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Standards

Irish Standard  
I.S. EN 14199:2015

# Execution of special geotechnical works - Micropiles

**I.S. EN 14199:2015**

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## Execution of special geotechnical works - Micropiles

Exécution des travaux géotechniques spéciaux - Micropieux

Ausführung von Arbeiten im Spezialtiefbau - Mikropfähle

This European Standard was approved by CEN on 12 March 2015.

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## **EN 14199:2015 (E)**

### **Foreword**

This document (EN 14199:2015) 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of an identical text or by endorsement, at the latest by November 2015, and conflicting national standards shall be withdrawn at the latest by November 2015.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 EN 14199:2005.

The technical changes in comparison to EN 14199:2005 are:

- Driven piles are excluded from EN 14199 and transferred to EN 12699;
- sections describing concrete and testing have been minimised;
- EN 14199:2015 has been harmonized with EN 1536.

The general scope of CEN/TC 288 is the standardization of the execution procedures for geotechnical works, including testing and control methods, and the required material properties. WG 16 has been charged with the subject area of micropiles.

This document has been prepared to stand alongside EN 1997-1. Clause 7 of this Standard covers design aspects of micropiles.

According to the CEN/CENELEC Internal Regulations, the national standards organisations 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 micropiles.

They are for drilled piles constructed using a drilling tool with a diameter less than 300 mm.

NOTE 1 This European Standard is not applicable to driven piles, the execution of which is governed by EN 12699.

NOTE 2 For a definition of shaft diameter see 3.3.

**1.2** Micropiles are structural members to transfer actions to the ground and can contain bearing elements to transfer directly or indirectly loads and or to limit deformations. For examples of micropiles see Figure 1, Figure 2 and Figure 3. Their shaft and base resistance can be improved (mostly by grouting) and they can be constructed with (see Figure 4):

- uniform cross section (straight shaft); or
- telescopically changing shaft dimensions;
- shaft enlargements; and/or
- base enlargement.

**1.3** Other than practical considerations, there are no limitations regarding, length, inclination (definition of inclination, see Figure 5), slenderness ratio or shaft and base enlargements.

**1.4** The provisions of this European Standard apply to (see Figure 6):

- single micropiles;
- micropile groups;
- reticulated micropiles;
- micropile walls.

**1.5** The material of micropiles covered by this European Standard can be:

- steel or other reinforcement materials;
- grout, mortar or concrete;
- a combination of above.

**1.6** Micropiles can be used for:

- working under restricted access and/or headroom conditions;
- foundations of new structures (particularly in very heterogeneous soil or rock formations);
- reinforcing or strengthening of existing structures to increase the capacity to transfer load to depth with acceptable load settlement characteristics, e.g. underpinning works;
- reducing settlements and/or displacements;
- forming a retaining wall;

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- reinforcing of soil to form a bearing and/or retaining structure;
- improving slope stability;
- securing against uplift;
- other applications where micropile techniques are appropriate.

**1.7** Deep mixing columns according to EN 14679 are not included in this European Standard. Columns constructed by jet grouting are covered by EN 12716. Ground anchors are covered by EN 1537.

**2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 206:2013, *Concrete - Specification, performance, production and conformity*

EN 445, *Grout for prestressing tendons - Test methods*

EN 447:2007, *Grout for prestressing tendons - Basic requirements*

EN 934-2, *Admixtures for concrete, mortar and grout — Part 2: Concrete admixtures — Definitions, requirements, conformity, marking and labelling*

EN 1090-2, *Execution of steel structures and aluminium structures — Part 2: Technical requirements for steel structures*

EN 1536:2010, *Execution of special geotechnical work - Bored piles*

EN 1990, *Eurocode - Basis of structural design*

EN 1991 (all parts), *Eurocode 1: Actions on structures*

EN 1992-1-1, *Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings*

EN 1993 (all parts), *Eurocode 3: Design of steel structures*

EN 1994-1-1, *Eurocode 4: Design of composite steel and concrete structures — Part 1-1: General rules and rules for buildings*

EN 1997-1:2004, *Eurocode 7: Geotechnical design - Part 1: General rules*

EN 1997-2, *Eurocode 7 - Geotechnical design - Part 2: Ground investigation and testing*

EN 10025 (all parts), *Hot-rolled products of non-alloy structural steels*

EN 10080, *Steel for the reinforcement of concrete - Weldable reinforcing steel - General*

prEN 10138-4:2001, *Prestressing steels — Part 4: Bars*

EN 10210 (all parts), *Hot finished structural hollow sections of non-alloy and fine grain structural steels*

EN 10219 (all parts), *Cold formed welded structural hollow sections of non-alloy and fine grain steels*

EN 12390-3, *Testing hardened concrete - Part 3: Compressive strength of test specimens*



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