



ExMC/934/CD
July 2014

**INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) SYSTEM
FOR CERTIFICATION TO STANDARDS RELATING TO EQUIPMENT FOR
USE IN EXPLOSIVE ATMOSPHERES (IECEx SYSTEM)**

For Consideration by Members of the IECEx Management Committee, ExMC

**Proposed revision of IECEx Operational Document OD 503, ExCB Procedures for
issuing and maintaining IECEx Certificates of Personnel Competence (Edition 2.0)**

Introduction

In support of Decision 2013/26A recorded at the 2013 ExMC Fortaleza meeting and in response to Action Items from the subsequent ExPCC and ExPCC WG2 meetings in Dubai in May 2014, the attached IECEx OD 503 Edition 3.0 is provided for ExMC consideration and endorsement to proceed to publication.

The major change to this document is the accommodation of the Ex 000 competence unit.

Members are to note that the ExPCC has recommended that the ExMC endorses the implementation of OD 503 Edition 3.0 from 1st January 2015.

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IECEX OPERATIONAL DOCUMENT

IEC System for Certification to Standards relating to Equipment for use
in Explosive Atmospheres (IECEX System)

IECEX Scheme for Certification of Personnel Competence for Explosive
Atmospheres

ExCB Procedure for issuing and maintaining IECEx Certificates of Personnel
Competence



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

IECEx Operational Document 503

IECEx Scheme for Certification of Personnel Competence for Explosive Atmospheres

ExCB Procedures for issuing and maintaining IECEx Certificates of Personnel Competence

This Operational Document, OD 503 sets out the requirements for Personnel to be certified to perform activities / functions according to an applicable IECEx Competence

Use of this OD 503 is necessary in order for the IECEx Scheme to adequately assign the relevant Personnel Competence assessed.

Document History

Date	Summary
October 2009	Original issue (Edition 1.0)
April 2013	Edition 2
July 2014	Edition 3 Published to include details of Ex000 and revisions of Table 2

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INTRODUCTION

This document is supplementary to the operational manuals and procedures operated by IECEx Certification Bodies (ExCBs), approved by the IECEx Management Committee to issue IECEx Certificates of Personnel Competence (CoPCs).

The purpose of this Operational Document is to ensure that each ExCB, accepted by the ExMC for the purposes of issuing IECEx CoPCs, processes applications from individuals, or organisations nominating individuals, in a consistent harmonious manner.

This IECEx Operational Document comprises procedures for the issuing and maintenance of IECEx Certificates of Personnel Competence (CoPCs).

The procedures are set out in flowchart and table form identifying:

- Step number showing the link between flowcharts and table
- Description of the activity
- Related documents
- Responsible person or party
- Additional comments and remarks where appropriate

The preparation of this document has been done so with the aim of alignment with various ISO/IEC International Standards and Guides, including but not limited to the following:

ISO/IEC 17024, *Conformity Assessment – General requirements for bodies operating certification of persons*

ExCB Procedures for issuing and maintaining IECEx Certificates of Personnel Competence

1 Scope

This operational document specifies the requirements for the ExCB assessment procedures for the purposes of issuing and maintaining a CoPC for personnel involved in activities such as, but not limited to,:

- basic knowledge and awareness to enter a site that includes a classified hazardous area
- application of basic principles of protection in explosive atmospheres
- the classification of hazardous areas
- installation of explosion-protected equipment and wiring systems
- maintenance of equipment in explosive atmospheres
- overhauling and repairing explosion-protected equipment
- testing electrical installations in, or associated with, explosive atmospheres
- conducting visual and close inspection of electrical installations in or associated with explosive atmospheres
- conducting detailed inspection of electrical installations in or associated with explosive atmospheres
- designing electrical installations in or associated with explosive atmospheres
- conducting audit inspection of electrical installations in, or associated with, explosive atmospheres

This Operational Document shall be read in conjunction with the Basic Rules of the IECEx System, as given in Publication IECEx 01 and the Rules of Procedure of the IECEx Scheme for Certification of Personnel Competence for Explosive Atmospheres, as given in Publication IECEx 05.

