



SLOVENSKI STANDARD
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Vgradnja sistemov za naknadno prednapenjanje konstrukcij – 1. del: Pristojnosti osebja

Installation of post-tensioned kits for prestressing of structures – Part 1: Competence of personnel

Ausführung von Arbeiten von Spannverfahren mit nachträglichem Verbund in Tragwerken - Teil 1: Personalkompetenz

Mise en oeuvre de kits de post-tension pour la précontrainte des structures — Partie 1 : Compétences du personnel

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ICS:

03.100.30	Vodenje ljudi	Management of human resources
91.080.40	Betonske konstrukcije	Concrete structures

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EUROPEAN STANDARD
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English Version

Installation of post-tensioned kits for prestressing of structures - Part 1: Competence of personnel

Ausführung von Arbeiten von Spannverfahren mit nachträglichem Verbund in Tragwerken - Teil 1: Personalkompetenz

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 104.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 17678-1:2021) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by SN.

This document is currently submitted to the CEN Enquiry.

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prEN 17678-1:2021 (E)**Introduction**

The market for the post-tensioning (PT) kits exists worldwide but the first area of concern is Europe.

The main motivating factor for creating a European standard on competence of personnel is:

- safety and quality considerations during the installation of the kits;
- safeguarding the integrity of structures during their service life;
- facilitating free movement of PT personnel, both between PT specialist companies and member states.

The requirements for the competence and assessment of prestressing personnel are based on the experience of CWA 14646:2003, *“Requirements for the installation of post-tensioning kits for prestressing of structures and qualification of the specialist company and its personnel”*.

The CWA was initiated by the PT providers and the CEN workshop represented all groups of stakeholders related to the installation of PT kits.

As CWA 14649 has expired and to fill this gap, an initiative by the same group of stakeholders was taken to replace and update the provisions on competence in CWA 14646 with this document.

This document supplements the general requirements of personnel given in EN 13670, *“Execution of concrete structures”*.

Part 1 of this document deals with the minimum competence personnel dealing with PT installations shall possess and on the tasks the personnel are qualified to undertake.

prEN 17678-2 gives the framework for how to assess the competence of PT personnel and issuing certificates to candidates fulfilling the requirements.

Additional requirements to those given in this document may be specified in the execution specification or in a national annex to this document.

1 Scope

This document indicates the minimum training and registration requirements for post-tensioning personnel involved in the installation of PT kits in concrete structures using bonded or unbonded tendons in accordance with the relevant execution specifications, product standard and/or European Technical Assessment (ETA).

This document describes the tasks that the various categories of PT personnel can undertake.

For the purposes of this document, PT personnel means: PT-Manager, Supervisors, Operatives and Trainees who are directly employed or indirectly employed on a sub-contract basis.

This document does not cover general safety and health aspects.

This document does not cover contractual issues.

prEN 17678-2 deals with the assessment of competence.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

EN 446, *Grout for prestressing tendons – Grouting procedures*

EN 447, *Grout for prestressing tendons – Basic requirements*

EN 13391:2004, *Mechanical tests for post tensioning systems*

EN 13670, *Execution of concrete structures*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

client

the body for which the PT installation works are being carried out

3.2

EOTA

European Organisation for Technical Assessment (EOTA), an international non-profit association responsible for laying down the harmonised conditions for the marketing and technical assessment of construction products under the CPR

prEN 17678-1:2021 (E)**3.3****ETA**

European Technical Assessment (ETA) for a construction product, a favourable technical assessment of its fitness for an intended use, based on the contribution made by this product to the fulfilment of the seven Essential Requirements, as stated in the Construction Products Regulation (CPR) for the construction works in which the product is installed

Note 1 to entry: ETA's are issued by approved Technical Approval bodies under the guidance of EOTA

3.4**hold point**

defined point in the post-tensioning installation process which require inspection or verification of the satisfactory completion of all of the necessary processes up to that point and prior to the commencement of the next stage of the process

3.5**inspection and test plan**

document which summarises the inspection requirements of each stage of the PT installation process, including receipt and safe storage

Note 1 to entry: Hold points and the person(s) responsible for release will be clearly defined in the document

