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Katodna zaščita – Stopnje usposobljenosti in certifikacija osebja za katodno zaščito

Cathodic protection – Competence levels and certification of cathodic protection personnel

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Cathodic protection - Competence levels and certification of cathodic protection personnel

Kathodischer Korrosionsschutz - Qualifikationsgrade und
Zertifizierung von den kathodischen Korrosionsschutz
geschultem Personal

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 219.

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.

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Foreword

This document (prEN 15257:2005) has been prepared by Technical Committee CEN/TC 219 “Cathodic protection”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document is aimed at enabling the competence of personnel carrying out cathodic protection studies, execution work, inspections and maintenance work to be defined and verified. The relevant application sectors concern underground or immersed metallic structures, marine metallic structures, reinforced concrete structures and the inner surfaces of metallic container structures.

The standard defines the **competence levels** of personnel within a given **application sector** and a framework for the training and **certification** for the personnel to reach and demonstrate the competence levels.

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1 Scope

This European standard defines the three competence levels of personnel acting in the field of cathodic protection, including survey, design, installation, testing and maintenance. It specifies the framework of procedures for the training and certification for the personnel to reach and demonstrate the competence levels. It defines the minimum requirements for certification bodies responsible for this certification.

These procedures shall be in accordance with EN ISO 17024.

Competence levels and certification schemes apply to each of the following application sectors:

- underground and immersed metallic structures;
- marine metallic structures;
- reinforced concrete structures;
- inner surfaces of metallic container structures.

These application sectors are detailed in annex A.

It is not mandatory for a certification body to establish certification in all application sectors or to all levels of competence.

Note 1: This European standard does not incorporate the certification of companies or services.

Note 2: This European standard does not include internal corporate assessment and qualification of personnel.

Note 3: Wherever gender specific words such as "his", "her", "he" or "she" appears in this standard the other gender is also applicable.

2 Normative references

The following referenced documents are indispensable for the application 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 ISO 17024, *Conformity assessment – General requirements for bodies operating certification of persons*

EN ISO 8044, *Protection of metallic materials against corrosion – Terms and definitions*

EN 12473, *General principles of cathodic protection in sea water*

EN 12474, *Cathodic protection for submarine pipelines*

EN 12495, *Cathodic protection for fixed steel offshore structures*

EN 12499, *Internal cathodic protection of metallic structures*

EN 12696, *Cathodic protection of steel in concrete*

EN 12954, *Cathodic protection of buried or immersed metallic structures - General principles and application of pipelines*

EN 13173, *Cathodic protection for steel offshore floating structures*

EN 13174, *Cathodic protection of harbour installations*

EN 13509, *Cathodic protection measurement techniques*

EN 13636, *Cathodic protection of buried metallic tanks and related piping*

EN 14505, *Cathodic protection of complex structures*

EN 50162, *Protection against corrosion by stray current from direct current systems*

EN 15112, *External cathodic protection of well casings*

EN xxxxx, *Cathodic protection of ships external hulls*

EN xxxxx, *Cathodic protection of internal ballast tanks of ships and floating structures*

EN xxxxx, *Galvanic anodes for cathodic protection in seawater*

TS 14038-1, *Electrochemical remediation of reinforced concrete – Part 1: Re-alkalisation*

3 Terms and definitions

The terms and definitions of EN ISO 8044 apply in general and for the specific purposes of this document, the following terms and definitions apply.

3.1

applicant

person applying for certification for a given level in a given application sector

3.2

application sector

particular section of industry or technology where specialised cathodic protection design, testing and maintenance practices are used requiring specific system related knowledge, skill, equipment or training

Application sectors are detailed in Annex A.