2 Normative References

The following publications contain provisions, which, through reference in this text, constitute provisions of this Operational Document. At the time of publication, the editions indicated were valid. The Ex Management Committee shall decide the timetable for the introduction of revised editions of the publications.

- ISO/IEC 17024 *Conformity Assessment – General requirements for bodies operating certification of persons*
- IECEx 05, *IECEx Scheme for Certification of Personnel Competence for Explosive Atmospheres – Rules of Procedure*
- IECEx OD 502, *Application for an IECEx Certificate of Personnel Competence (CoPC), documentation and information requirements*
- IECEx OD 504, *Specification for Units of Competence Assessment Outcomes*

3 Principles of the IECEx Certification of Personnel Competence Scheme

3.1 Operational Document application

This Operational Document is to be applied by ExCBs when processing new applications for the issue of an IECEx CoPC and undertaking a review for maintaining an existing IECEx CoPC. These steps follow the principles outlined in ISO/IEC 17024, *Conformity Assessment – General requirements for bodies operating certification of persons*, in addition to the requirements as laid down in the IECEx Scheme Rules of Procedure, IECEx 05.

3.2 Assessment process

In the assessment of an applicant for a Certificate of Personnel Competence both *Figures 1A and 1B – The pathway to obtaining an IECEx CoPC*, and *Table 1 – Procedures for the issuing of an IECEx CoPC* shall be applied.

