

# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 15257

ISO/TC 156

Secretariat: SAC

Voting begins on:  
2014-09-25

Voting terminates on:  
2015-02-25

---

---

## Cathodic protection — Competence levels of cathodic protection persons — Basis for certification scheme

*Protection cathodique — Niveaux de compétence des personnes en protection cathodique — Base pour un dispositif particulier de certification*

ICS: 77.060

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

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.



Reference number  
ISO/DIS 15257:2014(E)

© ISO 2014

### **Copyright notice**

This ISO document is a Draft International Standard and is copyright-protected by ISO. Except as permitted under the applicable laws of the user's country, neither this ISO draft nor any extract from it may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission being secured.

Requests for permission to reproduce should be addressed to either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Reproduction may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.

# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Levels of competence</b> .....	<b>3</b>
4.1 General.....	3
4.2 Level 1 Cathodic Protection Data Collector (or Tester).....	3
4.3 Level 2 Cathodic Protection Technician.....	3
4.4 Level 3 Cathodic Protection Senior Technician.....	3
4.5 Level 4 Cathodic Protection Specialist.....	3
4.6 Level 5 Cathodic Protection Expert.....	4
4.7 Levels and Named Designations.....	4
<b>5 Application sectors</b> .....	<b>4</b>
5.1 General.....	4
5.2 On-land metallic structures.....	4
5.3 Marine metallic structures.....	5
5.4 Reinforced concrete structures.....	5
5.5 Inner surfaces of metallic container structures.....	5
<b>6 Requirements for the competence of persons at the various levels and for the various applications sectors</b> .....	<b>6</b>
6.1 General.....	6
6.2 Knowledge required by persons in all application sectors.....	6
6.3 Tasks to be fulfilled in all application sectors.....	7
6.4 Specific tasks for on-land metallic structures application sector.....	10
6.5 Specific tasks for marine metallic structures application sector.....	12
6.6 Specific tasks for reinforced concrete structures application sector.....	14
6.7 Specific tasks for inner surfaces of metallic structures application sector.....	15
6.8 Requirements for a level 5 person.....	16
<b>Annex A (normative) Certification scheme: Eligibility for competence assessment</b> .....	<b>18</b>
<b>Annex B (normative) Certification scheme: Examination</b> .....	<b>21</b>
<b>Annex C (normative) Certification scheme: Validity, re-certification, transition periods</b> .....	<b>25</b>
<b>Annex D (informative) List of relevant standards, guidelines and programs</b> .....	<b>28</b>

## **Foreword**

ISO (the International Organization for Standardisation) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organisations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardisation.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 15257 was prepared by Technical Committee ISO/TC 156.

This document is aimed at enabling the competence of CP persons carrying out cathodic protection studies, execution work, inspections and maintenance work to be defined and verified.

Demonstration of competence is possible by certification. This International Standard offers a certification scheme in accordance with ISO/IEC 17024.

The relevant application sectors concern on-land metallic structures, marine metallic structures, reinforced concrete structures and the inner surfaces of metallic container structures.

# Cathodic protection — Competence levels of cathodic protection persons — Basis for certification scheme

## 1 Scope

This International Standard defines five levels of competence (defined in section 4) for persons acting in the field of cathodic protection, including survey, design, installation, testing and maintenance. It specifies a framework for establishing these competence levels and their minimum requirements.

Competence levels apply to each of the following application sectors:

- on-land metallic structures;
- marine metallic structures;
- reinforced concrete structures;
- inner surfaces of metallic container structures.

These application sectors are detailed in section 5.

This International Standard defines the requirements to be used for establishing a certification scheme as defined in ISO/IEC 17024. This certification scheme is detailed in normative [Annexes A, B and C](#).

## 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.

ISO/IEC 17024, *Conformity assessment — General requirements for bodies operating certification of persons*

ISO 8044, *Corrosion of metals and alloys — Basic terms and definitions*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8044 and the following apply.

### 3.1

#### **application sector**

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

### 3.2

#### **cathodic protection person (CP person)**

person 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 sectors

### 3.3

#### **competence**

ability to apply knowledge and skill to achieve intended results. Within the scope of this standard the ability of CP persons is to apply defined knowledge and defined skills and undertake defined tasks at specific levels and specific application sectors.

### 3.4

#### **complex structure**

structure composed of the structure to be protected connected to one or more foreign electrodes

Note 1 to entry: Note to entry: Reinforced concrete, metallic conduits, and earthing installations are examples of foreign electrodes.

### 3.5

#### **examination centre**

centre for the examination of competence in cathodic protection. The centre includes testing facilities to simulate the electrical conditions which normally exist in real cathodic protection of operating industrial structures, for a given application sector

### 3.6

#### **examiner**

person with relevant technical and personal qualifications, and competent to conduct and/or score an examination

### 3.7

#### **industrial cathodic protection experience**

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

### 3.8

#### **significant interruption**

absence from, or change in activity, which prevents the CP person from practising the duties corresponding to his level of competence within its application sector(s):

- a continuous period in excess of 365 days or;
- two or more periods for a total time exceeding two fifths of [Annex C](#)

### 3.9

#### **technical instruction**

#### **method statement**

#### **work instruction**

written description stating the precise steps to be followed in a cathodic protection survey, design, installation, testing or maintenance activity to an established standard, code, specification or cathodic protection procedure

### 3.10

#### **training**

theoretical and practical instructions given in conformity to a pre-established programme in order to furnish or increase the knowledge and the ability of the CP persons in cathodic protection activities

### 3.11

#### **training centre**

centre where training of CP persons is carried out. The training centre 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 Levels of competence

### 4.1 General

The competence shall be classified in one or more of the five following levels, depending on respective competence in particular application sectors.

A detailed description of the requirements of competence is given in [section 6](#).

### 4.2 Level 1 Cathodic Protection Data Collector (or Tester)

Level 1 CP persons collect simple CP performance data in accordance with written instructions and procedures produced by Level 3, 4 or 5 persons and collate the data to a format produced by Level 3, 4 or 5 persons and under their responsibility. Level 1 persons are not responsible for analysing the data. Level 1 persons shall understand the fundamentals of the measurements that they are required to undertake. The measurements shall include routine system function measurements as well as a limited number of specific measurements to determine the performance effectiveness of cathodic protection systems.

### 4.3 Level 2 Cathodic Protection Technician

Level 2 CP persons undertake a range of CP measurement, inspection and supervisory activities in accordance with written instructions and procedures produced by Level 3, 4 or 5 persons and collate and classify the data under their responsibility

Level 2 persons shall have knowledge of the fundamentals of electricity, corrosion, coatings, cathodic protection and measurement techniques, safety issues and applicable standards related to cathodic protection.

Level 2 persons shall be competent to check the calibration validity of the cathodic protection measuring and testing equipment, to supervise and perform inspection and testing during installation of cathodic protection systems and carry out routine maintenance work on cathodic protection systems.

Level 2 persons are not responsible for the choice of test method, technique to be used, for preparing the written technical instructions, or for the interpretation of test results.

### 4.4 Level 3 Cathodic Protection Senior Technician

In addition to the competences for level 2 persons, level 3 persons shall have knowledge of the general principles of corrosion and cathodic protection, the principles of electricity, the significance of coatings and their influence on cathodic protection and a detailed knowledge of cathodic protection test procedures and safety issues.

