



SLOVENSKI STANDARD

SIST EN 17678-1:2023

01-januar-2023

Vgradnja sistemov za naknadno prednapenjanje konstrukcij - 1. del: Pristojnosti osebja

Installation of post-tensioning 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

Ta slovenski standard je istoveten z: **EN 17678-1:2022**

ICS:

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

SIST EN 17678-1:2023

en,fr,de

EUROPEAN STANDARD

EN 17678-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2022

ICS 03.100.30; 91.080.40

English Version

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

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

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

This European Standard was approved by CEN on 19 September 2022.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents		Page
European foreword		3
Introduction		4
1	Scope	5
2	Normative references	5
3	Terms and definitions	5
4	General principles, duties and responsibilities	7
5	Competence	10
5.1	General	10
5.2	Levels of competence	10
5.3	Training modules	10
6	Training provider	12
7	Documents	12
8	Records	12
Bibliography		13

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European foreword

This document (EN 17678-1:2022) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by SN.

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of an identical text or by endorsement, at the latest by April 2023, and conflicting national standards shall be withdrawn at the latest by April 2023.

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

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EN 17678-1:2022 (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 this document on competence of personnel is:

- safety and quality considerations during the installation of the PT 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 [2].

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 14646 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.

Part 1 of this document deals with the minimum competence personnel working with PT installations shall possess, and with the tasks the personnel is qualified to undertake.

Part 2 of this document gives the framework for how to assess the competence of PT personnel and issue certificates to candidates fulfilling the requirements.

Additional requirements and requirements beyond the minimum formulated in this document may be specified in a project specification or in a national annex to this document.

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1 Scope

This document specifies the minimum training and registration requirements for post-tensioning personnel involved in the installation of PT kits. These PT kits are typically used in concrete structures using bonded or unbonded tendons in accordance with the relevant execution specifications, product standard and / or appropriate technical assessment.

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

For the purposes of this document, PT personnel means: PT Manager, PT Supervisors, PT Operatives and PT 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 17678-2:2022 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 1992-1-1, *Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings*

EN 13670, *Execution of concrete structures*

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

body for which the PT installation works are being carried out

3.2 ETA

European Technical Assessment (ETA) for a construction product, a favourable technical assessment of its fitness for the 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: ETAs are issued by approved Technical Approval bodies under the guidance of “European Organisation for Technical Assessment (EOTA)”.

EN 17678-1:2022 (E)**3.3****hold point**

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

3.4**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 specified in the document.

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

arrangement of tendons and anchorages to carry out post-tensioning

Note 1 to entry: Such a kit, as defined in the relevant technical specifications and approvals 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.

3.6**grout**

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

[SOURCE: EN 445:2007]

3.7**method statement**

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

[SOURCE: EN 13670:2009]

3.8**prestressing**

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

3.9**PT manager**

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

3.10**PT supervisor**

expert with special experience in PT site activities, nominated by the *PT specialist company* (3.13)

3.11**PT operative**

competent person with experience in PT site activities under the guidance of a *PT supervisor* (3.10)

3.12**PT trainee**

unqualified person undergoing training according to a defined training plan

3.13**PT specialist company**

company responsible and specializing in the installation of post-tensioning kits in accordance with the execution specification and having large experience in the field

3.14**PT kit manufacturer**

company who manufactures a post-tensioning kit and is holder of the relevant technical specifications and approvals

3.15**quality plan**

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

3.16**tendon**

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

3.17**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]

4 General principles, duties and responsibilities

This document describes 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 PT0 (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).

EN 17678-1:2022 (E)

Tasks:

- working under direct supervision of a PT operative;
- assisting 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);
 - quality control measures and checking;
 - preparation and assistance with stressing activities such as cut off and sealing /capping or grout blending;
 - preparation and undertaking of grouting.

PT operative – Level PT1 (A trained PT operative with defined knowledge as detailed in Table 1).

Tasks:

- working under the supervision of a PT supervisor;
- following site procedures and demonstrating good understanding of drawings, PT activities and quality control requirements to undertake site works activities:
 - PT installation, anchors, ducting and strand;
 - air testing (if required);
 - quality control measures and checking;
 - operation of PT specialist company's equipment and undertaking of stressing activities;
 - cut off and sealing / capping;
 - preparation and undertaking of grouting including required testing;
 - reporting any non-conformance to the supervisor.

PT supervisor – Level PT2 (A fully trained and experienced operative person with acceptable knowledge and experience as detailed in Table 1).

Tasks:

- site level responsibility for the supervision and undertaking of all PT site works in accordance with the approved site procedures, drawings, etc.;
- making sure that PT operatives have good understanding and acceptance of the procedures;
- responsible for safe and correct undertaking of the site operations for the post-tensioning activities including installation, stressing, grouting, etc.;
- maintenance and execution of all site quality control records;
- training activities as required for trainee and operative level staff members;