BS EN 1536:2010+A1:2015

BSI Standards Publication

Execution of special geotechnical works — Bored piles

National foreword

This British Standard is the UK implementation of EN 1536:2010+A1:2015. It supersedes BS EN 1536:2010 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by [A1] [A1].

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Execution of special geotechnical work - Bored piles

Exécution des travaux géotechniques spéciaux - Pieux forés

Ausführung von Arbeiten im Spezialtiefbau - Bohrpfähle

This European Standard was approved by CEN on 2 July 2010 and includes Amendment 1 approved by CEN on 17 April 2015.

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Foreword

This document (EN 1536:2010+A1:2015) has been prepared by Technical Committee CEN/TC 288 “Execution of special geotechnical works”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2015, and conflicting national standards shall be withdrawn at the latest by December 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes ⟩A1⟨ EN 1536:2010 ⟩/A1⟨.

This document includes Amendment 1 approved by CEN on 2015-04-17.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟩A1⟨ ⟩/A1⟨.

The general scope of TC 288 is the standardisation of the execution procedures for geotechnical works (including testing and control methods) and of the required material properties. WG15 has been charged to revise EN 1536:1999, with the subject area of bored piles, including barrettes, but not "micro piles" of diameter less than 0,3 m.

The design, planning and execution of bored piles call for experience and knowledge in this specialised field. The execution phase requires skilled and qualified personnel and the present standard cannot replace the expertise of specialist contractor.

The document has been prepared to complement EN 1997-1, *Eurocode 7: Geotechnical design — Part 1: General rules* and EN 1997-2, *Eurocode 7 — Geotechnical design — Part 2: Ground investigation and testing*. Clause 7 "Considerations related to design" of this European Standard expands on design only where necessary (e.g. the detailing of reinforcement), but provides full coverage of the construction and supervision requirements.

⟩A1⟨ The amendment became necessary to accord the Standard EN 1536:2010 with EN 206:2013, Concrete – Specification, performance, production and conformity. EN 206:2013 has been revised to contain also the specific requirements for concrete for applications for special geotechnical works, making redundant respective provisions in EN 1536 (e.g. 6.1, 6.3 and 8.8).

Full according with EN 13670, Execution of concrete structures is however still pending. EN 1536:2010+A1:2015 therefore still contains specific requirements for bored piles as a concrete structure, such as the detailing of the reinforcement, the concrete placement and the supervision of concreting process which are complementing the provisions of EN 13670.

In addition, some editorial corrections were made in this amended Standard. ⟩/A1⟨

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

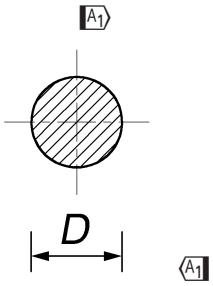
1 Scope

1.1 This European Standard establishes general principles for the execution of bored piles (see 3.2).

NOTE 1 This standard covers piles or barrettes which are formed in the ground by excavation and are structural members used to transfer actions and/or limit deformations.

NOTE 2 This standard covers piles with circular cross-section (see Figures 1 and A.1a)) and barrettes (see 3.3) with rectangular, **T** or **L** or any other similar cross-section (see Figure 2) concreted in a single operation.

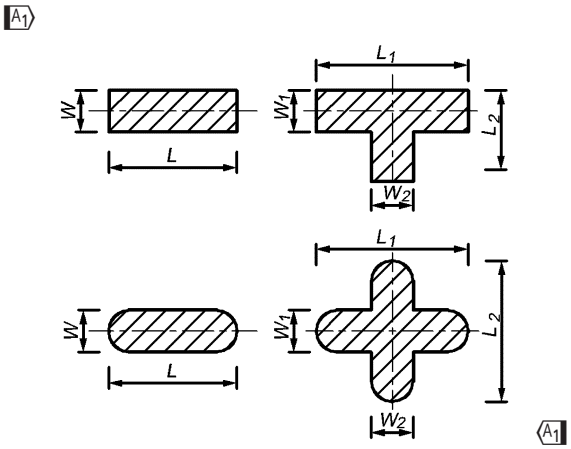
NOTE 3 In the standard the term pile is used for circular cross-section structure and the term barrette for other shapes. Both are bored piles.