Level 3 persons shall understand and be competent to perform cathodic protection tasks according to established or recognised procedures. They shall be competent to, carry out and supervise all level 1 and level 2 duties, provide guidance for persons at level 1 and level 2. They prepare written instructions for all CP persons of lower level competence and assess all data collected from these tasks.

### 4.5 Level 4 Cathodic Protection Specialist

In addition to the competences for level 2 and 3 persons, level 4 persons shall have detailed knowledge of corrosion theory, principles of electricity, cathodic protection design, installation, commissioning, testing and performance evaluation including in systems affected by interfering conditions. They shall have competence in establishing testing and performance criteria where none are otherwise available. They shall have a general familiarity with cathodic protection in all application sectors.

They shall be competent to design any kind of cathodic protection system including those where no pre-set parameters or procedural steps exist. They shall be competent to define the guidelines for

specifying, designing and monitoring of CP systems. They shall be competent to consider regulatory, technical, financial and safety aspects.

They shall be competent to prepare written instructions for all CP persons of lower level competence and assess all data collected from these tasks.

In all of these activities level 4 persons are not required to be supervised by level 5 or other persons.

Note. It is good established practice that design work is subject to peer review.

### 4.6 Level 5 Cathodic Protection Expert

Level 5 CP persons shall be competent to advance the state of the art by scientific work and peer reviewed publications and shall have made a marked and original contribution to the science or practice of corrosion control by cathodic protection.

Level 5 persons shall have all of the competence required of Level 4 persons but shall also have detailed knowledge of cathodic protection and a broad range of competences in all sectors. They shall have in at least one of the sectors an established and mature reputation as a cathodic protection specialist at the highest level.

### 4.7 Levels and Named Designations

The levels 1 through 5 are the definitive terms. In addition the terms Cathodic Protection Tester, Cathodic Protection Technician, Cathodic Protection Senior Technician, Cathodic Protection Specialist and Cathodic Protection Expert are used above in an indicative purpose only.

## 5 Application sectors

### 5.1 General

Any of the following application sectors shall be used in the establishment of competence levels of CP persons. For each of the application sectors ([5.2](#) to [5.5](#).) national and international specific standards apply.

### 5.2 On-land metallic structures

The following topics are relevant to this application sector:

- Cathodic protection general principles and specific applications in soils and waters;
- Cathodic protection measurement techniques;
- Protection against corrosion by stray current from direct current systems;
- Interference AC and DC;
- Touch potentials.

This application sector includes for example:

- Buried pipelines;
- Sections of onshore pipelines crossing rivers, lakes or short lengths of sea;
- Buried tanks;
- Bottoms (external side) of above-ground tanks;
- Complex structures;



- Well casings.

### 5.3 Marine metallic structures

The following topics are relevant to this application sector:

- General principles of cathodic protection in seawater and marine sediments

This application sector includes for example:

- Ships (external hulls and ballast tanks);
- Fixed offshore structures (platforms, jackets, monopiles, offshore windfarms, tension leg platforms etc.);
- Floating structures (buoys, semi-submersible platforms, floating production storage and offloading structures (FPSO);
- Underwater structures (well heads, manifolds, piping);
- Coastal and offshore pipelines, risers;
- Harbour facilities, piers, jetties and lock gates.

### 5.4 Reinforced concrete structures

The following topics are relevant to this application sector:

- Cathodic protection of steel in concrete
- Other electrochemical techniques than cathodic protection also aimed at mitigating corrosion of steel embedded in concrete, such as electrochemical re-alkalisation and chloride extraction treatments for reinforced concrete

This application sector includes for example:

- Air-exposed reinforced (and pre-stressed) concrete, onshore structures (bridges, walls, piles, buildings etc.);
- Buried reinforced (and pre-stressed) concrete structures (pipelines, tunnels, foundations, etc.);
- Reinforced (and pre-stressed) concrete structures immersed in fresh water (pipe lines, foundations, swimming-pools, water tanks);
- Reinforced (and pre-stressed) concrete structures immersed in seawater (harbour facilities, piers, jetties, offshore platforms).

### 5.5 Inner surfaces of metallic container structures

The following topics are relevant to this application sector:

- Internal cathodic protection of metallic structures

This application sector includes for example:

- Fresh water containing equipment (storage tanks, condensers, filters, cooling water systems, etc.);
- Seawater containing equipment (ballast tanks, flooded dock gates, flooded compartments, flooded piles, cooling water systems, etc.);
- Oil field production water storage tanks;
- Other electrolyte containing equipment (tanks and piping).

## 6 Requirements for the competence of persons at the various levels and for the various applications sectors

### 6.1 General

The CP persons of competence levels 1 to 4 shall be knowledgeable on the topics in [Table 1](#) and competent to undertake the tasks detailed in [Tables 2 to 6](#). The CP persons shall have the knowledge and skill to properly undertake these tasks, to understand their purposes, to recognise possible problems with their execution and the significance of the data arising from them.

Requirements for level 5 CP persons are listed in [section 6.8](#).

All work by level 1 and level 2 CP persons shall be according to technical instructions issued by CP persons of a higher level.

CP persons of a particular level may assist in tasks at one level higher than defined in [Tables 2 to 6](#) for their level alongside and under the direct supervision of a CP person of the higher level. The higher level person retains the responsibility for the work performed by the lower level person.

CP persons of a particular level may undertake tasks at one level higher than defined in [Tables 2 to 6](#) for their level following additional documented training and assessment for the particular task by a CP person of the higher level. This assessment and documentation may be undertaken within a corporate system. The higher level person retains the responsibility for the work performed by the lower level person. Each defined level of competence shall include also the competence of the corresponding lower levels.

Subject to national, local or corporate regulations certain of the tasks in the [tables 3-6](#), such as making metallurgical connections to the structure and making good coatings may require separate training and assessment for executing the tasks.

### 6.2 Knowledge required by persons in all application sectors

The knowledge detailed in [Table 1](#) constitutes a common core for all application sectors. The level of knowledge in [Table 1](#) is progressively increased from level one to level four.

