)P
— 11.3.5 (2)P
— 11.3.7 (1)
— 11.6.1 (1)
— 11.6.2 (1)
— 11.6.4.1 (1)
— 11.6.4.2 (2)
— 12.3.1 (1)
— 12.6.3 (2)
— A.2.1 (1)
— A.2.1 (2)
— A.2.2 (1)
— A.2.2 (2)
— A.2.3 (1)
— C.1 (1)
— C.1 (3)
— E.1 (2)
— J.1 (2)
— J.2.2 (2)
— J.3 (2)
— J.3 (3)

In addition, NA.2.2 includes non-contradictory complementary information for the application of DIN EN 1992-1-1:2011-01. This information is preceded by the letters “NCI”.

— 1.2.2
— 1.4
— 1.5.2
— 1.6
— 2.3.1.2(3)
— 2.3.1.3 (4)
— 2.3.4.2
— 2.3.4.2 (1)P
— 2.3.4.2 (2)
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— 3.2.1 (4)P
— 3.2.1 (5)
— 3.2.2 (1)P
— 3.2.2 (5)
— 3.2.2 (6)P
— 3.2.4 (1)P
— 3.2.4 (2)
— 3.2.5 (1)P
— 3.2.5 (1)P, Table 3.4
— 3.2.6 (1)P
— 3.2.7 (2)
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— 4.4.1.1 (2)P
— 4.4.1.2 (9)
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— 5.3.2.1 (2)
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— 5.3.2.2 (3)
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— 5.8.3.3
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— 5.8.6 (5)
— 5.8.9 (2)
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— 6.8.2 (2)P
— 6.8.3 (1)P
— 6.8.4 (1)
— 6.8.4, Table NA.6.3
— 6.8.4, Table NA.6.4
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— 8.7.5.1 (4)
— 8.7.5.1 (6)
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— 10.9.4.2 (3)
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— 10.9.6.3 (1)
— NA.10.9.8
— NA.10.9.9
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— NA.J.4

NA.2.2 National provisions

In the following, the clauses are numbered as in DIN EN 1992-1-1. Supplementary clauses have been added as required.

NCI re 1.2.2

NA DIN 488 series, *Reinforcing steel*

NA DIN 1045-2:2008-08, *Plain, reinforced and prestressed concrete structures — Specification, performance, production and conformity of concrete (Application rules for DIN EN 206-1)*

NA DIN 1045-3:2008-08, *Plain, reinforced and prestressed concrete structures — Execution of structures — Application rules for DIN EN 13670*[1)]

NA DIN 1045-4, *Plain, reinforced and prestressed concrete structures — Supplementary specifications governing the production and conformity of precast concrete elements*

NA DIN 18516-1, *Back-ventilated, non-loadbearing external enclosures of buildings — Requirements and testing*

NA DIN EN 206-1, *Concrete — Part 1: Specification, performance, production and conformity*

NA DIN EN 1536, *Execution of special geotechnical work — Bored piles*

NA DIN EN 13670, *Execution of concrete structures*

NA DIN EN 14199, *Execution of special geotechnical works — Micropiles*

NA DIN EN ISO 4063, *Welding and allied processes — Nomenclature of processes and reference numbers*

NA DIN EN ISO 17660-1, *Welding — Welding of reinforcing steel — Part 1: Loadbearing welded joints*

NA *DAfStb-Heft* (DAfStb Code of practice) 600, *Erläuterungen zu DIN EN 1992-1-1 und DIN EN 1992-1-1/NA* (Commentary on *DIN EN 1992-1-1* and *DIN EN 1992-1-1/NA*)[2)]

NA *DAfStb-Richtlinie Massige Bauteile aus Beton* (DAfStb Code of practice on massive concrete elements)[2)]

DBV-Merkblätter (DBV Codes of practice):

NA *DBV-Merkblatt Abstandhalter* (Spacers)[3)]

NA *DBV-Merkblatt Betondeckung und Bewehrung* (Concrete cover and reinforcement)[3)]

NA *DBV-Merkblatt Unterstützungen* (Supports)[3)]

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1) DIN 1045-3:2008-08 applies pending acceptance of DIN EN 13670 in combination with DIN 1045-3, *Plain, reinforced and prestressed concrete structures — Part 3: Workmanship*, by the building inspectorate.