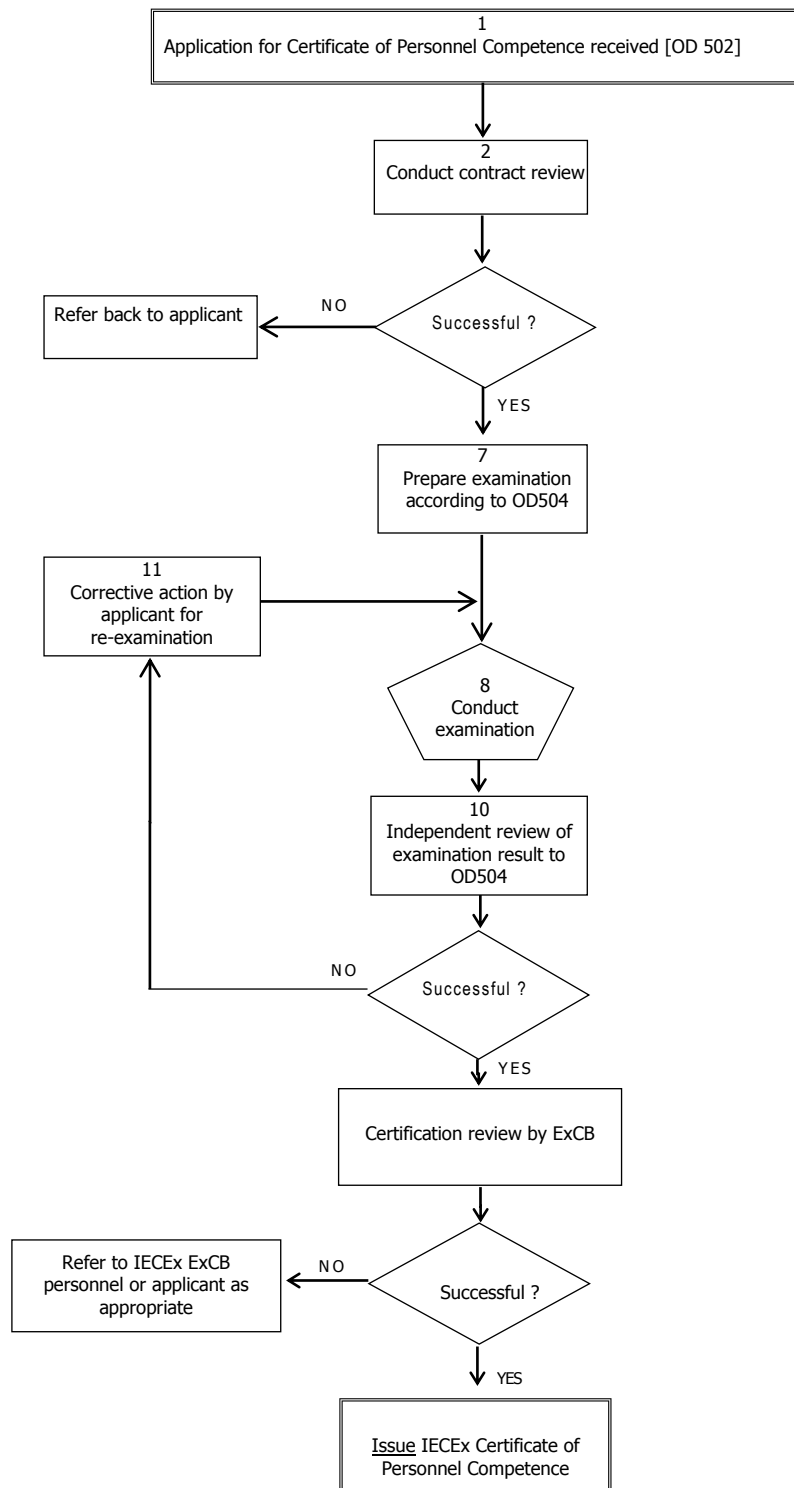


Figure 1A – The pathway to obtaining an IECEx CoPC for Unit Ex 000 only

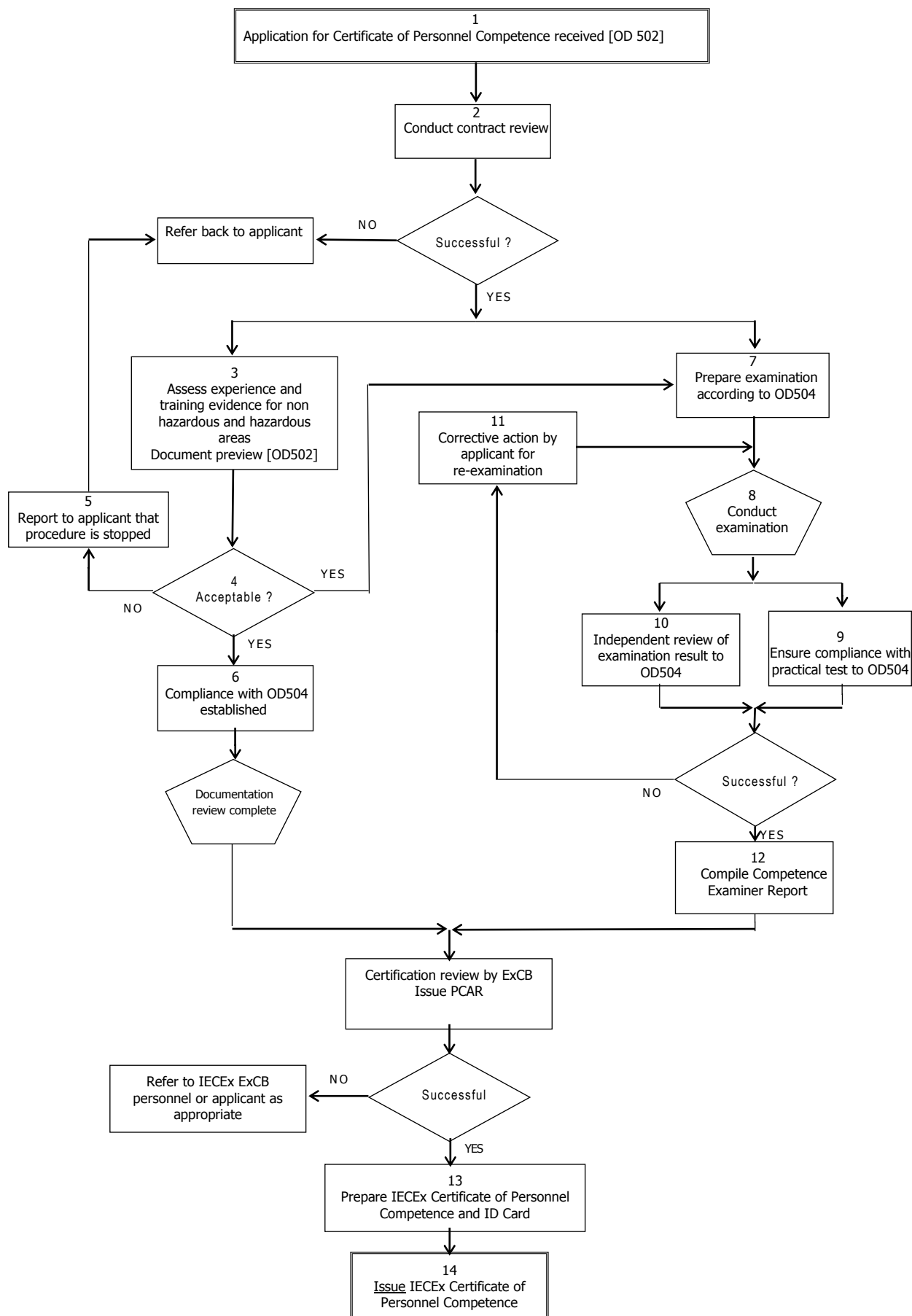


Figure 1B – The pathway to obtaining an IECEx CoPC Units 001 to 010 inclusive

Table 1 – Procedures for the issuing of an IECEx CoPC

Step	Procedures for the issuing of an IECEx Certificate of Personnel Competence Description of activity	Related Documents	By whom	Notes/Comments
<i>INITIAL ASSESSMENT</i>				
1.	Application in accordance with OD 502 submitted by an individual to an ExCB that has been accepted by the IECEx Management Committee under the IECEx Certification of Personnel Competence Scheme.	IECEx 05	The individual applicant	In the application for an IECEx CoPC the applicant will provide the initial evidence of compliance with the requirements of this IECEx Scheme and relevant Operational Documents.
2.	<p>Contract review to be conducted by the ExCB receiving the application and shall include:</p> <ul style="list-style-type: none"> • A review to ensure that the application is within the scope of acceptance of the ExCB • Confirming receipt of the applicants experience log • Confirming receipt evidence of applicants training record and qualifications • Determining whether a surcharge applies for applicant from non IECEx member countries refer to OD019 • Estimation of time and costs to complete project • Establishing if there are any special requirements, e.g. travel, translation of documentation etc. • Agreement on method and system of payment by applicant, in accordance with ExCB's own policy and quality system. <p>ExCB shall communicate in writing to the applicant whether the application is unsuccessful and the applicant is free to amend the application. ExCB shall only proceed where the contract review has been successfully completed</p>	ExCBs own Certification procedures as included in their Quality System and ISO/IEC 17024	ExCB	<p>The results of the contract review shall be documented and recorded.</p> <p>Both the experience/training and examination elements are compulsory for a complete assessment.</p>
3.	<p>The ExCB receiving the application shall conduct an evaluation of the pre-requisite requirements, for the competence being assessed, as detailed in OD 502, Application for a CoPC.</p> <p>The ExCB shall ensure that evidence of the pre-requisites (e.g. qualifications/training/ experience etc.) is available and that all work experience to be considered is verified by qualified individuals.</p>	OD 504	ExCB that received the application	<p>The assessment is conducted by the ExCB.</p> <p>The ExCB shall have procedures covering new applications and extension of scope.</p> <p>Where the pre-requisite evidence is provided by the applicant it is to be validated by a third party.</p>