**Table 1 — Knowledge required by persons for the various competence levels whatever the application sector**

Knowledge number	Description of Knowledge	Level 1	Level 2	Level 3	Level 4
1	Fundamentals of electricity relevant to routine cathodic protection measurements	Yes	Yes	Yes	Yes
2	Fundamentals of routine cathodic protection measurements	Yes	Yes	Yes	Yes
3	Safety issues related to cathodic protection routine measurements	Yes	Yes	Yes	Yes
4	Fundamentals of corrosion and coatings relevant to cathodic protection	No	Yes	Yes	Yes
5	Fundamentals of the diagnostics of cathodic protection systems sufficient to allow competent measurements	No	Yes	Yes	Yes
6	Safety issues related to cathodic protection	No	Yes	Yes	Yes
7	Fundamentals of interference conditions (AC and DC)	No	Yes	Yes	Yes
8	Fundamentals of interference conditions (AC and DC) sufficient to allow competent measurements	No	No	Yes	Yes

Table 1 (continued)

Knowledge number	Description of Knowledge	Level 1	Level 2	Level 3	Level 4
9	General principles of electricity, corrosion, coatings and cathodic protection	No	No	Yes	Yes
10	The significance of coatings and their influence on cathodic protection	No	Yes	Yes	Yes
11	General knowledge of cathodic protection test procedures, the setting up of test equipment	No	Yes	Yes	Yes
12	Detailed knowledge of cathodic protection test procedures, and test equipment	No	No	Yes	Yes
13	Knowledge of safety requirements related to application of cathodic protection and the related standards	No	No	Yes	Yes
14	General knowledge of Standards and Codes of Practice in the relevant application sector	No	No	Yes	Yes
15	Detailed knowledge of electricity, corrosion, coatings and cathodic protection	No	No	No	Yes
16	Detailed knowledge of Standards and Codes of Practice in the relevant Sector in the relevant application sector	No	No	No	Yes
17	Basic knowledge of Standards and Codes of Practice in the all application sectors	No	No	No	Yes

### 6.3 Tasks to be fulfilled in all application sectors

Table 2 details tasks which shall be fulfilled for each level of competence whatever the application sector. The field of application of each of these tasks covers only the application sector of the competent CP person.

**Table 2 — Tasks to be fulfilled by the various competence levels whatever the application sector**

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
1	Preparation of specifications	No	No	No	Yes
2	Preparation of technical instructions	No	No	Yes	Yes
3	Collection of general information for design purposes based on technical instructions for simple conditions (as defined in 4.4)	No	Yes	Yes	Yes
4	Collection of detailed information and data for design purposes	No	No	Yes	Yes
5	Check calibration validity of CP measuring and testing equipment	Yes	Yes	Yes	Yes
6	Perform verification test of working portable reference electrode against master electrode of the same type	Yes	Yes	Yes	Yes
7	Perform verification test of working portable reference electrode against another type of reference electrode	No	Yes	Yes	Yes
8	Perform verification test of stationary reference electrode against a portable reference electrode	No	Yes	Yes	Yes

Table 2 (continued)

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
9	Pre-commissioning testing	No	Yes	Yes	Yes
10	Checking whether the positive output of the rectifier is connected to the anode and the negative output is connected to the structure	No	Yes	Yes	Yes
11	Ability to identify a wrong polarity of the CP system	Yes	Yes	Yes	Yes
12	Start-up and commissioning	No	No	Yes	Yes
13	Record and report results of the measurements in a comprehensible format	Yes	Yes	Yes	Yes
14	Classify the results of the measurements	No	Yes	Yes	Yes
15	Defining the limitations of application of the testing method according to established procedures	No	No	Yes	Yes
16	Interpretation of commissioning or performance verification data and preparation of commissioning report, performance verification report or system review report for simple cathodic protection systems (as defined in 4.4)	No	No	Yes	Yes
17	Interpretation of commissioning or performance verification data and preparation of commissioning report, performance verification report or system review report for the other systems	No	No	No	Yes
18	Measurement of current and voltage in the CP circuit	Yes	Yes	Yes	Yes
19	carry out basic maintenance work on cathodic protection systems	Yes	Yes	Yes	Yes
20	Inspection and measurement of DC power supply output current and voltage	Yes	Yes	Yes	Yes
21	Inspection and verification of DC power supply overall operations	No	Yes	Yes	Yes
22	Inspection and maintenance of DC power supply output terminations	Yes	Yes	Yes	Yes
23	Inspection and maintenance of DC power supply components	No	Yes	Yes	Yes
24	Verification of DC power supply voltage and current outputs with portable calibrated meter	Yes	Yes	Yes	Yes
25	Interpretation of data and preparation of reports	No	No	Yes	Yes
26	Routine and expected increase/decrease in current output to maintain predetermined performance	No	Yes	Yes	Yes
27	Interpretation of data and analysis of anomalies detected	No	No	Yes	Yes
28	Determination of increase/decrease in current output to maintain optimum performance including remedial actions to correct anomalies and interferences	No	No	Yes	Yes

Table 2 (continued)

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
29	Awareness and compliance with safety requirements related to application of CP in the application sector, task and competence level	Yes	Yes	Yes	Yes
30	Risk assessment of safety requirements related to application of cathodic protection in the application sector, task and competence level	No	No	Yes	Yes
31	Translating cathodic protection measuring and testing standards and specifications into written technical instructions for cathodic protection measuring and testing, routine maintenance, and installations procedures	No	No	Yes	Yes
32	Expertise to investigate material weight loss corrosion when application of cathodic protection may be involved	No	No	Yes	Yes
33	Setting up measuring and testing equipment and verifying equipment settings	No	Yes	Yes	Yes
34	Expertise to investigate any case of material cracking when application of cathodic protection may be involved	No	No	No	Yes
35	Utilize new developments in science and technology of corrosion and cathodic protection along with field performance experience and participate in developing improvements to cathodic protection designs, operations, performance assessments, and maintenance procedures	No	No	No	Yes
36	Ability to write work instructions for lower level persons and to supervise and train them in the practice of their tasks	No	No	Yes	Yes
37	Interpret and evaluate results in accordance with established standards, codes or specifications	No	No	Yes	Yes
38	Undertake simple cathodic protection design works according to established procedures in a known environment without supervision	No	No	Yes	Yes
39	Ability to select test procedures and set up cathodic protection test procedures and test equipment and the organization and reporting of test data for tasks covered in Standards, codes and specifications	No	No	Yes	Yes
40	Ability to select test procedures and set up cathodic protection test procedures and test equipment and the organization and reporting of test data for tasks not fully determined in Standards, codes and specifications	No	No	No	Yes
41	Ability to write work instructions for lower level persons and to supervise and train them in the practice of their tasks	No	No	No	Yes

**Table 2** (continued)

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
42	Interpret and evaluate results from all tests including testing during installation, commissioning, function testing and performance verification	No	No	No	Yes
43	Ability to undertake complex cathodic protection designs	No	No	No	Yes

Work on the ac side of transformer rectifiers is specifically excluded from the competence requirements of all levels of personnel. National regulations, training and specific certifications apply for work on mains voltage equipment

#### 6.4 Specific tasks for on-land metallic structures application sector

[Table 3](#) indicates which specific tasks can be fulfilled by each competence level in the on-land metallic structures application sector.