2) Registered in the DITR Database of *DIN Software GmbH*, obtainable from *Beuth Verlag*, Am DIN-Platz, Burggrafenstraße 6, 10787 Berlin.

3) Registered in the DITR Database of *DIN Software GmbH*, obtainable from *Deutscher Beton- und Bautechnik-Verein e.V.*, Kurfürstenstraße 129, 10785 Berlin, Germany.

NA *DBV-Merkblatt Rückbiegen von Betonstahl und Anforderungen an Verwahrkästen* (Rebending of reinforcing steel and requirements for reinforcement boxes)[3)]

NA *DBV-Merkblatt Parkhäuser und Tiefgaragen* (Multistorey und underground car parks)[3)]

NCI re 1.4

Principles (denoted by "P" following the paragraph number) contain:

— general provisions, definitions and other details that are of a binding nature,

— requirements and calculation models, deviations from which are not permitted unless explicitly stated.

Application rules (without "P") are generally recognized rules that obey the principles and meet the requirements these formulate. Deviations from application rules are permitted provided they obey the principles and achieve serviceability, loadbearing capacity and durability equivalent to those required in this standard.

NCI re 1.5.2

NA.1.5.2.5 conventional building: building designed to sustain predominantly static, uniformly distributed imposed loads up to 5,0 kN/m^2, and in some cases concentrated loads up to 7,0 kN and loads from passenger cars.

NA.1.5.2.6 predominantly static action: static action, or non-static action that may be regarded as static for the purposes of structural design.

NA.1.5.2.7 predominantly non-static action: sudden or frequently recurrent action that often causes a change in internal forces and moments during the service life of a structure or member and that is not to be regarded as static for the purposes of structural design (e.g. loads from cranes, craneways, fork-lift trucks, imposed loads on bridges).

NA.1.5.2.8 normal-weight concrete: concrete with a dry density over 2 000 kg/m^3, but not more than 2 600 kg/m^3.

NA.1.5.2.9 lightweight concrete: concrete of dense structure with a dry density between 800 kg/m^3 and 2 000 kg/m^3, produced using coarse lightweight aggregate.

NA.1.5.2.10 heavyweight concrete: concrete with a dry density over 2 600 kg/m^3.

NA.1.5.2.11 high strength concrete: concrete with a compressive strength class ≥ C55/67 or ≥ LC55/60.

NA.1.5.2.12 pre-tensioned member: tendon made from prestressing steel tensioned in the mould prior to concreting. The bond between the concrete and tendon is achieved as the concrete hardens.

NA.1.5.2.13 post-tensioned member: tendon made from prestressing steel passed through a sheath cast in concrete, that is tensioned after the concrete has hardened and is kept in position by anchorages. Hardening of grout injected into the sheath ensures the bond between concrete and tendon.

NA.1.5.2.14 single strand: steel strand that is already corrosion-protected when produced, enclosed in a greased plastic sheath which allows its free movement in the axial direction.

NA.1.5.2.15 deviator: element with rounded end designed to transfer forces into the structure over which an external tendon is deflected. It can be open at one side or be completely enclosed in concrete.

NA.1.5.2.16 composite element: element comprising a precast element and in-situ topping, with or without fasteners.

NA.1.5.2.17 member predominantly subjected to bending: member which, at the ultimate limit state, has a relative eccentricity $e_d/h \geq 3{,}5$**.**

NA.1.5.2.18 compression member: linear or two-dimensional member predominantly subjected to compression, which, at the ultimate limit state, has a relative eccentricity $e_d/h < 3{,}5$.