Step	Procedures for the issuing of an IECEx Certificate of Personnel Competence Description of activity	Related Documents	By whom	Notes/Comments
4.	Given that the evaluation of the documentation is satisfactory then the individual applicant is approved for the Ex assessment of competence. Where the ExCB has conducted a competence assessment of a person prior to an application being lodged, the ExCB may use all or part of the results from that assessment provided this information is no more than 3 years old and only if it is shown that the assessment was carried out in accordance with the requirements of this Scheme.		ExCB	Any discrepancies or shortcomings in the documentation shall be resolved before proceeding.
5.	Incomplete or lack of documentation shall result in the applicant being notified in writing that the assessment cannot		ExCB and Applicant	
6.	The ExCB shall use the appropriate assessment methods suitable for the competence sought as detailed in OD 504 Competence Outcomes. This may include written examinations, witnessing practical skills, oral examination etc. under controlled conditions.		ExCB and Applicant	
7.	Examination content shall be as given in OD 504 Competence Outcomes. Where required by Clause 4 the ExCB shall have procedures to ensure that choice of examination questions and/or practical exercise is made independently and impartially. The requirements of ISO/IEC 17024 shall be followed by the ExCB, particularly with variation of multiple choice questions etc.		ExCB	ExPCC WG3 is developing a database of questions and practical exercises for each module of competence which are to contain both mandatory questions and a selection of questions which may be used. It is not expected that the ExCB will use the same set examination make up on a regular basis but vary them according to
8.	The assessment content shall be selected and conducted independent of any training or training provider.		ExCB	The ExCB shall have procedures to confirm the identity of the candidate to ensure that an individual receiving a CoPC can be shown to be the same person who was assessed for that competence unit.
9.	The ExCB shall observe any criteria given in OD 504, Competence Outcomes against which to assess if competence has been achieved.	Industry standard/ professional guidance	ExCB	
10.	The ExCB shall arrange for an independent review of the completed assessment/s. This review shall be conducted by a qualified person not involved in the original assessment.		ExCB	
11.	Where the independent review raises questions that need to be resolved, these shall be referred to the original assessor for clarification, correction or further action.		ExCB	
12.	The results of the assessment shall be recorded in the PCAR.		ExCB	
13.	The PCAR is then issued in accordance with IECEx 05.		ExCB	

Step	Procedures for the issuing of an IECEx Certificate of Personnel Competence Description of activity	Related Documents	By whom	Notes/Comments
14.	Based on a successful PCAR the Certificate/ID Card is then issued in accordance with IECEx 05.		ExCB	ID Card is issued by the IECEx Secretary following advice from the ExCB The ExCB shall retain records of assessments, recommendations and certification decisions for individuals for at least 3 years from the date of the certificate no longer being valid.
<i>PERIODIC REVIEW</i>				
	The ExCB shall also periodically review assessment content to ensure consistency and understanding of tasks and questions set. Where appropriate the ExCB shall address any known issues that arise (i.e. rewriting questions that can be misconstrued) and where appropriate provide feedback to the Scheme.		ExCB	The ExCB shall have procedures covering complaints and appeals, and also withdrawal, cancellation and suspension of a certificate. Where such complaints and appeals cannot be resolved between the applicant and the ExCB either party has the option to refer the matter to the ExMC Board of Appeal, according to IECEx 01.
<i>SURVEILLANCE</i>				
	The ExCB shall take into account any feedback from the employer or other parties, make appropriate investigations, and if necessary take steps to correct, withdraw or cancel certification.		ExCB	
	The ExCB shall have procedures for use and misuse of certificates.		ExCB	Notify IECEx Secretariat

4 Assessment

4.1 Objectives

4.1.1 Attributing competence

Competence shall be attributed based on evidence demonstrating that the person, so deemed competent, is able to undertake the responsibilities for all safety measures, care of plant and equipment, and care of the environment, directly related to the work function for which such competence are required.

NOTE Sufficient sources of evidence of competence will be required where the consequences of unjustifiably or mistakenly deeming a person competent carries a risk of injury to persons, or damage to property and/or the Environment.

4.1.2 Sufficiency of evidence

In all instances competence shall be attributed on evidence sufficient to show that a person

- has the necessary skills required for the scope of work;
- can act competently across the specified range of activities; and
- has the knowledge and understanding underpinning competence.

4.1.3 Currency of evidence

Evidence shall be appropriate and recent being suitable for making decisions about what a person knows and can do now and in the immediate future.

NOTE Attributing competence at a point in time does not mean that competence exists for all time; competence must be maintained.