**Table 3 — Specific tasks to be fulfilled by the various competence levels in the on-land metallic structures application sector**

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
1	Measurement of metal to electrolyte natural (free corrosion) potential	Yes	Yes	Yes	Yes
2	Measurement of resistivity: four pins Wenner	Yes	Yes	Yes	Yes
3	Measurement of resistivity: soil box methods	No	Yes	Yes	Yes
4	Measurement of resistivity by Schlumberger method	No	No	Yes	Yes
5	Calculation of vertical resistivity distribution	No	No	Yes	Yes
6	Design of simple CP systems for simple conditions (as defined in 4.4)	No	No	Yes	Yes
7	Design of all other cathodic protection systems	No	No	No	Yes
8	Supervision of the preparation of steel for making cable connection and for repairing coating	No	Yes	Yes	Yes
9	Supervision of the installation of cable connections: bolting, compression and conductive adhesive	No	Yes	Yes	Yes
10	Supervision of the installation of cable connections: soldered, exothermic welded, pin brazed	No	Yes	Yes	Yes
11	Supervision of installation of galvanic anodes	No	Yes	Yes	Yes
12	Supervision of installation of DC power supply (electrical AC supply excluded, depending on regulations)	No	Yes	Yes	Yes
13	Supervision of the installation of deepwell anode groundbeds	No	Yes	Yes	Yes
14	Supervision of the installation of other impressed current anode groundbeds	No	Yes	Yes	Yes
15	Supervision of installation of isolation devices	No	Yes	Yes	Yes
16	Supervision of installation of reference electrodes (including calibration) and coupons (monitoring systems may be complex instrumentation, remote control or telecommunication systems requiring specialist knowledge and training)	No	Yes	Yes	Yes

Table 3 (continued)

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
17	Supervision of installation of AC mitigation earthing electrodes and DC decoupling devices	No	Yes	Yes	Yes
18	Verification of the electrical continuity of all parts of the structure to be protected	No	Yes	Yes	Yes
19	Locating of structure, concrete steel reinforcement and foreign metallic structures	No	Yes	Yes	Yes
20	Inspection and testing of isolation	No	Yes	Yes	Yes
21	Measurement of metal to electrolyte ON potential	Yes	Yes	Yes	Yes
22	Measurement of metal to electrolyte instant OFF potential	No	Yes	Yes	Yes
23	Measurement of metal to electrolyte instant off and depolarisation	No	Yes	Yes	Yes
24	Reporting of measurements including comparison of measurement results to a selected CP criteria according to procedure	No	Yes	Yes	Yes
25	Close interval potential survey (ON and natural	No	Yes	Yes	Yes
26	Potential measurement of structure to remote earth	No	Yes	Yes	Yes
27	Close interval polarized potential survey (ON/ Instant OFF)	No	Yes	Yes	Yes
28	Establishment of synchronisation of current interruptions for instant OFF measurements	No	Yes	Yes	Yes
29	Confirmation of synchronisation of current interruptions for instant OFF measurements	No	No	Yes	Yes
30	Measurement of ON and IR free potential and current both DC and AC on coupons	No	Yes	Yes	Yes
31	Measurement of potential gradients in soil	No	Yes	Yes	Yes
32	Intensive measurements	No	No	Yes	Yes
33	AC frequency current signal attenuation measurements	No	Yes	Yes	Yes
34	Direct Current Voltage Gradient (DCVG), non recording	No	Yes	Yes	Yes
35	Direct Current Voltage Gradient (DCVG) with recording of digital measurements	No	Yes	Yes	Yes
36	Pearson surveys	No	Yes	Yes	Yes
37	Interference testing and measurement static DC source	No	Yes	Yes	Yes
38	Interference testing and measurement dynamic DC source	No	Yes	Yes	Yes
39	Analysis and treatment of DC interferences from a static source	No	No	Yes	Yes
40	Analysis and treatment of DC interferences from a dynamic source	No	No	No	Yes
41	Analysis and treatment of AC interferences from a static source	No	No	No	Yes
42	Analysis and treatment of AC interferences from a dynamic source	No	No	No	Yes
43	Supervision of cable and connection repair	No	Yes	Yes	Yes



**Table 3** (continued)

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
44	Test casings for isolation from carrier pipe	No	Yes	Yes	Yes
45	Visual inspection, of simple cathodic protection system components (e.g. Test posts)	Yes	Yes	Yes	Yes
46	Visual inspection of structure, coating and cathodic protection system with respect to physical or corrosion damage	No	No	Yes	Yes
47	Properly classify coating type, condition and damage on excavated, in-service structure	No	No	Yes	Yes
48	Evaluation of cathodic protection effectiveness under disbonded coating	No	No	Yes	Yes
49	Collect soil samples and deposits from the structure for laboratory corrosion analysis	No	Yes	Yes	Yes
50	Perform basic chemical and microbiological analysis in the field from samples obtained under disbonded coating	No	No	Yes	Yes
51	Measurement of extent of corroded area	No	Yes	Yes	Yes
52	Assessment of data and determination of cause of corrosion and remedial action	No	No	No	Yes

## 6.5 Specific tasks for marine metallic structures application sector

Table 4 indicates which specific tasks can be fulfilled by each competence level in the marine metallic structures application sector.

**Table 4 — Specific tasks to be fulfilled by the various competence levels in the marine metallic structures application sector**

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
1	Design of simple cathodic protection systems for simple conditions (as defined in 4.4) Examples are systems for buoys, small boats	No	No	Yes	Yes
2	Design of all other cathodic protection systems Examples are systems for coastal, offshore and submarine facilities, floating production and storage structures, ships	No	No	No	Yes
3	Supervision of installation of galvanic or impressed current anodes and monitoring systems	No	Yes	Yes	Yes
4	Supervision of installation of DC power sources (AC power supply excluded, depending on regulations)	No	Yes	Yes	Yes
5	Supervision of installation of isolation devices	No	Yes	Yes	Yes
6	Verification of the electrical continuity of all parts of the structure to be protected	No	Yes	Yes	Yes
7	Measurement of metal to electrolyte potential in seawater by simple methods from surface with mobile reference electrode	Yes	Yes	Yes	Yes



Table 4 (continued)

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
8	Measurement of metal to electrolyte potential in seawater from surface with monitoring systems (permanent reference electrodes and connection by cables or acoustic transmission)	Yes	Yes	Yes	Yes
9	Measurement of metal to electrolyte potential in seawater with mobile reference electrode connected to measurement system in surface	Yes	Yes	Yes	Yes
10	Measurement of metal to electrolyte potential in seawater by autonomous measurement device combining reference electrode, voltmeter and contact tip	Yes	Yes	Yes	Yes
11	Measurement of anode current output from surface using monitoring systems (monitored anodes and connection by cables or acoustic transmission)	Yes	Yes	Yes	Yes
12	Measurement of current output of stand-off anodes using underwater clamp meter	Yes	Yes	Yes	Yes
13	Checking of calibration of measurement equipment before use	Yes	Yes	Yes	Yes
14	Measurement of potential gradient in seawater	No	Yes	Yes	Yes
15	Organization of underwater potential and/or anode current output surveys for simple cathodic protection systems and simple conditions (as defined in <a href="#">5.3</a> and <a href="#">B.1.3</a> ) Examples are systems for buoys, small boats	No	No	Yes	Yes
16	Organization of underwater potential and/or anode current output surveys for all other applications of the application sector	No	No	No	Yes
17	Analyse of the results of potential and/or anode current output surveys for simple cathodic protection systems for simple conditions (as defined in <a href="#">5.3</a> and <a href="#">B.1.3</a> ) Examples are systems for buoys, small boats	No	No	Yes	Yes
18	Analyse of the results of potential and/or anode current output surveys for all other applications of the application sector	No	No	No	Yes
19	Measurement of current and voltage in the cathodic protection circuit	Yes	Yes	Yes	Yes
20	Inspection and measurement of DC power sources output current and voltage	Yes	Yes	Yes	Yes
21	Inspection and verification of DC power sources overall operations	No	Yes	Yes	Yes
22	Inspection and maintenance of DC power sources output terminations and check polarity	Yes	Yes	Yes	Yes
23	Inspection and maintenance of DC power sources components (extent depending on regulations)	No	Yes	Yes	Yes
24	Verification of DC power sources voltage and current outputs with portable calibrated meter	Yes	Yes	Yes	Yes
25	Interpretation of data	No	No	Yes	Yes