3.3

attestation

letter from the certification body or delegated body confirming successful completion of examination

3.4

cathodic protection personnel

personnel who devote a regular and significant percentage of their professional activity to the practical application of cathodic protection within one or more of the application sector

3.5

certificate

document issued under the rules of the certification system defined in this standard indicating that the named person has demonstrated that he is competent to perform the tasks defined in this standard for the given level and application sector identified on the certificate

3.6

certification assessment

assessment of competence by examination (for level 1 and level 2) or general assessment (for level 3)

3.7

certification body

body that administers procedures for certification of cathodic personnel according to the requirements of this standard and which fulfils the requirements of EN ISO 17024

3.8

certification examination

mechanism that is part of the certification assessment, which measures a candidate's competence by one or more means such as written, oral, practical and observational examination

3.9

competence

ability of personnel to undertake tasks at specific levels and in specific cathodic protection application sectors in accordance with existing European standards on cathodic protection. This is demonstrated by appropriate levels of training, professional knowledge, skill and experience

3.10

delegated body

body, independent of any single predominant interest, subcontracted by the certification body to perform any of its tasks, except the issue of certification, in compliance with EN ISO 17024

Note: The delegated body constitutes one of the elements of the system governed by the certification body

3.11

examination centre

centre approved by the certification body for the examination of competence in cathodic protection.

Note: The examination centre constitutes one of the elements of the system governed by the certification body

3.12

examiner

person with relevant technical and personal qualifications, and competent to conduct and/or score an examination under the authorisation of the certification body or the delegated body

3.13

industrial cathodic protection experience

experience in the applicable cathodic protection techniques and field of application concerned, which leads to the required skill and knowledge.

3.14

significant interruption

absence from, or change in activity, which prevents the certificated person from practising the duties corresponding to his level of certification within the application sector(s) for which he is certificated, for:

- a) a continuous period in excess of 365 days or;
- b) two or more periods for a total time exceeding two fifths of the total period of validity of the certificate.

3.15

technical instruction

written description stating the precise steps to be followed in a cathodic protection design, testing or maintenance activity to an established standard, code, specification or cathodic protection procedure. It may also be known as a method statement or work instruction. The technical instruction defines all essential parameters and precautions to be observed when applying cathodic protection testing techniques to a specific task, following an established standard, code or specification. A technical instruction may involve the application of more than one cathodic protection testing technique.

3.16

training centre

centre where training of applicants is carried out for preparation to certification examination. It includes demonstration and testing facilities to simulate the electrical conditions which normally exist in real cathodic protection of operating industrial structures, for a given application sector.

4 General principles, duties and responsibilities

4.1 Certification body

The certification body shall fulfil the requirements of EN ISO 17024 and this standard in respect of the certification of cathodic protection personnel.

The certification body shall:

- a) initiate, promote, maintain and administer the certification scheme according to this standard;

- b) determine which competence levels and application sectors shall be the subject of certification;
- c) establish and publish the requirements for training and industrial experience for levels 1, 2 and 3 personnel in the application sectors detailed in Annex A for the levels and sectors selected for certification;
- d) assess and approve examination centres;
- e) monitor and document all delegated functions, in accordance with a documented procedure.

The certification body may delegate, under its direct responsibility, to a delegated body:

- i) the detailed administration of the certification procedure;
- ii) the approval of properly staffed and equipped training centres and their monitoring on a periodic basis;
- iii) the establishment of properly staffed and equipped examination centres and their monitoring on a periodic basis;
- iv) the establishment of an appropriate system for the maintenance of training, competence and examination records, which shall be retained for at least one certification cycle (10 years).

4.2 Delegated body

Where established, the delegated body shall:

- a) work under the control of the certification body;
- b) have the resources and expertise needed to undertake all the tasks delegated by the certification body;
- c) apply a documented quality management system approved by the certification body in accordance with EN ISO 17024.

4.3 Training centre

The establishment of a training centre is not mandatory. A training centre may be situated at an employer's premises or at an examination centre or independently. A training centre may be used as an examination centre, provided that it satisfies the minimum characteristics listed in 4.4.

- 1) A training centre may be established for one or more application sectors.
- 2) A training centre shall provide the following components, any of which may be combined:
 - a) demonstration and testing facilities to simulate the electrical conditions which normally exist in real cathodic protection of operating industrial structures, for the appropriate application sector(s);
 - b) a classroom having appropriate equipment and facilities for teaching the theoretical principles;
 - c) a workshop appropriate equipment, facilities and equipped with cathodic protection instruments, materials and samples for practical training and testing.