4.1.4 Authenticity

Evidence shall be capable of being validated as relating to the person being assessed, and no-one else.

4.2 Sources of evidence relating to pre-requisites

4.2.1 General

Competence shall be attributed based on evidence of essential knowledge underpinning performance and from evidence gathered across the whole range of performance activities relevant to the Unit of Competence that is to be attributed.

4.2.2 Evidence of essential knowledge

4.2.2.1 Assessment methods

Structured assessment methods, such as written, practical and oral examinations/technical interviews shall be used to gather evidence that a person has the knowledge necessary to support competent performance.

4.2.2.2 Assessment criteria

Assessment shall be based on the extent of essential knowledge specified for each Unit of Competence as detailed in OD 504, *Specifications for Units of Competence Assessments Outcomes*.

4.2.3 Evidence of competent performance

Evidence of competent performance shall be gathered by one or more of the methods described in Clauses 4.2.3.1 to 4.2.3.3. The criterion against which the work performance shall be assessed is given in OD 504, *Specifications for Units of Competence Assessments Outcomes*.

4.2.3.1 Gathering evidence of performance in a simulated work environment

In this method the simulated work environment shall include equipment relevant to the competence to be assessed and arrangement in a manner similar to a real work place. Assessment activities shall be as close as practicable to real work situations and include real work decisions by the person being assessed.

4.2.3.2 Gathering evidence of performance directly in the workplace

In this method a qualified examiner shall gather the evidence through direct observation of relevant work activities on multiple occasions and situations.

NOTE Direct assessment of work activities may not be acceptable in some work places as it is disruptive to productivity and may require further safety measures.

4.2.3.3 Gathering evidence of performance, from indicators in relevant work experience

In this method evidence shall be gathered through a daily or weekly log of work experience indicators, relevant to the Unit(s) of Competence being assessed; this shall be verified by a qualified responsible person. Such evidence shall be used to form a profile of competence development showing sufficient exposure to work activities and indicating when a final decision about competence can be made.

NOTE Examiners will need to analyse log entries to evaluate the evidence when making assessment decisions. Computerized log systems provide automated analysis of entries that assists examiners in making consistent decisions. In addition computerized log systems can provide progress reports that assist in managing the work experience to which the person seeking competence should be exposed.

4.3 Assessment processes

4.3.1 Knowledge assessment instruments

4.3.1.1 IECEx Question Bank

Knowledge examination questions shall be selected from the IECEx Certification of Personnel Competence Question Bank relevant to the Unit(s) of Competence being assessed.

4.3.1.2 Alternative to the IECEx Question Bank

Where the IECEx Question Bank does not cover the specific Unit(s) under assessment, the requirements of this Clause shall apply.

Knowledge tests shall be made up of items that sample all the essential knowledge specified for each Unit of Competence OD 504, *Specification for Units of Competence Assessment Outcomes*.

4.3.1.3 Items in a knowledge test.

The following provides a guide to the minimum number and types of items in a knowledge test where limitations of competence apply or a sampling approach to assessment is used.

Table 2 – Minimum number and type of items

OD 504 Clause	Description	Selected Response A	Selected Response B	Constructed Response C	Total Number of Items	Practical assessment
5.1	The nature of explosive hazards and hazardous areas	3	6		9	
5.2	Occupational health and safety responsibilities related to hazardous areas	3	6		9	
5.3	Explosive atmospheres and explosion-protection principles	3	6		9	
5.4	Explosion-protected equipment – Ex certification schemes	6	9	3	18	
5.5	Explosion-protected equipment – Principles	4	8	2	14	
5.6	Explosion-protection visual checks	4	9	2	15	
5.7	Explosive atmospheres classification techniques	5	8	2	15	
5.8	Hazardous area classification work performance					3
5.9	Flameproof (Ex 'd') explosion-protection technique	2	3	2	7	
5.10	Increased safety (Ex 'e') explosion-protection technique	2	2	2	6	
5.11	Type of protection 'n' (Ex 'n')	1	2	1	4	
5.12	Encapsulation (Ex 'm') explosion-protection technique	1	1	1	3	
5.13	Oil immersion (Ex 'o') explosion-protection technique	1	1	1	3	
5.14	Powder filled (Ex 'q') explosion-protection technique	1	1	1	3	
5.15	Intrinsic safety (Ex 'i') explosion-protection technique	2	3	3	8	
5.16	Pressurization (Ex 'p') explosion-protection technique	1	2	1	4	
5.17	Dust protection by enclosures (Ex 't') explosion-protection technique	1	2	1	4	
5.18	Intrinsic safety (Ex 'iD') explosion-protection technique	1	1	1	3	