**Table 4** (continued)

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
26	Inspection and maintenance of DC power sources components including replacement of failed components (extent depending on regulations)	No	No	Yes	Yes
27	Visual inspection of structure with respect to physical damage, coating damage, corrosion damage	No	No	Yes	Yes
28	Estimation of anode dimensions	No	No	Yes	Yes
29	Supervision of measurement of extent of underwater corroded area	No	Yes	Yes	Yes
30	Supervision of diver or remote operated vehicle cathodic protection survey of pipeline, riser or structure	No	No	No	Yes
31	Measurement of resistivity of seawater or mud with soil box	No	Yes	Yes	Yes
32	Measurement of resistivity of seawater by conductivity meter or salinity or chlorinity	No	No	Yes	Yes

## 6.6 Specific tasks for reinforced concrete structures application sector

[Table 5](#) indicates which specific tasks can be fulfilled by each competence level in the reinforced concrete structures application sector.

**Table 5 — Specific tasks to be fulfilled by the various competence levels in the reinforced concrete structures application sector**

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
1	Electrical continuity testing of reinforcement to allow accurate potential measurements	No	Yes	Yes	Yes
2	Measurement of steel to concrete natural potential in concrete	Yes	Yes	Yes	Yes
3	Measurement of “Half Cell Potential Survey” (close interval survey natural potential)	Yes	Yes	Yes	Yes
4	Processing of potential data for mapping	No	No	Yes	Yes
5	Location of reinforcement with cover meter	Yes	Yes	Yes	Yes
6	Measurement of cover to reinforcement with cover meter	No	Yes	Yes	Yes
7	Supervision or undertaking of the collection of concrete drilling dust or core samples for chloride testing	No	Yes	Yes	Yes
8	Interpretation of chloride analysis results	No	No	No	Yes
9	Carbonation testing to broken or cored concrete	No	Yes	Yes	Yes
10	Measurement of concrete resistivity (two pins or four pins)	No	No	Yes	Yes
11	Inspection of surface of reinforcement when exposed for corrosion or physical damage	No	No	Yes	Yes
12	Measurement of pit depth with suitable gauge	No	No	Yes	Yes
13	Inspection of surface of pre-stressing steel when exposed for corrosion or physical damage	No	No	Yes	Yes

Table 5 (continued)

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
14	Design of cathodic protection system and other electrochemical treatments	No	No	No	Yes
15	Measurement of reinforcement electrical continuity (resistance and potential techniques)	No	Yes	Yes	Yes
16	Supervision of reinforcement electrical continuity bonding and retest	No	Yes	Yes	Yes
17	Supervision of installation of cable connection to reinforcement or embedded/surface mounted metallic items: mechanical	No	Yes	Yes	Yes
18	Supervision of installation of cable connection to reinforcement or embedded/surface mounted metallic items: exothermic/welded/pin brazed	No	Yes	Yes	Yes
19	Supervision of installation of cable connection to pre-stressing steel	No	No	No	Yes
20	Supervision of installation of anode systems: galvanic and impressed current	No	No	Yes	Yes
21	Supervision of installation of reference electrodes, sensors and coupons	No	No	Yes	Yes
22	Supervision of installation of DC power supplies and monitoring system (electrical input AC excluded due to regulations/safety)	No	No	Yes	Yes
23	Measurement of anode to reinforcement isolation (resistance and potential techniques)	No	Yes	Yes	Yes
24	Measurement of anode circuit continuity or resistance	No	Yes	Yes	Yes
25	Measurement of cathode and test circuit continuity or resistance	No	Yes	Yes	Yes
27	Correction or removal of anode to reinforcement short circuit	No	No	Yes	Yes
31	Setting up of synchronised current interruptions for instant OFF potential measurements	No	No	Yes	Yes
32	Measurement of ON and Instant OFF potential and current at permanently installed electrodes	No	Yes	Yes	Yes
33	Measurement of ON and Instant OFF potential and potential decay from instant OFF at permanently installed reference electrodes	No	Yes	Yes	Yes
34	Survey/measurement of potential decay from instant OFF over concrete surface using portable reference electrodes	No	Yes	Yes	Yes
35	Interference testing	No	No	Yes	Yes

## 6.7 Specific tasks for inner surfaces of metallic structures application sector

Table 6 indicates which specific tasks can be fulfilled by each competence level in the inner surfaces of metallic structures application sector.

**Table 6 — Specific tasks to be fulfilled by the various competence levels in the inner surfaces of metallic structures application sector**

Task number	Description of task	Level 1	Level 2	Level 3	Level 4
1	Measurement of resistivity of electrolyte: Soil box	No	Yes	Yes	Yes
2	Measurement of resistivity of electrolyte: Conductivity meter	Yes	Yes	Yes	Yes
3	CP design for simple conditions (as in 4.4)	No	No	Yes	Yes
4	CP design for any conditions	No	No	No	Yes
5	Supervision of installation of galvanic anodes	No	Yes	Yes	Yes
6	Supervision of installation of impressed current anodes and reference electrodes	No	Yes	Yes	Yes
7	Supervision of installation of DC power supply (electrical AC supply excluded, depending on regulations)	No	Yes	Yes	Yes
8	Supervision of installation of isolation devices	No	Yes	Yes	Yes
9	Verification of the operation of automatic gas blow-off systems	No	Yes	Yes	Yes
10	Verification of the electrical continuity of all parts of the structure to be protected	No	Yes	Yes	Yes
11	Supervision and verification of cable connections	No	Yes	Yes	Yes
12	Inspection and measurement of isolation devices	No	Yes	Yes	Yes
13	Measurement of metal to electrolyte natural potential	Yes	Yes	Yes	Yes
14	Measurement of metal to electrolyte ON potential	Yes	Yes	Yes	Yes
15	Measurement of metal to electrolyte instant OFF potential	No	Yes	Yes	Yes
16	Setting up and confirmation of synchronised current interruptions for instant OFF measurements	No	Yes	Yes	Yes
17	Measurement of ON and IR free potential and current on coupons	No	Yes	Yes	Yes
18	Interference testing	No	No	Yes	Yes
19	Verification of DC power supply voltage and current outputs with portable calibrated meter	Yes	Yes	Yes	Yes
20	Visual inspection of cathodic protection system components (e.g. galvanic anodes) with respect to damage	Yes	Yes	Yes	Yes
21	Visual inspection of vessel and coating with respect to physical and corrosion damage	No	No	Yes	Yes
22	Compliance with the hygienic requirements on products and materials in case of contact with drinking water	Yes	Yes	Yes	Yes

### 6.8 Requirements for a level 5 person

Level 5 persons in this sector shall have all of the competence required of Level 4 persons but shall also have additional knowledge sufficient to be able to lead advances in science and technology and the practice of corrosion control by cathodic protection in this sector.