NA.1.5.2.19 beam (T-beam): linear member predominantly subjected to bending, with an effective span equal to not less than three times the depth of section and a width of section or web width not more than five times the depth of section.

NA.1.5.2.20 plate (slab): plane, two-dimensional member that is predominantly subjected to bending at right angles to its surface, and whose lesser span is equal to not less than three times its thickness while its width is not less than five times its thickness**.**

NA.1.5.2.21 column: linear compression member whose greater cross-sectional dimension is not more than four times the smaller dimension.

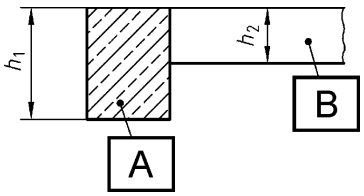
NA.1.5.2.22 diaphragm (wall): plane, two-dimensional member whose greater cross-sectional dimension is more than four times the lesser dimension and that is subjected to loads in its plane (axial loading).

NA.1.5.2.23 deep beam: plane, diaphragm-like member whose span is less than three times its depth of section and that is subjected to loads in its plane.

NA.1.5.2.24 concrete cover: distance between the surface of a reinforcing bar, pre-tensioned member or sheath of a post-tensioned member and the nearest concrete surface.

NA.1.5.2.25 decompression: limit state in which part of the cross section of the concrete is only just still in full compression when subjected to the relevant combination of actions**.**

NA.1.5.2.26 direct and indirect support: beams or slabs are directly supported if the distance of the lower edge of the supported member to the lower edge of the supporting member is greater than the depth of the supported member. Otherwise, indirect support is to be assumed (see Figure NA.1.1).



Key

A	Supporting member
B	Supported member
$(h_1 - h_2) \geq h_2$	for direct support
$(h_1 - h_2) < h_2$	for indirect support

Figure NA.1.1 — Direct and indirect support

NCI re 1.6 Symbols

d_g maximum aggregate particle size

NOTE Denoted D_{max} in DIN EN 206-1.

l_{eff} effective span

u_0 perimeter of loaded area A_{load} in the case of punching shear

u_1 perimeter of critical section in the case of punching shear

u_{out} perimeter of section beyond which punching shear reinforcement is no longer required

NCI re 2.3.1.2 (3)

Generally, $\gamma_{Q,T}$ = 1,5.

In linear-elastic analysis using the stiffness of uncracked sections and the mean secant modulus of elasticity, E_{cm}, a partial factor, $\gamma_{Q,T}$ = 1,0, may be assumed for restraint.

NCI re 2.3.1.3 (4)

Generally, the partial safety factor, $\gamma_{Q,set}$ = 1,5.

In linear-elastic analysis using the stiffness of uncracked sections and the mean secant modulus of elasticity, E_{cm}, a factor, $\gamma_{Q,set}$ equal to unity may be assumed for settlement.

Given the specification of partial safety factors for settlement in the NCI references, the note in DIN EN 1992-1-1 does not apply.

NDP re 2.3.3 (3)

d_{joint} is to be determined on a case-by-case basis.

NCI re 2.3.4.2

NOTE The specifications of this clause apply to in situ concrete displacement piles by analogy.

NCI re 2.3.4.2 (1)P

NOTE Effects due to placing concrete against the soil may be allowed for by increasing the concrete cover (see DIN EN 1536).

NCI re 2.3.4.2 (2)

NOTE The specifications of DIN EN 1536 are to be deemed “other provisions” within the meaning of 2.3.4.2 (2). Paragraph (2), therefore, does not necessarily apply if piles are cast in accordance with DIN EN 1536.

NDP re 2.4.2.1 (1)

The recommended value γ_{SH} = 1,0 applies.

NDP re 2.4.2.2 (1)

Generally, $\gamma_P = \gamma_{P,fav} = \gamma_{P,unfav}$ = 1,0.