3.6**post-tensioning kit
(PT kit)**

arrangement of tendons and anchorages to carry out post-tensioning

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Note 1 to entry: Such a kit, as defined in the relevant ETA may include some or all of the following components:

- *Anchorage*. A mechanical device, usually consisting of several components designed to retain the force in the stressed tendon and to transmit it to the concrete;
- *Bursting reinforcement*. The reinforcement in the anchorage zone to resist transverse tensile forces due to the introduction of prestressing force;
- *Coupler*. A device to join tendons;
- *Duct (sheathing)*. An enclosure in which the prestressing steel is placed and which temporarily or permanently allows relative movement between the prestressing steel and the surrounding concrete;
- *Tendon*. One or a number of prestressing steel elements, i.e. wire, strand, bar.

3.7**grout**

homogeneous mixture of cement and water, it may contain admixtures and additions

Note 1 to entry: *Pre-bagged* grout is grout comprising a pre-bagged blended mixture of cement admixture and additives mixed with water

Note 2 to entry: *Site blended* grout is grout blended on site using a defined menu of cement, admixture, additives mixed with water.

[SOURCE: EN 445:2007, definition 3.1]

3.8**method statement**

documentation describing the methods and procedures to be used to perform the work

[SOURCE: EN 13670:2009, definition 3.12]

3.9**prestressing**

controlled generation of permanent forces and deformations in a structural concrete member to counteract the stresses arising from dead and imposed loads

3.10**PT manager**

expert with a technical qualification or license and with special experience in managing large scale PT sites

3.11**PT supervisor**

expert with special experience in PT site activities, nominated by the PT specialist company

3.12**PT operative**

competent person with experience in PT site activities under the guidance of a PT Supervisor

3.13**PT trainee**

unqualified person undergoing training according to a defined training plan

3.14**PT specialist company**

company responsible for the installation of post-tensioning kits in accordance with the execution specification

3.15**PT kit manufacturer**

company who manufactures a post-tensioning kit and is holder of the relevant ETA

3.16**quality plan**

document specifying which procedures and associated resources shall be applied by whom and when to a specific project, product, process or contract

3.17**tendon**

single tensile element or a bundle of tensile elements used for the prestressing of a structure, including the required protection and anchorages

3.18**filling material**

material which is situated inside the anchorages and ducts and which can be made of cementitious grout, wax or grease

[SOURCE: EAD 160004-00-0302 and 160027-00-0301]

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prEN 17678-1:2021 (E)**3.19****execution specification**

documents covering all drawings, technical data and requirements necessary for the execution of a particular project

Note 1 to entry: The execution specification is not one single document, but the total sum of documents required for the execution of the work as provided by the designer to the constructor. It includes the project specification prepared to supplement and qualify the requirements of this document (EN 13670), as well as referring to the national provisions relevant in the place of use.

[SOURCE: EN 13670:2009, definition 3.8]

4 General principles, duties and responsibilities

This document relates to four categories of PT personnel that are authorized to undertake related tasks in execution class 2 and 3, in accordance with EN 13670:

PT trainee – level PT 0 (An entry level with little or no knowledge of the PT installation process, but with an acceptable Safe Working in Construction qualification / endorsement applicable to the country of work).

Tasks:

- works under direct supervision of a PT operative;
- assists the PT operatives and supervisor whilst receiving training and undertaking operations under supervision for all PT site works activities:
 - PT installation for anchors, ducting, strand;
 - air testing (if required);
 - QC measures and checking.
- prepares for and assists with stressing activities:
 - cut off and sealing / capping;
- preparation and undertaking of grouting.

PT operative – Level PT 1 (A trained PT operative with defined knowledge as detailed in Table 1 below).

Tasks:

- works under the supervision of a PT supervisor;
- follows site procedures and demonstrates good understanding of drawings and QC requirements to undertake site works activities for:
 - PT installation, anchors, ducting, strand;
 - air testing (if required);
 - QC measures and checking;
 - operation of specialist equipment and undertaking of stressing activities;
 - cut off and sealing / capping;
 - preparation and undertaking of grouting including required testing;
 - report any non-conformance to the supervisor.