In addition to the competences for level 4 persons, level 5 persons shall be competent to advance the state of the art by scientific work and peer reviewed publications in the specific field of application.

Level 5 persons shall meet the following conditions:

- a) have been certificated to level 4 for a minimum of three years;
- b) have detailed knowledge of cathodic protection and a broad range of competences in all sectors;
- c) have in at least one of the sectors an established and mature reputation as a cathodic protection specialist at the highest level;
- d) have the competence to lead advances in science and technology in the applications in cathodic protection practice and corrosion control and shall have made a marked and original contribution to the science or practice of corrosion control by cathodic protection.

## Annex A (normative)

### Certification scheme: Eligibility for competence assessment

#### A.1 General

The eligibility of the CP person for competence assessment shall be demonstrated in sufficient detail by documentation giving personal information which includes a declaration of education, training and experience.

The competent CP person shall fulfil the requirements for cathodic protection training and practical experience as defined in this Annex and shall pass the relevant assessment as detailed in [Annex B](#).

#### A.2 Industrial experience

The minimum requirements for duration of cathodic protection experience to be gained in all application sectors for particular levels of competence shall be as defined in [Table A.1](#). The purpose is to ensure the equivalence of the different levels of educational qualification in relevant scientific or engineering disciplines with a minimal number of years of professional experience in CP.

The duration of cathodic protection experience to be gained for the given application sector shall be a minimum of 50 % of the minimum total cathodic protection experience requirements in [Table A.1](#).

Levels 4 and 5 competence requires knowledge beyond the technical scope of any one application sector. This broad knowledge may be acquired through a variety of combinations of education, training and experience.

All level 4 and 5 CP persons in any application sector shall demonstrate by documentary evidence that they are competent in both practical and theory to level 4 in the appropriate application sector.

**Table A.1 — Minimum education and experience requirements for each level**

Target Level	Education	Minimum experience in cathodic protection (years)
1	relevant engineering or scientific discipline	0
	technical education	0
	other (requires basic math skills)	0
2	relevant engineering or scientific discipline	1
	technical education	1
	other	1
3	relevant engineering or scientific discipline and specialized education in the corrosion field	2
	technical education	3
	other	4
4	relevant engineering or scientific discipline and specialized education in the corrosion field	5
	technical education	8
	other	12

Table A.1 (continued)

Target Level	Education	Minimum experience in cathodic protection (years)
5	relevant engineering or scientific discipline and specialized education in the corrosion field	9
	technical education	12
	other	16

## A.3 Training

### A.3.1 Training for level 1, level 2 and level 3

The CP person shall provide documentary proof that he has completed a period of training, in the application sector and level. The training period, method and syllabus, shall be sufficient in order to deliver the knowledge and skill as detailed in [section 6](#). Documentation may be retrospective. Training may be by the employer or through a recognised course at a training centre or by self-study.

The training should be supported by level 3, level 4 or level 5 CP persons.

The minimum duration of training that shall be undertaken:

- a) Level 1: 20 h of formal or documented on-the-job training in each particular application sector;
- b) Level 2 and level 3: 40 h of formal or documented on-the-job training in each particular application sector and for each level;
- c) CP persons without level 2 competences shall undertake a minimum of 80 h training for level 3. Training hours shall include both practical and theory components.

### A.3.2 Training centre for levels 1, 2 and 3

The establishment of a training centre is not mandatory. A training centre may be situated at an employer's premises or independently.

- a) A training centre may be established for one or more application sectors.
- b) A training centre shall provide the following components, any of which may be combined:
  - i) 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);
  - ii) a classroom having appropriate equipment and facilities for teaching the theoretical principles;
  - iii) a workshop with 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.

### A.3.3 Training for level 4

Taking into account the required scientific and technical competence of level 4 CP persons preparation for level 4 competence 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 training period, method and syllabus, shall be sufficient in order to deliver the knowledge and skill as detailed in [section 6](#).

Level 4 CP persons should keep documentary evidence of training, experience, theoretical knowledge, continued professional development and practical skills in cathodic protection to enable assessment of competence.



## Annex B (normative)

### Certification scheme: Examination

#### B.1 General

Bodies performing certification of the competence levels of CP persons shall be in accordance with ISO/IEC 17024 and shall establish a certification scheme as defined in that standard.

Demonstration of competence shall be achieved through examinations organised in an examination centre approved by the certification body.

The examination system shall be established and maintained in order to assess the competence in accordance with [section 6](#).

For each level, the examination shall comprise three examination sessions. Two examination sessions shall be theoretical: the so-called “common-core examination session” applicable to cathodic protection generally and the so-called “sectoral theoretical examination session”, specific to each application sector. In addition, the examination shall be completed by a “sectoral practical examination session” specific to each application sector.

Theoretical sessions may be combined.

All knowledge and tasks listed in chapter 6 shall be assessed either by practical or theoretical examination.

#### B.1.1 Examination centre

An examination centre shall:

- a) have adequately qualified staff, suitable premises and sufficient equipment to ensure successful examinations for the levels and application sectors concerned;
- b) apply a documented quality management procedure;
- c) have the resources needed to administer examinations, including the calibration and control of any equipment used;
- d) prepare and conduct examinations under the responsibility of an examiner(s);
- e) use only test facilities suitable for the practical examinations conducted at that centre;
- f) include testing facilities to simulate the electrical conditions which normally exist in real cathodic protection of operating industrial structures, for a given application sector.

Examinations and their assessments shall be independent of the employer and the training of the examined CP person.

#### B.1.2 Common-core examination session

The common-core examination session shall enable the CP person to demonstrate that he possesses the general knowledge common to all application sectors required for understanding the corrosion phenomena, cathodic protection and coatings in accordance with [6.2](#).

The common-core examination session shall include current questions of basic knowledge. They shall be based on the same content (equivalent) across examination forms and equivalent in difficulty.

The time allowed to the CP persons for completion of each examination shall be based upon the number and difficulty of the questions.

### **B.1.3 Sectoral theoretical examination session**

The sectoral theoretical examination session shall enable the CP person to demonstrate their knowledge and competence to undertake tasks used within the application sector in question in accordance with [section 6](#).

The sectoral theoretical examination session shall include only questions related to the application sector concerned.

The time allowed for the CP person to complete each examination shall be based upon the number and difficulty of the questions.

The sectoral theoretical examination session shall include a series of written questions on the processes and testing procedures used within the relevant application sector.

### **B.1.4 Sectoral practical examination session**

A sectoral practical examination session organised on structures or simulated structures and systems shall be provided. The CP person shall demonstrate the competence to fulfil the requirements of [section 6](#).

### **B.1.5 Conduct of examinations**

At the examination, the CP person shall have in his possession valid and unambiguous proof of identification (e.g. identity card, passport, or driving licence incorporating photograph) and an official notification of the examination, which shall be shown to the examiner or invigilator upon demand.

Examinations shall be evaluated and approved by at least one examiner. The examination shall not be invigilated by the examiner. An interchange between examiners and invigilators has to be avoided.

At least one examiner shall be responsible for grading the examination.

A CP person shall not be examined only by an examiner who:

- has trained him in the past two years;
- or is employed in the same company.

The examiners shall attest their independence in the assessment of the candidates and that all information received in the assessment process shall be maintained in confidence.