5.19	Pressurization (Ex 'pD') explosion-protection technique	1	2	1	4	
5.20	Encapsulation (Ex 'mD') explosion-protection technique	1	1	1	3	
5.21	Common characteristics of explosion-protection techniques	1	1	1	3	
5.22	Explosive atmospheres installation requirements	6	8	2	16	
5.23	Explosive atmospheres cable termination techniques	4	6	2	12	
5.24	Hazardous area installation work performance					12
5.25	Hazardous area maintenance work performance					6
5.26	Hazardous area operations reporting work performance					4
5.27	Explosive atmospheres maintenance requirements	6	12	4	22	
5.28	Explosive atmospheres management	2	3	2		
5.29	Hazardous area maintenance work performance					6
5.30	Explosion-protected equipment overhaul and repair – General requirements	15	2	2	19	
5.31	Explosion-protected equipment overhaul and repair specific to each technique (# questions per Protection concept)	3	1	1	5	
5.32	Explosion-protected equipment overhaul and repair work performance – operative					10
5.33	Explosion-protected equipment overhaul and repair work performance – Responsible Person					4
5.34	Explosive atmospheres installation testing	3	4	2	9	
5.35	Hazardous area installation testing work performance					6
5.36	Explosive atmospheres visual and close inspection requirements	4	6	2	12	
5.37	Hazardous area visual and close inspection work performance					6
5.38	Explosive atmospheres detailed inspection techniques	6	8	2	16	
5.39	Hazardous area detail inspection work performance					6
5.40	Explosive atmospheres installation planning	4	6	4	14	
5.41	Common classified explosive atmospheres	4	6	4	14	
5.42	Explosion-protected electrical systems design	6	8	5	19	
5.43	Hazardous area installation design work performance					3
5.44	Explosion-protected electrical system design work performance					5
5.45	Hazardous area auditing processes	6	12	3	21	
5.46	Hazardous area audit inspection work performance					10

4.3.2 Content and duration of knowledge tests

The duration of a knowledge test shall be based on the following:

- Selected response items:
 - Selected Response (e.g. multiple choice); 2 minutes per item.
 - Multiple choice questions shall consist of 1 correct answer and 3 distractors
- Constructed response items:
 - Short answer; 3 minutes per item
 - Extended short answer; 5 minutes per item
 - Calculations; 3 minutes per item

There shall be a reading time of 10 minutes for the applicant prior to the commencement of each test.

The knowledge test duration shall not exceed 4 hours for each Ex Unit of Competence.

Where multiple Units are assessed during the same assessment activity the questions used on one Unit need not be repeated in the assessment of subsequent Units. For example, where an

assessment is undertaken for Unit Ex 003 and Ex 004 together it is not necessary to repeat those Clauses of OD 504 already covered in Ex 003 when assessing for Ex 004.

It is intended that the ExCB will conduct a written examination, however this does not preclude the option of conducting the examination orally and fully documenting the results according to ISO/IEC 17024. For oral examination both the examinee and examiner shall be in the same room.

4.3.3 Duration of skills assessment

The duration of the skills assessment will depend on the Unit of Competence requested and the limitations associated with that unit e.g. protection concepts equipment types voltages etc. However the practical skill tests shall include all relevant requirements for the Units and limitations being assessed.

The table below gives a suggested minimum time allocated to each unit where a practical skills test applies.