Up to date calibration certificates and repair records for all devices, instrumentation and equipment shall be maintained by the training centre.

4.4 Examination centre

An examination centre shall:

- a) have adequately qualified staff, suitable premises and sufficient equipment to ensure satisfactory examinations for the levels and application sectors concerned;
- b) work under the control of the certification body or delegated body;
- c) apply a documented quality management procedure approved by the certification body;
- d) have the resources needed to administer examinations, including the calibration and control of any equipment used;
- e) prepare and conduct examinations under the responsibility of an examiner(s) authorised by the certification body.
- f) use only those examination documents established or approved by the certification body;
- g) use only test facilities prepared or approved by the certification body for the practical examinations conducted at that centre.

h) use only those assessment procedures established or approved by the certification body.

An examination centre may be situated at a training centre or at an employer's premises. Examinations and their assessments shall be conducted only in the presence of, and under the control of an authorised representative of the certification body or delegated body, which shall be independent of the employer of the applicant.

5 Levels of competence

5.1 General

An individual who has been certificated in accordance with this standard shall be classified in one or more of the three following levels, depending upon his respective competence in particular application sectors.

A detailed description of competence levels is given in annex B.

5.2 Level 1

An individual certificated to level 1 shall have demonstrated outline knowledge of:

- a) the fundamentals of electricity, corrosion and coatings;
- b) cathodic protection and measurement techniques;
- c) safety issues and applicable standards related to cathodic protection.

He shall be competent to carry out cathodic protection tasks according to written technical instructions and under the supervision of level 2 or level 3 personnel.

Within the scope of the competence defined in annex B, level 1 personnel shall be competent to:

- i) check the calibration validity of the cathodic protection testing equipment;
- ii) perform tests as instructed;
- iii) record and classify the results of the tests;
- iv) report the results in a comprehensible format;
- v) supervise and perform inspection and testing during installation of cathodic protection systems;
- vi) carry out routine maintenance work on cathodic protection systems.

Note: Some installation works may be carried out by the level 1 personnel. If installation is undertaken by these personnel it is understood that their supervision, inspection and testing tasks are not reduced.

Level 1 certificated personnel shall not be responsible for the choice of test method or technique to be used, nor for preparing the written technical instructions, nor for the interpretation of test results.

5.3 Level 2

In addition to the competences for level 1 personnel, an individual certificated to level 2 shall have demonstrated competence in:

- a) general principles of corrosion and cathodic protection;
- b) the principles of electricity
- c) the significance of coatings and their influence on cathodic protection;
- d) a detailed knowledge of cathodic protection test procedures and safety issues.

He shall understand and be competent to perform cathodic protection tasks according to established or recognised procedures. Within the scope of the competence defined in Annex B, level 2 personnel shall be competent to:

- i) carry out and supervise all level 1 duties;
- ii) provide guidance for personnel at level 1;
- iii) select the cathodic protection testing technique for the purpose required;
- iv) define the limitations of application of the testing method according to established procedures;

- v) translate cathodic protection testing standards and specifications into written technical instructions for cathodic protection testing, routine maintenance, and installations procedures;
- vi) set up and verify equipment settings;
- vii) organise and report the results of cathodic protection testing;
- viii) interpret and evaluate results according to applicable standards, codes or specifications;
- ix) undertake cathodic protection design work under the supervision of an individual certificated to level 3. Subject to local regulations, an individual certificated to level 2 may undertake simple cathodic protection design work as described in annex B, according to established procedures in a known environment, without supervision;
- x) supervise and test the installation of cathodic protection systems;
- xi) commission cathodic protection systems under the responsibility of an individual certificated to level 3. Subject to local regulations, an individual certificated to level 2 may undertake simple cathodic protection commissioning according to established procedures in a known environment, without supervision;
- xii) undertake maintenance of cathodic protection system.