### **B.1.6 Grading of**

At least one examiner shall be responsible for the grading of the examinations by comparison with model answers.

The common-core, sectoral theoretical and practical examination sessions shall be graded separately. Each examination session and the overall examination shall have minimum pass grades in order that the theoretical knowledge and the practical competence required in [section 6](#) are properly verified.

The CP person shall successfully complete each of the examination sessions.

In establishing the examination marking scheme it shall be determined that there is greater weight allocated to the sectoral practical examination session in level 1 and level 2 than the theoretical examinations. For level 3 it shall be determined that the theoretical examinations have equal or greater weight than the sectoral practical examination session.

The written tests of the common-core part shall be marked separately in order to allow the CP person to apply, without re-sitting the common-core part, for another application sector.

### **B.1.7 Final assessment**

It shall be established an assessment committee that shall review the results of the examination sessions and the recommendations from the examiners in order to determine the competence.

### **B.1.8 Re-assessment**

Persons adding a new application sector at the same competence level shall be required to re-sit only the sectoral theoretical and practical examination sessions concerning the new application sector.

A candidate failing for reasons of unethical behaviour shall wait for a period of time as determined by the certification body before reapplying.

A candidate who fails to obtain the pass grade required may retake any of the examination sessions (general, specific, or practical) once, provided further training acceptable to the certification body is satisfactorily completed and the re-examination takes place not later than twelve months after the original examination.

A candidate failing re-examination may apply for and shall take the examination in accordance with the procedure established for new candidates.

## **B.2 Assessment for level 4**

The competence of level 4 CP persons, in accordance with all aspects detailed in [section 6](#), shall be assessed by examination plus an assessment committee on the basis of a dossier detailing and documenting:

- educational, scientific or engineering qualifications of the CP person;
- extent of responsible experience in the particular application sector;
- examples of design documents, reports or technical papers prepared by the CP person;
- additional information offered by the candidate in order to document and demonstrate competence.

The dossier or the examination results shall demonstrate knowledge of general and specific theory of cathodic protection and the ability to prepare technical reports.

The examined application and dossier shall be supported by a minimum of two independent CP persons with a competence of level 4 familiar with the work of the CP person who shall attest to the veracity and accuracy of the dossier and the suitability of the CP person to be competent to level 4 in the application sector (s).

The assessment committee shall comprise a minimum of five members experienced in cathodic protection of which at least two shall be competent to level 4.

The members of assessment committee and any supplementary experts shall attest their independence in the assessment of the person and that all information received in the assessment process shall be maintained in confidence.

## **B.3 Assessment for level 5**

The competence of level 5 CP persons in accordance with all aspects detailed in [section 6](#) shall be assessed by an assessment committee on the basis of an interview and a dossier detailing and documenting:

- educational, scientific or engineering qualifications of the CP person;
- extent of responsible experience in the particular application sector;

- examples of design documents, reports or technical papers prepared by the CP person;
- demonstration of the general understanding of all cathodic protection sectors;
- demonstration of the competence to level 4 in the Sectors to which the person is certificated;
- demonstration of continued professional development and that their expertise is at the forefront of the technology and that they are entirely up to date with the practice of cathodic protection;
- demonstration that they have made significant contributions to the development of the science and technology of cathodic protection.

The dossier shall demonstrate compliance with all of the above without exception.

The dossier shall be supported by a minimum of two independent CP persons with a competence of level 4 or level 5 familiar with the work of the CP person who shall attest to the veracity and accuracy of the dossier and the suitability of the CP person to be competent to level 5 in the application sector (s).

The assessment committee shall comprise a minimum of three members experienced in cathodic protection who shall be competent to level 4 or level 5.

The members of assessment committee and any supplementary experts who may be called by the assessment committee shall attest their independence in the assessment of the person and that all information received in the assessment process shall be maintained in confidence.

The assessment committee shall review the dossier and then spend a minimum of 2 hours and a maximum of 4 hours in questioning the candidate for level 5 in order to demonstrate compliance with the above without exception.

## Annex C (normative)

### Certification scheme: Validity, re-certification, transition periods

#### C.1 Validity

The maximum period of validity of the certificate and/or wallet card shall be five years. The initial period of validity shall commence when all of the requirements for certification (training, experience, success in competence assessment) are fulfilled.

Certification shall become invalid:

- at the option of the certification body, e.g. after reviewing evidence of unethical behaviour incompatible with the certification procedures;
- if a significant interruption (see [3.7](#)) takes place in the application sector for which the individual is certificated.

#### C.2 Re-certification

##### C.2.1 General

Recertification shall be by submission every five years of documentary evidence of continued successful cathodic protection work activity without significant interruption (see 0) and updating of technical knowledge in the application sector and in addition, every 10 years, an examination or assessment as in [C.2.2](#), [C.2.3](#), [C.2.4](#).

##### C.2.2 Level 1, level 2 and level 3

The CP person shall successfully complete a sectoral practical examination session organised to a simplified procedure which assesses ongoing competence to carry out corresponding cathodic protection tasks. This shall include tasks appropriate to the scope of competence to be revalidated and, for level 3, the production of a written instruction suitable for the use of level 1 and level 2 CP persons. If the individual fails to achieve this examination, he shall be permitted to attempt a complete examination session.

##### C.2.3 Level 4

A scheme shall be established for level 4 CP persons by which the CP persons demonstrate their continued competence to meet the requirements of [section 6](#) by the submission of a dossier detailing the continued professional development of the CP persons (courses, conferences, etc.), the continued responsible activity of the CP person in undertaking the tasks in [section 6](#) in the applicable sector(s) and evidence of continued competence (reports, designs, technical papers, etc.). It shall be required that the CP persons provide confirmation of this dossier by the employer and/or independent CP persons.

##### C.2.4 Level 5

A scheme shall be established for level 5 CP persons by which the CP persons demonstrate their continued competence to meet the requirements of [4.6](#) by the submission of a dossier detailing the continued professional development of the CP persons (courses, conferences, etc.), the continued responsible activity of the CP person in undertaking the tasks in [4.6](#) in the applicable sector(s) and evidence of

continued competence (reports, designs, technical papers, etc.). It shall be required that the CP persons provide confirmation of this dossier by the employer and/or independent CP persons.

### **C.3 Transition periods**

#### **C.3.1 Transition period for establishment of a certification body**

The following requirements apply to the transition period for a certification body implementing the present certification scheme in one or more application sectors.

The transition period shall not last more than five years after the establishment of the scheme.

In order to establish a certification scheme, or to extend an existing scheme to (a) new application sector(s), the certification body shall appoint trustees for the scheme or the new sector(s).

The certification body shall consider in appointing the trustees the need to ensure that all participants of the cathodic protection industry in a country for the application sector(s) proposed for inclusion in the scheme are adequately and ideally equally represented. The trustees should include representatives from, for example:

- operating companies/users with their own cathodic protection expertise;
- cathodic protection contracting companies;
- cathodic protection consulting companies and individuals;
- academics with particular competence in cathodic protection.

The certification body shall appoint a minimum of three trustees who shall not be from the same companies and who shall not be commercially linked.