Table 3 – Suggested minimum time for practical skills test duration

Units of Competence	Hours
Unit Ex 000 – Basic knowledge and awareness to enter a hazardous area.	n/a
Unit Ex 001 – Apply basic principles of protection in explosive atmospheres	n/a
Unit Ex 002 – Perform Classification of Hazardous Areas	3
Unit Ex 003 – Install explosion-protected equipment and wiring systems	4
Unit Ex 004 – Maintain equipment in explosive atmospheres	4
Unit Ex 005 – Overhaul and repair of explosion-protected equipment	4
Unit Ex 006 – Test electrical installations in or associated with explosive atmospheres	4
Unit Ex 007 – Perform visual and close inspection of electrical installations in or associated with explosive atmospheres	3
Unit Ex 008 – Perform Detailed Inspection of electrical installations in or associated with explosive atmospheres	4
Unit Ex 009 – Design electrical installations in or associated with explosive atmospheres	4
Unit Ex 010 – Perform audit inspection of electrical installations in or associated with explosive atmospheres	4

4.3.4 Skills assessment instruments

Practical examinations to assess skills shall contain sufficient items to verify competence for each protection concept, product type and voltages as listed by the applicant and the Critical Aspects of Evidence as they align with the performance criteria specified for each Unit of Competence in OD 504, *Specification for Units of Competence Assessment Outcomes*.

The minimum number and types of items in a practical examination will depend on the actions and skills to be demonstrated.

4.3.5 Assessment results

In deeming a candidate competent an examiner will consider the following results as a minimum requirement:

- Knowledge assessment:

The knowledge assessment will consist of three papers or sections:

- Paper A or Section A will contain no less than the number of selected response questions as specified in the table above All questions on Paper A or Section A shall be designated absolute. All items in a knowledge examination designated as absolute are to be answered

correctly. The candidate will be informed that these questions shall be answered correctly and failure to do so may result in failure of the Unit of Competence.

- Paper B or Section B will contain no less than the number of selected response questions as specified in the table above and at least 80 % of these questions shall be answered correctly.
- Paper C or Section C will contain no less than the number of constructed response questions including calculation questions where relevant as specified in the table above and at least 80 % of these questions shall be answered correctly.
- Practical skills tests: All items shall be correctly demonstrated

4.3.6 Conducting and managing assessment

4.3.6.1 Location and supervision

All examinations shall be conducted in an appropriate facility.

The knowledge test shall be supervised by an examiner or invigilator under the ExCB's responsibility.

Practical examinations shall be supervised by an examiner who may also request assistance by a person competent in the unit for which the candidate is being assessed. This person shall be acceptable to the ExCB.

4.3.6.2 Candidate identification and conduct

Before commencement an assessment, the candidate shall present to the examiner or invigilator valid proof of identification.

A candidate who, during the course of an examination, perpetrates, or is an accessory to, fraudulent conduct shall be excluded from all further examinations for a period of one year.

4.3.6.3 Resources

The ExCB shall ensure that all resources needed to conduct a fair examination are available to each candidate.

During an examination each candidate may use their own copies of IEC, Regional and National Standards, Codes of Practice, Technical Reports relevant to the unit for which they are being assessed. Other material may be used during the assessment and is used entirely at the responsibility of the applicant. The use of any form of electronic documentation such as with a computer, PDA, telephone etc. is not permitted.

4.3.6.4 Setting and evaluating assessment instruments

Assessment instrument shall be set independently. The examiner shall evaluate the assessment instrument before it is used to ensure that it meets the requirements of Clauses 4.3.1 and 4.3.4 relevant to the unit for which the candidate is being assessed.

4.3.6.5 Assessment outcome

The examiner shall make the judgement that a candidate has clearly demonstrated competence based on the minimum requirement of both the knowledge and practical assessments specified by Clause 4.3.5.

4.3.6.6 Reporting assessment results

An unsuccessful candidate shall be informed of the criteria in which they failed to demonstrate competence so that they may prepare for a subsequent assessment they may wish to take.

4.4 Qualification of examiners

- Tertiary qualification or equivalent and encompassing technical evaluation; or
- Extensive experience in compliance assessment; and
- Essential knowledge and understanding of the application specified in the Units of Competence for which the examiner is designated.

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