Key

D Shaft diameter

Figure 1 — Bored pile with circular cross-section



Key

L Barrette length

W Barrette thickness

A Cross-sectional area of the shaft

Figure 2 — Bored pile with non circular cross-section (barrettes)

1.2 This European Standard applies to bored piles (see Figure 3) with:

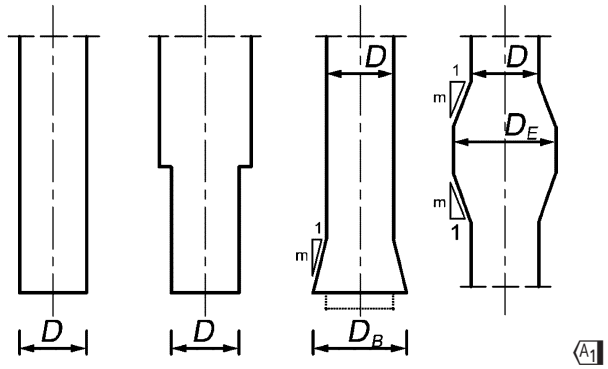
— uniform cross-section (straight shaft);

— telescopically changing shaft dimensions;

— excavated base enlargements; or

— excavated shaft enlargements.

NOTE The shape of a pile base and of an enlargement depends on the tool used for the excavation.



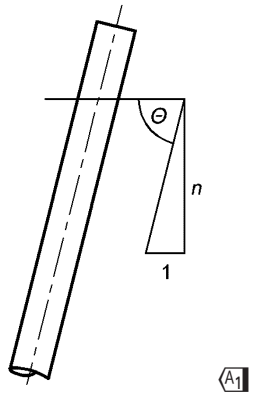
Key

D Shaft diameter

D_B Base enlargement diameter

D_E Shaft enlargement diameter

Figure 3 — Examples for straight shaft piles and piles with shaft and base enlargement



Key

n Rake

Figure 4 — Definition of the rake

1.3 This European Standard applies (see Note) to:

— bored piles with a depth to width ratio ≥ 5;

— piles (see Figures 1 and 3) with a shaft diameter 0,3 m ≤ D ≤ 3,0 m;

— barrettes (see Figure 2) with the least dimension W_i ≥ 0,4 m, a ratio L_i / W_i between its largest and its least dimensions ≤ 6 and a cross-sectional area A ≤ 15 m²;

— piles with circular precast elements used as structural member (see Figure 7) with a least dimension D_P ≥ 0,3 m;

— barrettes with rectangular precast elements used as structural member with a least dimension W_P ≥ 0,3 m.

NOTE The standard covers a large range of diameters. For small diameter bored piles less than 450 mm, the general specification can be adapted to cater for the lack of space (e.g. minimum bars number and spacing).

1.4 This European Standard applies to piles with the following rake (see Figure 4):

— n ≥ 4 (Θ ≥ 76°);

— n ≥ 3 (Θ ≥ 72°) for permanently cased piles.

1.5 This European Standard applies to bored piles with the following dimensions of the shaft or base enlargements (see Figure 3):

a) base enlargements:

1) in non-cohesive ground: D_B / D ≤ 2;

2) in cohesive ground: D_B / D ≤ 3;

b) shaft enlargements in any ground: $D_E / D \leq 2$;

c) slope of the enlargement in non-cohesive ground $m \geq 3$;

1) in non-cohesive ground: $m \geq 3$;

2) in cohesive ground: $m \geq 1{,}5$;

d) base enlargements area of barrettes: $A \leq 15\ m^2$;

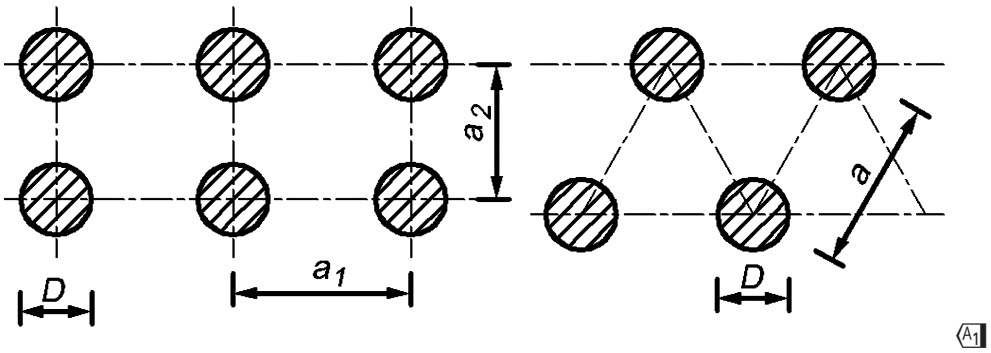
1.6 The provisions of this European Standard apply to:

— single bored piles;

— bored pile groups (see Figure 5);

— walls formed by piles (see Figure 6).

〈A1〉



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Key

D Shaft diameter

a_i Centre to centre spacing of the piles

Figure 5 — Examples of pile groups