The trustees shall each comply with [4.5](#) and shall each have a minimum of ten years continuous experience in cathodic protection in the sector(s) proposed for inclusion in the scheme and shall demonstrate by a dossier to the certification body that they have completed cathodic protection designs, testing, commissioning and performance verification in the application sector(s) in the previous five years.

The certification body and the trustees shall work together to establish the examination elements of the scheme for the application sector(s) in accordance with this standard.

The certification body shall consider whether the scheme would be advantaged if liaisons and exchanges are established between the certification body, the trustees and the certification body and examiners of existing schemes in accordance with this standard in the application sector(s).

During the transition period, the examiners shall be appointed from the trustees. After the five years of transition period for the establishment of the scheme, examiners shall be appointed who have been formally assessed and certificated to level 4 in accordance with [B.3](#) in the application sector(s).

During the transition period, the assessment committee shall comprise a minimum of five personnel each with a minimum of ten years' experience in cathodic protection and shall in addition include representatives of the certification body. At least three members of the assessment committee shall be trustees.

#### **C.3.2 Transition period between previously certification schemes and this International Standard**

Certification according to this International Standard is considered as fulfilling the requirements of EN 15257: 2006 for the competence levels given in [Table C.1](#).

Consequently, certificates delivered according to EN 15257: 2006 before publication of this International Standard remain valid until the next mandatory step in the certification process, i.e. renewal or recertification, which shall be carried out according to this International Standard.

**Table C.1 — Equivalence between existing certification schemes and this International Standard during the transition period**

<b>Application sector</b>	<b>Level 1 of ISO 15257</b>	<b>Level 2 of ISO 15257</b>	<b>Level 3 of ISO 15257</b>	<b>Level 4 of ISO 15257</b>	<b>Level 5 of ISO 15257</b>
<b>Buried on-land structures</b>	NACE Level 1 (CP Tester)	NACE Level 2 (CP Technician) EN 15257 Level 1	NACE Level 3 (CP Technologist) EN 15257 Level 2 AS 2832.1 (Corrosion Technician)	NACE Level 4 (CP Specialist) EN 15257 Level 3 AS 2832.1 (Corrosion Engineer)	No present equivalent
<b>Marine and immersed structures</b>	EN 15257 Level 1S (France)	NACE Level 2 (CP Technician - Maritime) EN 15257 Level 1	EN 15257 Level 2	EN 15257 Level 3	No present equivalent
<b>Steel reinforced concrete structures</b>	No present equivalent	EN 15257 Level 1	EN 15257 Level 2	EN 15257 Level 3	No present equivalent
<b>Inner surfaces</b>	No present equivalent	EN 15257 Level 1	EN 15257 Level 2	EN 15257 Level 3	No present equivalent

## Annex D (informative)

### List of relevant standards, guidelines and programs

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

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

EN 12499, *Internal cathodic protection of metallic structures*

EN 12474, *Cathodic protection for submarine pipelines*

EN 12496, *Galvanic anodes for cathodic protection in seawater and saline mud*

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

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

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 15112, *External cathodic protection of well casings*

EN 15257:2006, *Cathodic protection — Competence levels and certification of cathodic protection personnel*

EN 15280, *Evaluation of AC corrosion likelihood of buried pipelines applicable to cathodically protected buried pipelines*

EN 16222, *Cathodic protection of ship hulls*

EN 16299, *Cathodic protection of external surfaces of above-ground storage tank bases in contact with soil or foundations*

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

ISO 12696, *Cathodic protection of steel in concrete*

ISO 13174, *Cathodic protection for harbour installations*

ISO 15589-1, *Petroleum, petrochemical and natural gas industries — Cathodic protection of pipeline systems — Part 1: on-land pipelines*

ISO 15589-2, *Petroleum, petrochemical and natural gas industries — Cathodic protection of pipeline transportation systems — Part 2: Offshore pipelines (EN 12474, Cathodic protection for submarine pipelines)*

CEN/TS 14038-1, *Electrochemical realkalization and chloride extraction treatments for reinforced concrete — Part 1: Realkalization*

NACE SP0169-2013 *“Control of External Corrosion on Underground or Submerged Metallic Piping Systems”*

NACE 10A392 (2006 Edition), *Effectiveness of Cathodic Protection Cathodic Protection Survey Procedures, Second Edition*

NACE SP0286-2007 *Electrical Isolation of Cathodically Protected Pipelines*



*NACE RP0193-2001, External Cathodic Protection of On-Grade Carbon Steel Storage Tank Bottoms*

*NACE SP0285-2011 "Corrosion Control of Underground Storage Tank Systems by Cathodic Protection"*

*NACE/TM 0101-2012 Measurement Techniques Related to Criteria for Cathodic Protection of Underground Storage Tank Systems*

*NACE SP0207-2007, Performing Close-Interval Potential Surveys and DC Surface Potential Gradient Surveys on Buried or Submerged Metallic Pipelines*

*NACE SP0177-2014 Mitigation of Alternating Current and Lightning Effects on Metallic Structures and Corrosion Control Systems*

*NACE/TM 0497-2012, Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Piping Systems*

*NACE/TM 0112-2012 Test to Determine the Potential Corrosion Effects of Ballast Water Treatment Systems on Ballast Tanks*

*ANSI/NACE Standard RP0104-2004, The Use of Coupons for Cathodic Protection Monitoring Applications*

*NACE SP0572-2007, Design, Installation, Operation, and Maintenance of Impressed Current Deep Anode Beds*

*NACE SP0176-2007 Corrosion Control of Submerged Areas of Permanently Installed Steel Offshore Structures Associated with Petroleum Production*

*NACE SP0196-2011 "Galvanic Anode Cathodic Protection of Internal Submerged Surfaces of Steel Water Storage Tanks"*

*NACE SP0109-2009, Field Application of Bonded Tape Coatings for External Repair, Rehabilitation, and Weld Joints on Buried Metal Pipelines*

*NACE SP0186-2007 Application of Cathodic Protection for External Surfaces of Steel Well Casings*

*NACE SP0575-2007 Internal Cathodic Protection (CP) Systems in Oil-Treating Vessels*

*NACE RP0375-2006, Field-Applied Underground Wax Coating Systems for Underground Pipelines: Application, Performance, and Quality Control*

*NACE SP0290-2007 Impressed Current Cathodic Protection of Reinforcing Steel in Atmospherically Exposed Concrete Structures*

*NACE/TM 0190-2012, Impressed Current Laboratory Testing of Aluminum Alloy Anodes*

*NACE/TM 0404-2004, Offshore Platform Atmospheric and Splash Zone New C*

*NACE SP0187-2008 Design Considerations for Corrosion Control of Reinforcing Steel in Concrete.*

*NACE SP0308-2008, Inspection Methods for Corrosion Evaluation of Conventionally Reinforced Concrete Structures*

*NACE SP0100-2008 Cathodic Protection to Control External Corrosion of Concrete Pressure Pipelines and Mortar-Coated Steel Pipelines for Water or Waste Water Service*

*NACE SP0390-2009 Maintenance and Rehabilitation Considerations for Corrosion Control of Atmospherically Exposed Existing Steel-Reinforced Concrete Structures*

*NACE International Cathodic Protection Training Program*

*NACE Institute Certification Program*