5.4 Level 3

An individual certificated to level 3 shall be competent to:

- a) design cathodic protection systems;
- b) establish and validate cathodic protection testing procedures;
- c) interpret standards, codes, specifications and procedures;
- d) designate the particular cathodic protection test methods and procedures to be used;
- e) interpret the reported results of cathodic protection testing and use them in performance verification;
- f) determine any remedial actions.
- g) carry out and supervise all level 1 and level 2 duties;
- h) assume full technical responsibility for a training centre or examination centre and staff;

Level 3 personnel shall have demonstrated:

- i) detailed knowledge of corrosion theory, principles of electricity, cathodic protection design, installation, commissioning, testing and performance evaluation including safety in at least one application sector,
- ii) competence to undertake without supervision the design of cathodic protection systems in at least one application sector;
- iii) sufficient theoretical knowledge and practical experience of cathodic protection to select cathodic protection testing methods, survey requirements and performance criteria;
- iv) competence to evaluate and interpret results of cathodic protection performance in accordance with existing standards, codes and specifications;
- v) competence to assist in establishing testing and performance criteria where none are otherwise available;
- vi) a general familiarity with cathodic protection in other application sectors;

Level 3 personnel may, if authorised by the certification body or the delegated body, manage and supervise training and examinations to level 1 and level 2 on its behalf.

6 Eligibility for certification

6.1 General

Applicants may be employed, self employed or unemployed.

The applicant shall document to the certification body, or the delegated body, personal information which includes a declaration of the applicant's education, training and experience. This shall contain sufficient detail to demonstrate the eligibility of the applicant for certification.

To be eligible for certification, the applicant shall fulfil the requirements for cathodic protection training and practical experience as defined in this clause and shall pass the relevant examination or assessment as detailed in clause 7.

Applicants for levels 1 and 2 may complete the training as in 6.2 and the examination as in 7.2 before completion of industrial experience as in 6.3. The certification body or delegated body may issue an attestation confirming satisfactory completion of the examination but making clear that full certification of the applicant will not be issued until satisfactory completion of the industrial experience as in 6.3.

The issue of the attestation shall be recorded by the certification body as in 4.1 (iv) and shall comply with 8.2.

6.2 Training

A formal and documented programme of training is required. This may be through training by the employer, a recognised course at a training centre or by self study.

Attendance at a training centre may be a mandatory requirement for certification, depending upon the requirements of the certification body.

6.2.1 Level 1 and level 2

The applicant shall provide documentary proof that he has completed a period of training, in the application sector and level for which the certification is sought. The training period, method and syllabus, shall be established by the certification body in accordance with annex B.

The minimum duration of training undertaken by the candidate for certification shall be as defined in Table 1.

Table 1 — Minimum training requirements

Application sectors	Level 1 (hours) a c	Level 2 (hours) a b c
Underground or submerged metallic structures	40 hr	40 hr
Metallic marine structures	40 hr	40 hr
Reinforced concrete structures	40 hr	40 hr
Inner surfaces of metallic container structures	40 hr	40 hr
<p>a Training hours include both practical and theory components.</p> <p>b Direct access to level 2 examination requires the total hours shown for level 1 and level 2.</p> <p>c Training hours may be allocated by the certification body to comprise a common core of both practical and theory for all application sectors which shall be between 20 and 30 hours of the total of 40 hours minimum for each application sectors. In addition to this common core each application sector shall be the subject of both practical and theory training of between 10 and 20 hours minimum. Training may comprise a single common core and up to 4 modules each of 10 to 20 hours minimum for each application sectors.</p>		

6.2.2 Level 3

Taking into account the required scientific and technical competence of applicants for level 3 certification as described in 5.4, preparation for certification at level 3 may be by, for example:

- a) completing a relevant engineering or scientific degree or period of post graduate education at a reputable school of higher education,
- b) attending training courses, conferences or seminars (such as those organised by established industrial or independent associations),
- c) studying scientific or engineering text books, periodicals, and other specialised materials.

The certification body shall establish, publish and from time to time update the certification requirements for level 3 personnel.